97383

L.D. 1356.

NEW NORFOLK
LD 1366

LD 1361
GLENORCHY

KINGBOROUGH
LD 1363

WEST COAST
LD 1374

LAKE GORDON

LAKE PEDDER

HOBART

KINGSTON

BRIDGEWATER

NORTHERN INTERSECTION OF HARWOOD & DAVEY RIVERS

MT MACONOCHIE

STRAIGHT LINES

MT HESPERUS

STRAIGHT LINE

WESTERN INTERSECTION OF ANNE & HOUN RIVER

STRAIGHT LINE

For details of boundary definition in this area refer to CPR 2537 (LD 1395)

For details of boundary definition in this area refer to CPR 2536 (LD 1394

For details of boundary definition in this area refer to CPR 2528 (LD 1386

DE WITT ISLAND

MAATSUYKER GROUP

Flat Witch Island

Maatsuyker Island

SOUTHERN OCEAN

TASMAN SEA

HUON VALLEY
Huon Valley Municipality extends to Low Water Mark and includes all islands and offshore rocks adjacent to the coastline of this Municipality and also including all islands belonging to Tasmania between South East Cape and the 60th degree of south latitude.

CENTRAL PLAN REGISTER
Plan No 2469
Registered 19/6/92
Surveyor General

No.	PRODUCTION / AMENDMENT	AUTHORITY	REFERENCE	DRAWN	APPROVED	DATE
1	PRODUCTION	L.G.A.B.	SVY/14/020			19/6/92
2	BOUNDARY DEFINITION DETAIL ADDED	L.G.A.B.	SVY/14/020			25-6-92

CENTRAL PLAN OFFICE

SURVEY & LAND INFORMATION DIVISION – DEPT OF ENVIRONMENT & PLANNING

GAZETTED:

STAT RULE: 100 OF '92

SURVEYOR GENERAL

DATE 19-6-92

SR 125 OF 1990

HUON VALLEY MUNICIPALITY

SCALE 1:250000
DATUM (H)
DATUM (V)
CONTOUR
CHARTED

LD 1356

TASMANIAN STATE COASTAL POLICY

1996

Revised 16 April 2003 in accordance with the *State Coastal Policy Validation Act 2003*

Revised to take account of a minor amendment that was *Gazetted* on 25 February 2009

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Preamble

The State Coastal Policy is a policy created under the State Policies and Projects Act 1993. State Policies, also known as Tasmanian Sustainable Development Policies, are a new policy mechanism created under the Tasmanian Resource Management and Planning System and they apply across the State.

A State Policy is a statutory document which is intermediate between the provisions of an Act and the lesser policies and provisions of planning schemes and other mechanisms identified in the relevant legislation comprising the System.

The State Policies and Projects Act 1993 determines the functions of a State Policy and what it can contain:

S.5(1) A State Policy-

(a) must seek to further the objectives set out in Schedule 1; and

(b) may be made only where there is, in the opinion of the Minister, a matter of State significance to be dealt with in the State Policy; and

(c) must seek to ensure that a consistent and coordinated approach is maintained throughout the State with respect to the matters contained in the State Policy; and

(d) must incorporate the minimum amount of regulation necessary to obtain its objectives.

The central objective of any State Policy is sustainable development. This means that it must address the use, development and protection of natural and physical resources together with the objectives relating to public involvement and the sharing of responsibility in resource management and planning as well as those relating to economic development. The State Coastal Policy incorporates the Schedule 1 objectives for sustainable development.

In order to be effective a State Policy has to be implemented fully. A number of statutory and non-statutory implementation tools exist for use by State and local government. It is likely that each State Policy will require a different combination of implementation mechanisms, dependent on its subject matter.

Statutory tools include provisions under statutes comprising the Resource Management and Planning System and discretionary and other actions provided for in existing statutes. Non-statutory tools include Ministerial advice, Cabinet directives, Codes of Practice review and development, guidelines and educational initiatives, the budgetary process, and a range of economic instruments. Establishing institutional arrangements such as the State Coastal Advisory Committee (SCAC) will also aid policy implementation.

Of major importance with regard to implementation and enforcement of a State Policy are the provisions of the State Policies and Projects Act 1993 contained in Sections 13 and 14.

S.13(1) Where there is an inconsistency between a provision of a State Policy and the provision of a planning scheme or a special planning order in force at the time when the State Policy comes

into operation, the provision of the planning scheme or special planning order is void to the extent of the inconsistency.

To avoid any inconsistencies the State's peak planning body, the Land Use Planning Review Panel, is required to remove inconsistencies between a State Policy and planning schemes and interim orders.

S.13(3) The Panel must, as soon as practicable after a State Policy comes into operation, amend a planning scheme or an interim order to remove any inconsistency between it and the State Policy.

All new schemes, of course, are required to be consistent with any State Policy that is in effect when the scheme is preprared. In addition, this particular State Policy, the State Coastal Policy, specifically requires planning authorities to implement it. Compliance with a State Policy is enforced through the provisions of S.14(1).

S.14(1) A person who contravenes or fails to comply with a provision of a State Policy or a requirement or obligation imposed under a State Policy is guilty of an offence punishable on summary conviction in accordance with subsection (2).

(2) A person convicted of an offence under subsection (1) is liable to a fine not exceeding 500 penalty units, and a person who is so convicted in respect of a contiuing contravention of or failure to comply with a provision of a State Policy or a requirement or obligation imposed under a State Policy-

(a) is liable, in addition to the fine otherwise applicable to that offence, to a fine for each day during which the contravention or failure to comply continued of not more than 50 penalty units; and

(b) if the contravention or failure to comply continues after the person is convicted, is guilty of a further offence against subsection (1) and is liable, in addition to the fine otherwise applicable to that further offence, to a fine for each day during which that contravention or failure to comply continued after that conviction of not more than 50 penalty units.

On the whole, all government bodies at State and local level are required to give effect to a State Policy 'to ensure that a consistent and coordinated approach is maintained throughout the State' as set out in S.5(1)(c) of the State Policies and Projects Act.

For further information on the State Coastal Policy please contact:

Coastal and Marine Branch
Department of Primary Industries, Water & Environment
6th Floor, Lands Building, 134 Macquarie Street
GPO Box 44
Hobart TAS 7001
Phone: 03 6233 3963
Fax: 03 6233 6800
Email: Coastal.Enquiries@dpiwe.tas.gov.au

STATE COASTAL POLICY

APPLICATION OF THE STATE COASTAL POLICY

This Policy applies to the Crown in all its capacities, in particular by force of ss.4 and 14 of the State Policies and Projects Act 1993 and s.63(2) of the Land Use Planning and Approvals Act 1993. Subject to contrary statutory provision, it also applies to statutory authorities.

Planning authorities are also required to give effect to this Policy.

The State Coastal Policy applies to all of Tasmania, including all islands except for Macquarie Island which is subject to a special management regime.

DEFINITIONS

Coastal Zone
Under the *State Coastal Policy Validation Act 2003*, a reference in the State Coastal Policy 1996 to the coastal zone is to be taken as a reference to State waters and to all land to a distance of one kilometre inland from the high-water mark.

The Act states that "State waters" has the same meaning as in the *Living Marine Resources Management Act 1995*.

Sustainable Development
(Schedule 1, State Policies and Projects Act 1993)
The term "sustainable development" means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while:

a) sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and
b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
c) avoiding, remedying or mitigating any adverse effects on the environment.

Activities
"activities" means any human action occurring in the coastal zone including use and development.

Amenity Value
(Environmental Management and Pollution Control Bill 1993)
"amenity value" of an area includes any quality or condition of the area that is conducive to its enjoyment.

Development

(Land Use Planning and Approvals Act 1993)
"development" includes-
a) the construction, exterior alteration or exterior decoration of a building; and
b) the demolition or removal of a building or works; and
c) the construction or carrying out of works; and
d) the subdivision and consolidation of land, including buildings or airspace; and
e) the placing or relocation of a building or works on land; and
f) the construction or putting up for display of signs or hoardings.

Works
(Land Use Planning and Approvals Act 1993)
"works" includes any change to the natural or existing condition or topography of land including the removal, destruction or lopping of trees and the removal of vegetation or topsoil, but does not include forest practices, as defined in the *Forest Practices Act 1985*, carried out in State Forests.

Environment
(Environmental Management and Pollution Control Act 1994)
"environment" means land, air, water, organisms and ecosystems, and includes-
(a) human-made or modified structures or areas; and
(b) the amenity values of an area.

Land
(Land Use Planning and Approvals Act 1993)
"land" includes-
(a) buildings and structures permanently fixed to land; and
(b) land covered with water; and
(c) water covering land; and
(d) any estate, interest, easement, servitude, privilege or right in or over land.

Planning Schemes
(Land Use Planning and Approvals Act 1993)
"planning schemes" means any planning scheme in force under section 29 of the *Land Use Planning and Approvals Act 1993.*

Precautionary principle
(Intergovernmental Agreement on the Environment, 1992)
"precautionary principle" means where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:
(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
(ii) an assessment of the risk-weighted consequences of various options.

Shack

A "shack" is a dwelling used for recreational and other purposes on a temporary occupancy basis at intermittent periods throughout the year.

State Waters
Under the *State Coastal Policy Validation Act 2003*, a reference to "State waters" has the same meaning as in the *Living Marine Resources Management Act 1995*.

Use
(Land Use Planning and Approvals Act 1993)
"use" in relation to land, includes use or proposed use for the purpose for which the land has been, is being or may be developed.

Public land
"public land" means but shall not be limited to public land as defined in the Public Land Administration and Forests) Act 1991.

Planning controls
“planning controls” means a planning scheme or interim order under the Land Use Planning and Approvals Act 1993, a management plan prepared under the Forestry Act 1920, the National Parks and Wildlife Act 1970, or the Living Marine Resources Management Act 1995, a marine farming development plan under the Marine Farming Planning Act 1995, or a plan of management prepared for an area reserved under the Crown Lands Act 1976.

OBJECTIVES

(Schedule 1, State Policies and Projects Act 1993)

Sustainable Development Objectives of the Resource Management and Planning System, Tasmania:

a) to promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity; and
b) to provide for the fair, orderly and sustainable use and development of air, land and water; and
c) to encourage public involvement in resource management and planning; and
d) to facilitate economic development in accordance with the objectives set out in paragraphs a), b) and c); and
e) to promote the sharing of responsibility for resource management and planning between the different spheres of government, the community and industry in the State.

The Sustainable Development Objectives are central to the Policy's intent and all other provisions are based on these objectives either explicitly or implicitly.

PRINCIPLES

The purpose of these Policy principles is to guide the outcomes of the Tasmanian State Coastal Policy. No one principle should be read in isolation from the others to imply a particular action or consequence.

The principles are not listed in priority order.

Three main principles guide Tasmania's State Coastal Policy:

Natural and cultural values of the coast shall be protected.

The coast shall be used and developed in a sustainable manner.

Integrated management and protection of the coastal zone is a shared responsibility.

Each of these principles are based on the understanding of a variety of factors.

Natural and cultural values of the coast shall be protected

This principle recognises:

- that Tasmania comprises a number of islands and has more coastline per unit/area than any other State in Australia;
- that the natural character of the coastal zone is of special cultural value to Tasmanians and to visitors from elsewhere;
- the importance of the coastal zone to Aboriginal people, in particular traditional use and Aboriginal culture;
- the dynamic, complex and interconnected nature of biological and physical processes in the coastal zone (terrestrial and marine);
- the susceptibility of the coast to the effects of natural events, including sea-level rise;
- the importance of good water quality to Tasmania's marine ecosystems;
- the importance of maintaining representative or significant natural ecosystems and sites of biological importance, and the biodiversity of Tasmania's indigenous coastal flora and fauna; and

- that protection of coastal sites and features of cultural and historic value is of State and regional significance.

The coast shall be used and developed in a sustainable manner

This principle recognises:

- that Tasmania's coast is a major economic asset, which contains the State's major concentrations of population and industry;
- that some activities are dependent on or gain an advantage from a coastal location;
- the economic and social values of sea ports and airports, mineral and forest resources, agriculture, marine farming and fisheries to Tasmania, and the legitimate aspirations of individuals and communities for allocation of space and resources in the coastal zone for these activities;
- the importance of protecting valuable fish nursery habitat for future fishing activities;
- the importance of good water quality to Tasmania's marine-based food industries;
- the economic and social values of tourism and recreation in the coastal zone;
- that the availability of the coastal zone for some activities, uses and development will be limited by the ability of natural and physical resources to meet the foreseeable needs of future generations and by the need to sustain the life-supporting capacity of air, water, soil and ecosystems;
- the importance of public access to and along the coast consistent with protection of natural coastal values, systems and processes; and
- that the coastal environment is being affected by activities, uses and development occurring outside the coastal zone.

Integrated management and protection of the coastal zone is a shared responsibility

This principle recognises:

- that it is the duty of all government agencies which manage part of the coastal zone to further the sustainable development objectives of the resource management and planning system of Tasmania;
- the need for integrated, coordinated and cooperative management of the coast (marine and terrestrial systems), which is effective across the whole of government and that it covers many disciplines;

- that management responsibility for the coast is shared between:
  - communities, especially those who gain directly by the use and development of coastal resources and those who have traditionally used them:
  - Local Government
  - State Government
  - Commonwealth Government;

- the importance of generating and sharing knowledge and information about coastal resources and processes;

- that governments at all levels acknowledge that there are responsibilities created by a number of international conventions and agreements relating to the coastal zone;

- that the State Government has primary management responsibility for the Tasmanian coastal zone;

- that planning authorities have a key role in sustainable development of the coastal zone under the Land Use Planning and Approvals Act 1993 through planning schemes and decisions which are guided by the State Coastal Policy;

- that where the scale of effects of use or development is of State significance, the project may become a Project of State Significance under the State Policies and Projects Act 1993; and

- that communities have an important role to play in coastal management through:
  - participation in decision making
  - input to policies and plans
  - direct management.

OUTCOMES

1. Protection of Natural and Cultural Values of the Coastal Zone

1.1. NATURAL RESOURCES AND ECOSYSTEMS

1.1.1. The coastal zone will be managed to ensure sustainability of major ecosystems and natural processes.

1.1.2. The coastal zone will be managed to protect ecological, geomorphological and geological coastal features and aquatic environments of conservation value.

1.1.3. The coastal zone will be managed to conserve the diversity of all native flora and fauna and their habitats, including seagrass and seaweed beds, spawning and breeding areas. Appropriate conservation measures will be adopted for the protection of migratory species and the protection and recovery of rare, vulnerable and endangered species in accordance with this Policy and other relevant Acts and policies.

1.1.4. Exotic weeds within the coastal zone will be managed and controlled, where possible, and the use of native flora encouraged.

1.1.5. Water quality in the coastal zone will be improved, protected and enhanced to maintain coastal and marine ecosystems, and to support other values and uses, such as contact recreation, fishing and aquaculture in designated areas.

1.1.6. Appropriate monitoring programs and environmental studies will be conducted to improve knowledge, ensure guidelines and standards are met, deal with contaminants or introduced species and generally ensure sustainability of coastal ecosystems and processes and ensure that human health is not threatened.

1.1.7. Representative ecosystems and areas of special conservation value or special aesthetic quality will be identified and protected as appropriate.

1.1.8. An effective system of marine reserves will continue to be established to protect marine ecosystems and fish nursery areas.

1.1.9. Important coastal wetlands will be identified, protected, repaired and managed so that their full potential for nature conservation and public benefit is realised. Some wetlands will be managed for multiple use, such as recreation and aquaculture, provided conservation values are not compromised.

1.1.10. The design and siting of buildings, engineering works and other infrastructure, including access routes in the coastal zone, will be subject to planning controls to ensure compatibility with natural landscapes.

1.1.11. Fire management, for whatever purpose, shall be carried out in a manner which will maintain ecological processes, geomorphological processes and genetic diversity of the natural resources located within the coastal zone.

1.2. CULTURAL AND HISTORIC RESOURCES

1.2.1. Areas within which Aboriginal sites and relics are identified will be legally protected and conserved where appropriate.

1.2.2. All Aboriginal sites and relics in the coastal zone are protected and will be identified and managed in consultation with Tasmanian Aboriginal people in accordance with relevant State and Commonwealth legislation.

1.3. CULTURAL HERITAGE

1.3.1. Places and items of cultural heritage will be identified, legally protected, managed and conserved where appropriate.

1.4. COASTAL HAZARDS

1.4.1. Areas subject to significant risk from natural coastal processes and hazards such as flooding, storms, erosion, landslip, littoral drift, dune mobility and sea-level rise will be identified and managed to minimise the need for engineering or remediation works to protect land, property and human life.

1.4.2. Development on actively mobile landforms such as frontal dunes will not be permitted except for works consistent with Outcome 1.4.1.

1.4.3. Policies will be developed to respond to the potential effects of climate change (including sea-level rise) on use and development in the coastal zone.

2. Sustainable Development of Coastal Areas and Resources

2.1. COASTAL USES AND DEVELOPMENT

2.1.1. The coastal zone shall be used and developed in a sustainable manner subject to the objectives, principles and outcomes of this Policy. It is acknowledged that there are conservation reserves and other areas within the coastal zone which will not be available for development.

2.1.2. Development proposals will be subject to environmental impact assessment as and where required by State legislation including the Environmental Management and Pollution Control Act 1994.

2.1.3. Siting, design, construction and maintenance of buildings, engineering works and other infrastructure, including access routes within the coastal zone will be sensitive to the natural and aesthetic qualities of the coastal environment.

2.1.4. Competing demands for use and development in the coastal zone will be resolved by relevant statutory bodies and processes, in particular the Land Use Planning Review Panel, the Resource Management and Planning Appeal Tribunal and the Marine Farming Planning Review Panel. Planning schemes, marine farming development plans and other statutory plans will provide guidance for resource allocation and development in accordance with this Policy.

2.1.5. The precautionary principle will be applied to development which may pose serious or irreversible environmental damage to ensure that environmental degradation can be avoided, remedied or mitigated. Development proposals shall include strategies to avoid or mitigate potential adverse environmental effects.

2.1.6. In determining decisions on use and development in the coastal zone, priority will be given to those which are dependent on a coastal location for spatial, social, economic, cultural or environmental reasons.

2.1.7. New industrial developments will be encouraged to locate in specified industrial zones.

2.1.8. Extraction of construction materials, mineral, oil, and natural gas deposits in the coastal zone will be allowed provided access to areas is allowed under the provisions of the Mining Act 1929.

2.1.9 Exploration will be conducted in accordance with environmental standards under relevant legislation and the Mineral Exploration Code of Practice. Adequate rehabilitation shall be carried out.

2.1.10. Extraction will be subject to the Quarry Code of Practice and environmental assessment as required by State legislation including the Environmental Management and Pollution Control Act 1994. Adequate rehabilitation shall be carried out.

2.1.11. Extraction of sand will be provided for by zoning of appropriate areas in planning schemes

2.1.12. Timber harvesting and reforestation in the coastal zone will be conducted in accordance with the Forest Practices Code and have regard to this Policy.

2.1.13. Whole farm planning and sustainable farming activities will be encouraged on agricultural land in the coastal zone and in coastal catchments in order to minimise problems such as erosion, sedimentation and pollution of coastal waters including surface and ground waters.

2.1.14. Management arrangements for commercial and recreational fisheries will be further developed in accordance with the objectives, principles and outcomes of this Policy, through a management planning framework designed to maintain sustainability and diversity of fish resources and their habitats and

promote economic efficiency under the Living Marine Resources Management Act 1995.

2.1.15. Harvesting of marine plants shall be conducted in a sustainable manner in accordance with relevant State legislation and this Policy.

2.1.16. Water quality in the coastal zone and in ground water aquifers will accord with the requirements and guidelines established by the Environmental Management and Pollution Control Act 1994 or the Environment Protection (Sea Dumping) Act 1987 (as appropriate) and any other relevant State and Commonwealth Policies and statutes.

2.1.17. Waste discharge into the coastal zone, including offshore waters, or likely to affect groundwater aquifers, must comply with provisions of the Environmental Management and Pollution Control Act 1994 or the Environment Protection (Sea Dumping) Act 1987 (as appropriate) and any relevant State and Commonwealth Policies.

2.1.18. Where oil pollution occurs in the coastal zone, and, or, offshore areas, the National Plan to combat Pollution of the Sea by Oil, Tasmanian Supplement, will apply. Efforts to prevent or mitigate maritime accidents and pollution shall be based upon relevant ANZECC and other guidelines.

2.1.19. Every effort will be made to prevent the introduction of foreign marine organisms and species. Relevant Commonwealth provisions for quarantine and ballast water or other ship discharges shall apply.

2.2. MARINE FARMING

2.2.1. Marine farming will be planned, developed and conducted in the coastal zone having regard to sustainable development considerations and in accordance with the Marine Farming Planning Act 1995 and other relevant terrestrial and marine resource management and planning legislation and consistent with this Policy.

2.2.2. Marine Farming Development Plans will be prepared, approved and gazetted under the Marine Farming Planning Act 1995 and consistent with the objectives, principles and outcomes of this Policy.

2.3. TOURISM

2.3.1. Tourism use and development in the coastal zone, including visitor accommodation and other facilities, will be directed to suitable locations based on the objectives, principles and outcomes of this Policy and subject to planning controls.

2.3.2. Tourism development proposals in the coastal zone will be subject to environmental impact assessment as required by State legislation including a

water safety assessment to indicate the level and type of lifesaving facilities and personnel required to protect people.

2.3.3. Opportunities for tourism development will be identified wherever strategic planning occurs for the coastal zone or any part of it.

2.3.4. Tourism development will be located where there is environmental capacity and where it does not significantly conflict with the natural and aesthetic qualities of the coastal zone.

2.4. URBAN AND RESIDENTIAL DEVELOPMENT

2.4.1. Care will be taken to minimise, or where possible totally avoid, any impact on environmentally sensitive areas from the expansion of urban and residential areas, including the provision of infrastructure for urban and residential areas.

2.4.2. Urban and residential development in the coastal zone will be based on existing towns and townships. Compact and contained planned urban and residential development will be encouraged in order to avoid ribbon development and unrelated cluster developments along the coast.

2.4.3. Any urban and residential development in the coastal zone, future and existing, will be identified through designation of areas in planning schemes consistent with the objectives, principles and outcomes of this Policy.

2.5. TRANSPORT

2.5.1. All transport infrastructure and associated services will be planned, developed and maintained consistent with the State Coastal Policy.

2.5.2. Significant scenic coastal transport routes and associated facilities will be identified, planned and managed to ensure sustainable benefits for tourism and recreation value and amenity.

2.5.3. New coast hugging roads will be avoided where possible with vehicular access to the coast being provided by spur roads planned, developed and maintained consistent with the State Coastal Policy.

2.5.4. Marine structures will be designed, sited, constructed and managed in accordance with best practice environmental management and subject to environmental impact assessment having regard to statutory requirements.

2.5.5. The multiple use of port areas will be encouraged but priority will be given to efficient port operations and safety requirements subject to cultural, natural and aesthetic values not being compromised.

2.6. PUBLIC ACCESS AND SAFETY

2.6.1. The public's common right of access to and along the coast, from both land and water, will be maintained and enhanced where it does not conflict with the protection of natural and cultural coastal values, health and safety and security requirements.

2.6.2. Public access to and along the coast will be directed to identified access points. Uncontrolled access which has the potential to cause significant damage to the fragile coastal environment and is inconsistent with this Policy will be prevented.

2.6.3. Agreements between landowners, landholders and councils or State Government to grant public access to the coast, and Aborigines access to Aboriginal sites and relics in the coastal zone over private and public land will be encouraged and shall be considered when preparing plans or approving development proposals.

2.6.4. Public facilities such as life saving facilities and essential emergency services, parking facilities, toilet blocks, picnic sites, rubbish disposal containers, boat ramps and jetties will be provided at appropriate locations consistent with the objectives, principles and outcomes of this Policy to facilitate access to and enjoyment of the recreational amenity of the coast and estuarine foreshores.

2.6.5. Councils will ensure that there will be a coastal safety assessment for any new coastal development likely to attract people to the coast to indicate the level and type of lifesaving facilities and personnel required.

2.6.6. Developer contributions will be encouraged in respect to the costs of providing public access and safety services for the community.

2.7. PUBLIC LAND

2.7.1. All future use and development of public land in the coastal zone will be consistent with this Policy, and subject to planning controls unless otherwise provided by statute.

2.7.2. Future development of camping areas on public land in the coastal zone will only be permitted where such development does not conflict with the protection of natural features and cultural values, but not within 30 metres above high water mark.

2.7.3. Expansion of shack sites on public land in the coastal zone will not be permitted.

2.7.4. Shacks currently located on public land in the coastal zone will continue to be subject to review under the Shack Site Categorisation Program of the Tasmanian Property Services Group.

2.8. RECREATION

2.8.1. Recreational use of the coastal zone will be encouraged where activities can be conducted in a safe and environmentally responsible manner.

2.8.2. Suitable recreation opportunities will be identified through strategic planning and may be provided in appropriate locations where they do not adversely affect sensitive coastal ecosystems and landforms or in designated areas where such effects can be remedied or mitigated.

2.8.3. Special recreational vehicle areas may be established as an environmental protection measure and as a means of limiting unauthorised motor vehicle activity in environmentally sensitive areas.

3. Shared Responsibility for Integrated Management of Coastal Areas and Resources

3.1. SHARED RESPONSIBILITY FOR MANAGEMENT

3.1.1. Provision will be made for consistency in policy interpretation and implementation by all spheres of government throughout Tasmania, including consistency in changes to planning schemes affected by this Policy.

3.1.2. Coastal management should be considered as an integral component of regional planning undertaken in the State.

3.1.3. Provision shall be made for effective coordination of the activities of governments, industry and local communities in interpreting and implementing the State Coastal Policy.

3.1.4. Provision for effective and greater involvement of Aboriginal people in areas of particular interest to Aboriginal people will be made as part of community participation processes.

3.1.5. Planning authorities, the Land Use Planning Review Panel and the Marine Farming Planning Review Panel will use their best endeavours to function in a coordinated and collaborative manner to effectively and efficiently implement the State Coastal Policy.

3.1.6. Councils will prepare strategic and operational plans for their municipal areas having regard to the principles, objectives and outcomes of this Policy and will be encouraged to function in a coordinated and collaborative manner with adjacent councils and other planning authorities.

3.1.7. State government agencies and planning authorities will participate with other State, Territory and Commonwealth agencies in relevant forums to foster a national approach to coastal zone management.

3.2. INSTITUTIONAL ARRANGEMENTS

3.2.1. A State Coastal Advisory Committee comprising representatives of State and local government and the community will be established to facilitate implementation, coordination, consistent interpretation, and evaluation of this Policy.

3.2.2. The State Coastal Advisory Committee will be supported by the Coastal and Marine Program in the Department of Environment and Land Management.

3.2.3. The Tasmanian Government will provide funding and other resources considered necessary for the effective implementation of this Policy.

3.2.4. A high level of coastal expertise will progressively be developed in agencies responsible for implementation of the State Coastal Policy.

3.2.5. The effectiveness of institutional arrangements will be reviewed three years from the date of implementation of the State Coastal Policy.

3.3 PUBLIC PARTICIPATION AND INFORMATION

3.3.1. Public awareness of coastal issues and community participation in managing the coastal zone will be encouraged and facilitated, including networking between community groups working in the coastal zone.

3.3.2. Advice and information will be provided to coastal community groups through councils and State Government agencies responsible for coastal planning and management on the implementation and interpretation of the State Coastal Policy, on government assistance programs or other matters relevant to the coastal zone.

3.3.3. Community projects and action which benefit the coastal zone and are consistent with this Policy will be encouraged and assisted through the Coastal and Marine Program of the Department of Environment and Land Management or other relevant government programs.

3.3.4. Communities will be given the opportunity to make submissions to all plans or policies affecting the coastal zone. Consultative meetings with relevant and interested community groups and individuals in local or regional areas will be held in conjunction with the release of policies and plans wherever possible.

3.3.5. Research into coastal processes and matters related to coastal zone planning and management by government or research institutions will be encouraged and assisted where possible.

4. Implementation, Evaluation and Review

4.1. Implementation of the State Coastal Policy will be coordinated through the State Coastal Advisory Committee.

4.2. The main vehicles for implementation of this Policy will be land use planning controls, marine farming development plans, and local council strategic and operational plans.

4.3. To ensure integration between planning schemes and other plans affecting the coastal zone, all planning authorities (including local councils, Marine Boards, the Secretary of the Department of Primary Industry and Fisheries and other agencies developing plans which cover all or any part of the coastal zone) are required, as appropriate, to consult with the Marine Resources Division (Department of Primary Industry and Fisheries) the Marine Board responsible for the area subject to the plan and the Department of Environment and Land Management.

4.4. The effectiveness of the State Coastal Policy will be monitored and assessed throughout its term. A report on the coastal zone will be included in all State of the Environment Reports which the Sustainable Development Advisory Council submits to the Minister pursuant to Section 29 of the State Policies and Projects Act 1993.

4.5. To ensure that policies and plans for the coast are responsive to changing needs and circumstances the Minister responsible for the administration of the State Policies and Projects Act 1993 shall review the State Coastal Policy at the end of three (3) years after this Policy has come into operation and thereafter no less than every five (5) years.

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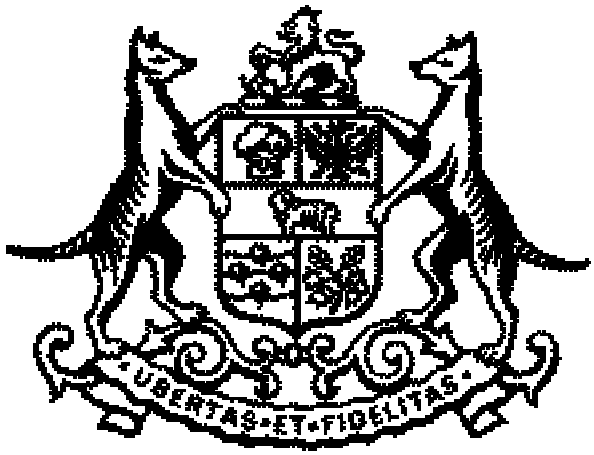
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STATE POLICY ON WATER QUALITY MANAGEMENT 1997

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PART 1 - PRELIMINARY

1. Authority

1.1

This State Policy is prepared pursuant to the *State Polices and Projects Act 1993.*

2. Policy to bind the Crown

2.1

This Policy binds-

(a) the Crown in right of Tasmania and, so far as the legislative power of Parliament permits, in all its other capacities unless it is specified in this Policy that it or part of it does not bind the Crown; and

(b) a council unless it is specified in this Policy that it or part of it does not bind the council.

3. Application

3.1

This Policy applies to all surface waters, including coastal waters, and groundwaters, other than:

(i) privately owned waters that are not accessible to the public and are not connected to, or flow directly into, waters that are accessible to the public;

or

(ii) waters in any tank, pipe or cistern.

4. Definitions

4.1

In this Policy, unless the contrary intention appears:

"accepted modern technology":	means technology which has consistently demonstrated achievement of the desired effluent pollutant levels in economically viable situations, takes account of engineering and scientific developments in economically viable operations and pursues opportunities for waste minimisation. (from the National Water Quality Management Strategy - 'Policies and Principles - A Reference Document')
"acid drainage":	means drainage or seepage which is highly acidic (often containing elevated levels of various metals due to contact with oxidising sulphide minerals such as pyrite).

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“acute toxicity”:	means toxicity which causes a rapid adverse effect in an organism following short-term exposure.
“agency”:	means: (a) a department or other agency of government of the State or of the Commonwealth; or (b) an authority of the State or of the Commonwealth established for a public purpose; or (c) a planning authority; or (d) the Local Government Association of Tasmania; or (e) any other person undertaking a function for the public benefit *(State Policies and Projects Act 1993).*
“agri-business”:	means a business with a commercial focus which provides services to agriculture and/or value adding to agricultural products.
“ambient environment”:	means the general environment which surrounds living organisms and forms part of the ecosystem.
"attenuation zone":	means a three dimensional area of land, soil and rock within which it is recognised that the water quality objectives for the groundwater present in that land may not be achieved.
“Australian Water Quality Guidelines”	means the ‘*Australian Water Quality Guidelines for Fresh and Marine Waters*’ November 1992, published by the Australian and New Zealand Environment and Conservation Council.
“best practice environmental management”:	means the management of an activity to achieve an ongoing minimisation of the activity's environmental harm through cost effective measures assessed against current international and national standards applicable to the activity. (*Environmental Management and Pollution Control Act 1994*).
“Board”:	means the Board of Environmental Management and Pollution Control. (*Environmental Management and Pollution Control Act 1994*).
“coastal waters”:	means that part of the sea that is, from time to time included in the coastal waters of the State by virtue of the *Coastal Waters (State Powers) Act 1980* of the Commonwealth (*Environment Protection (Sea Dumping) Act 1987*).

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“chronic toxicity”:	means toxicity which results in adverse physiological effects in exposed organisms which appear slowly and persist for long periods following frequent, prolonged, repeated or continuous exposure to a toxicant.
“diffuse source pollution”:	means pollution which enters the receiving waters via a number of entry points, or arises from a large number of dispersed sources.
“domestic purpose”:	means personal use for drinking, cooking and washing, but does not include water to be used in carrying on a business unless it is for the personal use of persons employed in the business (*Water Management Act 1999*).
“draw-down zone”:	means the area surrounding a well or bore in which the groundwater table is depressed due to pumping from the well or bore.
"environmental harm":	means any adverse effect on the environment (of whatever degree or duration) and includes an environmental nuisance. (*Environmental Management and Pollution Control Act 1994*)
“groundwater”:	means any water contained in or occurring in a geological formation.
“homestead supply”:	means the taking of water from a watercourse or lake as of right under Section 48(2) of the *Water Management Act 1999*, or groundwater, for a domestic purpose.
“karst”:	means formations of limestone or dolomite characterised by structures such as underground drainage systems, caves, and sinkholes.
“Level 1 activity”:	means any activity which may cause environmental harm and in respect of which a permit is required under the *Land Use Planning and Approvals Act 1993*, but does not include a Level 2 or a Level 3 Activity. (*Environmental Management and Pollution Control Act 1994*).
“Level 2 activity”:	means an activity which is specified in Schedule 2 of the *Environmental Management and Pollution Control Act 1994*.
“Level 3 activity”:	means an activity which is a Project of State Significance under the *State Policies and Projects Act 1993*.

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"marine farming":	means the farming, culturing, ranching, enhancement and breeding of fish or marine life for trade, business or research. (*Marine Farming Planning Act 1995*).
"mixing zone":	means a three dimensional area of the receiving waters around a point of discharge of pollutants within which it is recognised that the water quality objectives for the receiving waters may not be achieved.
"net environmental risk":	means the summation of the risk of all aspects environmental harm (within the meaning of the *Environmental Management and Pollution Control Act 1994)* which might result from an activity.
"planning authority" :	means a municipality or a Marine Board constituted under the *Marine Act 1976* (*Land Use Planning and Approvals Act 1993*), the Secretary of the Department of Primary Industry and Fisheries (*Marine Farming Planning Act 1995*) and the Director of the National Parks and Wildlife Service (*National Parks and Wildlife Act 1970).*
"point source pollution":	means the pollution which is emitted at a discrete, identifiable location, usually via a discharge pipe or outfall, and which can be readily measured.
"potable":	means water suitable for drinking and culinary use.
"pollutant":	includes: (a) a gas, liquid or solid; or (b) an odour; or (c) an organism (whether alive or dead), including a virus; or (d) energy, including noise, radioactivity and electromagnetic radiation; or (e) a combination of pollutants - that may cause environmental harm within the meaning of the *Environmental Management and Pollution Control Act 1994* ; (*Environmental Management and Pollution Control Act 1994*).
"pollute":	means (a) discharge, emit, deposit or disturb pollutants; or (b) cause or fail to prevent the discharge, emission, depositing, disturbance or escape of pollutants; (*Environmental Management and Pollution Control Act 1994*).

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"precautionary principle":	means where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by: (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and (ii) an assessment of the risk weighted consequences of various options. (*Intergovernmental Agreement on the Environment, 1992)*
"primary contact recreation":	means recreation involving bodily immersion or submersion where there is direct contact with water and includes activities such as swimming, diving, water skiing and surfing. (National Health and Medical Research Council).
"pristine":	means predominantly unchanged by human activities or influences.
"privately owned waters":	means any surface waters confined within the boundary of privately owned land and which do not flow into, or do not communicate with: (a)the sea or any arm or creek of the sea (b)a source of supply for a water district or irrigation water district; (c)any river, stream, watercourse lake pond or marsh.
"protected environmental value":	means the value or use for which it has been determined that a given area of the environment should be protected. There can, and often will be, more than one protected environmental value for a given area. A list of potential protected environmental values is given in clause 7.1.
"recycling":	means the multiple use of a resource in the course of the same production process or other activity.
"receiving waters":	means the waters receiving a discharge of wastewater, runoff or pollutants.

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“regulatory authority”:	means an authority which has a statutory power to approve and regulate the environmental effects of an activity or a proposed activity. (For Level 1 activities the regulatory authority will be the relevant planning authority and for Level 2 activities, the Board of Environmental Management and Pollution Control. There are some activities which are neither Level 1 or Level 2 activities and the regulatory authority in such instances may be another Government agency.)
“re-use”:	means any process by which waste from one activity is used beneficially for another use or activity.
“secondary contact recreation”:	means activities in which there is likely to be some direct contact with water, but where it is unlikely that water will be swallowed, and includes paddling, washing, boating and fishing (National Health and Medical Research Council).
“stormwater”:	means water which flows over the surface of the land following precipitation.
"sustainable development":	means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while- (a) sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and (b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and (c) avoiding, remedying or mitigating any adverse effects of activities on the environment. (*State Policies and Projects Act 1993*)
“sub-lethal”:	means below the level that causes death.
“surface waters”:	means all waters on the land surface, including both fresh and marine waters e.g. streams, lakes, estuaries, and coastal waters.
“technology-based criteria or standards”:	means criteria or standards equivalent to those which can be achieved using a particular level of technology e.g. accepted modern technology.

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"water quality indicators": means an element, compound or characteristic of water, or a biological organism or community living in water, which can be measured and used as an index of water quality.

4.2
Words and expressions used both in this Policy and the *Environmental Management and Pollution Control Act 1994* have in this Policy, unless the contrary intention appears, the same respective meanings as they have in that Act.

PART 2 - OBJECTIVES

5. Purpose of the Policy

5.1
To achieve the sustainable management of Tasmania's surface water and groundwater resources by protecting or enhancing their qualities while allowing for sustainable development in accordance with the objectives of Tasmania's Resource Management and Planning System. (Schedule 1 of the *State Policies and Projects Act 1993*)

6. Objectives of the Policy

6.1
The objectives of this policy are to:

(a) focus water quality management on the achievement of water quality objectives which will maintain or enhance water quality and further the objectives of Tasmania's Resource Management and Planning System;

(b) ensure that diffuse source and point source pollution does not prejudice the achievement of water quality objectives and that pollutants discharged to waterways are reduced as far as is reasonable and practical by the use of best practice environmental management;

(c) ensure that efficient and effective water quality monitoring programs are carried out and that the responsibility for monitoring is shared by those who use and benefit from the resource, including polluters, who should bear an appropriate share of the costs arising from their activities, water resource managers and the community;

(d) facilitate and promote integrated catchment management through the achievement of objectives (a) to (c) above; and

(e) apply the precautionary principle to Part 4 of this Policy.

Recycled paper

PART 3 - WATER QUALITY OBJECTIVES

7. Protected environmental values

7.1

Protected environmental values are values or uses of the environment for which it has been determined that a given area of the environment should be protected. Water quality objectives may be set for surface waters and groundwaters in Tasmania by determining which of the following protected environmental values should apply to each body of water.

A. Protection of Aquatic Ecosystems

A1 Surface waters, including estuaries, but not including coastal waters

(i) Pristine or nearly pristine ecosystems

(ii) Modified (not pristine) ecosystems

(a) from which edible fish, crustacea and shellfish are harvested

(b) from which edible fish, crustacea and shellfish are not harvested

A2 Coastal waters

(i) Coastal waters ecosystems

A3 Groundwaters

(i) Groundwater ecosystems

B. Recreational Water Quality and Aesthetics

(i) Primary contact
(ii) Secondary contact
(iii) Aesthetics only

C. Raw Water for Town Drinking Water Supply

D. Raw Water for Homestead Supply

Note: The Director of Public Health advises that all raw water from any surface water source or groundwater source which is to be used for domestic purposes should comply with the Australian Drinking Water Guidelines (NH&MRC &ARMCANZ 1996), at the point of use, regardless of source. The Director of Public Health recommends that drinking water, including water for cooking and bathing, should at least be disinfected before use. Water can be disinfected by holding it at a rolling boil for at least 1 minute.

E. Agricultural Water Uses

(i) Irrigation
(ii) Stock watering

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F. Industrial Water Supply

The specific industry type for which the water is to be used must be specified to identify appropriate guidelines. (Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC 1992)

8. Water quality guidelines

8.1

Water quality guidelines are estimates, based on the best scientific information available, of the levels of indicators which should be met in order to protect an environmental value.

8.2

Guidelines to protect human health should be those recommended by the National Health and Medical Research Council, unless otherwise specified by the Director of Public Health.

8.3

Guidelines to protect values other than human health should be determined by the Board of Environmental Management and Pollution Control on a case by case basis in accordance with the following principles:

(a) Wherever practical and appropriate, guidelines should be based on site-specific information which should be used to supplement the latest edition of the Australian Water Quality Guidelines and any other appropriate and authoritative information.

(b) Where site specific information is not available, the Australian Water Quality Guidelines should be the principal basis for setting guidelines, although these levels may be varied by the Board in the light of any other appropriate and authoritative information.

8.4

The need for regional or site specific information should be prioritised to assist the setting of water quality objectives in Tasmania. The development of guidelines for priority areas should be encouraged and facilitated.

9. Water quality objectives

9.1

Water quality objectives for a specific body of water are the most stringent set of water quality guidelines which should be met to achieve all of the protected environmental values nominated for that body of water.

9.2

Water Quality Objectives are to be used as a measure of the success of strategies and actions required by Part 4 of this Policy for the management of pollution from point and diffuse sources.

9.3

For the purposes of this Policy, Water Quality Objectives do not set regulatory limits.

Recycled paper

10. Determining protected environmental values

10.1
Consistent with the purpose of the Policy to protect or enhance water quality, the protected environmental values for specific surface water bodies and coastal waters will be those values and uses listed in clause 7 which exist in respect of those waters at the time that this Policy is implemented in respect of those specific waters.

10.2
Consistent with the purpose of the Policy to protect or enhance water quality, the protected environmental values for groundwaters will be those values and uses listed in clause 7 which are likely to be possible given the level of total dissolved solids, as indicated in Table 1, in the specific groundwater body at the time when this Policy is implemented in respect of that specific groundwater body.

Table 1 Environmental Values and Uses of Groundwater Classified by the Level of Total Dissolved Solids (mg/L)

Category **TDS (mg/L)**	A Less than 1000	B 1000-3500	C 3500-13000	D greater than 13000
Protected Environmental Value				
Drinking Water (1)	*			
Irrigation	*	*		
Industry	*	*	*	
Stock	*	*	*	
Ecosystem Protection	*	*	*	*

" * " Denotes an environmental value which can be achieved given the level of dissolved solids

(1) Where groundwaters have TDS levels below 500 mg/L, TDS levels should be maintained below these levels wherever practicable.

10.3

The values and uses referred to in clauses 10.1 and 10.2 will be determined by agreement between the Board, the planning authorities with jurisdiction over those waters, and, where relevant, the water management authorities with jurisdiction over those waters, provided that the Board has taken all reasonable measures to consult other agencies and organisations having an interest in the body of water or groundwater body about the existing protected environmental values, and has taken account of those views.

Recycled paper

10.4

If agreement cannot be reached between the authorities referred to in clause 10.3, the matters in dispute will be determined by the Resource Planning and Development Commission.

10.5

Protected environmental values for specific surface waters, except coastal waters, shall be identified within 5 years of the Policy coming into operation.

10.6

Protected environmental values for specific coastal waters shall be identified by 31 December 2003.

10.7

Protected environmental values for specific groundwaters shall be determined as follows:

(a) by identifying PEVs, in accordance with clause 10.2, at the well-head of existing bores by 31 December 2005;

(b) by nominating interim PEVs, in accordance with clause 10.2, for specific groundwaters, on the basis of PEVs identified at the well-head of existing bores tapping that specific groundwater body, by 31 December 2005;

(c) by nominating interim PEVs, in accordance with clause 10.2, for groundwaters which do not have existing bores, on the basis of Minerals Tasmania groundwater prospectivity data, by 31 December 2005;

(d) by confirming interim PEVs, or collecting appropriate data to enable the determination of PEVs in accordance with clause 10.2, for specific groundwaters at the well-head, as and when the specific groundwater body is tapped;

(e) by confirming interim PEVs, or collecting appropriate data to enable the determination of PEVs in accordance with clause 10.2, for specific groundwaters, where any proposed use or development of land has a significant potential to adversely affect that specific groundwater body or proposes to draw water from that groundwater body, prior to that use or development being approved.

Recycled paper

10.8

Protected environmental values for specific surface waters, coastal waters and groundwaters:

(a) shall be shown in a public register established by the Board and shall be posted on the Departmental internet site; and

(b) shall be shown in any strategic planning study developed for marine farming and national parks and reserves; and

(c) may be shown in planning schemes, water management plans, resource management strategies, forest management plans or catchment management plans; and

(d) shall be shown and taken into account, in any strategic planning study (excluding strategic planning plans pursuant to s.66 of the *Local Government Act 1993*) conducted by a planning authority, pursuant to the review of a planning scheme, or pursuant to the amendment of a planning scheme or equivalent planning instrument, where the amendment relates to significant water quality management issues, and

(e) shall be reviewed or designated through a catchment-based consultative process.

11. Setting water quality objectives

11.1

The Board will determine, in accordance with clauses 8.2 and 8.3, the water quality guidelines for key indicators to achieve protected environmental values, and will make available the basis for such determinations. In accordance with clause 9, the Board will use the guideline values to derive water quality objectives.

PART 4 OUTCOMES - ACTIONS TO ACHIEVE WATER QUALITY OBJECTIVES

DIVISION 1 - MEASURES TO ACHIEVE POLICY OBJECTIVES

12. Range of measures to achieve objectives

12.1

In giving effect to this Policy, governments and other decision-makers must examine the most appropriate mix of regulatory measures, economic instruments and communications strategies to achieve the objectives of the Policy.

13. Economic instruments

13.1

Economic instruments which should be considered as possible means of achieving Policy objectives include, accredited licences, taxation relief, rate relief, grants for innovation, and grants to assist community-based groups in areas such as communications.

Recycled paper

14. Water allocation

14.1

When issuing or reviewing water rights and other licences or permits which allow water abstraction, diversion or the construction of in-stream impoundments, water management authorities must take account of the likely effects of the proposed action on water quality, and whether it will prejudice the achievement of water quality objectives.

DIVISION 2 - MANAGEMENT OF POINT SOURCES OF POLLUTION

DIVISION 2A - AVOIDING DISCHARGES

15. Avoiding discharges

15.1

A regulatory authority must not authorise a point source discharge of a pollutant to surface waters or groundwaters unless it is satisfied that:

(a) it is not practical to avoid the need for the discharge of wastes by re-cycling or re-use in accordance with clause 16.2; and

(b) land application of the wastewater in an environmentally acceptable and sustainable manner is not practical or would result in a higher net environmental risk than disposal to surface waters or groundwaters; and

(c) any unavoidable discharge will not prejudice the achievement of the water quality objectives for the receiving waters; and

(d) the discharge would not give rise to "pollution" within the terms of the *Groundwater Act 1985*, beyond the boundary of any attenuation zone set in accordance with clause 25 of this Policy.

15.2

Where a discharge is unavoidable, regulatory authorities should exercise their powers to avoid the creation of new point source discharges, and will support the rationalisation of existing discharge points. This should include directing wastes to existing wastewater treatment systems with appropriate treatment capacity unless the regulatory authority is satisfied that this:

(a) is not practical; or

(b) would not result in a lower net environmental risk than a separate means of treatment and disposal of the pollutant.

Recycled paper

15.3
When interpreting clause 15.1 in relation to waste discharges to inland waters, regulatory authorities must take account of the higher environmental risk of discharging wastes to inland waters in comparison to coastal waters due to the limited dispersion and dilution available in most inland waters.

DIVISION 2B - SETTING EMISSION LIMITS FOR DISCHARGE TO SURFACE WATERS

16. Key principles for limiting emissions from point sources

16.1
Where a point source of pollution might cause environmental nuisance or material or serious environmental harm, limits should be set on the permissible concentrations and/or loads of pollutants which may be present in discharges to waters from point sources of pollution, and these limits be implemented through permits, authorisations, economic measures, or other instruments as appropriate.

16.2
The limits placed on the discharge of pollutants from point sources must be consistent with the following key principles:

(a) The discharge limits must be set at levels which will not prejudice the achievement of water quality objectives; and

(b) Pollutant discharges to the environment should be reduced to the maximum extent that is reasonable and practical having regard to best practice environmental management, and in accordance with the following hierarchy of waste management, arranged in decreasing order of desirability:

(1) waste avoidance;

(2) recycling/reclamation;

(3) waste re-use;

(4) waste treatment to reduce potentially degrading impacts;

(5) waste disposal.

16.3
Regulatory authorities must not require, in accordance with clause 16.2(b), pollutant reduction measures which can be demonstrated to provide no potential environmental benefit.

17. Use of accepted modern technology

17.1
Consistent with clause 16 the discharge limits for proposed new activities should be set at levels which can be achieved by the use of accepted modern technology, unless lower limits are required to protect recognised water quality objectives.

Recycled paper

17.2
Regulatory authorities should require the operators of activities which are being carried out at the time that this Policy is made to reduce waste discharges in accordance with the principles set down in the Policy, and, as far as is reasonable and practical, work towards achieving discharge levels equivalent to those which can be achieved using accepted modern technology. A time frame for existing activities to achieve discharge levels which can be achieved using accepted modern technology should be determined on a case-specific basis having regard to the environmental effects of the discharge and the practicability of reducing emissions.

18. Emission limit guidelines

18.1
The Board may publish emission limit guidelines for common activities which are likely to give rise to point source discharges of pollutants to surface waters.

Such guidelines must:

(a) be consistent with the provisions of this Policy;

(b) define the circumstances in which compliance with the guidelines will not normally prejudice the achievement of recognised water quality objectives;

(c) be developed in consultation with relevant interested parties;

(d) be made available for public comment prior to being published.

18.2
The Board must publish emission limit guidelines for the following activities within 2 years of this Policy coming into operation:

(a) Sewage treatment plants;

(b) Abattoirs and slaughterhouses;

(c) Produce processing industries; and

(d) Intensive animal husbandry.

18.3
If emission limit guidelines have been published in accordance with clause 18.1, regulatory authorities must set discharge limits in accordance with the guidelines unless:

(a) there are case-specific circumstances which are identified as inappropriate for use of the guideline limits; or

(b) the limits specified in the guidelines will not be adequate to protect water quality objectives; or

(c) it can be demonstrated by the operator of the activity that it is not reasonable or practical to comply with the limits specified in the guidelines, and that discharges in accordance with a higher limit will not prejudice the achievement of recognised water quality objectives.

Recycled paper

19. Setting discharge limits where Emission Limit Guidelines are inappropriate or not available

19.1
If it is necessary to set emission limits for an activity in accordance with clause 16, but emission limit guidelines have not been published in accordance with clause 18.1, or if clause 18.3 applies, the Board must set the emission limits in accordance with the provisions of this Policy.

19.2
In relation to level 1 activities for which it is necessary to set emission limits under this clause, planning authorities must seek the advice of the Board on the emission limits which should be set, and implement the Board's advice through permit conditions. Where appropriate the Director should exercise the powers under section 24(1) of the *Environmental Management and Pollution Control Act 1994* to allow for adequate time to set emission limits.

20. Mixing zones

20.1
If, after waste reduction in accordance with clause 16.2(b) it is not reasonable or practical to reduce the levels of pollutants in an emission to the levels which would be required to achieve the water quality objectives for the receiving waters at the point of discharge, the Board may designate a mixing zone around the point of discharge.

20.2
Where a mixing zone has been designated, emission limits must be set at levels which will not prejudice the achievement of water quality objectives at or beyond the edge of the mixing zone.

20.3
Mixing zones must be set in accordance with the following principles:

(a) The location and size of the mixing zone must be clearly defined in a permit or other legally enforceable instrument of approval.

(b) The mixing zone must be as small as practical in accordance with the requirements of clauses 16 and 17, and either alone or in combination with other mixing zones, should not occupy a significant proportion of the receiving waters designated for any given protected environmental value.

(c) The presence of the mixing zone, either alone or in combination with other mixing zones, should not detract from the values and uses of the surrounding waters.

(d) Mixing zones should not generally be designated in waters which:

(i) receive significant and regular use for primary contact recreation; or

(ii) are recognised as of significant value as spawning or nursery areas; or

(iii) are close to areas used for aquaculture; or

Recycled paper

(iv) are close to potable water supply intakes; or

(v) are of outstanding ecological or scientific importance; or

(vi) for which the protected environmental values include protection of pristine aquatic ecosystems.

(e) Mixing zones must not create a significant barrier to the migration of fish or other aquatic organisms.

(f) Mixing zones designated in rivers, streams and estuaries should be set having regard to the effects of the mixing zone under low flow conditions (7 day minimum flow for a 10 year annual exceedance probability).

20.4
Emission limits shall be set such that, within the mixing zone, the emission does not cause:

(a) objectionable odours which would adversely affect the use of the surrounding environment; or

(b) objectionable discolouration at the surface of the mixing zone, which could adversely affect the use of the surrounding environment; or

(c) visible floating foam, oils, grease, scum, litter or other objectionable matter; or

(d) mortality of fish or other aquatic vertebrates; or

(e) fish or other aquatic organisms used for human consumption to become unacceptable for such use as determined by Tasmanian health standards.

20.5
Where a mixing zone has been designated by the Board in accordance with clause 20.1, the operator shall be responsible for monitoring their effluent(s) for pollutants, and the receiving waters, including baseline monitoring. These responsibilities shall be reflected in the conditions attached to the permit.

21. Toxicity of emissions to aquatic organisms

21.1
Where a mixing zone has been designated in accordance with clause 20, the emission limits should be set at levels which are unlikely to cause chronic or sub-lethal toxicity to living organisms present in the local ecosystem at the dilution expected at the boundary of the mixing zone.

22. Transitional arrangements

22.1
Regulatory authorities should set discharge limits in accordance with this Policy in relation to all point sources of pollution for which they have regulatory responsibility within 5 years of this Policy being made.

Recycled paper

DIVISION 2C - SETTING LIMITS FOR DISCHARGES TO GROUNDWATERS

23. Direct discharges to groundwater

23.1

A direct discharge to groundwater is where a pollutant is discharged or deposited directly into groundwater or below the normal upper limit of the water table, including through a well, trench, bore or other excavation.

23.2

Due to the special characteristics of groundwater aquifers, including their hidden nature, large storage volume, slow movement and slow flushing capacity, direct discharges of pollutants to groundwaters shall not be permitted except in the following circumstances:

(a) the return of mineral tailings to mines provided that it can be demonstrated that this practice will not prejudice the water quality objectives for the groundwater aquifer outside of an attenuation zone set in accordance with clause 25 of this Policy, and this is the means of disposing of the tailings which poses the least net environmental risk; and

(b) the use of wastewaters to re-charge aquifers where the quality of the water being discharged is equal to or better than the water quality in the aquifer as measured by key water quality indicators.

23.3

Any permit issued which allows the direct discharge of pollutants to groundwater must:

(a) establish discharge limits which are consistent with the principles established by clause 16 of this Policy,

(b) require monitoring and assessment of wastewater and groundwater quality to test predictions on attenuation and guard against unforseen impacts; and

(c) require the permit holder to undertake measures to restore the quality of contaminated groundwater to achieve water quality objectives if monitoring shows that the discharge is preventing these objectives being met beyond the boundary of any attenuation zone set in accordance with clause 25 of this Policy.

24. Indirect or incidental contamination of groundwater

24.1

The person who is responsible for an activity which has the potential to indirectly cause the contamination of groundwater must ensure that appropriate safeguards are taken to minimise the risk and the extent of such contamination. If an attenuation zone has been designated in relation to the activity, the activity must be managed such that it does not pose a risk to the water quality objectives for groundwater beyond the boundary of the attenuation zone.

Recycled paper

24.2
Regulatory authorities should use their powers to require compliance with clause 24.1 and should not approve applications to undertake activities which have the potential to indirectly cause the pollution of groundwater unless the proposal includes, or has attached as a condition of approval, safeguards which are consistent with best practice environmental management to minimise risk and the extent of pollution.

24.3
The Board in conjunction with the principal regulatory authority with responsibility for groundwater should develop and adopt mutually agreed guidelines, or, where appropriate in the light of this Policy, endorse existing guidelines which set out the requirements and standards which will normally be required in relation to activities with the potential to pollute groundwater. Such guidelines shall be developed in accordance with the requirements set out in clause 18.1

25. Attenuation zones

25.1
The Board may designate an attenuation zone in relation to an activity of the type described in clauses 23.2 or 24 only if, after waste reduction in accordance with clause 16.2(b) and the use of best practice environmental management, it is not reasonable or practical to prevent restricted pollution of groundwater in the immediate vicinity of the activity.

25.2
Where an attenuation zone has been designated, the activity must be managed so that the discharge will not prejudice the achievement of water quality objectives at or beyond the edge of the attenuation zone.

25.3
Attenuation zones must be designated in accordance with the following principles:

(a) Attenuation zones shall be as small as possible taking into account the use of all reasonable and practical measures to reduce pollutant discharges.

(b) Attenuation zones shall not be defined:

  (i) within the draw-down zone of any well supplying water for human consumption, stock watering, or the irrigation of crops for human consumption; or

  (ii) within the groundwater catchment of any significant karst feature.

(c) Attenuation zones shall not, either alone or in combination, occupy a significant proportion of an aquifer;

(d) An attenuation zone shall not prevent the achievement or maintenance of water quality objectives in any surface waters fed by the aquifer in which the attenuation zone has been designated.

25.4

Recycled paper

Where an attenuation zone has been designated by the Board in accordance with clause 25.1, the operator shall be responsible for monitoring their effluent(s) for pollutants, and the groundwaters, including baseline monitoring. These responsibilities shall be reflected in the conditions attached to the permit.

DIVISION 2D - GENERAL

26. Review of discharge limits

26.1

Regulatory authorities must review the discharge limits applied to point source discharges at intervals not exceeding 5 years and modify the limits as necessary to ensure that they remain consistent with the requirements of this Policy.

27. Environmental emergency management

27.1

Environmental emergency management plans to prevent the pollution of waterways and groundwater, and manage the consequences of any pollution which does occur, should be prepared in respect of activities which use, produce, convey or store significant quantities of materials which could cause environmental harm to waters if released through accidents, malfunctions or spillages.

27.2

The Board in conjunction with other relevant Government agencies and stake-holders, should produce guidelines setting out the types of activities for which environmental emergency management plans to protect surface and groundwaters are required.

27.3

Regulatory authorities shall require the persons responsible for the types of activities identified pursuant to clause 27.2 to prepare environmental emergency management plans, and regularly review such plans.

27.4

When considering the requirement for environmental emergency management plans to meet the objectives of this clause, regulatory authorities shall have regard to the requirements for emergency planning established by other statutes, policies or administrative practices, and, wherever possible ensure that emergency management plans prepared for these purposes also meet the requirements of this clause so as to avoid duplication.

28. Overflows from sewerage systems

28.1

All new and reconstructed sewage pump stations should be designed and operated in accordance with guidelines issued or endorsed by the Board.

28.2

Recycled paper

The Board will review '*Design Guidelines for the Minimisation of Pollution from Sewage Pump Station Overflows*' published by the Department of Environment and Planning (1992), taking account of the provisions of this Policy and the guidelines on overflows from sewerage systems published as part of the National Water Quality Management Strategy.

28.3
All reasonable and practical measures must be used to reduce the incidence and effect of overflows from other components of sewerage systems, including sewage treatment plants and existing pump stations.

29. Trade waste policies

29.1
The operators of sewage or wastewater treatment plants which receive significant volumes of industrial wastes should have a trade waste policy to regulate the acceptance of wastes.

29.2
Trade waste policies should be consistent with the *Tasmanian Plumbing Regulations 1994* and the '*Guidelines for the Acceptance of Liquid Wastes to Sewer*' developed by the Institute of Municipal Engineering Australia (Tasmanian Division) and published by the Department of Environment and Land Management (1994), or any review of these guidelines endorsed by the Board.

DIVISION 3 MANAGEMENT OF DIFFUSE SOURCES OF POLLUTION

30. Key Principle for the management of diffuse sources of pollution

30.1
Emissions from diffuse sources of pollution should be reduced and managed through the development and implementation of best practice environmental management, and so as not to prejudice the achievement of water quality objectives.

30.2
The State Government and stakeholders with an interest in an activity with the potential to give rise to diffuse source pollution should jointly develop and maintain guidelines to describe best practice environmental management for that activity, and develop strategies to promote the implementation of the guidelines.

30.3
Guidelines which describe best practice environmental management should be regularly reviewed. The period between reviews should not exceed five years.

31. Control of erosion and stormwater runoff from land disturbance

31.1

Recycled paper

Planning schemes should require that development proposals with the potential to give rise to off-site polluted stormwater runoff which could cause environmental nuisance or material or serious environmental harm should include, or be required to develop as a condition of approval, stormwater management strategies including appropriate safeguards to reduce the transport of pollutants off-site.

31.2
Stormwater management strategies required pursuant to clause 31.1 should address both the construction phase and operational phase of the development and use of land and have the maintenance of water quality objectives (where these have been defined) as a performance objective.

31.3
To assist with the preparation of stormwater management strategies, the Board should facilitate the development or adoption of a code of practice or guidelines describing best practice environmental management for the control of erosion and stormwater runoff from construction activities, including roadworks.

31.4
Codes of practice or guidelines required by this Policy in respect of specific activities with the potential to impact on stream-side land should pay specific attention to defining appropriate stream-side buffer strips and acceptable management practices within these strips. Strategies and incentives, including economic instruments, to encourage the retention and/or improved management of streamside vegetation should be investigated.

31.5
Planning schemes must require that land use and development is consistent with the physical capability of the land so that the potential for erosion and subsequent water quality degradation is minimised.

32. Agricultural runoff

32.1
The State Government will facilitate and encourage the development of a code of practice or guidelines to describe best practice environmental management to minimise the impact of stormwater runoff from agricultural land on water quality, and ensure that the farming community has the opportunity to play a key role in the development of such guidelines or codes.

32.2
Governments and agri-businesses should promote the implementation of best practice environmental management for agricultural activities to minimise impacts on water quality.

32.3

Recycled paper

The managers of agricultural enterprises shall implement the code of practice or guidelines referred to in 32.1 as a means of complying with the *Environmental Management and Pollution Control Act 1994*. Regulatory authorities should take account of the application of the code when considering enforcement action under that legislation.

33. Urban runoff

33.1

Regulatory authorities must require that erosion and stormwater controls are specifically addressed at the design phase of proposals for new developments, and ensure that best practice environmental management is implemented at development sites in accordance with clause 31 of this Policy.

33.2

State and Local Governments should develop and maintain strategies to encourage the community to reduce stormwater pollution at source.

33.3

Where urban stormwater runoff is prejudicing, or has significant potential to prejudice, the achievement of water quality objectives, councils should prepare and implement a stormwater management plan consistent with the principles and methodology set out in "*Guidelines for Urban Stormwater Management*", publication 10 of the National Water Quality Management Strategy.

33.4

Councils should carry out an assessment of the need for stormwater management plans in respect of stormwater discharges within their jurisdiction, and provide a report on this assessment to the Board within 3 years of the making of this Policy. The assessment should also be reported in the council's annual report.

34. Forestry operations

34.1

To protect and maintain water quality, forest practices as defined in the *Forest Practices Act 1985* should be carried out in accordance with the relevant provisions of the Tasmanian Forest Practices Code and have regard to this Policy.-

34.2

When this Policy has been made the Code should be reviewed to ensure that it is consistent with this Policy.

35. Road construction, maintenance and drainage

35.1

Road construction and maintenance operations will be carried out in accordance with the guidelines or code of practice developed pursuant to clause 31.3 of this Policy, or employ other measures consistent with best practice environmental management, to prevent erosion and the pollution of streams and waterways by runoff from sites of road construction and maintenance.

Recycled paper

36. Acid drainage - soils

36.1

The State Government should ensure that a survey is carried out to identify Tasmanian soils and surface geology with the potential to give rise to highly acidic drainage if disturbed or developed.

36.2

Any such areas will be subject to appropriate development controls to prevent acid drainage developing to the extent that it may become a threat to water quality objectives in the short or long term.

36.3

If the survey described in clause 36.1 identifies areas where acid drainage from soils is preventing the achievement of water quality objectives, the appropriate authorities should develop a remediation strategy with the objective of achieving the water quality objectives.

37. Acid drainage - mines

37.1

Regulatory authorities must not approve new mining operations unless they are satisfied that:

(a) the potential for acid drainage generation has been adequately investigated; and,

(b) where there is the potential for acid drainage to develop, the proposal incorporates best practice environmental management to reduce the risk that such drainage will prevent the achievement and maintenance of water quality objectives for designated surface waters or groundwaters.

37.2

Proposals to rework mines presently producing acid drainage should not be approved by regulatory authorities unless they include action, of a nature and scale appropriate to the size of the proposed operation, to reduce the emission or environmental effects of acid drainage.

37.3

As a component of environmental management and rehabilitation obligations, regulatory authorities should require the operators of mines giving rise to acid drainage to manage and rehabilitate:

(a) current and future works, and;

(b) any works that the operator has carried out and which are on a mining lease currently held by that operator;

such that, on abandonment, acid drainage will not prevent the achievement of water quality objectives for designated surface waters or groundwaters. Full compliance with (b) may not be required where the operator can demonstrate that such compliance is not reasonable and practical in view of the length of time since the works were carried out.

Recycled paper

37.4
Where reasonable and practical the current operators of mines should also take steps to reduce the volume or environmental effects of acid drainage from historic workings which they have not carried out, but which are on their mining lease. Such action should be voluntary and not mandated by regulatory authorities.

37.5
An inventory of sources of acid drainage from historic abandoned mine workings in Tasmania should be carried out and a remedial program developed to address priority problem areas.

38. Re-use of wastes by land application

38.1
The beneficial re-use of wastewater by land application in an environmentally acceptable and sustainable manner should be encouraged and facilitated.

38.2
Notwithstanding clause 38.1, regulatory authorities should not approve proposals to apply wastes to land unless they are satisfied that this:

(a) can be carried out in an environmentally sustainable manner; and

(b) incorporates the use of best practice environmental management; and

(c) will not compromise the water quality objectives for surface or groundwaters; and

(d) will not give rise to an unacceptable risk to human or animal health; and

(e) involves less net environmental risk than other strategies for dealing with the wastes.

38.3
Existing activities involving the application of wastes to land should be reviewed against the requirements of clause 38.2, and, where necessary a strategy developed to bring the operation into compliance with these requirements.

38.4
The land application of wastewater from sewage treatment plants should be carried out in accordance with '*Guidelines for the re-use of wastewater in Tasmania*' (Department of Environment and Land Management, 1994) and any subsequent reviews of this document, or any other means approved by the Board on the basis that it complies with the provisions of this clause. Any review of these guidelines must take account of this Policy and be consistent with it.

39. Stream management

39.1

Recycled paper

The State Government should ensure that guidelines are developed for Tasmania to define best practice environmental management for carrying out modifications to stream channels and banks, including drainage lines.

39.2
Regulatory authorities shall develop criteria for the approval of stream management works and require that any such works are designed and carried out in accordance with best practice environmental management and so as not to prejudice the achievement of water quality objectives.

40. Release of water from storages

40.1
The State Government should ensure that guidelines are developed to define best practice environmental management for minimising the downstream effects on water quality from the release of water from storages.

40.2
The operators of a water storage must ensure that the release of water from the storage does not prejudice the achievement and maintenance of water quality objectives for waters downstream of the storage, and should use best practice environmental management to minimise the effects on downstream water quality.

41. Disposal of sewage and other wastes from ships and boats

41.1
Within Tasmanian waters, raw sewage disposal and other waste disposal from ships and boats should be prohibited wherever this practice has significant potential to adversely affect water quality objectives, including:

(a) from ocean going vessels in ports, estuaries or near shore coastal areas;

(b) from commercial passenger-carrying vessels and fishing boats carrying a specified minimum number of persons in specified port areas, commonly used estuaries, enclosed bays or inland waters;

(c) from any commercial or recreational vessels in waters where the protected environmental values are:

A. Protection of Aquatic Ecosystems
   (i) Pristine or nearly pristine ecosystems
   (ii) Modified (not pristine) ecosystems
      (a) from which edible fish, crustacea and shellfish are harvested

B. Recreational Water Quality and Aesthetics
   (i) Primary contact

C. Raw Water for Drinking Water Supply

41.2

Recycled paper

A strategy to ensure acceptable waste disposal practices from boats, including recreational craft will be developed and implemented. The strategy will include, but not be limited, to:

(a) a requirement to fit holding tanks for sewage in all new commercial and recreational craft which are of greater than 20 tonnes displacement; and

(b) the development and implementation of a voluntary code of practice describing best practice environmental management in relation to the disposal of raw sewage and other wastes from boats.

(c) an analysis of the circumstances in which facilities to pump out holding tanks should be installed at wharfs and marinas etc.

42. Marine farming

42.1

Areas designated for marine farming should be chosen such that marine farms are sited and can be operated to provide sustainable environmental outcomes.

42.2

Areas designated for marine farming should be protected from adverse changes in water quality arising from adjacent land based activities or activities in the adjacent coastal area.

42.3

Marine farming operations should be managed and regulated as required to ensure that they do not prevent the achievement of recognised water quality objectives outside of marine farming leases.

43. Discharge of ballast water

43.1

The State Government will continue to actively support the development of a comprehensive national and international strategy to reduce the risk of the introduction and spread of exotic organisms from ballast water discharges through the establishment of a state Ballast Water Management Group.

43.2

In accordance with the National Coastal Ballast Water Guidelines, responsible authorities shall, within 3 years of this Policy coming into operation, prepare Port Management Plans for all Tasmanian ports receiving coastal shipping.

44. Pesticide application in streams

44.1

Any person proposing to use chemicals to control pests (including weeds) in streams or along stream banks should first investigate, and, wherever practical, use non-chemical means of control unless it can be demonstrated that chemical control poses a lesser net environmental risk than other practical options.

44.2

Recycled paper

Where chemical control of pests (including weeds) in streams or along stream banks is used in accordance with clause 44.1, the chemicals used must be registered or approved under the Agvet Code of Tasmania and used in accordance with the *Agricultural and Veterinary Chemicals (Control of Use) Act 1996.*

PART 5 MONITORING

45. Responsibility for monitoring

45.1

Monitoring is a critical component of water quality management and authorities responsible for resource management and environment protection should ensure that adequate monitoring is carried out to determine whether water quality objectives are being achieved.

45.2

The responsibility for monitoring should be determined in accordance with the following principles:

(a) The operators of activities which give rise to significant point sources of pollutants have a responsibility to monitor their effluent(s) for pollutants, and contribute to the ambient monitoring of the receiving waters, including baseline monitoring. These responsibilities should be reflected in the conditions attached to permits as and where appropriate. Monitoring requirements should be proportional to the level of environmental risk and, as a secondary consideration, take account of the economic costs of monitoring.

(b) Significant contributors to diffuse source pollution should contribute, directly or indirectly, to ambient monitoring of the receiving waters.

(c) Water resource managers should contribute to baseline monitoring of ambient water quality as a component of their management responsibility and on behalf of water users and beneficiaries.

(d) Community-based monitoring organisations should be incorporated into monitoring programs wherever practical.

46. Co-ordination and Quality Control

46.1

The State Government shall ensure that appropriate mechanisms are in place to co-ordinate ambient water quality monitoring programs to maximise their benefits.

46.2

Monitoring programs should be designed and conducted in such a manner as to facilitate the use of the data collected for State of the Environment Reporting.

46.3

Recycled paper

Authorities responsible for carrying out or approving monitoring programs and data storage should ensure that programs meet acceptable standards in terms of quality assurance for the design and conduct of programs, and analysis and storage of results.

47. Public access to data

47.1

Information on the quality of public water resources should be publicly available, and the State Government should facilitate appropriate mechanisms to achieve this objective, including the provision of regular public reports.

48. Use of monitoring data

48.1

Water quality data should be used by resource managers, other decision-makers and the community, to review the extent to which water quality objectives are being achieved, and where they are not, to devise strategies and programs to achieve the objectives.

PART 6 - REVIEW

49. Review of Policy

49.1

This Policy will be reviewed three years after it comes into operation and at intervals of no longer than five years thereafter.

49.2

Implementation of this Policy will be reviewed annually by the Minister.

Recycled paper

Huon Valley Council

Town Structure Plans

Part of the Huon Valley Land Use Strategy



Bridge - Huonville

By

TBA Planners Pty Ltd

In Association With

Barwick and Associates
Brian Risby

OCTOBER 1997

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1. Introduction

As part of the Huon Valley Resource Management and Planning Strategy five (5) town structure plans have been prepared. These structure plans set out the preferred pattern and nature of future use and development in each town.

The town structure plans provide a broad overview of each town and establish a basis for future strategic planning decisions. The structure plans indicate a preferred layout of residential, commercial, community and other land uses based on a ten (10) year outlook. The structure plans are to also set out environmental and infrastructure management arrangements.

The structure plans are designed to meet a variety of objectives including quality of lifestyle, environmental quality and economic opportunities. The opportunity for coordinated town improvements, in terms of the location, appearance and servicing of use and development, has been identified. These improvements will take place overtime and there is a need to implement the structure plans through each individual decision and action.

The structure plans are designed to provide a framework for land use and development rather than a pre-determined blueprint. As such the structure plans promote the idea of new use and development meeting a number of criteria:

- infrastructure servicing;
- desired future character; and
- environmental sustainability.

In this way the structure plans assist Council in making decisions about individual proposals within a strategic framework as well as providing certainty for proponents in what type and form of development is deemed appropriate for towns within the municipal area and for State agencies and authorities in providing services.

The process followed in the development of the structure plans included:

- analysis of population characteristics (unfortunately detailed information from the 1996 census is not yet available);
- consideration of building statistics and development trends;
- profile of physical infrastructure;
- a built and natural landscape assessment;
- public consultation through public meetings; and
- a strategic planning assessment.

2. Overview

The four main factors taken into consideration in the development of the structure plans are:

- existing pattern of development and historic trends;
- existing constraints;
- use and development opportunities; and
- community ideas and opinions.

There is great diversity in the qualities of different towns in the Huon Valley municipal area. Some towns have a distinct heritage element, some play a key role as residential communities, some towns have an identifying landscape setting and other towns are closely related to their agricultural setting. It is these characteristics which combine to contribute to the individual content of the structure plans.

An objective of the town structure plans has been to recognise and enhance the generally discrete nature of the towns set in their various environments. This objective is central to maintaining identity and environmental quality in each town. The general approach is to consolidate development to create visual and physical links to existing development whilst avoiding fragmented development in surrounding areas.

Where possible new use and development should seek to maximise the use of existing services and facilities. The ability of towns to protect and support their commercial viability and level of community services can be enhanced by ensuring a coordinated approach to the development of future buildings and works.

The unique features of each town is what gives a 'sense of place' for residents and attracts visitors to the area. Future use and development needs to maintain the existing qualities of these small towns and enhance these qualities where possible.

Generally, the town structure plans define residential, commercial and, in some locations industrial, areas in the municipal area's towns. The town structure plans accommodate future town expansion and low density residential development primarily in Huonville and promote township consolidation in Cygnet, Dover, Franklin and Geeveston.

3. Guiding Principles

The general principles were developed through the initial round of public consultation. The guiding principles are:

- recognise the individual characteristics of towns by protecting and enhancing the significant natural and built elements of the places where the community lives;
- strengthening the social, economic and cultural roles and functions of towns by encouraging residential and commercial development in accordance with the capacity of infrastructure.
- consolidate and focus development in townships to provide for more efficient use of infrastructure and support commercial and community services and facilities;
- the importance of sustainable natural resource management and recognition of the capability of land as a key requirement for the use and development of land;
- supporting agricultural production and processing industries as a major economic activity;
- ensuring that productive farming practices are not compromised by incompatible or sensitive uses;
- protection and enhancement of the strengths and attributes of the municipal area's natural and cultural assets; and
- supporting quality tourism development initiatives based on the municipal area's natural and cultural heritage and rural environment.

4. Planning Objectives For Each Town

The planning objectives which are universal to the town structure plans are:

Housing

- Provide a range of housing types to meet the needs and preferences of the community;
- Integrate residential use and development with community, commercial and recreation areas within towns;

Infrastructure

- Provide efficient, integrated movement network providing equally for vehicular and non-vehicular forms of transportation;
- Minimising immediate and future servicing costs and facilitate the economic provision of essential infrastructure services;
- Ensure subdivision is linked to the ultimate development of the land through the staging of development and use of agreements. This prevents land being left vacant for long periods of time until taken up which has two consequences: first, rural land used for productive purposes is lost prematurely; and second, infrastructure services and other works are put in place too early.

Natural and Cultural Heritage

- Protecting the natural and cultural features of towns and enhancing those qualities that make the towns a pleasant place to live, work and visit;
- Provide open space and natural areas with towns for visual amenity and passive recreation utilising and enhancing existing natural and built features;
- Ensure the growth and development of towns does not impact on agricultural land and areas of environmental significance;
- Ensure the rural character and traditional built form of towns is maintained and that 'suburban' features do not dominate;
- Enhance the main gateways and approach roads to the municipal area's towns protecting and building upon the image and identity relevant to each town, establishing landscaping and planting along the highway and major roads based on distinctive themes.

Economic Opportunities

- Protect the future role and viability of towns in the municipal area by the retention of those services and facilities that are essential to the role of each town and promoting opportunities for new services and facilities that reinforce the role and identity of the towns;
- To promote commercial and industrial development where appropriate infrastructure services are available, environmental standards maintained and development is consistent with town character.

5. Built and Natural Landscape Assessment

One of the issues which is relevant in the determination of future land use and development policies for these rural towns is the current or potential significance of the built and natural landscape in contributing to the quality of these environments. With sometimes limited building elements, and low rates of growth; the selection, placement and form of development is critical in protecting, reinforcing or establishing township character.

Similarly, cultural, historical or environmental landscape features create important reference points for future development areas. These factors contribute to the uniqueness and overall quality of the town, which is becoming an increasingly important factor in sustaining economic development. An attractively presented town will promote residential growth and encourage tourist use. An equally important consideration, however, is the need to facilitate available development and not frustrate its implementation by excessive development standards and controls.

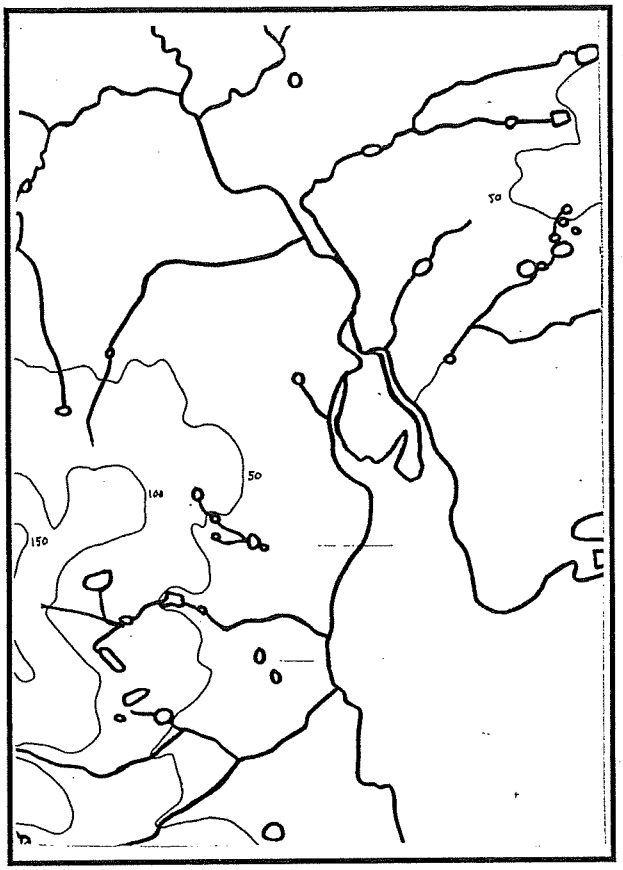
As a starting point, the following criteria may be applied in the examination of the towns. By understanding the strengths and weaknesses of each town, a range of strategies may be adopted to assist in their future development and enhancement.

Township Setting	The relationship of the settlement with its geographical context (i.e. hilltop, valley, open plain, coast).
Environmental Comfort	Features which contribute to the quality of the activity areas for residents and visitors.
Transport and Access	Ease of access by pedestrians, cyclists and motorists travelling within and between townships.
Approach Route and Visitor Interpretation	How the township is interpreted by visitors entering, stopping at and travelling through the centre.
Sense of 'Township'	The level of cohesion of the built, natural and cultural environment.
Uniqueness and Points of Difference	Characteristics that individually or collectively contribute to the town character and experience.
Range of Facilities and Services	Availability of commercial and community facilities (proximity, hours of operation, cost and quality of services).

These characteristics which are expressed in the composition of the built and natural landscape will continue to have a significant impact on, and will be fundamentally affected by, the potential for new development.

Townships which have severe restrictions to growth and development such as topographic constraints, adverse micro-climate, isolated locations from larger centres offering employment, or poor quality living environments will not be favoured for future expansion. Some of these constraints may be overcome, to improve their potential to attract new residents such as improved quality of living environment or improved transportation links to available employment sources. Generally though, and having regard to a range of now often competing small rural communities, some of these towns will at best survive, and perhaps even decline further. By contrast, a town with a distinctively high quality living environment, a characteristic often identified by tourists, may attract sufficient new residential growth, and patronage by passing motorists.

Cygnet - *Structure Plan*



Cygnet - Topography and Waterways

Features

- Kings Hill to the west and Tobys Hill to the east provide an impressive landscape setting to the town.
- The town is located along the Agnes Rivulet which spreads to a floodplain along the eastern margin of the town.
- The mouth of the Agnes Rivulet at Port Cygnet enters at two locations into an extensive estuary.

Issues

- The location and design of development on the hills can impact on visual character of the area.
- Areas along Agnes Rivulet are subject to inundation.
- The Port Cygnet estuary is sensitive to capturing sediment and any pollutants from the Agnes Rivulet.

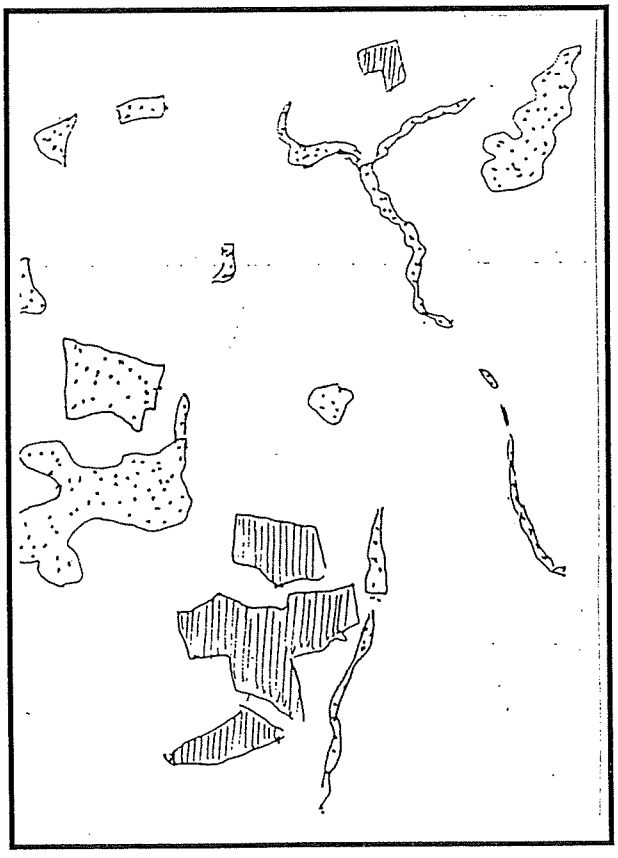
Cygnet - Vegetation

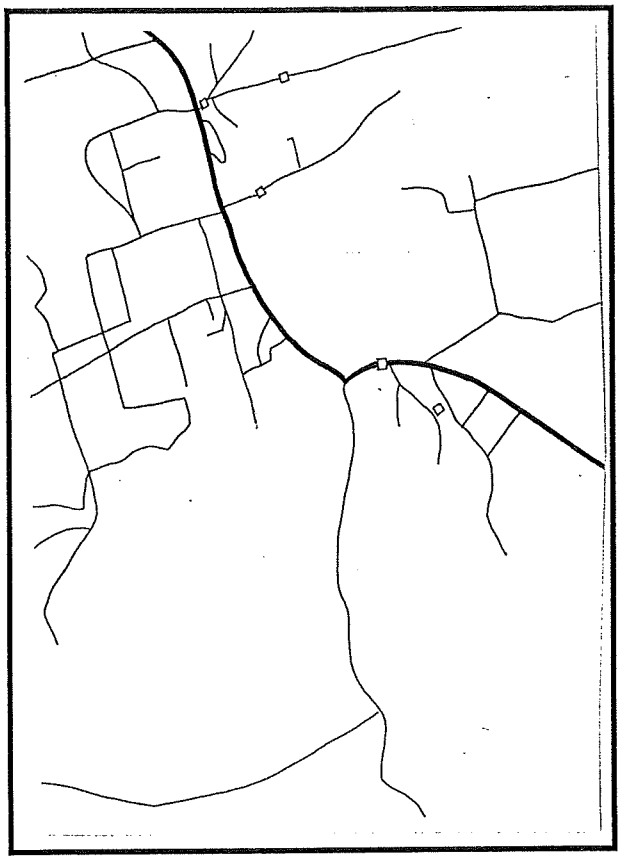
Features

- Areas surrounding Cygnet have generally been cleared of native vegetation.
- Remnant vegetation is largely confined to areas along the Agnes Rivulet, coastal margins of Port Cygnet and Kings Hill.
- Several orchards are located in the rural areas surrounding the town.
- Vegetation in the town area is generally limited to modest private gardens.

Issues

- Many of the drainage lines have no riparian vegetation to protect stream banks, slow water runoff and filter pollutants.
- Public areas and the main commercial area have limited landscaping features. Opportunity exists to improve the visual appeal of these areas, define and highlight key places and provide shelter.





Cygnet - Roads

Features

- The town is located on the Channel Highway which provides access to Huonville to the north and the Channel area to the southeast.
- The internal road layout is a grid pattern located to the west of the Channel highway. Many of the roads remain unformed.
- Outlying roads tend to follow a radial pattern.

Issues

- The less defined pattern of outlying roads has promoted linear development at the towns northern and southeastern areas.
- Formation of roads in the centre of the town will provide for infill development opportunities.

Cygnet - Settlement and Buildings

Features

- The settlement pattern is characterised by three areas of residential development to the north, west and southeast of the commercial and community centre.
- The Agnes Rivulet separates the southeast area of residential development from the rest of the town.
- Extensive areas of vacant land are located between Frederick and Church Street.

Issues

- Substantial residential development opportunities exist close to the commercial and community centre.
- Current zoning of residential land is extensive and could promote a disperse settlement pattern.
- Areas of undeveloped residential zoning are located in visually prominent areas.




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Cygnet - Strategic Issues

Environment

- Areas where land is subject to inundation limit the development of the town along the Agnes Rivulet area.
- The extensive areas of land subject to inundation mean the area is sensitive to alterations in landform and drainage patterns.
- There is limited vegetation along drainage lines, and few significant stands of remnant vegetation.
- Vegetation is not used to its potential to define features and elements of the town or contribute to the legibility and visual character of the town.
- There is limited connection between the town centre, Agnes Rivulet and the Port Cygnet Estuary.
- Agricultural land is located around the town and should be protected from encroachment.
- There is a need to encourage one well defined entry to the township and town centre.

Built Form

- The edges of the town are not strongly defined. Ad-hoc and unrestricted extensions to the town to the north and east will erode the town's existing character.
- Cygnet has a good collection of architecturally significant buildings, however, overall presentation could be improved and more consistent design treatment used.
- The existing commercial, residential and community elements of the town can be better linked to develop a more consolidated town form.
- The town does not have a precise urban/rural edge, however, it does have elements of a core urban area to provide a focus for future development.
- Apart from the main street area, there is no township character established to date. A lack of cohesion between the existing built elements and the absence of strongly unifying landscape features are major impediments to the establishment of any character.

Economy and Community

- Cygnet is a small historic settlement in the eastern area of the municipality which plays a service role to the agricultural industry as well as supporting tourism and nearby low density residential and lifestyle farming areas.
- Commercial and community activity is focused along Mary Street with the main core located south of Golden Valley Road, however, a few site specific commercial uses are located in the northern sections of the town.
- A range of commercial and community facilities are provided in the town, including youth centre, Huon Community Health Centre, two churches, Cygnet Community Creche, fire station, town hall, three church halls, library, post office and police station.
- Retention of local resident and tourist expenditure and development of local retail services is an issue.
- Cygnet has the potential to meet the needs of tourists, particularly day trips from Hobart. Assets within the township such as recreational open space, historical and cultural exhibits, and estuary area could be more effectively used to achieve this objective. Significant effort has already been made by the community in this regard.

Cygnet - Desired Future Character

Environment

- Agnes Rivulet utilised as a major natural feature and recreational area. The natural state character of the waterway should be maintained.
- Protection of natural drainage patterns and landform.
- A landscape setting re-establishing the indigenous plants of the area. Significant revegetation of drainage lines and use of plantings in public areas and to contribute to the streetscape.
- A distinct entry point to the town either built or landscape that defines and directs entry.
- Protection of surrounding rural land for its productive and landscape value.

Built Form

- Areas of vacant land close to the town centre used for residential development. More substantial residential development to consolidate the town's position as an attractive rural town.
- A more compact urban form with no additional linear development along the Channel Highway to the north or east.
- All allotments within residential planning areas to be capable of connection to a reticulated sewage system.
- Retention and protection of heritage buildings and items and for new use and development to have regard to built for and heritage value of buildings and areas.



Protection of heritage buildings - part of the desired future character for Cygnet

Economy and Community

- Cygnet offering a small town lifestyle in a natural setting.
- Develop and promote Cygnet as a cultural arts centre in the municipal area.
- Development of high quality marina facility, subject to environmental and infrastructure assessment, as a major tourism initiative.
- Commercial and community use and development continued to be focused along Mary Street with the main core located south of Golden Valley Road.
- Improved range of services for visitors which combine attractions and opportunities for expenditure.

- A walkway and bike track from the Guys Road intersection along the Agnes Rivulet to the Burton's Factory Site with a link via the Channel Highway to a connecting walkway route along the western arm of the rivulet and on to Robleys Point.
- Investigate improvement to, or relocation of, the existing caravan park.

Cygnet - Implementation

Environment

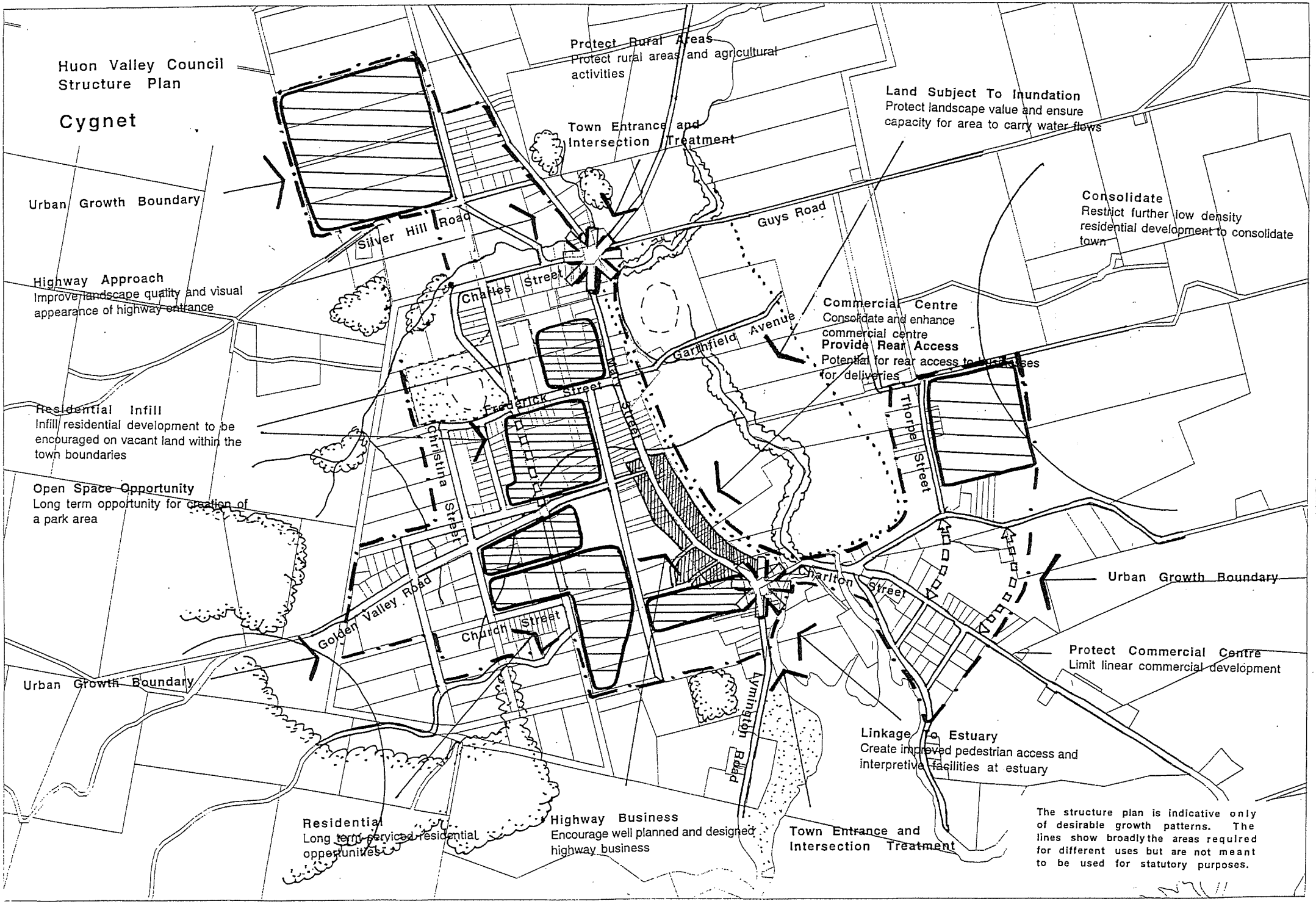
- Provide managed access to wetlands areas, such as adjacent Burtons Factory site.
- Continue rehabilitation of Agnes Rivulet area. Development along or near Agnes Rivulet should be strictly controlled.
- Improve maintenance and renovation to the Town Hall.
- Develop open space opportunities along Agnes Rivulet.

Built Form

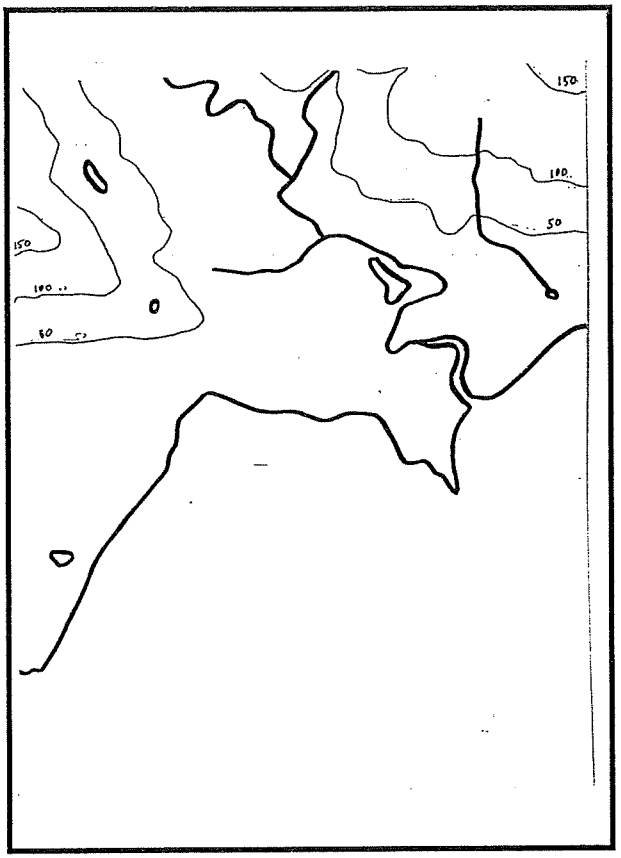
- Redesign and provide landscaping treatment to Cygnet carpark.
- Actively encourage residential development in identified activity areas within Cygnet. Residential growth potential in the short term should be accommodated in the existing infill sites throughout the town.
- The first stage of residential development should be in the areas located north of Frederick Street and west of Mary Street and south of Frederick Street, between Donohoe and George Streets. The second stage of residential development should be south of Golden Valley Road, back to approximately the 50 metre contour. The third stage of long term residential development, subject to infrastructure servicing capacity, should be in the areas off Dances Road and Silver Hill Road and extensions between Thorpe Street and the Channel Highway.
- Each 'stage' of development should be commence in accordance with Council's capital works program and the infrastructure servicing plans. Each stage should be substantially developed before the following stage commences.
- Maintain growth options by limiting low density residential development in identified future residential areas.
- Maintain long term bypass option of Mary Street to the east.
- Define the town edge with an urban growth boundary and consolidate development in the town area

Economy and Community

- In the future Cygnet's role can be promoted based on one or several themes. Aspects of these themes can be articulated in design improvements for the town centre: town by the estuary; and arts and culture.
- Commercial and community uses to be consolidated as part of the existing area on Mary Street south of Golden valley Road and Charlton Street.
- Encourage consolidation of the town centre; the town centre has sufficient vacant land and buildings to accommodate development in the foreseeable future.
- Provide interpretive signage related to historic items and places including Wilsons boat building, Helms Bay, Roberts Point, Curtis Point and Crooked Tree Point.
- Development of Aboriginal cultural centre at Nicholls Rivulet.
- Development of Burtons Factory site as cultural centre by the water, also the potential use of the block between the Town Hall and the old ANZ Bank for a complementary community use.
- Provide for the development of high quality marina facility at Cygnet and set out environmental and infrastructure assessment criteria.


Huon Valley Council
Structure Plan
Cygnet
Protect Rural Areas
Protect rural areas and agricultural activities
Town Entrance and Intersection Treatment
Land Subject To Inundation
Protect landscape value and ensure capacity for area to carry water flows
Urban Growth Boundary
Silver Hill Road
Guys Road
Consolidate
Restrict further low density residential development to consolidate town
Highway Approach
Improve landscape quality and visual appearance of highway entrance
Charles Street
Commercial Centre
Consolidate and enhance commercial centre
Garfield Avenue
Provide Rear Access
Potential for rear access to businesses for deliveries
Frederick Street
Main Street
Residential Infill
Infill residential development to be encouraged on vacant land within the town boundaries
Christina Street
Thorpe Street
Open Space Opportunity
Long term opportunity for creation of a park area
Golden Valley Road
Church Street
Charlton Street
Urban Growth Boundary
Protect Commercial Centre
Limit linear commercial development
Urban Growth Boundary
Arminoth Road
Linkage To Estuary
Create improved pedestrian access and interpretive facilities at estuary
Residential
Long term serviced residential opportunities
Highway Business
Encourage well planned and designed highway business
Town Entrance and Intersection Treatment
The structure plan is indicative only of desirable growth patterns. The lines show broadly the areas required for different uses but are not meant to be used for statutory purposes.

Dover - *Structure Plan*



Dover - Topography and Waterways

Features

- Dover is located to the west of the Dover Rivulet where it enters Port Esperance.
- The town is located between two prominent hills to the west and northeast.

Issues

- The town is constrained by topographical features.
- The location and design of development on the hills can impact on visual character of the area.
- The banks of the Dover Rivulet are relatively steep and susceptible to erosion.
- The Dover Rivulet is not a prominent feature in the town.

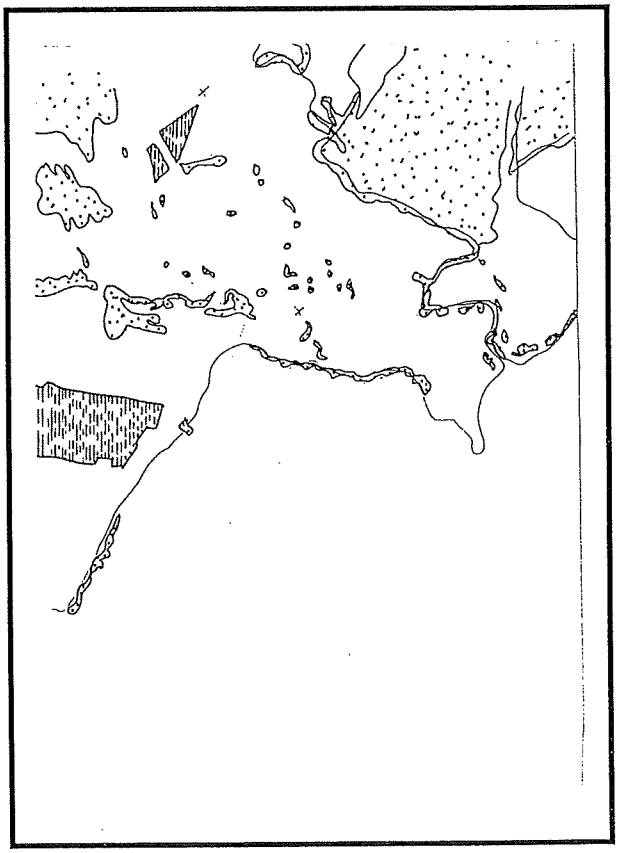
Dover - Vegetation

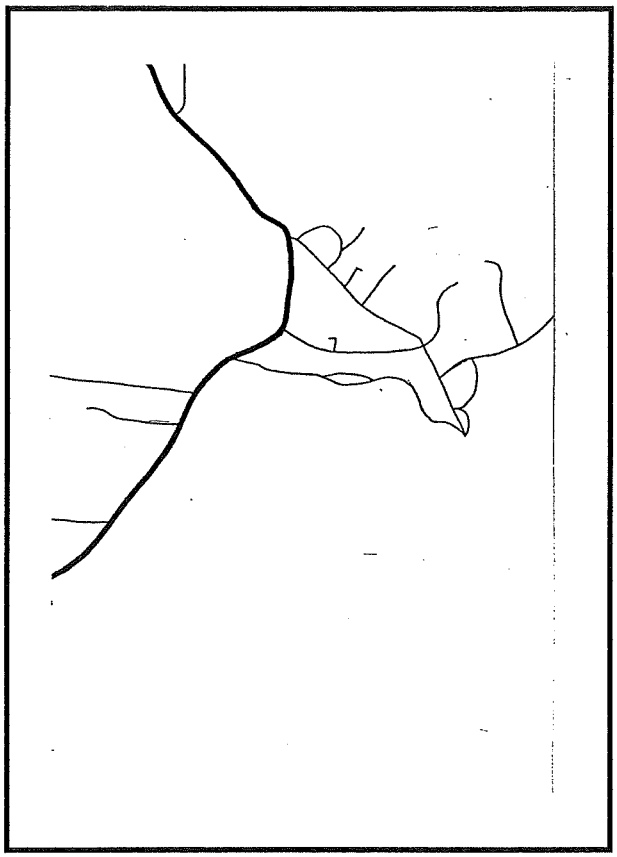
Features

- Remnant vegetation is generally limited to the steeper slopes of the nearby hillsides.
- Fragmented stands of remnant vegetation are located along the Dover Rivulet and the coastal margins of Bay View Road and Kent Beach Road.
- Orchards are located to the north of the high school and southwest of the Dover hotel.

Issues

- Public areas and the main commercial area have limited landscaping features. Opportunity exists to improve the visual appeal of these areas, define and highlight key places and provide shelter.





Dover - Roads

Features

- The town is located on the Huon Highway which provides access to Geeveston to the north and Southport to the south.
- The internal road layout is basically a triangle around a low hill.
- Outlying areas are characterised by coast hugging roads.
- Poor intersection of Huon Highway and Station Road.

Issues

- Topographical features which have forced the road network to following the coastal margins has promoted linear development at the towns southwestern and eastern areas.
- The intersection of the Huon Highway and Station Road is difficult to negotiate and could be improved.

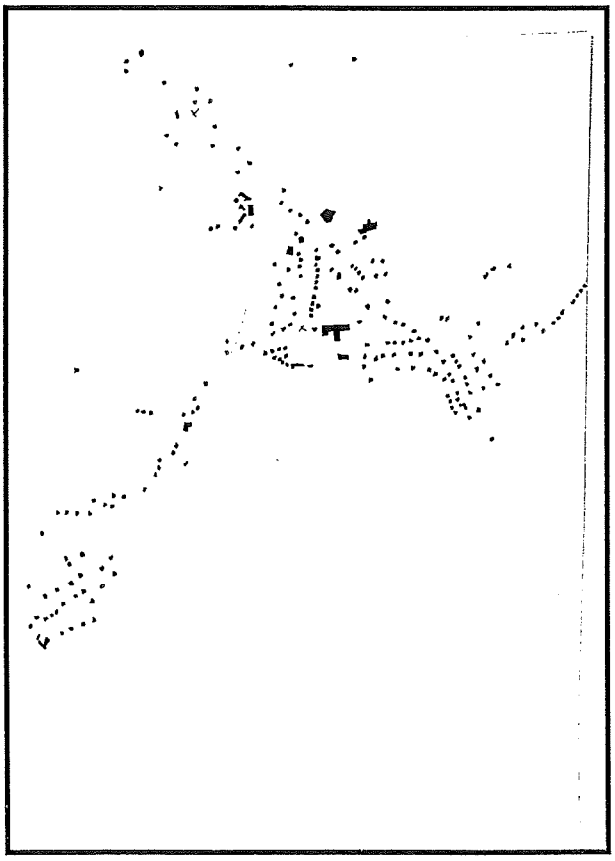
Dover - Buildings

Features

- The settlement pattern is characterised by a 'Y' shaped form along the Huon Highway in the Dover Rivulet Valley, along the Huon Highway toward Harveytown and along Kent Beach Road to the east.
- Most housing is clustered in a compact form between the town centre and bay.
- Built form is generally modest detached dwellings with some larger institutional buildings.

Issues

- Current zoning of residential land in the town is limited, however, extensive areas outside the town exist and could promote a disperse settlement pattern.
- Select pockets within the town represent development opportunities, however, would need to be kept off the prominent hillsides.




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Dover - Strategic Issues

Environment

- The surrounding topography and coastal margins severely restrict development options.
- Areas where land is subject to inundation limit the development of the town along the Dover Rivulet area.
- There is limited indigenous vegetation throughout the town, it is generally limited to hilly areas to the east and the coastal margin.
- Vegetation is not used to its potential to define features and elements of the town or contribute to the legibility and visual character of transport/movement areas.
- There is limited connection between the town centre, Dover Rivulet and the foreshore area.
- There is a need to introduce a well defined entry feature to the town at the intersection of Huon Highway and Station Road.

Built Form

- The edges of the town are not strongly defined. Dover is effectively composed of different segments of development from Kents Beach/Glenbervie Road, Dover Beach, Dover, Hopetoun Beach and Francistown Road.
- A number of low density residential subdivisions are located at a distance from the town centre along the coastal margin, and there is no clear relationship between each of these developments.
- The treatment of existing subdivisions requires review in order to 'complete' the existing development and improve infrastructure services and access.
- The safety and efficiency of the intersection of the Huon Highway and Station Road could be improved.

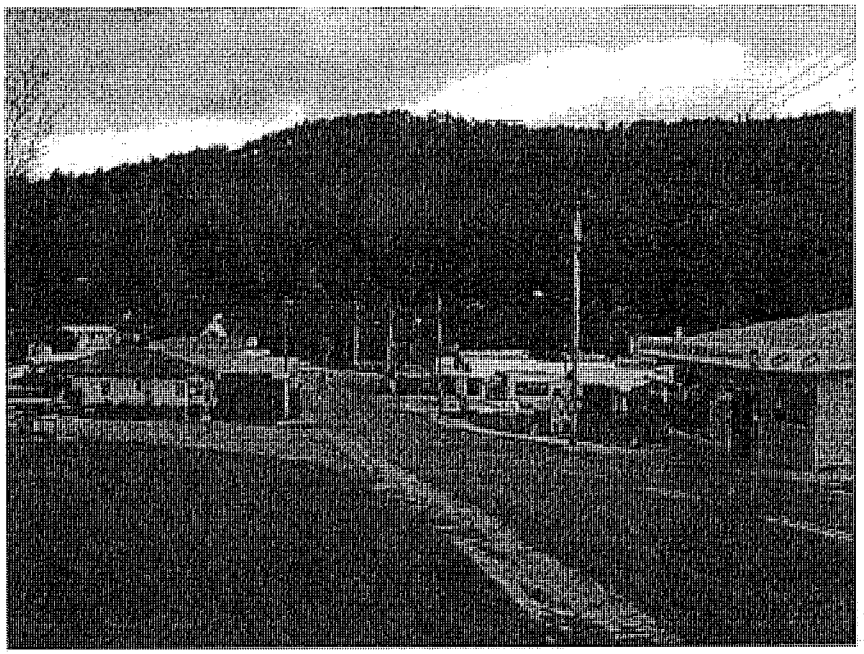
Economy and Community

- Commercial and community activity is focused along the Huon Highway with the main core between Station Road and Chapman Avenue.
- The town has two separate centres with no visual or functional linkages, this serves to fragment the town.
- There is a low number of households in Dover's trade catchment area. Retention of local resident and tourist expenditure and development of local retail services is an issue.
- Dover has a range of community facilities including Esperance health centre, community church, Dover District High School, Aquatic Club, fire station, post office and police station. The health centre is a major multi-purpose centre that is an important resource for the community in the area.
- Forestry Tasmania maintains a nursery off Station Road.
- Dover has the potential to meet the needs of tourists, particularly day trips from Hobart. Assets within the township such as foreshore area, historical steam exhibits, and maritime activities could be used to achieve this objective. Significant effort has already been made by the community in this regard.

Dover - Desired Future Character

Environment

- The foreshore area utilised as a major natural feature and recreational area.
- A landscape setting based on improving the quality of the foreshore area, with open land on the low hills and forested areas on steeper slopes.
- Improved pedestrian linkages between the commercial centre, steam museum, Dover Rivulet and the foreshore area.
- A distinct entry point to the town either built or landscape that defines and directs entry.
- Rehabilitation of foreshore areas through managed access and revegetation.
- Maintain the natural state character of Dover Rivulet and encourage rehabilitation of indigenous vegetation.



The main street of Dover - Potential for streetscape improvements

Built Form

- No further linear development along coastal areas.
- Promote new residential development inland, with views and access to coastal areas.
- All allotments within residential activity areas capable of connection to a reticulated sewage system. A more compact urban form with no additional linear development along the Huon Highway to the north or southwest.
- Improved traffic management arrangements for the intersection of the Huon Highway and Station Road.

Economy and Community

- Dover to offer a coastal town lifestyle in a natural setting.
- Develop Dover as the key maritime town in the Huon Valley.
- Commercial and community consolidated as part of the existing area on the Channel Highway, between Station Road and Chapman Avenue.
- Continued use of the Esperance health centre as a major multi-purpose centre for the community in the area.

Dover Implementation

Environment

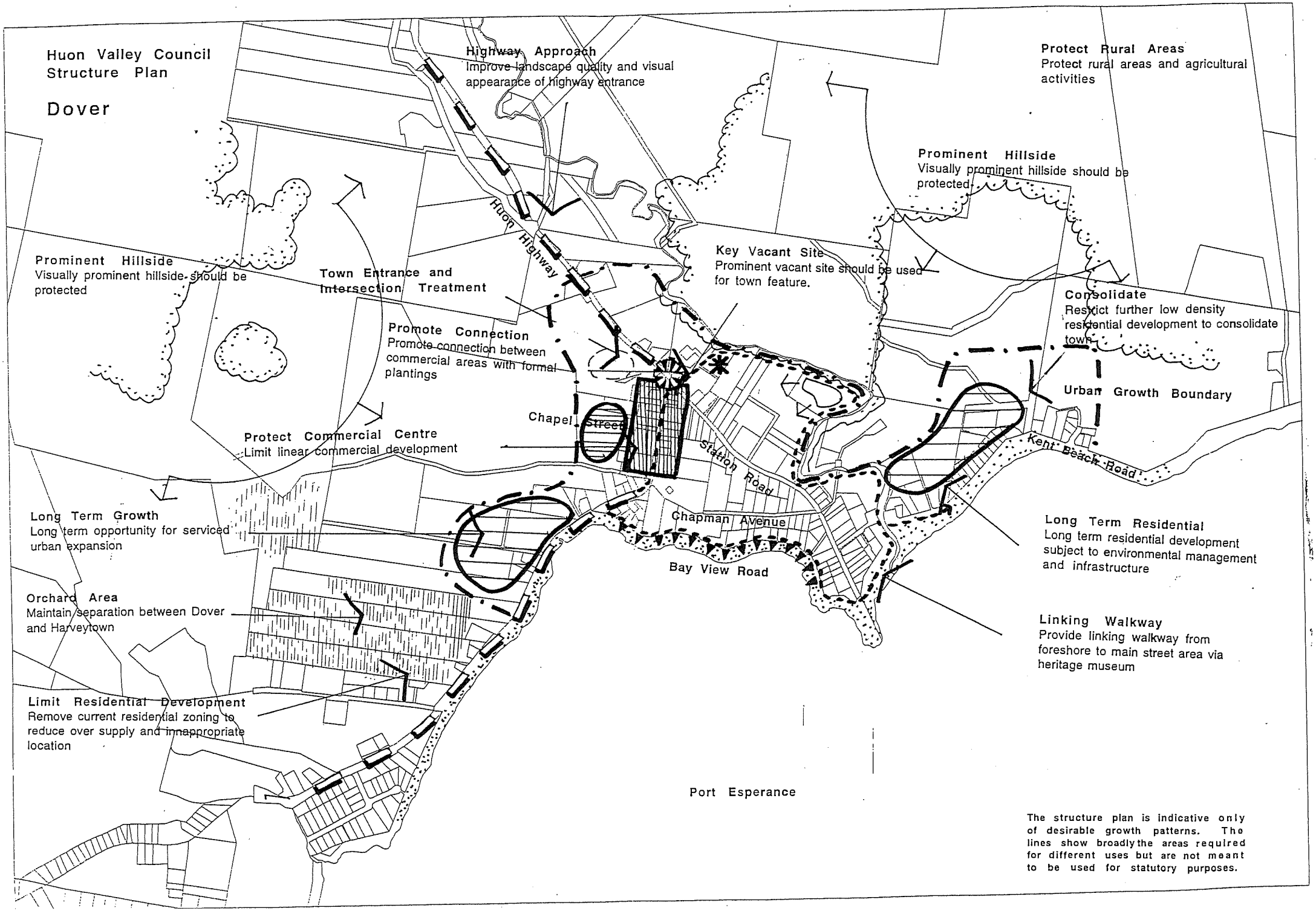
- Improved pedestrian linkages between the commercial centre, steam museum, Dover Rivulet and the foreshore area. The section from the aquatic club to Kent Beach is currently hazardous.
- Development along or near Dover Rivulet should be strictly controlled.
- Develop open space opportunities along the foreshore area and Dover Rivulet.

Built Form

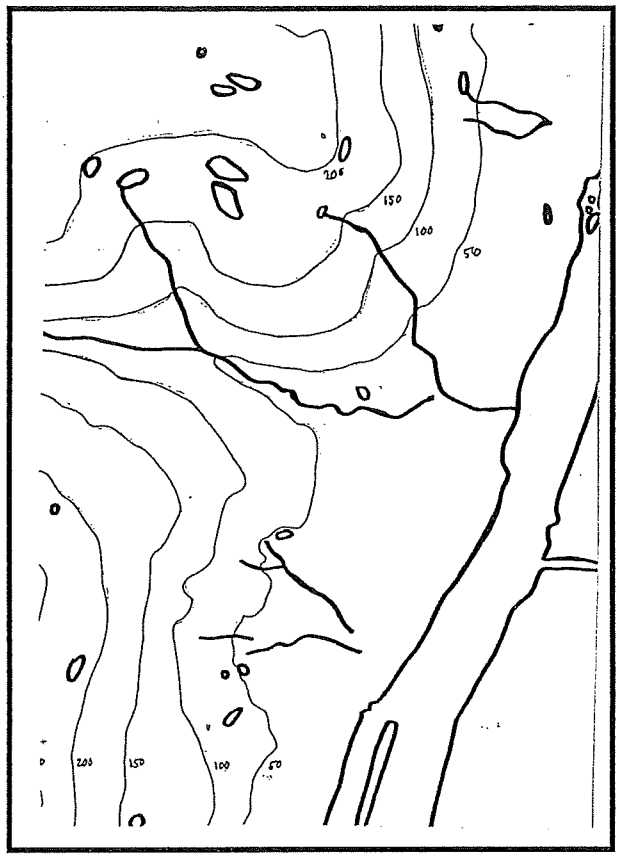
- Actively encourage residential development in identified activity areas within Dover. Residential growth potential in the short term should be accommodated in the existing infill sites throughout the town.
- In the longer term residential development, subject to infrastructure servicing capacity, residential development should be in the areas behind Kent Beach Road and to the west of the Channel Highway opposite the intersection of Bay View Road.
- Each 'stage' of development should be commence in accordance with Council's capital works program and the infrastructure servicing plans. Each stage should be substantially developed before the following stage commences.
- Maintain growth options by limiting low density residential development in identified future residential areas.
- Define the town edge with an urban growth boundary and consolidate development in the town area.
- Install a roundabout at the intersection of the Huon Highway and Station Road (refer to proposal by Dover Tidy Towns Committee).

Economy and Community

- In the future Dover's role can be promoted based on one or several themes. Aspects of these themes can be articulated in design improvements for the town centre: marine service centre; coastal town; and water based tourism.
- Commercial and community uses to be consolidated as part of the existing area on the Channel Highway, between Station Road and Chapman Avenue.
- Encourage consolidation of the town centre; the town centre has sufficient vacant land and buildings to accommodate development in the foreseeable future.
- Linkages between the main commercial and community area with the shopping centre off Station Road to the northeast can be developed with formal plantings and walking paths.
- Development of an aquaculture centre in Dover would be an asset to the community and the tourist industry.
- Create a town feature at vacant site on the northern side of the intersection of Huon Highway and Station Road.


Huon Valley Council
Structure Plan
Dover
Highway Approach
Improve landscape quality and visual appearance of highway entrance
Protect Rural Areas
Protect rural areas and agricultural activities
Prominent Hillside
Visually prominent hillside should be protected
Huon Highway
Prominent Hillside
Visually prominent hillside should be protected
Town Entrance and Intersection Treatment
Key Vacant Site
Prominent vacant site should be used for town feature.
Consolidate
Restrict further low density residential development to consolidate town
Promote Connection
Promote connection between commercial areas with formal plantings
Urban Growth Boundary
Chapel Street
Protect Commercial Centre
Limit linear commercial development
Station Road
Kent Beach Road
Long Term Growth
Long term opportunity for serviced urban expansion
Chapman Avenue
Long Term Residential
Long term residential development subject to environmental management and infrastructure
Bay View Road
Orchard Area
Maintain separation between Dover and Harveytown
Linking Walkway
Provide linking walkway from foreshore to main street area via heritage museum
Limit Residential Development
Remove current residential zoning to reduce over supply and inappropriate location
Port Esperance
The structure plan is indicative only of desirable growth patterns. The lines show broadly the areas required for different uses but are not meant to be used for statutory purposes.

Franklin - *Structure Plan*



Franklin - Topography and Waterways

Features

- Franklin has an outstanding natural setting on the Huon River overlooking the Egg Islands.
- Two prominent hills, the most northern being Hope Hill provide an impressive backdrop to the town.
- Prices Creek is the main drainage line to the Huon River. Other drainage lines are relatively short or have been modified.

Issues

- The form of the town is tightly constrained by its environmental setting.
- The location and design of development on the hills can impact on visual character of the area.

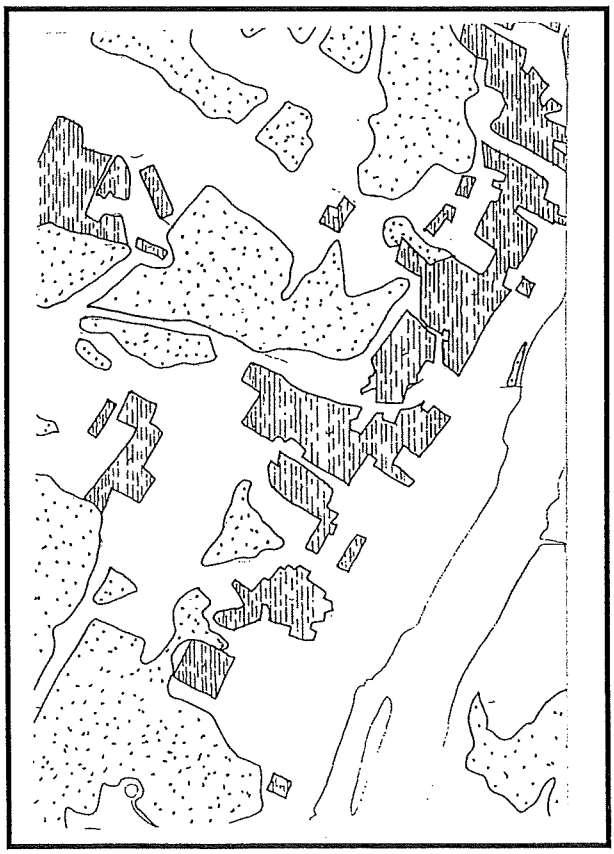
Franklin - Vegetation

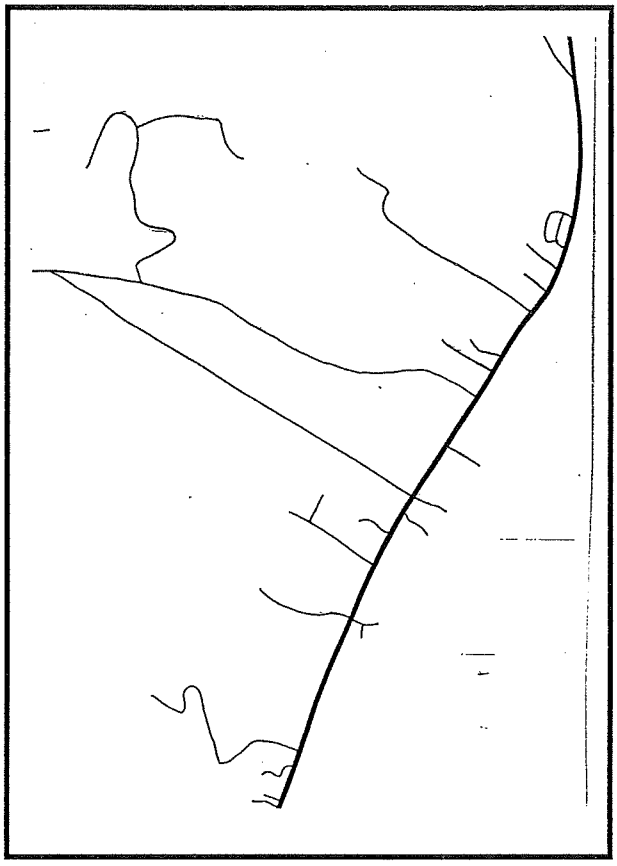
Features

- The backdrop to Franklin consists generally of two bands of vegetation. The first is of orchard species up to the 100m contour, with the second band of remnant native vegetation located above this.
- Vegetation in the town area is generally limited to modest private gardens, with some roadside bands of vegetation in the northern part of the town

Issues

- The landscape setting provided by a backdrop of orchards is an important cultural heritage feature of the town.
- Public areas and the main commercial area have limited landscaping features. Opportunity exists to improve the visual appeal of these areas, define and highlight key places and provide shelter.





Franklin - Roads

Features

- The town is located on the Huon Highway which provides access to Huonville to the north and Port Huon to the south.
- There is no road network, rather short access roads are located at intervals off the Huon Highway and are generally 200 - 400 metres in length.
- A number of small lanes link these roads parallel to the main road directly behind the first row of buildings.

Issues

- The road pattern, which is restricted by topographical features, means vehicular movement and development is generally focused on the Huon Highway.
- There are limited opportunities for further road construction that would not affect the cultural heritage features or environmental quality of the town.

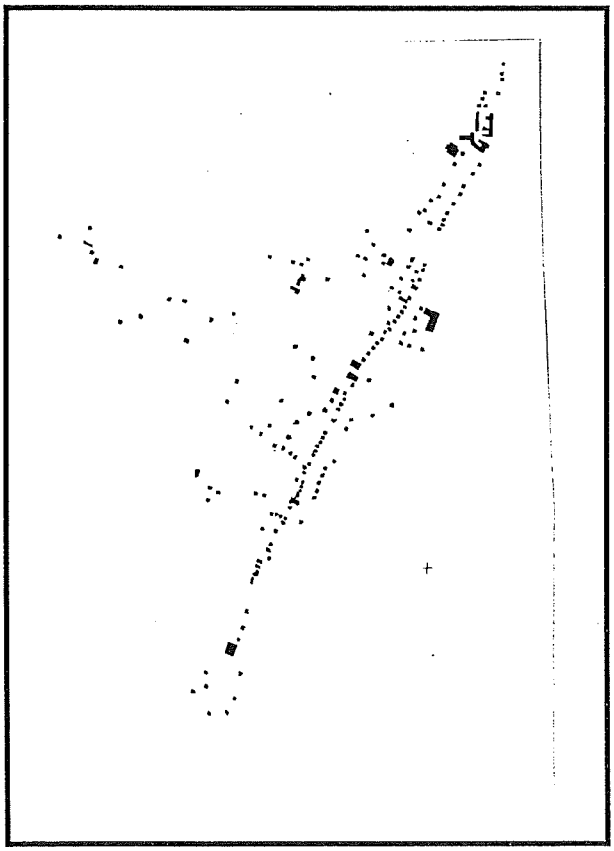
Franklin - Buildings

Features

- The settlement pattern has a strong linear form.
- The majority of buildings are located on the western side of the Huon Highway.
- Residential development has historically extended up the roads behind the town.
- The town has a considerable number of heritage buildings. Historical features of the township make a contribution to the townscape composition.

Issues

- There are limited opportunities for infill development, and where there is this needs take account of cultural heritage features.
- Residential development on the hills behind the town would significantly alter the character of the town and potential impact on its cultural heritage values.



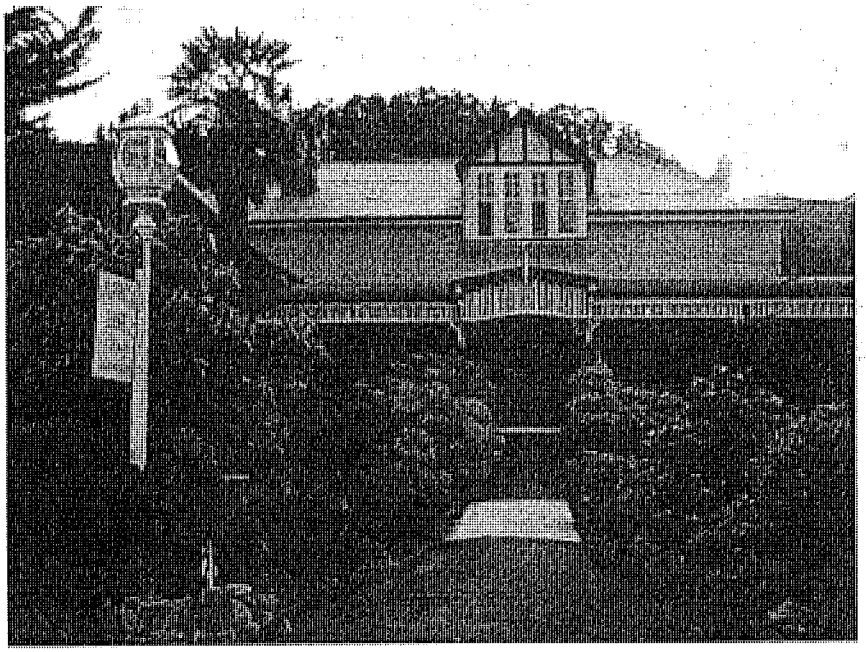
Franklin - Strategic Issues

Environment

- The town has substantial environmental assets including the Huon River, Egg Islands and a backdrop of vegetated hills. The most attractive features are the river and its foreshore.
- Agricultural land is located to the west of the town and should be protected from encroachment.
- The town building and landscape elements are highly cohesive and provide a strong landscape character which needs to be maintained.
- Views across the river to the town from the east are an important consideration in town form and development.

Built Form

- The town has a large number of weatherboard buildings as part of its overall heritage building assets.
- Ad-hoc and unrestricted extensions to the town will severely erode the town's existing character.
- Franklin has a lack of main street development sites. The linear form and environmental setting limit options.
- Sites within the town need to be identified for new a development to ensure that growth is planned and that the town's character is retained.



Heritage and tourism are key features of Franklin

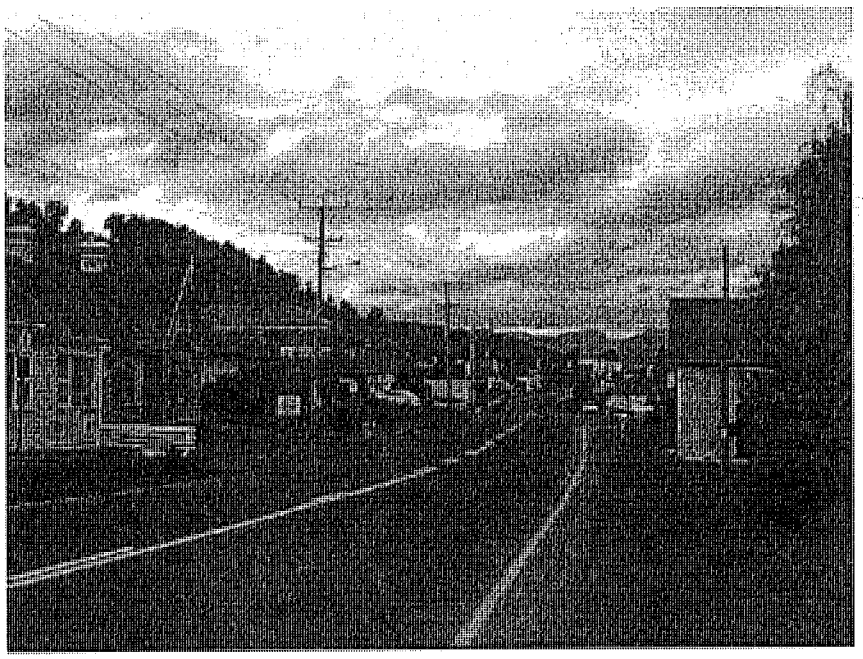
Economy and Community

- Commercial and community uses are generally scattered along the Huon Highway.
- Franklin has a range of community services including Huon District Hospital, Eldercare Home, Bowmont Centre, Franklin Primary School, community hall, two churches, fire station and police station.
- Tourism is considered to be important for the economy of the town. Franklin has a well developed tourism product based on day trips from Hobart. Assets within the township such as heritage buildings, restaurants and craft shops, river frontage and landscape setting contribute to this objective. Significant effort has already been made by the community in enhancing these assets.

Franklin - Desired Future Character

Environment

- Greater use of the Huon River as a major natural feature and recreational area.
- A landscape setting reflecting the agricultural (orcharding) history of the area.
- Protection of pedestrian amenity and human scale of main street.
- Rehabilitation of river foreshore areas through managed access and revegetation.
- Encourage rehabilitation of the Huon River foreshore and limit modification of its natural state.



The desired future character of Franklin is as a key heritage town in the Huon Valley.

Built Form

- Heritage conservation in the main street.
- Maintenance of the existing town form with a limited amount of development on select vacant sites.
- No additional development in hill backdrop to the town.
- All allotments within residential activity areas capable of connection to a future reticulated sewage system.
- Maintain diverse character of the streetscape and variety of uses along the main street.
- Maintain 'gaps' on the eastern side of the Huon Highway to preserve views to the water and islands.

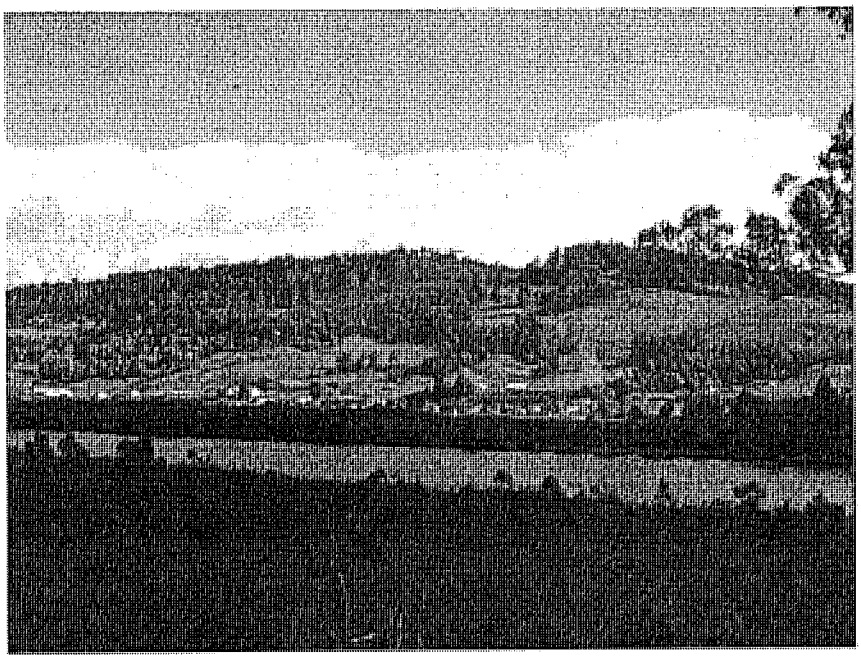
Economy and Community

- Franklin to offer a heritage town lifestyle in a river setting.
- Franklin as a vibrant tourism service town.
- Promotion of the town as a key rowing venue based on the excellence of the Huon River as a rowing site.
- Protect, enhance and promote Franklin as a key heritage town in the Huon Valley.

Franklin - Implementation

Environment

- Development along or near the Huon River should be strictly controlled.
- Protect drainage functions of land to the west of the town.
- Ensure surrounding land uses protect and do not impact on the quality and quantity of natural resources in the area.
- Maintain vegetation cover.



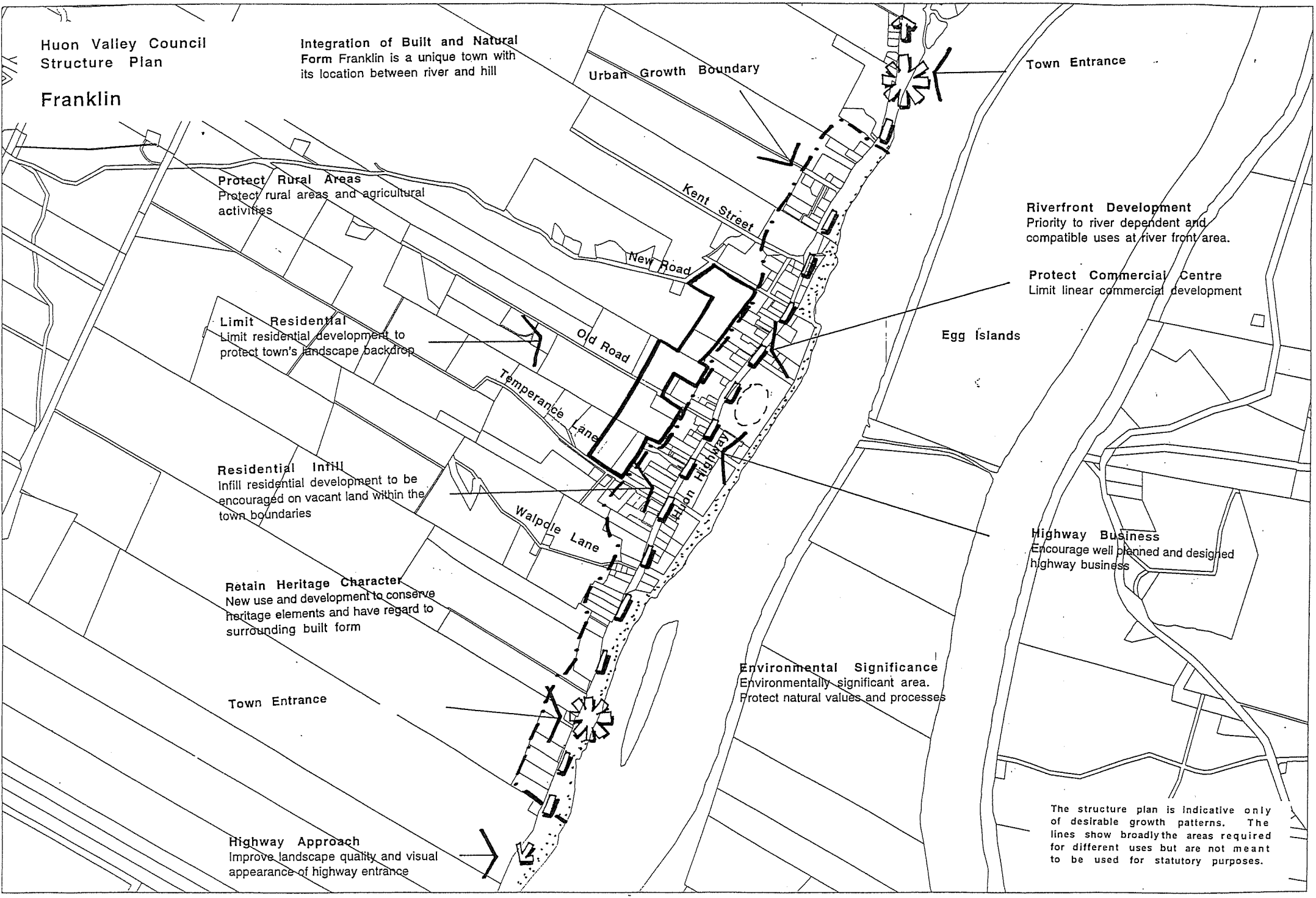
Siting and design of development on hillsides needs to be carefully managed.

Built Form

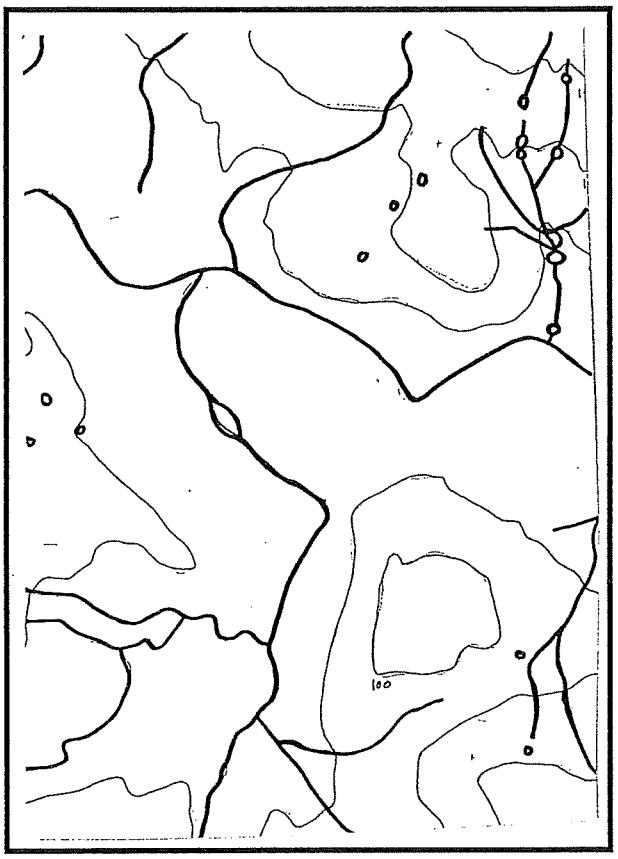
- Follow provisions of the *Franklin Heritage Study* in use and development proposals in the town following the adoption of the study by Council.
- Improve access to the foreshore area and develop walking path.
- Investigate restoration of Franklin cycling track.
- Any residential growth potential should be accommodated in the existing infill sites throughout the town.
- Siting and design of development on hillsides needs to be carefully managed.
- Residential development should be commence in accordance with Council's capital works program and the infrastructure servicing plans. Each stage should be substantially developed before the following stage commences.
- Define the town edge with an urban growth boundary and consolidate development in the town area.
- Protect options for rowing related use and development on the riverside area, and prevent loss of access for this form of use and development.

Economy and Community

- In the future Franklin's role can be promoted based on one or several themes. Aspects of these themes can be articulated in design improvements for the town centre: heritage and river town; craft and woodwork centre.
- Commercial and community development, to be generally focused between Walpole Lane and Church Street. Commercial development at the edges of the town to be strongly discouraged.


Huon Valley Council
Structure Plan
Franklin
Integration of Built and Natural Form Franklin is a unique town with its location between river and hill
Urban Growth Boundary
Town Entrance
Protect Rural Areas
Protect rural areas and agricultural activities
Kent Street
New Road
Riverfront Development
Priority to river dependent and compatible uses at river front area.
Protect Commercial Centre
Limit linear commercial development
Limit Residential
Limit residential development to protect town's landscape backdrop
Old Road
Egg Islands
Temperance Lane
Residential Infill
Infill residential development to be encouraged on vacant land within the town boundaries
Huon Highway
Walpole Lane
Highway Business
Encourage well planned and designed highway business
Retain Heritage Character
New use and development to conserve heritage elements and have regard to surrounding built form
Environmental Significance
Environmentally significant area.
Protect natural values and processes
Town Entrance
Highway Approach
Improve landscape quality and visual appearance of highway entrance
The structure plan is indicative only of desirable growth patterns. The lines show broadly the areas required for different uses but are not meant to be used for statutory purposes.

Geeveston - *Structure Plan*



Geeveston - Topography and Waterways

Features

- Geeveston is located on a terrace surrounded by three hills.
- A complex drainage system comprising the Kermandie River, Rileys Creek and Scotts Creek provide a central feature of the town.

Issues

- The location and design of development on the hills can impact on visual character of the area.
- Areas along Kermandie River are subject to inundation.

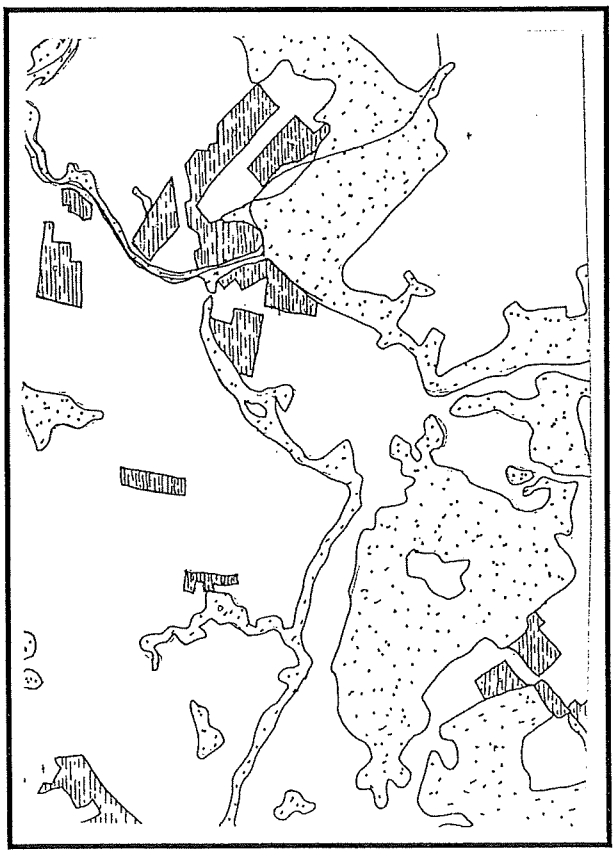
Geeveston - Vegetation

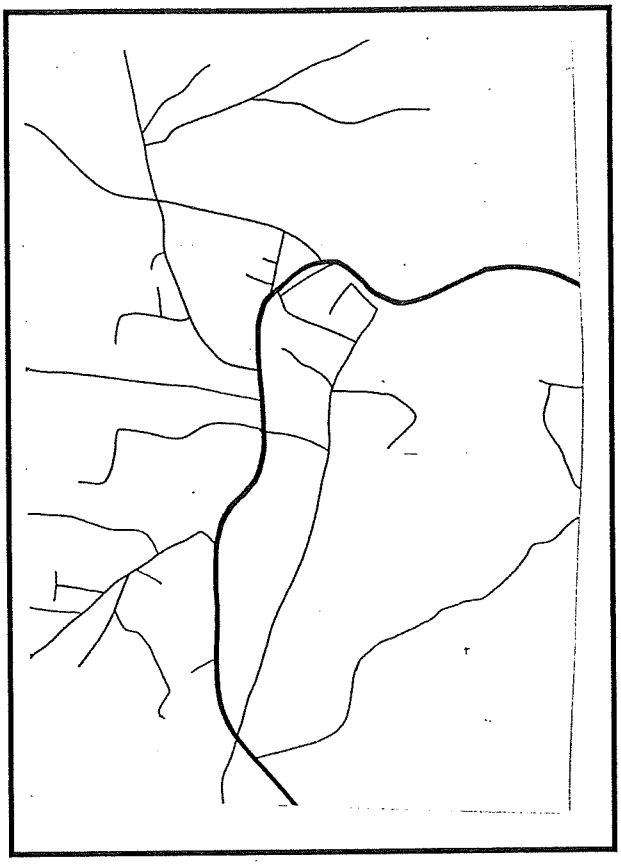
Features

- Remnant native vegetation is located on the lower slopes of the northern hill, the eastern hill and along most riparian areas.
- Areas to the west of Geeveston have generally been cleared of native vegetation.
- Some large orchards are located to the north and south of the town.
- Wind-break and remnant vegetation contribute to the character of the peripheral residential and rural areas.

Issues

- Public areas and the main commercial area have limited landscaping features. Opportunity exists to improve the visual appeal of these areas, define and highlight key places and provide shelter.





Geeveston - Roads

Features

- The town is located on the Huon Highway which provides access to the Port Huon to the north and Dover to the south.
- A central core area is based on a triangular pattern of roads with Church Street as a focus.
- The internal road layout follows a radial pattern which extends out in five directions.

Issues

- The less defined pattern of outlying roads has promoted dispersed development at the towns northwestern and southwestern areas.
- Improved alignment and formation of roads will provide for considerable infill development opportunities.

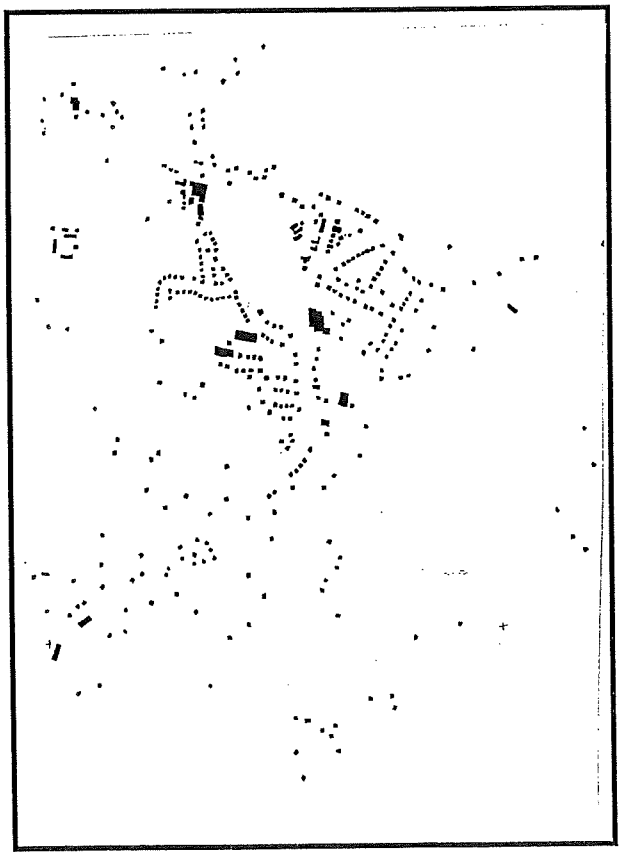
Geeveston - Buildings

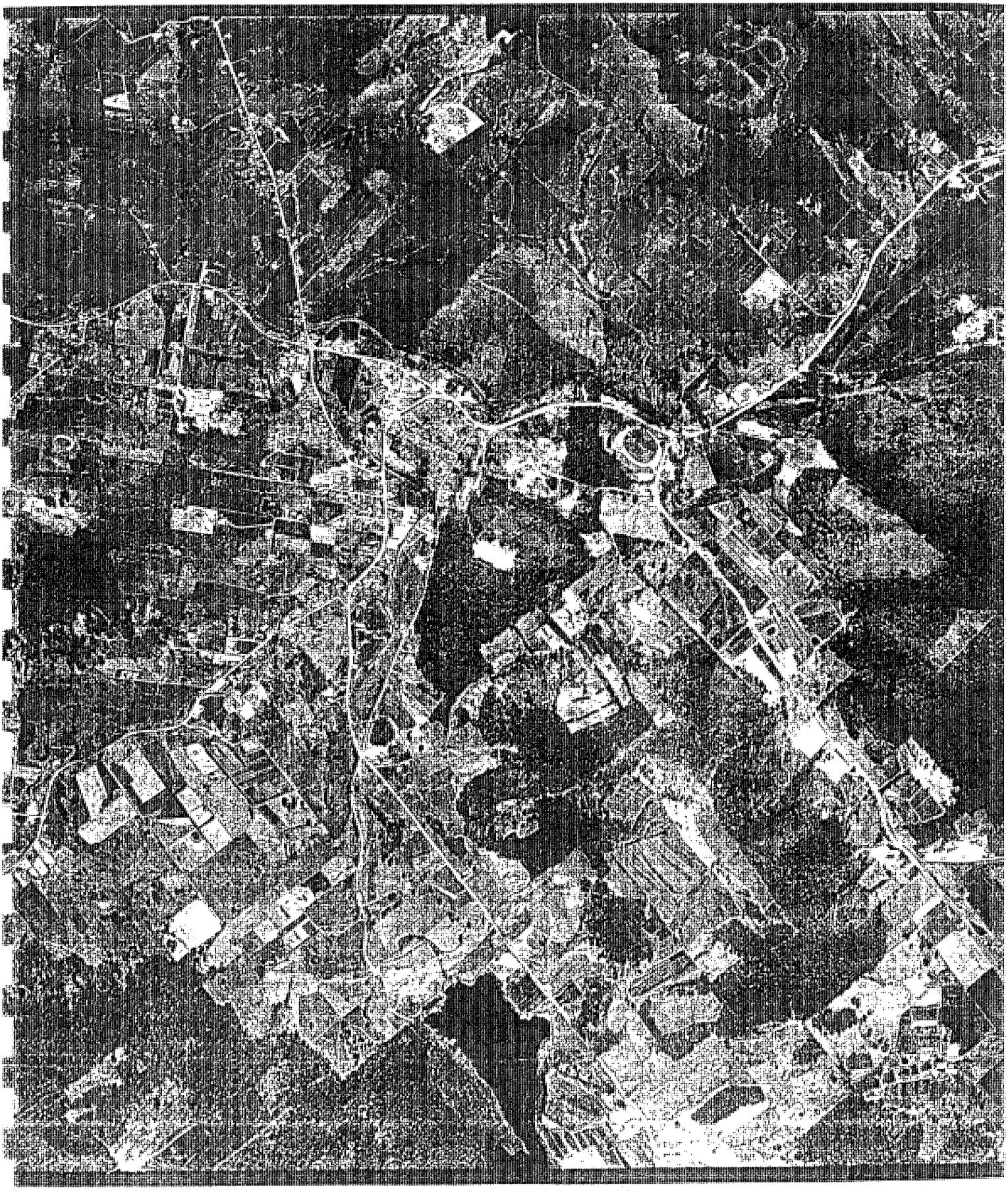
Features

- The density of buildings is highest in the central area following the Main Road, School Road and Arve Road area.
- In the outlying areas the town's form is less defined.

Issues

- Substantial residential development opportunities exist close to the commercial and community centre.
- Current zoning of residential land is extensive and could promote a disperse low density settlement pattern.
- Development to the east of the town would be in a visually prominent area.





Geeveston - Strategic Issues

Environment

- Geeveston is distinct from many other towns having a significant amount of remnant vegetation and forested areas surrounding the town.
- Areas where land is subject to inundation limit the development of the town along the Kermandie River area.
- Vegetation is not used to its potential to define features and elements of the town or contribute to the legibility and visual character of the town.

Built Form

- The existing elements of the town can be better linked to develop a more consolidated town form.
- The town does not have a precise urban/rural edge, however, it does have elements of a core urban area to provide a focus for future development.
- A lack of cohesion between the existing built elements and the absence of strongly unifying landscape features are major impediments to the establishment of any character.
- Geeveston has a lack of town centre development sites. There is potential to extend the centre westwards if necessary.
- The town form is circular with a large open space in the centre which is not used to its full potential.

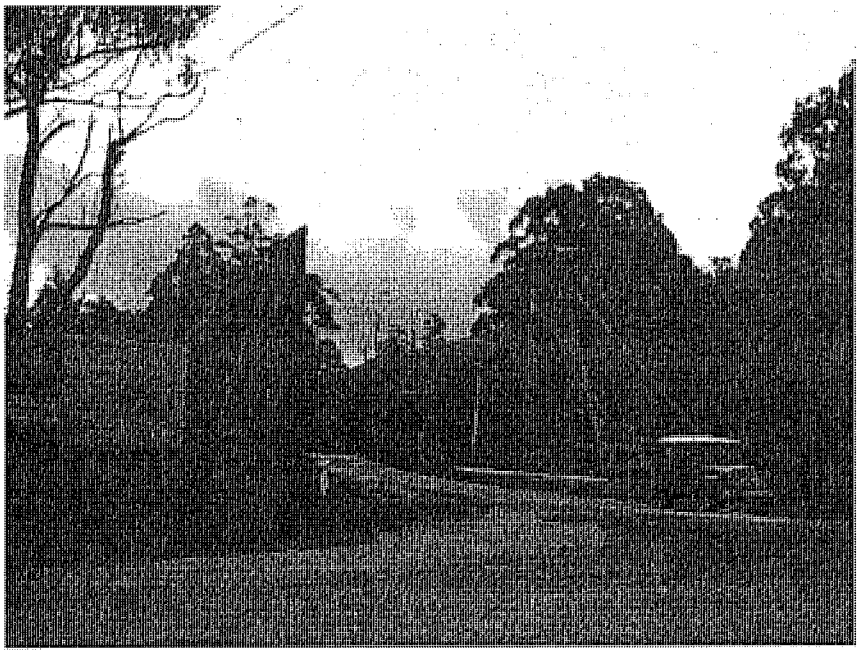
Economy and Community

- Commercial and community uses are well located in an active node centred on Church Street off Main Road (the Huon Highway).
- Retention of local resident and tourist expenditure and development of local retail services is an issue.
- Geeveston features a number of community facilities including Geeveston Child Health Clinic, community centre, community creche, Geeveston District High School, post office, police station, swimming pool, community church, scout and guide hall, old Council chambers.
- Forestry Tasmania maintains a work depot on the western edge of the town.

Geeveston - Desired Future Character

Environment

- Use of the large open space in the centre of the town as a formal park area.
- The Kermandie River used as a major natural feature and recreational area.
- A landscape theme based on the forested quality of the area.
- Protection of surrounding land and vegetated areas for their landscape value.



Develop Geeveston as a gateway for forest and wilderness based recreation.

Built Form

- Encourage a design theme for the town based on timber heritage to be reflected in building design, materials, signage and public buildings and works.
- All allotments within residential activity areas capable of connection to a reticulated sewage system.
- Residential development to occur largely as infill development in current zoned and serviced areas.
- Maintain the compact urban form with no additional linear development along the Huon Highway to the north or south.

Economy and Community

- Geeveston to offer a small town lifestyle in a forested setting.
- Develop Geeveston as a gateway for forest and wilderness based recreation.
- Developed walking trails including: track opportunities along the Kermandie River, link to the national trail; and likes between the school, town centre and recreational facilities.

Geeveston - Implementation

Environment

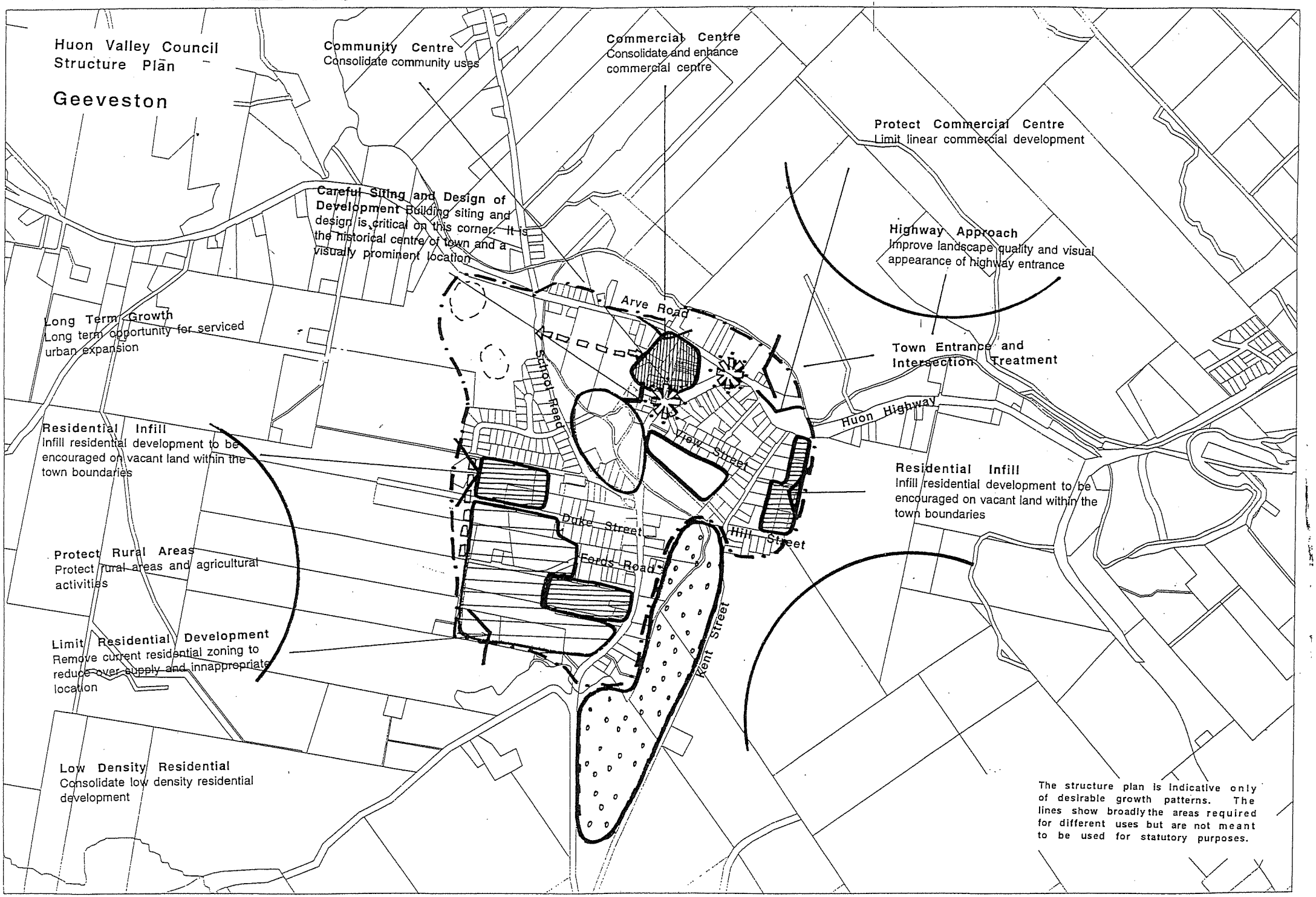
- Development along or near the Kermandie River should be strictly controlled.
- Develop open space opportunities between the heritage centre and the high school.
- Retain old orchard near heritage park as a key landscape feature.
- Limit development in areas subject to inundation.
- Remove willows and other pest plants.

Built Form

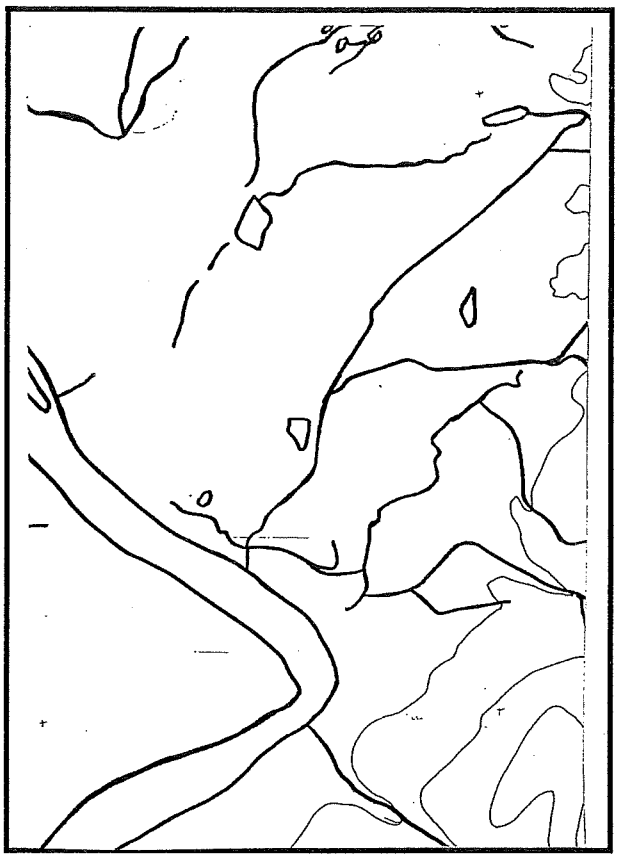
- Actively encourage residential development in identified activity areas within Geeveston. Residential growth potential in the short term should be accommodated in the existing infill sites throughout the town.
- The first stages of residential development should be in the area off Kent Street and off Fords Road. Long term residential development, subject to infrastructure servicing capacity, should be in the area between John Street and Fords Road. This may include the extension of John Street south.
- Each 'stage' of development should be commence in accordance with Council's capital works program and the infrastructure servicing plans. Each stage should be substantially developed before the following stage commences.
- Maintain growth options by limiting low density residential development in identified future residential areas.
- Define the town edge with an urban growth boundary and consolidate development in the town area

Economy and Community

- In the future Geeveston's role can be promoted based on one or several themes. Aspects of these themes can be articulated in design improvements for the town centre: forestry service centre; forest heritage town; wilderness tourism.
- Commercial activity to be consolidated along Church Street. Commercial development along the Huon Highway to be strongly discouraged.
- Promote the Forest and Heritage Centre as a key economic development opportunity in the town.


Huon Valley Council
Structure Plan
Geeveston
Community Centre
Consolidate community uses
Commercial Centre
Consolidate and enhance commercial centre
Protect Commercial Centre
Limit linear commercial development
Careful Siting and Design of Development Building siting and design is critical on this corner. It is the historical centre of town and a visually prominent location
Highway Approach
Improve landscape quality and visual appearance of highway entrance
Long Term Growth
Long term opportunity for serviced urban expansion
Arve Road
School Road
Town Entrance and Intersection Treatment
Huon Highway
Residential Infill
Infill residential development to be encouraged on vacant land within the town boundaries
Irene Street
Residential Infill
Infill residential development to be encouraged on vacant land within the town boundaries
Duke Street
Hill Street
Fords Road
Protect Rural Areas
Protect rural areas and agricultural activities
Kent Street
Limit Residential Development
Remove current residential zoning to reduce over supply and innappropriate location
Low Density Residential
Consolidate low density residential development
The structure plan is indicative only of desirable growth patterns. The lines show broadly the areas required for different uses but are not meant to be used for statutory purposes.

Huonville - *Structure Plan*



Huonville - Topography and Waterways

Features

- Huonville is located on a terrace alongside the Huon River with steep hills located to the southwest on the other side of the river and to the southeast.
- Mountain River enters the Huon River to the northwest of the town and Skinners Creek to the southeast. Other drainage lines have generally been modified.
- An estuarine area is located at Waltons Inlet.

Issues

- The location and design of development on the hills can impact on visual character of the area.
- Areas along Waltons Creek are subject to inundation.

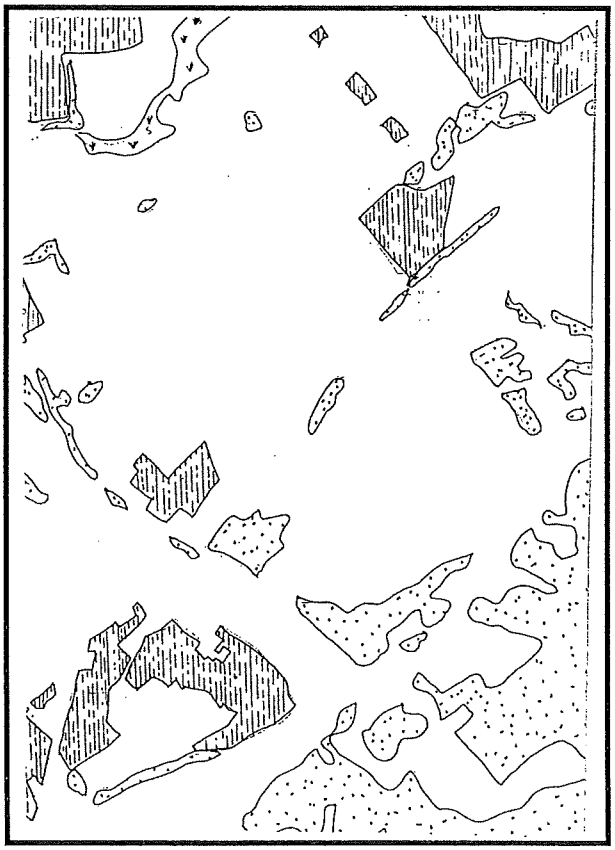
Huonville - Vegetation

Features

- Areas within and on the edge of Huonville have generally been cleared of native vegetation.
- Remnant vegetation is largely confined to some areas along the Huon River and in hilly areas to the southeast of the town.
- Extensive areas of orchards and hop plantations are located in the rural areas surrounding the town.
- Vegetation in the town area is generally limited to modest private gardens with no formal plantings as landscape features.

Issues

- Public areas and the main commercial area have limited landscaping features. Opportunity exists to improve the visual appeal of these areas, define and highlight key places and provide shelter.





Huonville - Roads

Features

- The town is located on the Huon Highway which provides access to Hobart to the north and Franklin to the south. The Channel Highways extends to the southeast providing access to Cygnet.
- The internal road layout resembles a 'pitchfork' extending out along Wilmot Road and Sale Street.

Issues

- The road pattern provides a basis for the continued form and development of the town.
- Long term option of Huonville bypass.

Huonville - Buildings

Features

- The settlement pattern is characterised by three features: a linear form along the Huon Highway, and compact central area and a separate residential area at Southbridge on the other side of the Huon River.
- The town has a good variety of land types, locations and ambiance.

Issues

- Select areas exist which are suitable for infill development.
- Continued extension of the town northwards will impact on the quality of the entry to the town.
- Expansion of the town is confined by the Huon River and surrounding agricultural activities.



Huonville - Strategic Issues

Environment

- The Huon River is a major landscape and environmental asset for the town and buildings and works which may affect its visual and environmental qualities.
- Agricultural land is located to the north of the town and should be protected from encroachment.
- There is no topographic element to the north to visually contain the town, and this factor has been significant in determining the form of its previous development.
- Urban runoff and sewage effluent causes pollution of waterways.
- Scarring by extractive industry activities above Scenic Road.

Built Form

- The mainstreet of Huonville has several attractive features good scale, however, it lacks any defining character and as a whole presentation is very poor. Heritage buildings are an important though understated element of the streetscape.
- Ad-hoc and unrestricted extensions to the town will erode the town's existing character.
- The town does not have a precise urban/rural edge, however, it does have elements of a core urban area to provide a focus for future development.
- Buildings and works on the Huon River need to be carefully assessed to ensure the functional qualities and pedestrian movement along the riverbank is not impinged upon.
- The relationship of the town to the Huon River is important. The protection of its natural character and very careful management of landscape qualities is critical.

Economy and Community

- Huonville is a traditional service town which has changed its role and appearance as it has absorbed new residents who primarily commute to Kingston and Hobart for work and who are seeking urban amenities in a country town setting.
- Developing a tourism function of Huonville is important.
- Proximity of Huonville to the Greater Hobart area will favour its intensification as a residential community.
- The proximity of Huonville to Hobart and activity along highway contributes to the level of activity and residential demand in the areas near the town.
- Challenges facing the town in the next 10 years include local employment, traffic management, town presentation and promotion of the town.
- The proximity and ease of access to higher order commercial and cultural services in Kingston and Hobart will generally limit the amount of commercial development in the town. Retention of local resident and tourist expenditure and development of local retail services is an issue.
- A range of community facilities are located in Huonville including child health clinic, several halls and churches, Huon Valley Council office and depot, community creche, library, post office, fire station, swimming pool, courthouse, Huonville Primary School and High School (a major regional facility), youth centre and ambulance. A number of State and Commonwealth agencies also maintain offices in the town.
- There are limited recreation and parkland areas in the town.

Huonville - Desired Future Character

Environment

- Introduction of mainstreet and amenity improvements generally in accordance with Andrew Shurman - Crawford Wegman Architects and Partricia Barwick - Landscape Architect (1994) *Streetscape Study Huonville.*
- The Huon River utilised as a major natural feature and recreational area. Development along or near the river should be strictly controlled to maintain the natural state of the river, visual quality and public access.
- Increased plantings in central commercial and community spaces.
- A landscape theme reflecting the agricultural (orchard) quality of the area, with indigenous vegetation along the river and Southbridge area.

Built Form

- All allotments within residential activity areas shall be capable of connection to a reticulated sewage system.
- Attractive low scale development of the Huon Riverbank area concentrated to the south of the bridge in the Apex Park area subject to assessment of flood hazard.
- Maintenance of long term bypass option to the west of Main Street.
- Improve pedestrian linkages and surfaces for access linking Main Street, school and river side areas.
- Maintain options for the development of a bypass to the west of the town. This may not be developed in the medium term, however, should not be prevent due to alienation caused by inappropriate buildings and works located along its possible route.

Economy and Community

- Huonville to be the primary service centre for its immediate region. The centre's retail component, which is the most significant in the municipal area, to play a local role with an emphasis on convenience goods, wholesale and retail traders and as a location for government sector activities.
- Huonville to offer a town lifestyle in a agricultural and river setting and relatively close to the Greater Hobart area.
- There is scope for additional retail development in the town based on tourism trade and increasing local population; land will need to be allocated for new development.
- Huonville to develop as a gateway for nature based recreation and exploration in southern Tasmania.
- There is an opportunity to develop a distinct market niche for Huonville as a primary agricultural service centre in the valley, i.e. promoting retail and business services and service industries.
- More substantial residential development in the town area.
- The attraction of new residents in order to contribute to the existing commercial and community vitality of the town.
- Additional elderly persons housing and services as an opportunity for new development and employment.

Huonville - Implementation

Environment

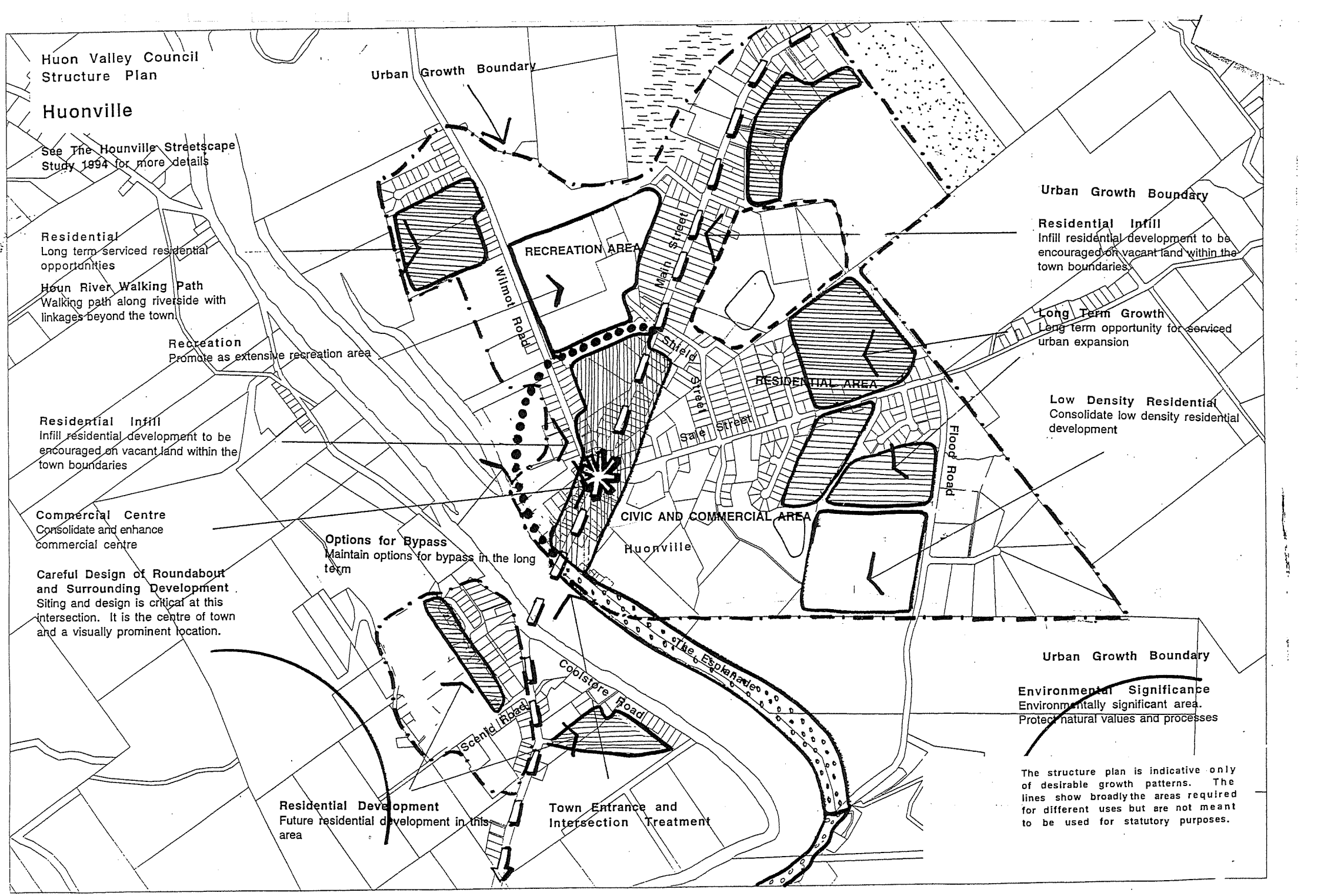
- Landscaping is needed to soften the visual impact of hard surfaces and provide shade. Car park areas have poor visual amenity.
- Pedestrian access can be improved by reinforcing important pedestrian links and by exploiting opportunities for establishing new links and making better use of existing links.
- Re-establish the treed avenue on the northern entrance to Huonville.

Built Form

- Follow provisions of Andrew Shurman - Crawford Wegman Architects and Partricia Barwick - Landscape Architect (1994) *Streetscape Study Huonville* in use and development proposals in the town. Introduce streetscape improvement including more seating, a central focus and landscaping.
- Actively encourage residential development in identified activity areas within Huonville. Residential growth potential in the short term should be accommodated in the existing infill sites throughout the town.
- The first stage of residential development should be in the areas off Walton Street. The second stage should be east of Main Street, south of the golf course subject to investigation of environmental capability. The third stage of residential development should be to the west of Wilmot Road, south of Stride Street opposite the high school.
- Very limited residential development off Scenic Road, south west (above) Frankcomb, may be suitable provided appropriate design measures and materials/finishes, are used to ensure no environmental hazards are present and landscape character is maintained.
- Further low density residential development in the Burwood Street/Ellison Street area.
- Each 'stage' of development should be commence in accordance with Council's capital works program and the infrastructure servicing plans. Each stage should be substantially developed before the following stage commences.
- Maintain growth options by limiting low density residential development in identified future residential areas.
- Define the town edge with an urban growth boundary and consolidate development in the town area.
- A more compact and consolidated the town centre will increase shopper amenity and convenience and increase the tourism appeal of the town centre

Economy and Community

- In the future Huonville's role can be promoted based on one or several themes. Aspects of these themes can be articulated in design improvements for the town centre: agricultural service centre; river town; and water tourism.
- Huonville needs to capitalise on the projected increases in population and number of household in its trade area. One important initiative is to implement town centre improvements that will increase shopper amenity and attractiveness of the town centre for shopping and business.
- Develop park areas for recreation in the residential area of Huonville.
- Improve landscaping along river bank near bridge and at town entrances.
- Commercial development should be located on main Street between the Heron Street/Shield Street and the bridge. Future expansions options to the east at the Forestry and Hydro site.
- An industrial estate could be established progressively, commencing with an 'incubator' site.
- Encourage consolidation of the town centre; the town centre has sufficient vacant land and buildings to accommodate development in the foreseeable future.
- Encourage improved design of commercial buildings. Design and colour guidelines for mainstreet buildings should be promoted.
- Encourage development of aged care housing and facilities.


Huon Valley Council
Structure Plan
Huonville
See The Hounville Streetscape Study 1994 for more details
Urban Growth Boundary
Residential
Long term serviced residential opportunities
Houn River Walking Path
Walking path along riverside with linkages beyond the town.
Recreation
Promote as extensive recreation area
Residential Infill
Infill residential development to be encouraged on vacant land within the town boundaries
Commercial Centre
Consolidate and enhance commercial centre
Careful Design of Roundabout and Surrounding Development
Siting and design is critical at this intersection. It is the centre of town and a visually prominent location.
Options for Bypass
Maintain options for bypass in the long term
Residential Development
Future residential development in this area
Town Entrance and Intersection Treatment
RECREATION AREA
RESIDENTIAL AREA
CIVIC AND COMMERCIAL AREA
Huonville
Wilmot Road
Main Street
Shield Street
Sale Street
Flood Road
Coolstore Road
Scenic Road
The Esplanade
Urban Growth Boundary
Residential Infill
Infill residential development to be encouraged on vacant land within the town boundaries.
Long Term Growth
Long term opportunity for serviced urban expansion
Low Density Residential
Consolidate low density residential development
Urban Growth Boundary
Environmental Significance
Environmentally significant area.
Protect natural values and processes
The structure plan is indicative only of desirable growth patterns. The lines show broadly the areas required for different uses but are not meant to be used for statutory purposes.

General Town Polices

7.2 Coastal Towns

These policies apply to remaining coastal towns.

Strategies

Environmental Management

- Protect and enhance the foreshores, streams and waterways within coastal towns.
- Ensure the dynamic, complex and interconnected nature of biological and physical processes (terrestrial and marine) are protected, as well as sites of geological and geomorphological significance.
- Maintain natural ecosystems and sites of biological importance and the biodiversity of indigenous coastal flora and fauna in and around coastal towns.
- New use and development shall have regard to land capability and the avoidance of environmental hazard.
- Protect coastal sites and features of cultural and historic value.
- Prevent changes to the natural processes of erosion and accretion of areas of exposed sand, sand dunes, blowouts and the like. Maintain vegetation which assists in the stabilisation of sand dune areas.

Building and Development

- Building and development in coastal towns should demonstrate dependence on a coastal location.
- The availability of land for use and development will be limited according to the ability of natural and physical resources to sustain such use and development.
- Prevent buildings or works which would alter the natural processes between wind, waves and sediment transfer.
- Promote the use of existing shacks and houses as short term holiday accommodation.
- Allow a range of uses which are related to and support the local fishing industry in isolated areas. Provide adequate environmental protection and maintain residential amenity.
- Preference will be for environmentally sensitive (or 'soft') engineering methods over modification of the environment and the use of hard structures.

Economic and Community Development

- Support community involvement in programs such as Coastcare, weed eradication and the like.
- Develop initiatives to resolve substandard access provisions for existing leasehold and freehold shacks.
- Develop initiatives to provide for long term lease, freehold title or disposal of existing shacks.
- Recognise the economic value of tourism and recreation in coastal areas. The importance of public access to and along the coast shall be consistent with the protection of natural coastal values, systems and processes and public safety.
- Support sustainable coastal related tourism and recreation, the development of essential services and facilities which manage the movement and use of the coast by visitors and encourage interpretation of the natural and cultural values of the coast, in accordance with the other objectives of this policy.

7.1 Rural Towns

The policies apply to remaining rural towns.

Strategies

Environmental Management

- Protect and enhance the streams and waterways within rural towns.
- Agricultural land and natural resources around rural towns shall be protected from encroachment.
- Natural and cultural features of rural towns shall be protected.
- New use and development shall have regard to land capability and the avoidance of environmental hazard.

Building and Development

- Infill vacant land with residential use and development only where such sites can be serviced by efficient disposal methods which can sustain adequate containment of all sullage within the site.
- Promote and support a compact urban form to towns which fully utilises existing vacant residential areas and peripheral urban growth.
- Ensure no additional areas of land are rezoned unless there is a review and rationalisation of the supply of residential land.
- New use and development is to be in harmony with the historical, cultural and landscape setting and built form of the town.
- Commercial use and development shall be located within existing towns and should be located in existing mainstreet/commercial areas. Edge locations for commercial activity will be strongly discouraged.
- Urban form will have regard maintaining growth options for future town use and development.
- Coordinate residential use and development with infrastructure services and ensure new residential development meets all required servicing costs.

Economic and Community Development

- Allow a range of uses which are relevant to and supportive of sustainable use of rural land.
- Ensure that incompatible uses are separated in order to protect residential amenity and enable industrial and commercial activities to operate.
- Ensure that the individual character and identity of towns is retained and enhanced.
- Support community involvement in programs such as landcare, integrated catchment management and pest plant eradication.

17.027/99*
HUON VALLEY PLANNING SCHEME OBJECTIVES
17/18
SPR ED G1

Manager Environment and Development Services presenting a report on the proposed objectives for the new Huon Valley Planning Scheme.

REPORT

Background

At the December 1997 meeting, Council adopted a Land Use Strategy prepared by TBA Planners Pty Ltd. The Land Use Strategy is to form the strategic basis of the Council's new planning scheme. At the September 1998 meeting of Council, approval was given to initiate the preparation of the Huon Valley Planning Scheme. A copy of the report is included in the attachments for reference.

Unfortunately, the scheme has not progressed as planned, due to Council's Planning Officer having been almost fully devoted to the implementation of the new computer system within Council. Kingborough Council have experienced similar delays. In the meantime however, the Minister for Primary Industries, Water and Environment has agreed to four Councils (Huon Valley, Kingborough, Circular Head and Waratah-Wynyard) trialling the Model Framework for Planning Schemes. Late this year, the Minister will announce whether all Councils will be required to adopt this Model.

In recent weeks, Council and Departmental staff have re-initiated the planning scheme and work has now begun in earnest.

Process of Planning Scheme Development

The planning scheme will be prepared in accordance with the Model Framework for Planning Schemes. The sequence of work can be very broadly described in the following steps:

1. Define Planning Scheme Objectives.
2. Determine values and intent of Zones, together with primary, secondary and prohibited use classes.
3. Prepare zoning maps.
4. Determine Development Standards, i.e. the relevant issues & objectives, performance criteria and acceptable solutions for the different zones.
5. Complete a variety of relevant schedules.

This is an interactive process whereby constant review and change will be required in developing the planning scheme document. It is anticipated that Council Officers will primarily do this work. However, constant interaction with Departmental officers, other State Agency officers and Councillors will be required.
The approval of the September 1998 Council meeting also involved "the establishment of a small steering committee to provide direction to the development of the planning scheme".

17.027/99*
HUON VALLEY PLANNING SCHEME OBJECTIVES (contd)
17/18
SPR ED G1

This was to be a joint committee with Kingborough Council, but unfortunately this has not progressed as we would have liked. While the development of the planning scheme will be a co-operative exercise with Kingborough, a formal joint committee appears unlikely to occur.

However, it is proposed that the same Councillors as originally envisaged (i.e. Councillors Clark and Pepper) plus the Mayor, be involved in providing the above-mentioned directions to the planning scheme. A regular meeting is anticipated to be held every second Monday afternoon at 2.30 p.m. (commencing 28 June 1999) with Council and Departmental staff to discuss in detail relevant policy issues and progress made to date. Formal reports will come back to Council when necessary.

The meetings and discussions to date have identified that the first step in the preparation of the scheme is to define the overall objectives of the planning scheme. Development applications will be assessed according to the development standards as stated within the final scheme. In order to determine the more precise information required within these standards, it is first necessary to define the overall scheme objectives.

These scheme objectives constitute a summary of the local strategies for the management and planning of resources within the municipal area as identified in the Land Use Strategy and they provide the context for the detailed provisions in later parts of the planning scheme.

Planning Scheme Objectives

Within the previously approved Land Use Strategy there was a number of "core Strategy elements". These were simple statements relating to:

- Protecting Natural Resources
- Facilitating Productive Primary Industry Activity
- Supporting Economic Development
- Rationalising Land Supply
- Promoting Town Development
- Providing Essential Infrastructure
- Protecting Landscape Features
- Managing Coastal Use and Development

Whilst these core strategy elements give a summary of the main issues identified within the strategy document they need to be further defined for inclusion as objectives under Part 2 of the new scheme. The Model Framework for Planning Schemes requires that Part 2 of the Scheme "will include the objectives for the planning and management of resources within the planning area".

17.027/99*
HUON VALLEY PLANNING SCHEME OBJECTIVES (contd)
17/18
SPR ED G1

From the above core strategy elements within the Land Use Strategy, plus other information contained within that document, a series of scheme objectives can be compiled. These objectives provide for an overall direction to the planning scheme and it is important that the Council sign them off so that the more detailed work of the scheme preparation can proceed.

The following list of objectives has been prepared based on the detail within the Land Use Strategy document. It can be noted that the issues dealt with in these objectives are not dissimilar to the core strategy elements of the Land Use Strategy previously approved by Council. They have however, been further refined for inclusion in the scheme. It is therefore proposed that the following objectives be included in the new Huon Valley Planning Scheme:

17.027/99*
RECOMMENDATION

That Council approve the planning scheme objectives as outlined below for inclusion within the final Huon Valley Planning Scheme document and for use as a basis for the formulation of development standards within the planning scheme document.

Natural Resources and Environmental Issues

(a) **To protect the natural resources of land, water, flora, fauna, biodiversity and natural eco-systems.**

(b) **To protect land and natural resources outside existing settlements primarily for the agricultural (including organic farming), forestry, aquaculture and tourism industries and environmental protection and conservation purposes.**

(c) **To ensure all use and development is located on land capable of sustaining that use or development.**

(d) **To ensure that adequate separation is maintained between sensitive uses and uses with the potential to create environmental impacts.**

(e) **To protect natural watercourses and provide for the protection and improvement of water quality.**

(f) **To ensure that use and development is safe from environmental hazards such as bushfire, flood and land instability or other environmental constraints.**

(g) **To encourage innovative solutions to environmental management, the design and siting of developments and residential amenity issues.**

17.027/99*
HUON VALLEY PLANNING SCHEME OBJECTIVES (contd)
17/18
SPR ED G1

17.027/99
RECOMMENDATION (contd)

(h) To protect coastal environmental values and to ensure that use and development does not interfere with the natural physical and biological processes of the coast.

Economic Development

(i) To facilitate productive primary industry, industrial and tourism sectors and to protect the natural resources relied upon by these sectors.

(j) To encourage diverse economic development and the establishment of new businesses.

(k) To encourage opportunities for industry to take up value adding or down-stream processing of local products.

Infrastructure

(l) To ensure that residential, commercial and industrial use or development is primarily concentrated in or adjacent to existing settlements where infrastructure is available.

(m) To ensure that use or development outside existing serviced settlements provides its own infrastructure.

(n) To ensure that any spare capacity of land serviced by publicly provided infrastructure is utilised to its economic capacity before new areas are considered for urban development.

(o) To protect infrastructure from use or development, which may reduce its safety, efficiency, capacity or potential for future upgrading.

(p) To ensure that future development is designed to incorporate socially acceptable solutions, particularly in regard to safety, access, comfort and general visual amenity.

Landscape, Heritage and Cultural Issues

(q) To protect and enhance places of cultural and heritage value.

(r) To protect and maintain the scenic quality, visual components, important features and amenity of the landscape.

17.027/99*
HUON VALLEY PLANNING SCHEME OBJECTIVES (contd)
17/18
SPR ED G1

17.027/99
RECOMMENDATION (contd)

Land Supply

(s) To rationalise land supply so that development opportunities exist for all short and medium term needs and so that an over-supply of such land is not created.

RESOLVED CR THOMAS CR HERON

That Council endorse the planning scheme objectives as outlined to assist in the preparation of the Huon Valley Planning Scheme document and for use as a basis for the formulation of development standards within the planning scheme.

Natural Resources and Environmental Issues

(a) To protect the natural resources of land, water, flora, fauna, biodiversity and natural eco-systems.

(b) To protect land and natural resources outside existing settlements primarily for the agricultural (including organic farming), forestry, aquaculture and tourism industries and environmental protection and conservation purposes.

(c) To ensure all use and development is located on land capable of sustaining that use or development.

(d) To ensure that adequate separation is maintained between sensitive uses and uses with the potential to create environmental impacts.

(e) To protect natural watercourses and provide for the protection and improvement of water quality.

(f) To ensure that use and development is safe from environmental hazards such as bushfire, flood and land instability or other environmental constraints.

(g) To encourage innovative solutions to environmental management, the design and siting of developments and residential amenity issues.

(h) To protect coastal environmental values and to ensure that use and development does not interfere with the natural physical and biological processes of the coast

17.027/99*
HUON VALLEY PLANNING SCHEME OBJECTIVES (contd)
17/18
SPR ED G1

17.027/99
RESOLUTION (Cont..)

Economic Development

(a) To facilitate productive primary industry, industrial and tourism sectors and to protect the natural resources relied upon by these sectors.

(b) To encourage diverse economic development and the establishment of new businesses.

(c) To encourage opportunities for industry to take up value adding or down-stream processing of local products.

Infrastructure

(a) To ensure that residential, commercial and industrial use or development is primarily concentrated in or adjacent to existing settlements where infrastructure is available.

(b) To ensure that use or development outside existing serviced settlements provides its own infrastructure.

(c) To ensure that any spare capacity of land serviced by publicly provided infrastructure is utilised to its economic capacity before new areas are considered for urban development.

(d) To protect infrastructure from use or development, which may reduce its safety, efficiency, capacity or potential for future upgrading.

(e) To ensure that future development is designed to incorporate socially acceptable solutions, particularly in regard to safety, access, comfort and general visual amenity.

Landscape, Heritage and Cultural Issues

(a) To protect and enhance places of cultural and heritage value.

(b) To protect and maintain the scenic quality, visual components, important features and amenity of the landscape.

Land Supply

(a) To rationalise land supply so that development opportunities exist for all short and medium term needs and so that an over-supply of such land is not created.

CLOSURE The meeting closed at 6.17pm

CONFIRMED

GG NORRIS
MAYOR

D'ENTRECASTEAUX REPORT

Land Capability Survey of Tasmania

R C DEROSE
Department of Primary Industries, Water and Environment
Newtown Offices
2001

D'Entrecasteaux Report
and accompanying 1:100 000 scale map

Tasmania
DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

Natural Heritage Trust
Helping Communities Helping Australia

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Accompanies 1:100 000 scale map, titled 'Land Capability Survey of Tasmania. D'Entrecasteaux.' By RC DeRose, Department of Primary Industries, Water and Environment, Tasmania, 2001.

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- The Bureau of Meteorology for providing climate data.

Department of Primary Industries, Water and Environment staff, who contributed to the production of this map and report include:

- Matthew Lawless, who assisted with all aspects of the land capability project from logistical support during field mapping to preparation of figures and digitising of the final map.

- Chris Grose for guidance during mapping, and editing and reviewing of the final report.

- The GIS team of Mark Brown, Simon Lynch and Tony Davidson, for preparation of base maps, climate modelling, and digitising and preparation of the 1:100 000 map.

- Darren Kidd for soil investigations. Also, to Stacey Spanswick for her helpful insights regarding soil description and classification.

- Various Departmental staff for reviewing and criticising the report prior to publication.

- The staff of Information and Land Services for supplying digital topographic data.

And finally, the Natural Heritage Trust, without whose financial support the project

SUMMARY

This map describes and classifies the land resources occurring on privately owned and leased Crown land within the area defined by the limits of the D'Entrecasteaux 1:100 000 scale topographic map (Sheet No: 8311) and eastern quarter of the Huon 1:100 000 scale topographic map (Sheet No: 8211). The survey area extends over 195 388ha of land, of which almost half or 92 656ha is mapped as exclusion area.

The area lies in southern Tasmania and includes the towns of Huonville and Blackmans Bay, together with smaller centres of Margate, Cygnet, Geeveston, and Dover. The survey area extends along the D'Entrecasteaux Channel from Blackmans Bay in the north to 7km below Southport in the south. It includes Bruny Island and the lower reaches of the Huon River from just northwest of Glen Huon to its confluence with the D'Entrecasteaux Channel northeast of Dover. The Snug Tiers and associated peaks rising to 831m above sea level form the dominant topographic feature in the survey area.

The land is described and assigned land capability classes according to the system defined in the Tasmanian Land Capability Handbook (Noble 1992a, Grose *in press*). The land capability assessment categorises land units according to their ability to produce agricultural goods without impairment to their long term, sustainable, productive potential. Each land unit is assigned one of seven capability classes, from Class 1 to Class 7 with increasing degree of limitation to agricultural production and decreasing range of potential agricultural uses. Classes 1 to 4 land are suitable for cropping activities. Class 3 or better land represents prime agricultural land and is restricted to the better soil types under more favourable site and climatic conditions. Classes 5 and 6 land are suitable for pastoral activities only, while Class 7 land is unsuitable for agricultural use.

In interpreting information contained within this report the reader needs to be aware of the following important points relevant to the land capability classification system:

- Land capability assessment in Tasmania is based on rainfed agriculture and does **not** consider the potential for irrigated agriculture.
- Land capability is assessed for broad acre cropping and grazing activities. Horticultural activities, notably orcharding and viticulture are not considered in the evaluation.
- Climate is an important factor in determining land capability. Cold, wet winter and spring months coupled with dry summer months, can produce limited opportunity for broad acre cropping.
- The 1:100 000 scale of survey restricts the minimum area of contiguous land that can be reasonably mapped to about 64ha. Smaller areas of land are occasionally mapped where they are considered significant and easily identified.
- Map units are not pure, and may contain up to 40% of another class, although in most cases the area of inclusions will be much smaller than this.

The land capability survey was achieved through a combination of fieldwork, aerial photo interpretation and computer modelling. The major limitations to agriculture were identified as poor soil properties (poor drainage, low natural fertility, high stone content, soil salinity and shallow rooting depth), water and wind erosion potential and unsuitable climate. The range of agricultural activities and their distribution across the survey area largely reflect the limitations identified.

Table 1 indicates the amount of each land capability class identified. Few areas of prime agricultural land (Class 1, 2 and 3 land) were mapped within the survey area. Small areas of Class 3 land were mapped on basalt and alluvial soils between Margate and Kingston where rainfall was considered adequate to support a range of cropping activities.

Throughout much of the remainder of the survey area, broad acre cropping is generally not undertaken due to a combination of poor soil conditions and an unsuitable climate of cold and wet winter and spring months. This greatly restricts soil trafficability and the establishment of arable crops. Historically, arable crops have been restricted to small areas of potatoes and wheat in some coastal localities where free draining soils are found (Atlas of Tasmania, 1965). Inland, cold temperatures produce a very short growing season. In general this area only supports short rotation cropping varieties suited to a cool temperate climate. Furthermore, summers are often dry and irrigation is normally required to offset risks associated with crop failure at this time of the year. Hence, most land is restricted to Class 5 or above, and current land use is predominantly grazing or perennial horticulture.

The area has traditionally been used for apple, berry fruits, stone fruits, and hops, although in recent years the area planted in orchards has decreased (Class 4 and 5 land). There is a trend towards more non-traditional farming enterprises such as the establishment of viticulture, hazelnut and olive orchards, albeit on a small scale, where suitable soil types and microclimates exist. Elsewhere, gently to moderate sloping land is used primarily for beef and sheep production (Class 5 land). Occasional cultivation is undertaken during summer and autumn months for pasture renewal and the occasional fodder crops of lucerne or oats (Photo 1). Grazing enterprises also dominate in coastal areas where extensive Quaternary sand sheets are found (Class 5 and 6 land). The lower slopes and benches of rises and hills provide grazing on productive native and improved pastures (Class 5 and 6 land). These areas are often underlain by siliceous Permian and Triassic rocks which produce nutrient poor, erodible soils. Jurassic dolerite commonly occurs further upslope and along ridges and, while producing more fertile soils, these are often stony and shallow. Extensive areas of steep hill country support native forest and woodland on steeper slopes (Class 6 land). Rocky mountain lands at higher elevation, together with very steep slopes, coastal cliffs, sand dunes, coastal and inland swamps in high rainfall areas are unsuitable for any form of agriculture (Class 7).

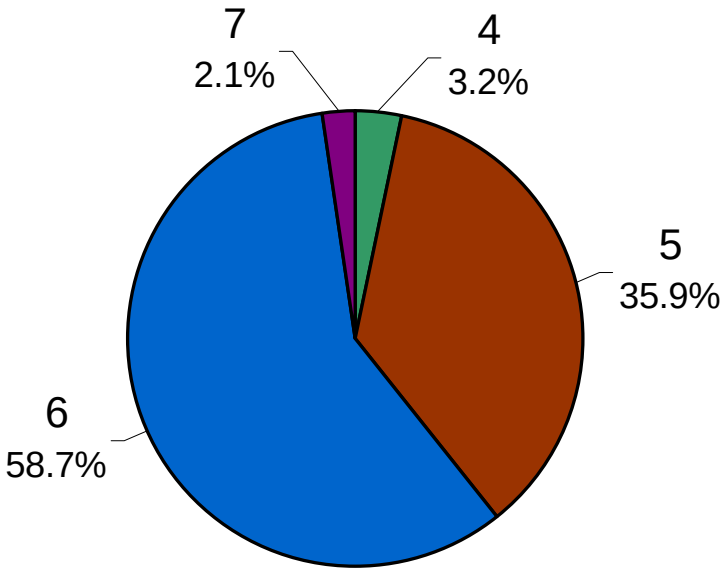


Figure 1. Relative proportion of Land Capability Classes on privately owned and leased Crown land within the D'Entrecasteaux map. Class 3 land only makes up 0.09% of the surveyed area and is too small to be shown on this chart relative to other classes.

Figure 1 above indicates the extent of the identified land capability classes within the survey area. These include complex units in which two land classes have been identified but cannot be usefully separated at the scale of mapping. Within each complex the first land class identified is dominant, occupying 50-60% of the unit, while the second class occupies only 40-50%. Complexes occupy only a small percentage of mapped units.

Table 1. Extent of Land Classes and Land Class Complexes on the D'Entrecasteaux map.

Capability Class	Area (ha)	% of map area
4+3	229	0.1
4	2502	1.3
4+5	972	0.5
5	35265	18.0
5+6	1718	0.9
6	59030	30.2
6+5	575	0.3
6+7	394	0.2
7	1961	1.0
7+6	86	<0.1
E	92656	47.4
TOTAL	195388	100.00

1. INTRODUCTION

This report describes the land capability of the agricultural land within the D'Entrecasteaux and part of the Huon 1:100 000 topographic map sheets (Sheet numbers 8311 and 8211, respectively). Throughout this report both areas are described collectively as the D'Entrecasteaux region. The distribution of the land capability classes identified is depicted in the accompanying map.

This report continues the series published by the Department of Primary Industries, Water and Environment as part of a 1:100 000 scale land capability survey of Tasmanian agricultural land which first started in 1989. This report and map describe and depict the land capability of private freehold and leased or unallocated crown land only. Other areas are considered non-agricultural and are mapped as exclusion areas.

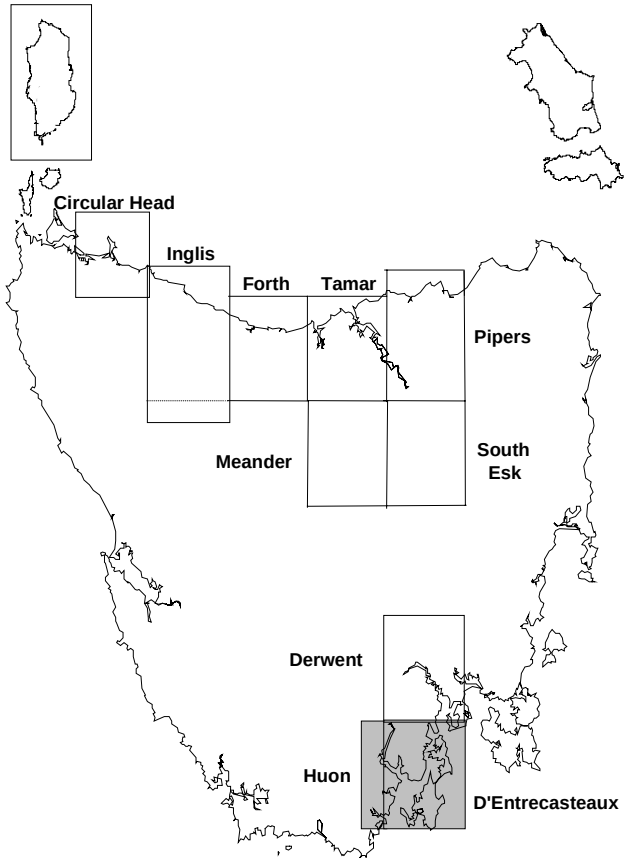


Figure 2. D'Entrecasteaux survey location and previous land capability surveys in Tasmania

The land capability survey aims to: a) identify and map the extent of different classes of agricultural land in order to provide an effective base for land use planning decisions; and b) ensure that the long term productivity of the land is maintained at a sustainable level through the promotion of compatible land uses and management practices. It undertakes to achieve these aims through a program of mapping activities and associated extension and awareness programs such as Farmwi$e and Best Farm Practice.

The land capability classification system for Tasmania comprises a seven class classification which ranks the capability of land to support a range of agricultural uses on a long term sustainable basis (Noble 1992a). The classification system ranks the capability of land to support sustained agricultural production and does not consider suitability for individual crops, silviculture, horticulture, viticulture or other non-agricultural uses. The information printed here and in the accompanying map is intended for use at a regional planning level and is inappropriate for farm scale planning. However, the system and the methodology can be applied at any level.

Ever increasing demands are placed on our agricultural land to produce greater yields with a corresponding greater risk of land degradation. For Tasmania to continue to support a productive agricultural industry into the future, landholders must employ appropriate soil conservation measures. Much of Tasmania's agricultural land has limitations that restrict the variety of crops that can be grown both productively and on a sustainable basis. The land capability classification system provides the framework to determine these limitations, and the classification that results from this process allows land managers to make informed decisions to ensure productive and sustainable use of the land. In other words, the use of land within it's capability.

In addition to it's use as an agricultural land management tool, land capability information is required by regional planners to make informed, objective land use planning decisions. High quality agricultural land is irreplaceable and needs to be protected from loss to urban development and rural subdivision. Land capability information contained within this report provides valuable information to help identify areas of significant agriculture value, and to ensure that land is used within its capability.

Chapter 3 of this report explains land capability classification in detail and provides explicit definitions of land capability classes and subclasses. Chapter 4 of this report explains the survey method and the guidelines that were used in assessing land within the survey area. A detailed description of the survey area appears in Chapter 5. A detailed account of land capability classes occurring within the survey area is presented in Chapter 6, wherein the land capability information is arranged hierarchically, firstly by class and secondly by the geology unit on which the class occurs.

2. HOW TO USE THIS MAP AND REPORT

This publication comprises a report and map. It is important that the land capability map be used in conjunction with the accompanying report.

Land capability classes are briefly defined in the map legend, and more detailed definitions may be found in Chapter 3 of this report. Further information regarding limitations for each of the land capability classes may be found in Chapter 6.

2.1 Limitations of Scale

Special attention must be paid to the limitations of the map imposed by the scale at which it was surveyed.

It is important that the map is used at the scale at which it is published (1:100 000). **The map should not be reproduced at a larger scale (eg. 1:25 000)**. The land capability boundaries found on this map are accurate only at the published scale of 1:100 000. Errors in interpretation will occur if the map is enlarged. If more detail is required, the area of interest should be remapped at a more suitable scale for the end use.

Gunn *et al* (1988) state that, at a scale of 1:100 000, the standard minimum area for a map unit which can be adequately depicted on the map is approximately 64ha. There appears to be little consistency however, as Landon (1991) suggests that a wide range of minimum areas are currently in use. For the purposes of this work, unit areas of less than 64ha have been mapped only where they are identifiable on the basis of clearly visible boundaries (usually topographic), or where they appear at the margins of the map or adjacent to exclusion zones. Impurities in map units will occur where land class changes are a result of less obvious changes in land characteristics.

In any mapping exercise there are always areas which are physically too small to delineate accurately at a given map scale. Surrounding units usually absorb these areas. The map units shown on this map will therefore often contain more than the one land capability class or sub-class. The map units are assigned the dominant land capability class within them, but it must be recognised that some map units may contain up to 40% of another class.

COMPLEX map units (eg. 4+5) have been mapped in some areas where two land classes are identified that cannot be delineated separately at this scale of mapping. These complex units represent areas where each class occupies between 40% and 60% of the unit area and are shown as striped units on the map. The first digit of the map unit label and the slightly wider of the two coloured stripes represent the dominant land capability class. Further discussion of this issue and the method of labelling units are found in Chapter 3.

The accuracy of the land capability class boundaries depends on a number of factors including the complexity of the terrain, soils and geology. Class boundaries are accurately mapped where topography, or other visible features important in boundary detection, change abruptly. Alternatively, where landscape changes are gradual, such as

is often the case with changes in soil depth or slope, the class boundary may be gradual and therefore less accurately mapped.

2.2 Interpretation of the Land Capability Information

The scope and range of applications of land capability information depend upon the scale of the mapping program. This map has been surveyed at a 1:100 000 scale and is targeted for use at the district or regional planning level. Therefore, best use can be made of this map and report by local government, as well as regional and State land use planning authorities.

The information at this scale is **not** suitable for use in planning at the farm level. It does however, provide a general indication of land capability which makes it a useful starting point for more detailed studies. Larger scale maps (1:5 000 or 1:10 000) are suitable for farm planning purposes. For example, they are a useful information source for planning farm layouts, and identifying appropriate soil conservation and land management practices. The methodology applies to all scales of mapping and can be utilised equally well by local landowners, and local, regional or State planning authorities. A detailed discussion of the methodology may be found in Chapter 4.

Some examples of suitable uses of land capability information at 1:100 000 scale are:

- **Identifying broad areas of prime agricultural land to be protected for agricultural use**
- **Enabling rational planning of urban and rural subdivisions**
- **Identifying areas for new crops, enterprises or major developments**
- **Identifying areas for expansion of particular land uses**
- **Planning of new routes for highways, railways, transmission lines, etc.**
- **Identifying areas of land degradation, flooding or areas that may require special conservation treatment**
- **Identifying areas of potential erosion hazard**
- **Resolving major land use conflicts**
- **Establishing integrated catchment management (depending on catchment size)**

Describing land capability information through this report and accompanying map is insufficient to ensure the adoption of sustainable land use practices. The move towards more sustainable practices can only occur through increased social awareness and education (a recognition that change is needed) together with the development of an appropriate implementation framework. This includes the legislative and administrative support responsible for putting land use policies into practice.

The land capability maps and reports do not purport to have legal standing as documents in their own right, nor should they attempt to stand alone in planning decisions without being supported by other relevant land resource, economic, social or conservation considerations. Indeed, the interpretation of land capability information can be greatly enhanced when viewed in concert with other resource information. The information is intended as a guide to planning development. More detailed plans, for

example route alignments or farm plans, require further fieldwork at a more appropriate scale.

2.3 Copyright

The maps, reports and digital information stored on the DPIWE databases are copyright, and the data is solely owned by the Department of Primary Industries, Water and Environment, Tasmania. We offer every encouragement to individuals and organisations who wish to use the information contained in this report and accompanying map to assist in property management or regional planning activities. However, commercial organisations or individuals wishing to reproduce any of this information, by any means, for purposes other than private use, should first seek the permission of the Secretary, Department of Primary Industries, Water and Environment, Hobart.

2.4 Availability of Other Reports and Maps in this Series

Land Capability Publications (based on the TASMAP 1:100 000 Series) currently available:

Derwent Report and Accompanying Map
Circular Head Report and Accompanying Map
Inglis Report and Accompanying Map
Forth Report and Accompanying Map
Pipers Report and Accompanying Map
Tamar Report and Accompanying Map
Meander Report and Accompanying Map
South Esk Report and Accompanying Map
Land Capability Handbook (Second Edition)
Land Capability Classification in Tasmania, Information Leaflet

Maps, reports and the handbook are available for purchase by contacting Service Tasmania or direct from:

Department of Primary Industries, Water and Environment
Resource Management and Conservation Division
Land and Water Assessment Branch
GPO Box 46
KINGS MEADOWS, TAS 7249.

3. LAND CAPABILITY CLASSIFICATION

Land capability classification is an internationally recognised means of land evaluation used to determine the capability of land to support a range of land uses on a long term, sustainable basis.

For the Tasmanian classification system, only agricultural land uses are considered. These are defined as broad scale grazing and cropping uses. Land capability ratings for specific land uses are not evaluated, nor is the capability of land for silvicultural, viticultural, or horticultural use incorporated into the classification system.

Land capability may be defined as a rating of the ability of land to sustain a range of land uses without degradation of the land resource. It is an interpretive and somewhat subjective assessment based on the physical limitations and hazards of the land, potential cropping and pastoral productivity, and the versatility of the land in producing a range of agricultural goods.

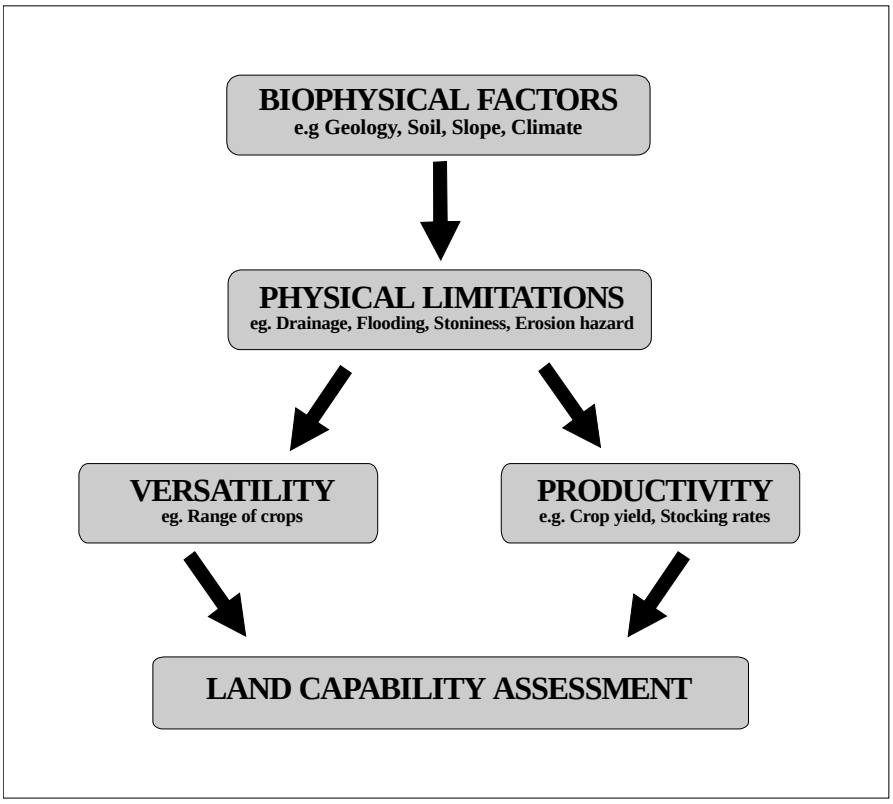


Figure 3. Factors in land capability assessment.

Land capability assessment takes into account the physical nature of the land (e.g geology, soils, slope) plus other factors (eg. climate, erosion hazard, land management practices) which determine how that land can be used without destroying its long term potential for sustainable agricultural production. It also takes into account limitations that might affect agricultural use, such as stoniness, drainage, salinity or flooding. Land capability assessment is therefore based on the permanent biophysical features of the land (including climate), and does not take into account the economics of agricultural production, distance from markets, or sociopolitical factors.

Land capability assessment should not be confused with land suitability assessment which, in addition to the biophysical features, may assess economic, social and/or political factors to determine the best use of a particular type of land. Land capability classification gives a grading of land for broad scale agricultural uses, whereas land suitability classification is applied to more specific, clearly defined land uses, such as classifying land 'suitable' for growing carrots. In addition, land suitability usually defines specific management systems.

3.1 Features of the Tasmanian Land Capability Classification System

The Tasmanian system of land capability classifies land into seven classes according to its' capability to produce agricultural goods. The system is modelled on the United States Department of Agriculture approach to land capability (Klingbiel and Montgomery 1961) and is described in full by Noble (1992a) and Grose (in prep). A summary of the system is presented here to assist in the interpretation of the report and accompanying map. The classification does not attempt to portray specific land uses, nor rank the value of any particular agricultural land use above another. Neither does it attempt to give an indication of land values.

The classification relates primarily to three permanent biophysical features of the landscape - soil, slope and climate - and their interactions, such as soil erodibility, flood risk, soil moisture holding capacity, etc. These three factors have a major influence in determining the capability of the land to produce agricultural goods. Past land use history and present management practices, such as the range of crops grown and soil conservation treatment required, are used as a guide in land capability assessments.

Three levels are defined within the Tasmanian land capability classification:

- The land capability **Class** - which gives an indication of the general degree of limitation to use
- **Subclass** - which identifies the dominant kind of limitation
- and the **Unit** - which groups land with similar management and conservation requirements, potential productivity, etc.

The land capability system can be used and applied at various scales by mapping to the class, subclass and unit levels. The level at which the mapping is undertaken and presented depends on the purpose and scale of the survey. The levels of the land capability classification system are shown in Figure 4.

The classification system comprises seven classes ranked in order of increasing degree of limitation, and in decreasing order of versatility, for agricultural use. The system is hierarchical. Class 1 land can produce a wider variety of crops and pastures at higher levels of production with lower costs, or with less risk of damage to the land, than any other of the land classes. Class 2 land is more productive than Class 3, and so on.

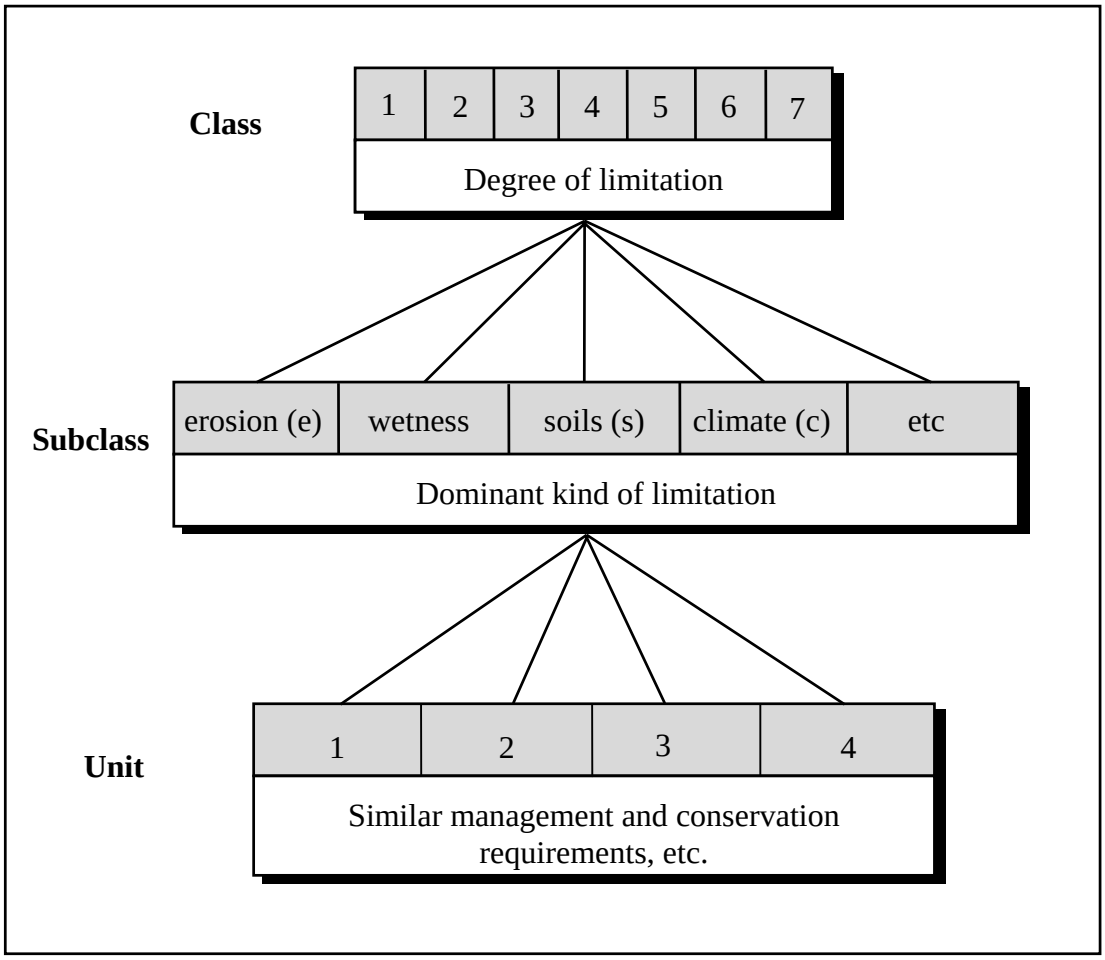


Figure 4. Levels of the land capability classification system. (Adapted from: National Water and Soil Conservation Organisation, 1979, Our Land Resources. NWASCO, Wellington, New Zealand).

Each land class can be subdivided into subclasses depending on the nature of the dominant limitation or hazard to the use of that land. Limitations may be defined as physical factors or constraints, which affect the versatility of the land and determine its capability for long term sustainable agricultural production. Some limitations can be removed or modified through normal management practices or other means. Where such improvements are considered feasible, both physically and economically, land may be classified higher than its current condition may indicate. Such improvements do not include the use of irrigation water but may include drainage or stone picking.

Each subclass may be further subdivided to unit level. Land capability units are areas of land with similar management and conservation requirements, or differences in productivity, which may not be significant at higher levels within the classification system. Thus an area identified as Class 4h may be further subdivided into 4h1 (Class 4h land subject to gully erosion) and 4h2 (Class 4h land subject to sheet erosion).

The system assesses the versatility of the land to produce a range of agricultural goods that are considered typical for Tasmania, and not just those that are specific or suited to localised areas. For example, small-scale intensive activities like soft fruit orchards and floriculture are not considered when evaluating the versatility of an area. Opportunities

for silviculture are another activity that the system does not consider. The main agricultural land uses that are considered when evaluating land include cereals, poppies, broadacre vegetable production, pyrethrum and essential oils, together with pastoral activities such as dairying, and beef, lamb and wool production.

The system considers degradation of the soil resource and does not take into account the possible effects of agricultural land use on landscape values or biodiversity, except where they might impact on the quality of the agricultural resource.

The classification, in particular at the unit level, takes into account the management strategies and soil conservation requirements that the land may need in order to maintain a level of production without long term degradation.

As with most land classification systems certain assumptions are necessary. These include:

a) The land capability classification is an interpretive classification based on the permanent biophysical characteristics of the land.

b) A moderately high level of management being applied to the land.

c) Appropriate soil conservation measures having been applied.

d) Where it is reasonable and feasible for an individual farmer to remove or modify physical limitations (eg. surface and sub-surface drainage, stoniness, low fertility) the land is assessed assuming the improvements have been made.

e) Land capability assessments of an area can be changed by major schemes that permanently change the nature and extent of the limitations (eg. drainage or flood control schemes).

f) The land capability classification is not a productivity rating for specific crops, although the ratio of inputs to outputs may help to determine the land capability class.

g) Land capability does not take into account economic, social or political factors. It is not influenced by such factors as location, distance from markets, land ownership, or skill of individual farmers.

h) Present and past uses of the land (or similar land elsewhere) are guides to potential, in that they can indicate the limits of the capability of the land. Present land use and vegetation cover are not always good indicators of land capability class. The system of land capability is aimed at assessing the potential sustainable productivity of land rather than current productivity.

i) Assessments are based on the capability of the land for sustained agricultural productivity, since use of the land beyond its capability can lead to land degradation and permanent damage.

j) Irrigation, or the potential access to irrigation, is not considered when evaluating land capability.

k) The system is consistent across the State.

It is important to remember that the land capability of an area can change as a result of improved farming practices, such as improvements in crop variety and technical

innovations. The information in this report has a limited lifespan and care should be given to its interpretation in future years. Farming practices that today are only available for the advanced or innovative farmer may become common practice in the future.

3.2 Land Capability Class Definitions

The criteria used to define classes are based on observation and experience only, and not on experimental work. Figure 5 outlines the main features of the capability classes. Classes 1-4 only are considered capable of supporting cropping activities on a sustainable basis; Classes 5 and 6 are suitable for grazing activities only, although pasture improvement may be possible on Class 5 land (Class 6 land remaining as native pasture); Class 7 land is unsuitable for any form of sustainable agricultural activity.

Also, there is a range of land that can occur in any one capability class. Thus it is often possible, for example, to identify good and poor quality Class 4 land. While the intensity of mapping required to achieve this is not feasible when mapping land classes at 1:100 000 scale it would be possible to map such differences at the unit level.

The land capability class definitions are as follows:

CLASS 1

Land well suited to a wide range of intensive cropping and grazing activities. It occurs on flat land with deep, well drained soils, and in a climate that favours a wide variety of crops. While there are virtually no limitations to agricultural usage, reasonable management inputs need to be maintained to prevent degradation of the resource. Such inputs might include very minor soil conservation treatments, fertiliser inputs or occasional pasture phases.

Class 1 land is highly productive and capable of being cropped eight to nine years out of ten in a rotation with pasture or equivalent without risk of damage to the soil resource or loss of production, during periods of average climatic conditions.

CLASS 2

Land suitable for a wide range of intensive cropping and grazing activities. Limitations to use are slight, and management and minor conservation practices can readily overcome these. However the level of inputs is greater and the variety and/or number of crops that can be grown is marginally more restricted than for Class 1 land.

This land is highly productive but there is an increased risk of damage to the soil resource or of yield loss. The land can be cropped five to eight years out of ten in a rotation with pasture or equivalent during ‘normal’ years, if reasonable management inputs are maintained.

CLASS		LIMITATIONS	CHOICE OF CROPS	CONSERVATION PRACTICES
1	Under cultivation	very minor	any	very minor
2		slight	slightly reduced	minor
3		moderate	reduced	major
4		severe	restricted	major + careful management
5	Under pastoral use	slight to severe	grazing	
6		severe	grazing	
7		very severe to extreme	No agricultural value	

Figure 5. Features of land capability classes

CLASS 3

Land suitable for cropping and intensive grazing. Moderate levels of limitation restrict the choice of crops or reduce productivity in relation to Class 1 or Class 2 land. Soil conservation practices and sound management are needed to overcome the moderate limitations to cropping use.

Land is moderately productive, requiring a higher level of inputs than Classes 1 and 2. Limitations either restrict the range of crops that can be grown, or the risk of damage to the soil resource is such that cropping should be confined to three to five years out of ten in a rotation with pasture or equivalent during normal years.

CLASS 4

Land primarily suitable for grazing but which may be used for occasional cropping. Severe limitations restrict the length of cropping phase and/or severely restrict the range of crops that could be grown. Major conservation treatments and/or careful management is required to minimize degradation.

Cropping rotations should be restricted to one to two years out of ten in a rotation with pasture or equivalent, during 'normal' years to avoid damage to the soil resource. In some areas longer cropping phases may be possible but the versatility of the land is very limited.

CLASS 5

This land is unsuitable for cropping, although some areas on easier slopes may be cultivated for pasture establishment or renewal and occasional fodder crops may be possible. The land may have slight to moderate limitations for pastoral use. The effects of limitations on the grazing potential may be reduced by applying appropriate soil conservation measures and land management practices.

CLASS 6

Land marginally suitable for grazing because of severe limitations. This land has low productivity, high risk of erosion, low natural fertility or other limitations that severely restrict agricultural use.

CLASS 7

Land with very severe to extreme limitations which make it unsuitable for agricultural use.

E - Exclusion Areas

Land that is not private freehold or leased crown land, is not included for assessment. Other exclusions included urban centres and other obviously non-agricultural areas.

Note on Class Definitions

The length of cropping phase given for Classes 1-4 is intended as a general guide only. Some land will not support production beyond the intensity recommended due to the unacceptable risk of erosion or soil structure decline. Other areas are limited by the risk of loss occasioned by more unpredictable factors such as adverse climatic conditions or flooding. Also, the classification system takes into account the *variety* of crops that can be grown. Thus Class 4 land often incorporates areas where production may be sustainable over a longer period than one or two years out of ten but only a relatively small range of crops can be grown. Whereas in other areas, Class 4 land is such that significant periods of cultivation without a break can lead to severe structure decline, hindering germination, water infiltration, soil aeration and increasing the likelihood of erosion.

It should be noted that capability classes have not been defined on the basis of productivity although a general relationship does exist.

3.3 Land Capability Subclass Definitions

The major subclass limitations together with their respective codes are summarised below. The decision as to whether a subclass should be recorded at the unspecified level (e, w, s, c) or at a more specific level is dependent on the ease with which specific limitations can be identified. For example, the aeolian erosion limitation is recorded only if it is clear that erosion has been caused by wind. If the cause of erosion is uncertain then unspecified erosion is recorded.

- **e** (erosion). Unspecified erosion limitation.
  - **a** (aeolian). Erosion caused by the effects of wind. Usually affects sandy or poorly aggregated soils and can occur on slopes of very low gradient.
  - **h** (water). Erosion resulting from the effects of rainfall, either directly through raindrop impact or through secondary effects of overland flow and surface runoff (including stream bank erosion).
  - **m** (mass movement). Landslip, slumping, soil creep and other forms of mass movement.
- **w** (wetness). Unspecified wetness limitation.
  - **f** (flooding). Limitations created through the surface accumulation of water either from overbank flow from rivers and streams, run-on from upslope areas or because the area lies in a topographic depression.
  - **d** (drainage). Limitations resulting from the occurrence of a high groundwater table, or restricted or impeded permeability within the soil profile, leading to the development of anaerobic conditions.
- **s** (soils). Unspecified soil limitation.
  - **g** (coarse fragments). Limitations caused by excess amounts of coarse fragments (particles of rock 2 - 600mm in size), including gravel, pebbles and stones, which impact on machinery, damage crops or limit growth. Coarse fragments may occur on the soil surface or throughout the profile.
  - **r** (rockiness). Limitations caused by boulders or outcrops of bedrock material greater than 600mm in size.
  - **k** (conductivity). Land at risk from salinity (as indicated by high electrical conductivity readings of a 1:5 ratio soil:water paste).
  - **l** (limiting layer). Rooting depth or depth to some limiting layer.
- **c** (climate). Unspecified climatic limitation.
  - **p** (precipitation). Limitations resulting from insufficient, excessive or uneven distribution of rainfall.

  - **t** (temperature). Limitations caused by frost risk or by reduced length of growing season due to low temperatures.

- **x** (complex topography). Limitations caused by irregular, uneven or dissected topography which hinder vehicular access or cultivation.

Use of Information

A valid criticism of the Land Capability methodology is that it is very subjective and dependent on the interpretation of individual surveyors. For this reason, a set of guidelines is being developed (Grose *in prep*) to ensure consistency among surveyors. The guidelines are based on a quantitative assessment of a range of a land attributes critical to the evaluation of land capability. There will, however, always remain some subjectivity in the determination of cut-offs points for each land class. This is largely due to the gradational nature of boundary conditions between each class. The guidelines provide as high a level of consistency for land assessment as is possible at the time of writing of this report. Future improvements to the classification may result from increases in knowledge acquired during subsequent mapping programs.

The authors therefore welcome constructive comment and criticism of the report and accompanying map and, in the unlikely event that significant errors in classification are identified at a scale appropriate to the level of mapping, they should be reported to the Senior Land Assessment Officer, Land Assessment Section, Resource Management and Conservation, DPIWE.

4. SURVEY METHOD

Field work for the D'Entrecasteaux Land Capability map was undertaken between November 1999 and April 2000 using information drawn from a wide variety of sources. These included existing soil descriptions and maps held by DPIWE, the advice of farmers, land managers and agricultural advisers within DPIWE, field assessments, aerial photo interpretation and computer modelling.

Field assessments involved land capability site descriptions and reconnaissance surveying to extrapolate and map class boundaries. In all, some 100 land capability site descriptions were recorded. This information was recorded on field sheets, which were then transferred to the DPIWE soils database. The field sheet records the site information required to justify the assessment, together with both the assigned land capability class and subclass. This information included site location, landform description, site aspect and slope. Soils were examined at the majority of sites. This was done using either a push-tube rig, a hand held soil auger, or by examination of existing soil exposures. The information collected included soil horizon depth, pH and 1:5 EC_e levels, texture, colour, structure and drainage characteristics. An example of a completed land capability description site card appears in Appendix A. Figure 6 presents the distribution of land capability description sites and existing soil description sites across the survey area.

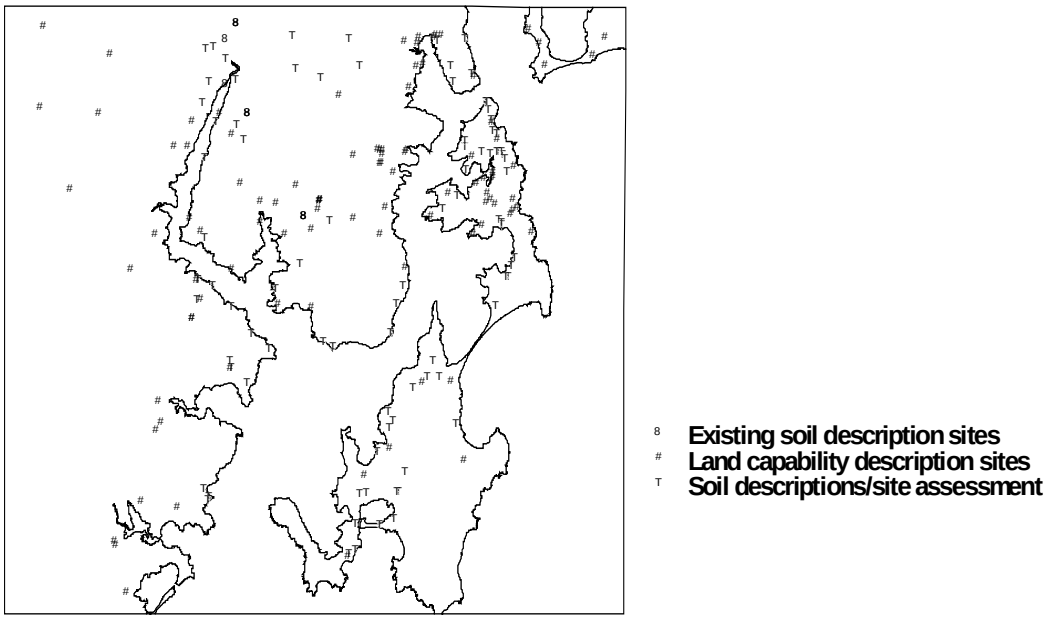
Land capability assessments for the most part follow guidelines outlined in the revised Land Capability Handbook for Tasmania (Grose *in prep*). The guidelines provide criteria for determining the major subclass limitations. These involve assessments of land capability in relation to climate (rainfall, temperature), topographic limitations (slope, wetness, uneven ground, flood risk), soil factors (depth, stoniness, rock outcrops, salinity, drainage), and erosion hazard (wind, water, mass movement). Assessments of soil erosion are based primarily on soil texture and organic matter content in the case of wind erosion, and on topographic gradient, soil texture, dispersion (sodicity), and structure in the case of water erosion. In the case of tunnel and mass movement, assessments are based on erosion features evident on hillslopes.

Subclass codes appear only on digital versions of the map maintained by DPIWE. These codes are intended to provide further information for potential users as to the nature of limitations that might occur within a particular map polygon. However, as individual subclass boundaries are not identified at this scale of mapping, several subclass codes may appear within a single polygon. The dominant limitation for a polygon is always recorded. In addition, other limitations may be observed. For example, an area of land classified 5r on the basis of significant rock outcrop, may additionally contain small areas with a drainage limitation. Consequently, the land is assigned an additional drainage limitation subclass (hence 5rd), although the actual area limited by poor drainage has not been specifically identified. The first limitation recorded in the polygon is the dominant limitation.

Stereo-pairs of 1:42 000 black and white aerial photographs and computer generated slope maps and geology overlays were used extensively to extrapolate field assessments and delineate unit boundaries. The slope maps were derived from 1:25000 contour data with a 10m contour interval and converted to a 40m grid. They portray slope

information and spatially accurate base information not available with the air photo stereo-pairs. These two information sources were used in concert, whereby map unit boundaries were delineated on the stereo-pairs, then fine tuned according to the additional information provided on the slope map. Once defined accurately, these boundaries were transferred to 1:50 000 base maps from which they were eventually digitised.

Figure 6. Distribution of land capability description sites and existing soil description sites in the D'Entrecasteaux survey area.



Existing maps, reports and site data were drawn upon where available. These included detailed soils information for the Huon valley (Taylor and Stephens 1935), 1:50 000 geology information (Farmer 1981, 1993) and 1:200 000 land systems information (Davies 1987). In general little soils information was available for the surveyed area. Consequently reliance was placed on the geology maps in order to give a general indication of soil parent materials and broad soil groups. Further to this, a field exercise was undertaken to determine the dominant soil type for each polygon, in effect producing a soil map with approximate boundaries indicated by the geology units. A total of 136 soils observations were made in addition to those documented during capability survey work.

Wherever possible, attempts were made to establish soil-landscape associations that could be used to provide additional information. In line with accepted land survey method, not all map units have been surveyed. Rather, informed assumptions have been made based on information extrapolated from other similar units. For example, it was generally found that there was a close association between current land use and field land capability assessments. Field mapping indicated that in most places forest margins tended to demarcate the boundary between Class 5 and 6 land. Consequently vegetation patterns were used during subsequent photo-interpretation to help delineate the Class 5/6 boundary. This method was applied only in areas where a good understanding existed of the relationships between known information, such as soil type or landform, and land capability class.

The 1:50 000 base maps, with land capability boundaries appended, were digitised and stored using ARC/INFO software. Final publication scale is at 1:100 000. Peers within the DPIWE with experience in agronomy and soil and land evaluation techniques have field checked the land capability map before publication.

5. THE D'ENTRECASTEAUX SURVEY AREA

5.1 Introduction

The study area lies in the south east of Tasmania and includes the smaller centres of Huonville, Cygnet, Dover, Margate and Blackmans Bay, and covers Bruny Island. It extends over an area of 1954km^2 of which 927km^2 are exclusion areas. Most of these exclusion areas comprise State and National Parks or Forest Reserves.

The area covers a diverse range of landforms, soils and climate. In most areas however, adverse soil and climatic conditions greatly restrict the range of agricultural activities undertaken. In general, there are few areas of high class agricultural land and broad scale cash cropping activities are normally not undertaken. The combination of generally poor soils and cold wet winters and springs, coupled with mild summer months, makes this area ideally suited to pome, stone and berry fruit production. By far the majority of agricultural land occurs within several kilometres of the coast, or follows the major rivers and many smaller rivulets throughout the survey area. Furthermore there is little agriculture activity undertaken above 300m elevation due to limitations imposed by topography, soils and climate. River flats to the north of Huonville provide the most extensively used agricultural area.

5.2 Climate

An evaluation of climate is an important aspect of land capability assessments as it generally determines the length of growing season and range of crops that can be grown. The D'Entrecasteaux region experiences a range of climatic conditions. Coastal areas experience a temperate maritime climate due to the stabilising effect of the Southern Ocean. Altitude and distance inland are the principal factors dictating local climatic conditions. Consequently, areas inland and at progressively higher elevation grade to a colder subalpine climate.

There are a number of climate recording stations throughout the survey area (Table 2). While most have recorded only rainfall data, five stations provide daily temperatures and frosts, and three provide measurements of pan evaporation. A number of climate stations occur just outside the boundary of the survey area, and these have been used to supplement climate information for northern areas (Grove, Kingston) and those at higher elevation (Hartz Mountain).

Spatial information presented in this section (Figures 8,12,13) has been derived from ANUCLIM climate modelling (Hutchinson et al. 1998). ANUCLIM was also used to provide estimates of pan evaporation for use in calculation of soil moisture availability. Both ANUCLIM data and point data from climate stations were cross checked where possible to ensure accuracy of data.

Rainfall

Table 2 shows mean monthly and annual rainfall for selected stations. The pattern of annual rainfall distribution across the survey area is illustrated in Figures 7 and 8. This pattern shows a general increase in rainfall gradient from the north and northeast

towards the south and southwest. Coastal areas from South Arm to Blackmans Bay and along eastern North Bruny Island receive the lowest rainfall, being typically less than 700mm per year. Mountain River and the Huon River valley from Judbury through to an area about Cygnet generally receives between 740 and 770mm per year. Much of the remaining area to the south, including coastal locations from Woodbridge across South Bruny Island to Geeveston and Southport, generally receive in excess of 850mm per year and commonly over 900mm per year. Highest rainfalls are generally recorded in inland and mountainous areas, notably on the Snug Plains and southwest of Geeveston.

Station	Elevation (m)	J	F	M	A	M	J	J	A	S	O	N	D	Annual average
Grove	60	48	45	47	67	64	63	77	77	73	69	69	66	765
Huonville	10	44	48	53	54	59	53	77	74	69	65	66	64	738
Judbury	19	56	30	41	45	57	61	69	71	75	78	74	61	741
Kingston	52	46	46	52	59	55	59	56	56	52	68	62	66	677
Bull Bay	40	54	48	37	52	37	43	60	55	52	57	51	73	619
Middleton	20	59	59	71	75	71	85	86	89	83	85	81	77	931
Woodbridge	15	55	59	62	85	69	81	82	89	84	86	78	76	910
Snug Plains	380	80	81	82	91	98	86	124	126	113	110	113	114	1220
Lunawanna	25	55	56	61	76	74	80	85	85	69	74	65	76	858
Cape Bruny	55	62	57	69	82	85	90	96	91	80	84	77	77	948
Dover	16	56	53	65	69	73	79	88	88	82	88	74	76	890
Cygnet	34	50	52	55	53	48	53	70	78	70	63	65	74	734
Geeveton	60	57	52	56	65	76	66	94	93	81	89	75	74	879
Hartz Mt.	830	46	83	76	56	57	72	77	42	77	84	76	70	816
Hastings	38	74	72	88	114	122	130	147	147	128	136	117	108	1381
Southport	20	63	55	74	85	85	98	99	92	89	93	77	78	985

Table 2. Average monthly rainfall and average annual rainfall for selected stations. Values have been rounded to the nearest mm.

Clearly, most areas receive ample rainfall for potential cropping activities. However, the length of growing season if often restricted by the seasonal distribution in rainfall (Figure 7). For example, wet winter months may restrict access to paddocks while dry summer months commonly lead to soil moisture deficits and poor plant growth. The seasonal distribution in rainfall across the D'Entrecasteaux region is broadly similar with relatively lower average monthly rainfall for the first sixth months of the year followed by a period of higher average monthly rainfall for the latter half of the year. Lowest monthly rainfall is generally recorded from January to March, whilst highest monthly rainfall is recorded from July to October. There are some differences in the seasonal pattern of rainfall across the survey area with the drier northeast having a more even rainfall distribution and peak rainfall in December, while the wetter southwest has a higher proportion of rainfall falling during autumn and peak rainfall occurring in winter months.

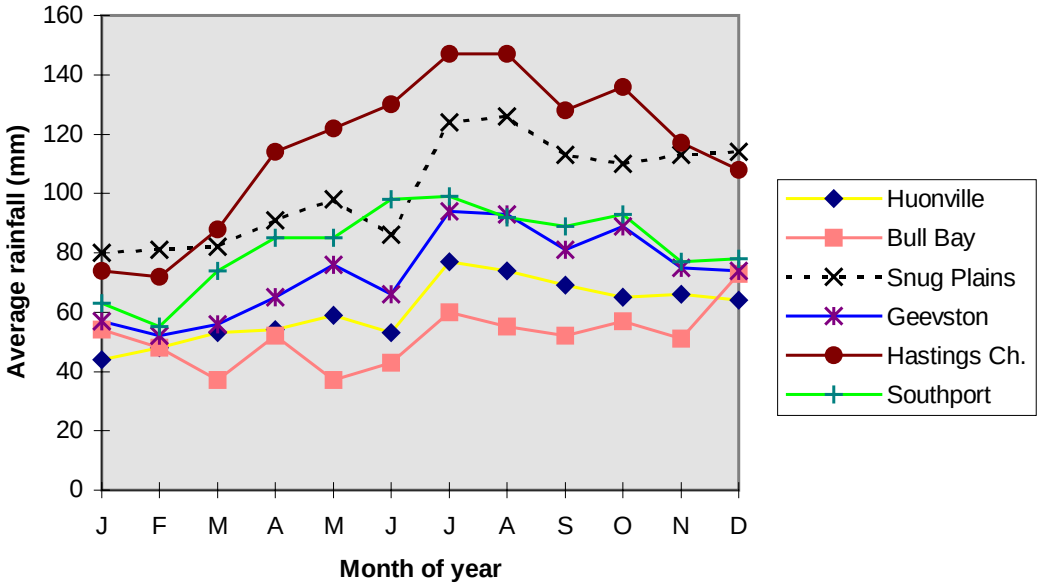


Figure 7. Seasonal rainfall for selected sites.

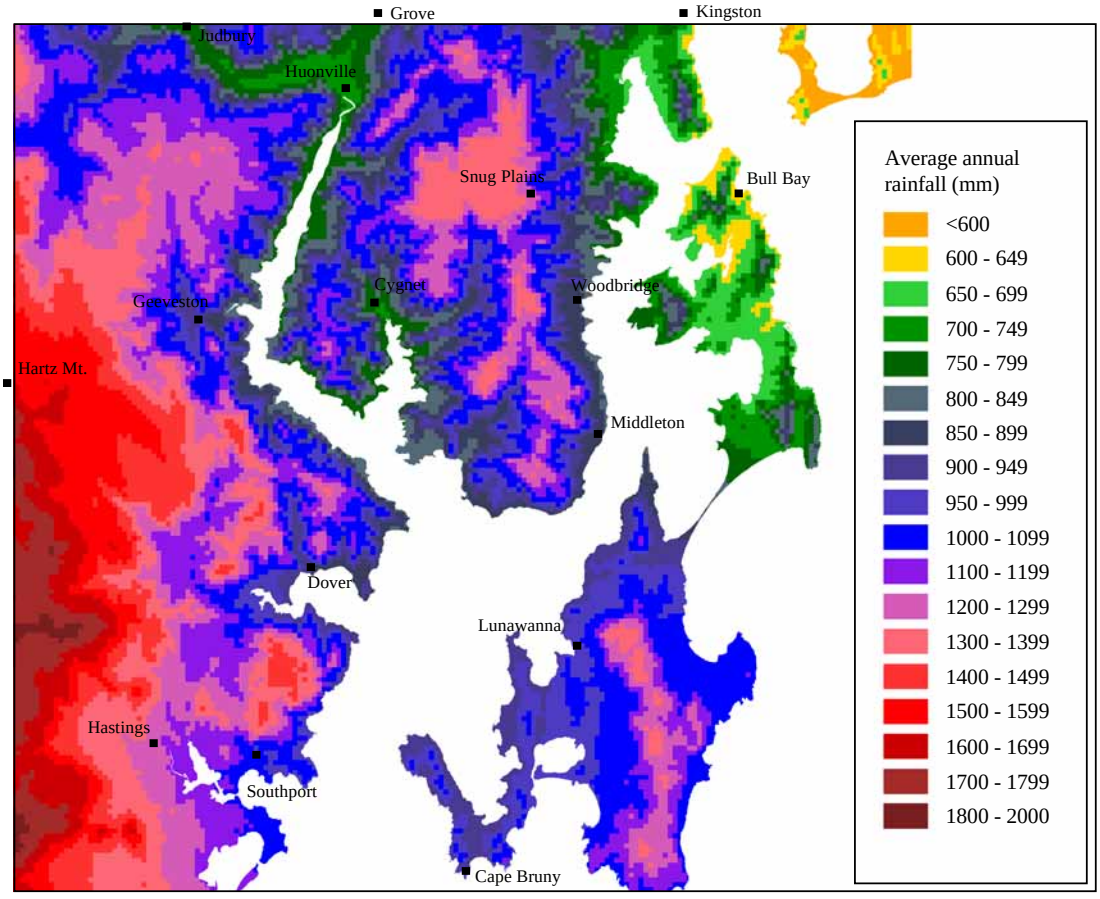


Figure 8. Average annual rainfall (ANUCLIM climate modelling) for the D'Entrecasteaux survey area. Selected climate stations recording rainfall are indicated.

Climatic extremes can have a major impact on agriculture activities. However, heavy snow falls and hailstorms are generally restricted to the higher inland areas and

droughts are almost non-existent. Periods of low average monthly rainfall may occur during summer months from December to March, and this could impose a significant risk of crop failure. Minimum monthly rainfall as low as 3 to 10mm can be expected in some years. In comparison, minimum monthly rainfalls generally do not fall below 10 to 30 mm for the remainder of the year. Inland areas at higher elevation remain relatively wet throughout the year. Rainfall records at Kingston, although outside the survey area, indicate that dry periods can begin in spring months for northeastern areas. It is notable that the period of field survey was one of the driest on record in the region with many soils being in an unusually dry state. Thus field coring of some soils types was impracticable due to hard-setting subsurface horizons.

Moisture Availability

Moisture availability is important in determining the length of growing season. It is a function of both rainfall and evapotranspiration rates and can be estimated using the index $P/E_w^{0.75}$, where P equals average daily rainfall per month and E_w equals average daily pan evaporation per month (Prestcott and Thomas 1949). Index values above 0.8 indicate available moisture is adequate to sustain growth. Index values between 0.4 and 0.8 may be considered part of the growing season if preceded by substantial periods with values above 0.8. Figure 9 shows that index values remain near to or above 0.8 for most of the year. However, there is a short period from January to March in some coastal localities in the northeast, including north Bruny Island and South Arm and in some inland areas from Grove to Huonville and south to Geeveston and Cygnet, when index values can fall to 0.4. This indicates significant soil moisture stress at this time and a shortened growing season for these areas.

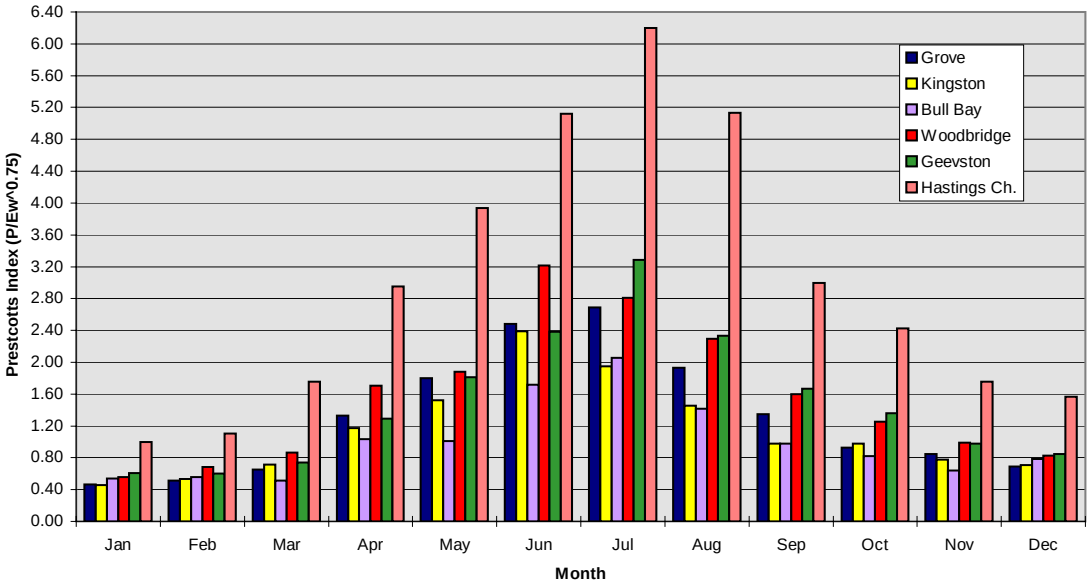


Figure 9. Prestcott's index of moisture availability per month for selected stations.

Prestcott's index is also useful for indicating periods of wet soil conditions. For example, index values above 1.0 indicate an excess of rainfall over evaporation. While this is generally not a problem for free draining soils, which lose excess soil moisture through subsurface runoff, soils with restricted subsurface drainage conditions or those in low lying areas will remain relatively wet at these times of the year. The Hastings

site, which typifies areas towards the southwest and at higher elevations, indicates that soils may remain wet all year. Further north towards Geeveston and Woodbridge index values remain above 1.0 from April through to November. In north and northeastern localities the period of potential wet soil conditions is shorter lasting from April through to September.

Temperature

Seasonal variation in daily temperature can have an important impact of plant growth and the range of crops that can be grown in a locality. For example, an average monthly temperature of 6 °C is commonly accepted as the minimum for crop growth. Above this temperature, crop growth increases and reaches an optimum when daily temperatures are between 20 and 25 °C. Large diurnal variations in temperature, with cold night or very hot day temperatures, can have a deleterious impact on crop growth.

Average temperatures (Table 3, Figure 10) indicate a distinct seasonality with cold winter months and warm summer months in most areas. At low elevation, most areas remain above the 6 °C minimum temperature. However, relatively low average temperatures during winter months indicate that little growth can be expected at this time. In general, there is little difference in average summer temperatures across the survey area. Winter and spring months show greater regional variation with slightly colder average temperatures occurring towards the southwest. The Hartz Mountain station indicates that altitude is the principal factor governing variation in average monthly temperatures. At high elevations, cold temperatures persist into spring and early summer months.

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bull Bay	17	17	15	13	12	9	9	10	11	12	13	15
Cape Bruny	15	15	14	13	11	9	9	9	10	11	12	14
Dover	15	15	14	12	10	8	8	8	10	11	12	14
Geeveston	16	16	14	12	9	7	7	8	9	11	13	14
Hartz Mt.	14	12	9	7	6	5	4	4	7	7	8	8

Table 3. Average daily temperature for selected sites.

Comparison of average daily minimum and maximum temperatures across the survey area further illustrate the moderating effect of the oceanic climate in coastal regions (Figure 10). The warmer winter months on Bruny Island, for example, are solely due to higher average minimum daily temperatures. Conversely, during summer months, cooler ocean air currents moderate average daily maximums. The net result is for inland areas to suffer greater extremes in temperature on both a diurnal and seasonal basis compared with coastal regions. For example, average diurnal variation ranges from 10-13 °C in inland basins (eg. Grove, Geeveston) compared with 5-9 °C in coastal areas. At higher elevation, diurnal variation becomes compressed again (eg. Hartz Mt) due to much lower average maximum daily temperatures during the year, but with average

minimums which are not that different from inland basins (particularly during winter months). Average maximum temperatures indicate that optimum growing conditions are only reached in the survey area during summer months. Spring months generally remain below 20 °C with daily temperatures ranging from 6 to 17 °C. This suggests that the area is restricted to cropping varieties that would be suited to cooler climatic zones.

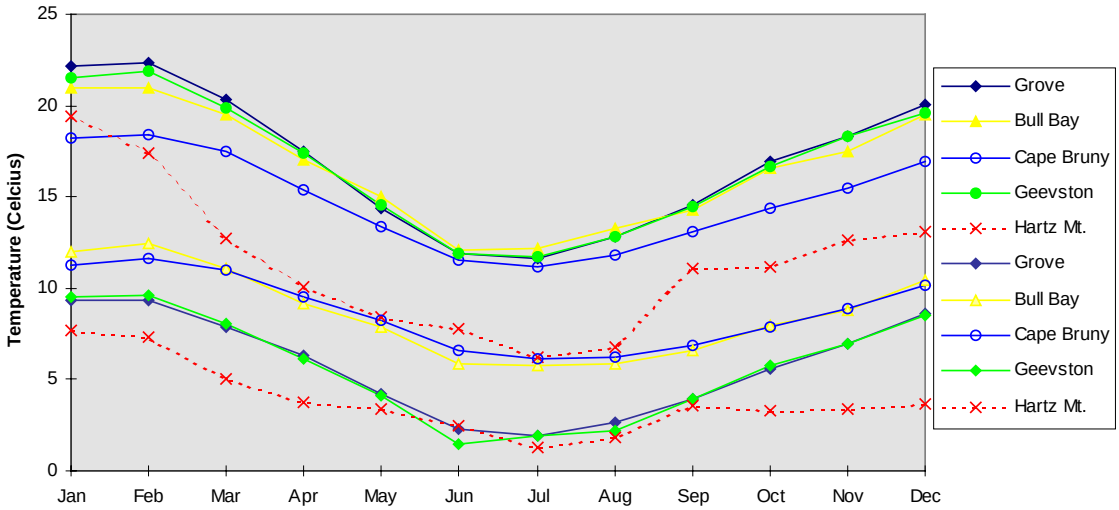


Figure 10. Mean daily maximum and minimum temperatures for selected climate stations.

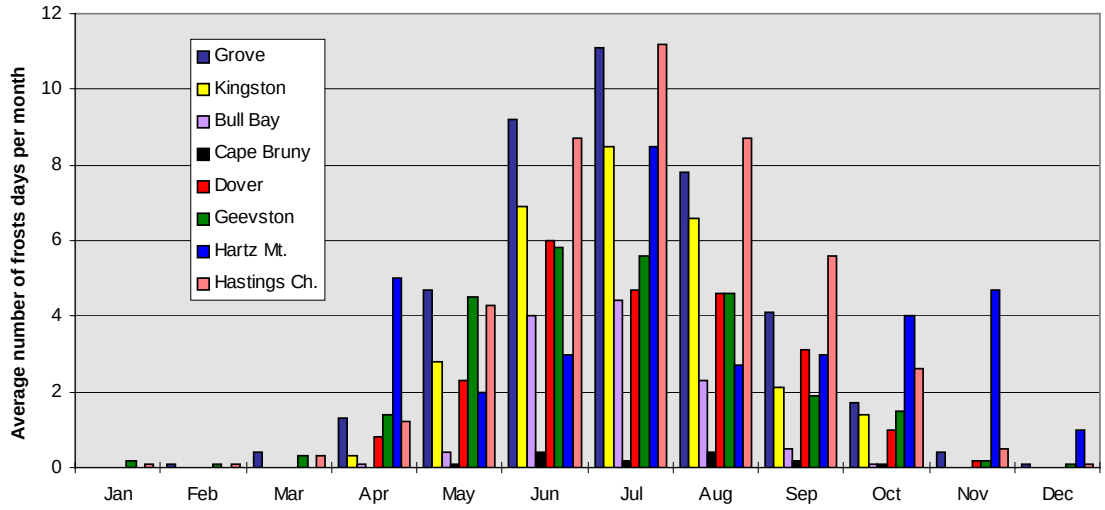


Figure 11. Average number of recorded frost days per month, or days with mean daily minimum temperature < 0 °C per month (Grove, Hartz Mt), for selected stations.

In regions that have cold winter months the length of the growing season is indicated by the first and last appearance of ground frosts (Figure 11). In the D'Entrecasteaux area frosts can be experienced in most places from April through to October. However, the northeastern coastal area including Bruny Island has a much lower incidence of frosts and these are generally confined to winter months. At higher elevation, frosts become increasingly common and can last through to December. Since only a few climate stations record frost days, an indication of the potential number of frosts can be determined from daily minimum temperatures below 0 °C. Figure 12 shows the variation in mean daily minimum temperature across the survey area during spring months: this being an important period for crop establishment. This provides a broad picture of frost incidence by relating mean daily minimums with actual frost incidence

recorded at climate stations. For example, where means are above 6 °C (eg. coastal areas) few frosts can be expected. In contrast, below about 4 °C (eg. inland), over 10 ground frosts can be expected during spring months. Between 4 and 6 °C occasional spring frosts pose a significant risk to the establishment of frost sensitive crops.

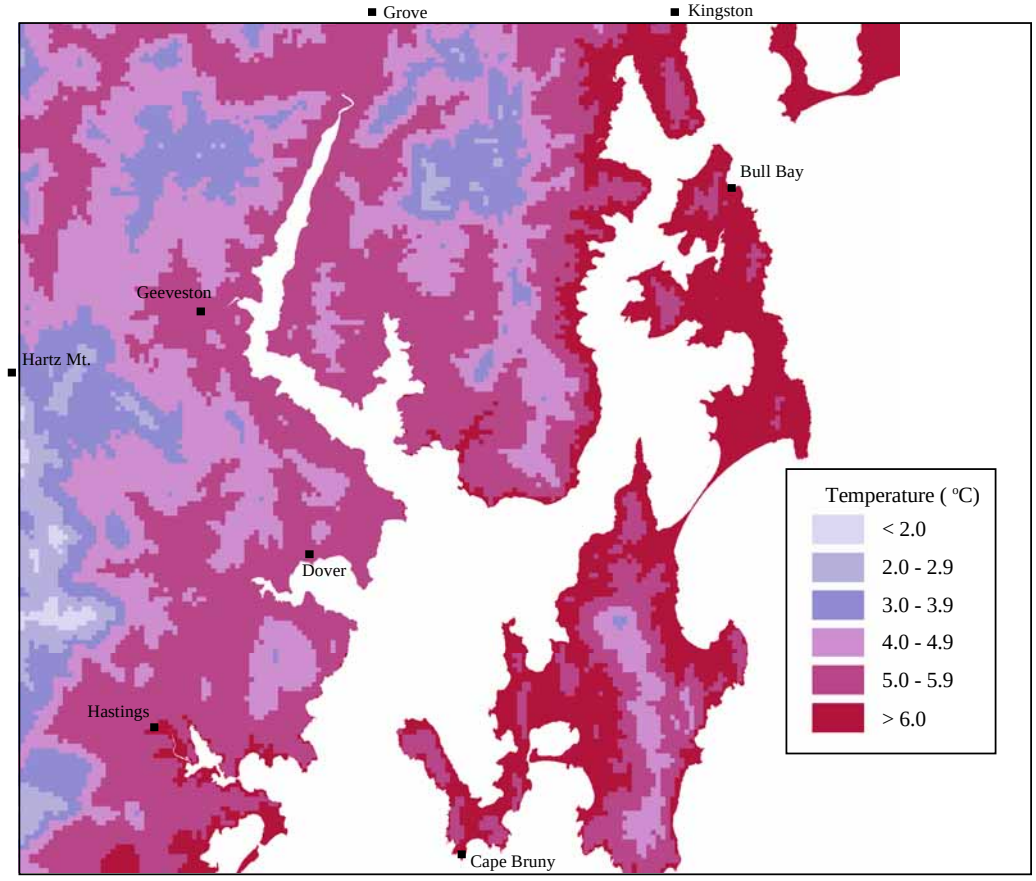


Figure 12. Average daily minimum temperature (from ANUCLIM) for spring months (September, October, and November) in the D'Entrecasteaux survey area. Climate stations recording frosts and daily minimum temperatures are indicated.

Length of growing season

Figure 13 shows the rapid change in soil moisture availability across the survey area from November through to February. It also illustrates how there is only a small window of opportunity for arable cropping activities in late spring and early summer months in most places, and that these activities will be confined to soils with relatively free drainage conditions. Three broad physiographic-climatic zones are evident with respect to length of growing season: coastal land to the northeast, inland basins, and high altitude slopes and mountains.

Areas at higher elevations remain relatively wet and cold throughout most of the year and are unsuited to broadacre cropping. Some mid-altitude sites may be suited to short rotation crops during summer months if rainfall is adequate. Inland basins are generally restricted to a short cropping season during late spring and early summer due to a combination of wet and frosty early spring months, and relatively dry mid-late summer months. The cropping phase could extend into summer months in places with suitable soils and higher summer rainfall. Coastal areas to the northeast generally have a slightly

longer growing season (extending from early spring to early summer months) due to fewer frosts and generally warmer conditions. Furthermore, drier soil conditions in spring may permit both earlier cultivation and cultivation across a broader range of soil types (eg. those with imperfect subsoil drainage). This could potentially allow for a greater range of crops to be grown. However, as will be seen in following sections, both a hilly topography and generally poor soil conditions greatly restrict sites for cropping.

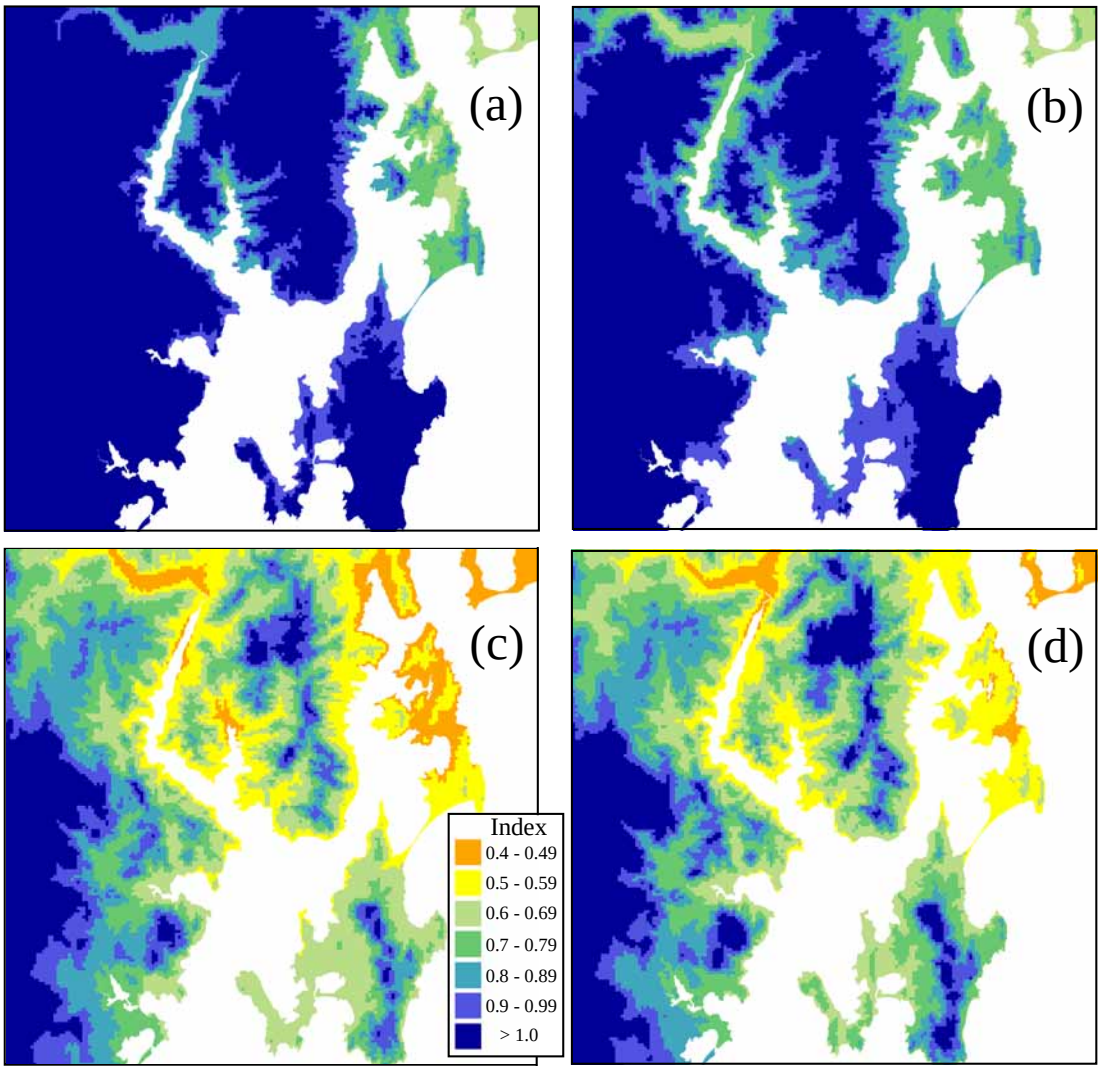


Figure 13. Prestcott's Index for the months of (a) November, (b) December, (c) January, and (d) February. Wet conditions (blue colours) prevail over most of the survey area until December.

5.3 Geology and Landforms

There is a wide range of rock types occurring within the D'Entrecasteaux survey area. These have had an important influence on the present day distribution of soils and landforms. For this reason geological information has played an important role in the land capability survey. The relationship between geology and landforms is illustrated in Figure 14 where a 1:250 000 scale geology map has been draped over a digital elevation model (DEM) of the survey area.

The principal lithologies are siliceous Permo-Triassic sediments and Jurassic dolerite. These together comprise 87% of the survey area. The remaining area is comprised of

Tertiary basalt together with Tertiary and Quaternary alluvial sediments. Small extents of Cretaceous syenite (an intrusive igneous rock) and Quaternary syenite talus occur distributed among the older Permian rocks within the survey area. Ordovician limestone and Precambrian dolomite occur in the south west but confined to exclusion zones and not considered in this report.

Geological formations have had a strong influence on erosion history and the formation of present day landforms and drainage patterns. Dolerite landforms dominate the survey area, forming most of the higher mountain peaks (eg. Grey Mountain, Mount Cygnet, Mount Mangana and Mount Bruny) and plateaux rising to 831m in elevation. Dolerite is generally more resistant to erosion than other lithologies and caps many of the lower mountain ranges and ridgelines. Radial drainage patterns are typical of coastal dolerite hills while more extensive fluvial drainage networks, which converge to form the larger rivers and streams, are typical of inland areas.

Permo-Triassic rocks typically underlie the dolerite cap rocks and these tend to crop out on lowerslopes and valley margins. In places, these rocks may extend to ridgelines of hills rising to between 100 and 500m. Tertiary basalt is of very limited extent and confined to valley margins. It tends to crop out on the side of terrace risers and is usually capped by more recent deposits.

Alluvial deposits of Tertiary and Quaternary age are generally confined to valley systems and coastal areas. Quaternary deposits comprise scree and talus at higher elevations, alluvium along valley flats, gravels and raised beach deposits along larger rivers and in coastal areas, and locally extensive wind blown sand sheets inland from large embayments and along beach foreshores.

The main area of this survey is covered by two 1:50 000 scale geology maps (Farmer 1981, 1993). To the west of the Huon River, only general 1:250 000 scale information is available. The main geological formations and associated landforms are described below from oldest to youngest. In order to help illustrate the associations between geology, landform, soils and land capability, idealized cross-sections (Figures 15 and 16) are presented for representative regions of the survey area.

Permian mudstone

Rocks of Permian age are the oldest exposed soil forming parent materials within the area surveyed. These occur mainly in the west and south and cover 20% of the total land area. Permian rocks generally comprise a sequence of alternating marine siltstones and mudstones. These rocks are glacio-marine sediments, which accumulated between 300 and 250 million years ago in a depression that widened and deepened towards the south east of Tasmania. Permian rocks are generally light grey or cream coloured and well bedded. Early Permian sediments (Truro Tillite) tend to be darker coloured and finer textured while younger sequences (Abels Bay Formation) are coarser textured, frequently containing beds of sandstone.

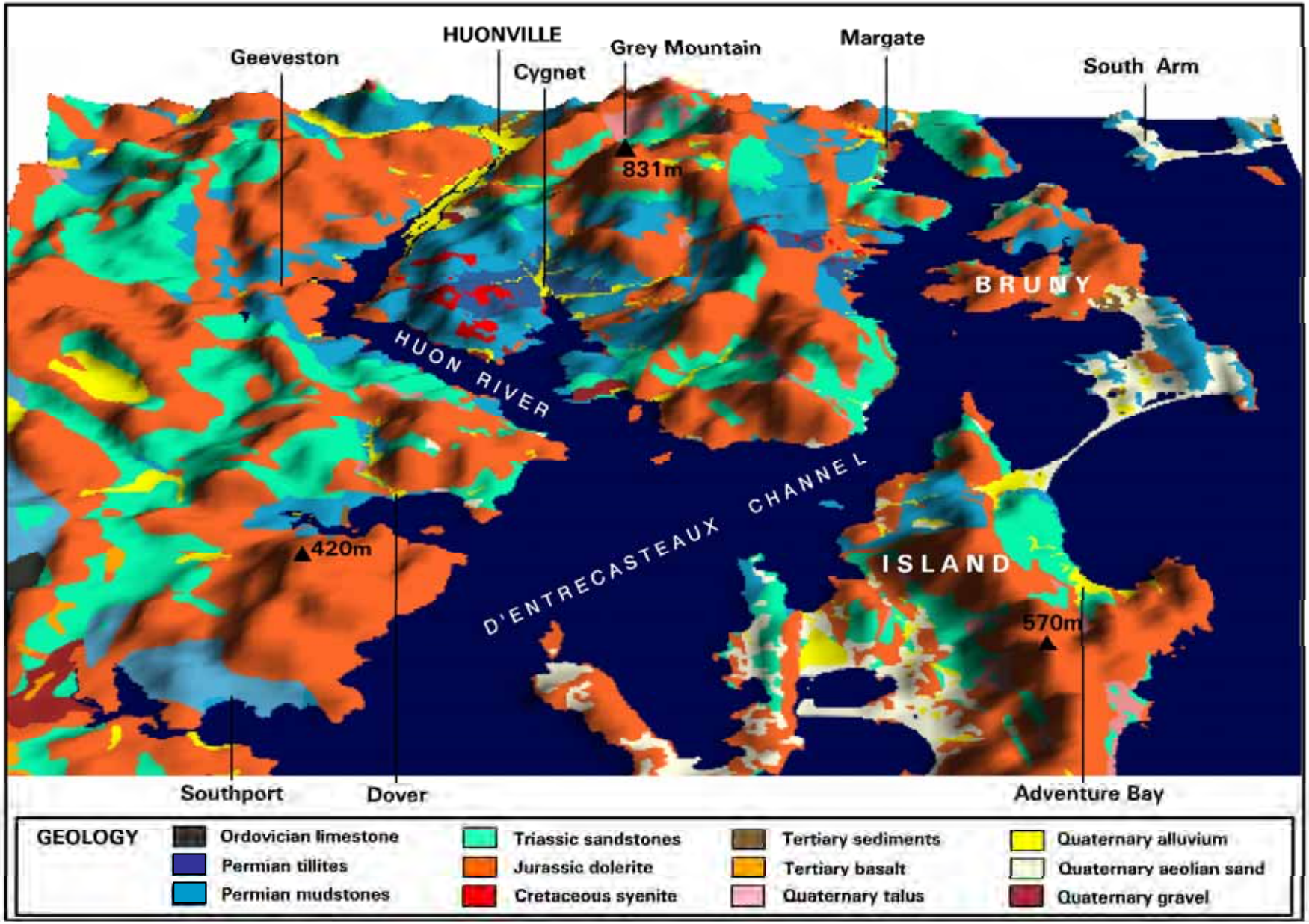
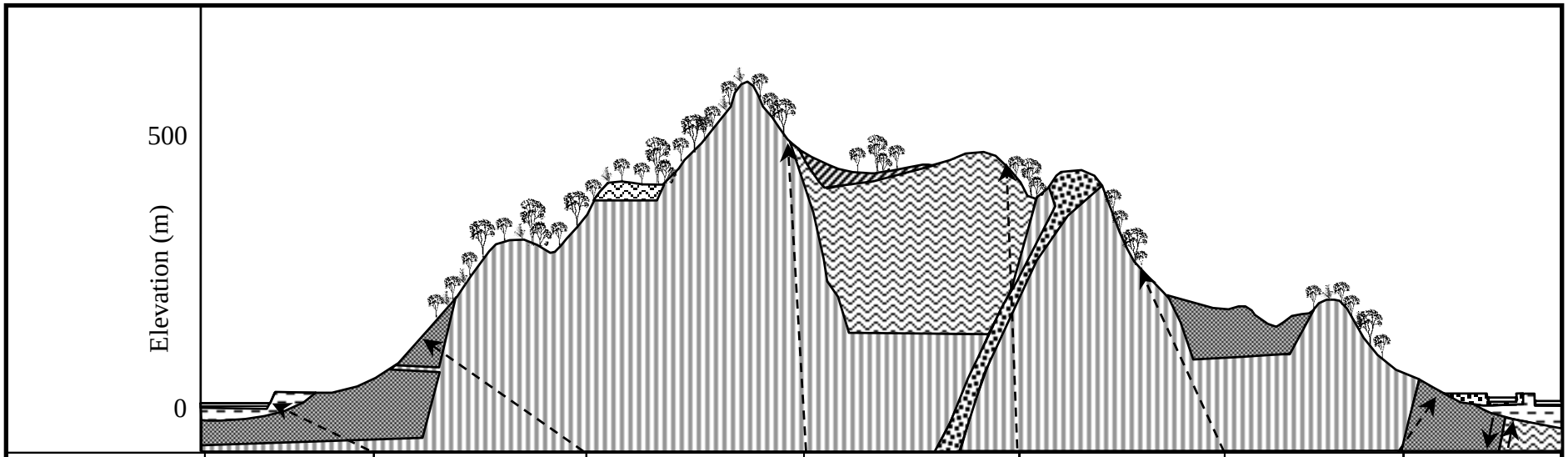


Figure 24. **Perspective view looking north showing geology in relation to landforms within the D'Entrecateaux survey area.**



Typical Landform	Flats	Dissected terraces and lowerslopes	Steep dissected hills and mountains	Highlands	Dissected hills	Foothills	Dissected terraces and coastal flats
Geology	Quaternary alluvium,	Tertiary sediments, Permian mudstone	Jurassic dolerite, Permian mudstone, Triassic sandstone	Triassic sandstone, Quaternary dolerite talus	Jurassic dolerite, Tertiary basalt, Triassic sandstone, Permian mudstone	Jurassic dolerite, Permian mudstone	Quaternary alluvium, Tertiary basalt, Tertiary sediments.
Soil Type	Kandosols, Dermosols	Kurosols, Podosols, Kandosols	Kurosols, Ferrosols, Dermosols	Kandosols, Ferrosols	Kurosols, Ferrosols, Kandosols	Kurosols, Sodosols, Kandosols	Dermosols, Ferrosols, Kurosols, Sodosols
Slope Range	0-12%	0-18%	12-56%	0-28%	5-45%	5-28%	0-12%
Drainage Status	Poor to imperfect	Imperfect to poor	Imperfect to well	Imperfect to well	Imperfect to well	Poor to moderate	Well to poor
Permeability	Moderate to high	Slow to high	Slow to moderate	Slow to moderate	Slow to high	Slow to moderate	High to slow
Erosion Risk	Low	Moderate to high	High	Low to moderate	Moderate to high	Moderate to high	Low to moderate
Main Limitations	Drainage, climate, soils, stoniness	Erosion, soils, drainage	Erosion, stoniness	Stoniness, climate, erosion	Erosion, stoniness	Drainage, erosion, soils, stoniness	Drainage, stoniness, rainfall
Land Capability Classes	5, 4	5, 6	6, 7	5, 6	6, 5	5, 6	5, 4, 3

Figure 15. Stylised cross-section through landforms from the Huon Valley to Margate in the east. The order of appearance of land capability classes reflects their areal extent within each landform.

Permian rocks are often exposed in valley systems, where they can form long gently sloping footslopes, as can be seen north of Huonville or about the township of Cygnet. In coastal regions, low hills with reasonably gentle hillslopes rising to 150m elevation have developed on Permian rocks. Further inland, slopes steepen, become highly dissected, and can rise to elevations of about 500m.

Triassic sandstones

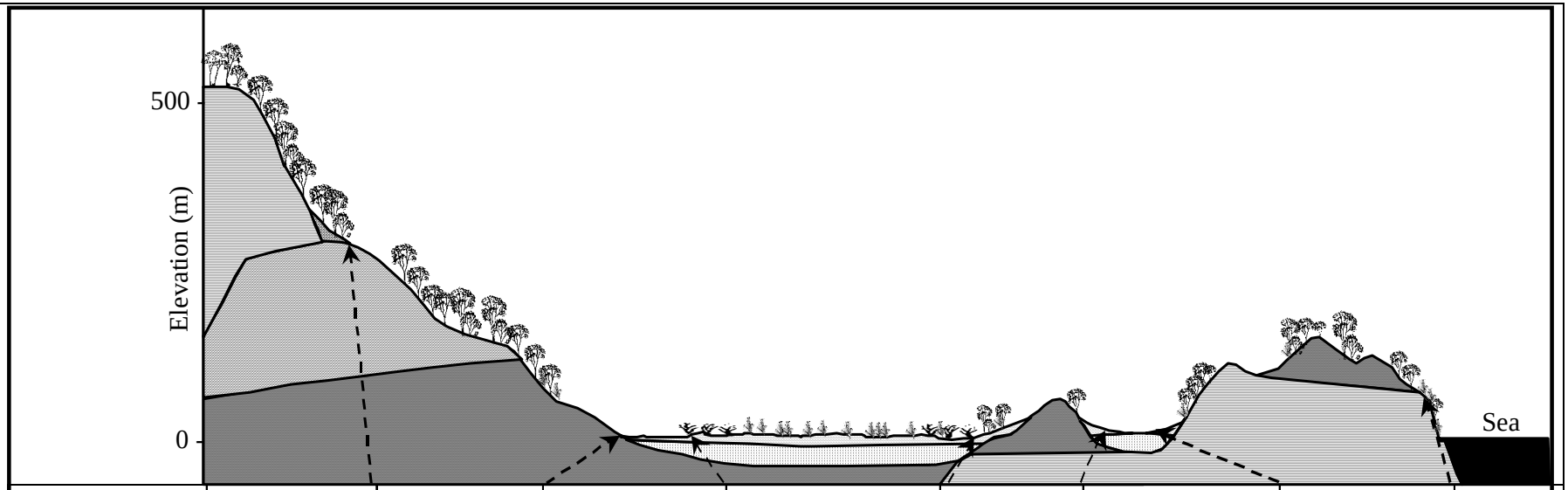
During the Triassic Period some 240 million years ago, thick sequences of predominantly medium to coarse quartz rich (siliceous) sandstones accumulated from sediment transported by rivers flowing towards the southeast of Tasmania. Today Triassic sandstone rocks crop out over 21% of the survey area. These rocks are commonly recognised by their coarse texture and yellow brown colour. They are often massive, displaying frequent cross-bedded sequences. There is little differentiation among sandstone in the survey area. Feldspathic members containing coal (Kaoota Coal Measures) occur at one locality to the north.

As with Permian rocks, Triassic rocks occur across a range of slope positions from gentle valley footslopes to ridge tops at elevations of about 600m. In places (eg. near Pelverata), hillslopes may become highly dissected and streams can be entrenched with steep valley sidewalls. In some coastal localities (eg. near Police Point, western Snug Tiers), stream incision has produced dissected plateaux with steep, often bare and rocky valley sideslopes. Landforms developed in Triassic rocks can be locally extensive, such as about North West Bay, the valleys and coastal flats southeast of Mount Cygnet, hillslopes to the west of Adventure Bay on Bruny Island, and large inland areas in the west of the survey area. Most of these occur within the SouthWest Conservation Area.

Jurassic dolerite

During the Jurassic Period (c.170 million years BP), the land was uplifted as large volumes of alkaline magma were intruded into the overlying Permo-Triassic sediments. Intrusion of this igneous rock, called dolerite, caused block faulting and large vertical displacements to occur within the older sediments. Subsequent erosion of the overlying sedimentary rocks has exposed large areas of dolerite.

Dolerite landforms comprise 46% of the survey area and are locally the most extensive rock type, covering large tracts of rolling hills or steep mountain land rising to 831m elevation. It also forms steep coastal cliffs (eg. eastern and southeast Bruny Island - Photo 2). Dolerite is commonly recognised as a hard, medium to coarse grained, dark coloured crystalline rock. However, its physical appearance in outcrops can vary considerably (Farmer 1985), particularly in relation to depth of weathering and fracturing. Commonly, exposures show mealy dolerite underlain by spheroidal weathered blocks containing kernels of fresher rock. In some places, exposures show much deeper weathering with dolerite ranging from fine-grained orange or red-brown to pinkish very coarse grained varieties.



Typical Landform	Steep Hills	Dissected hills	Flats and tidal marsh	Coastal dunes	Low hills	Undulating flats	Low hills	Coastal cliffs
Geology	Jurassic dolerite and talus deposits	Triassic sandstone, Permian mudstone	Quaternary alluvium, aeolian sands	Aeolian sands	Permian mudstone, aeolian sands	Tertiary sediments, aeolian sand, dolerite colluvium	Permian mudstone, Jurassic dolerite, aeolian sands	Jurassic dolerite
Soil Type	Ferrosols, Kurosols	Kurosols, Podosols	Kandosols, Hydrosols, Podosols	Rudosols, Podosols, Hydrosols	Kurosols, Podosols	Chromosols, Vertosols, Ferrosols, Podosols	Kurosols, Kandosols Sodosols, Podosols	Rudosols, bare rock
Slope Range	5-56%	5-45%	0-5%	5-45%	0-28%	0-12%	5-45%	>56%
Drainage Status	Moderate to poor	Imperfect to poor	Poor to very poor	Rapid	Imperfect to Rapid	Poor to well	Imperfect to well	Rapid
Permeability	Moderate to slow	Moderate	High to Moderate	Very high	Moderate	Slow to high	Slow to high	High
Erosion Risk	High	Moderate to high	Low	Extreme	Moderate to high	Moderate	Moderate to high	Extreme
Main Limitations	Erosion, stoniness	Erosion, soils, drainage	Drainage, salinity, wind erosion	Wind erosion	Soils, wind erosion, drainage	Wind erosion, soils, salinity, stoniness, drainage	Erosion, soils, stoniness	Rock, erosion
Land Capability Classes	E,6,7	6,5	5, 7	7,E	5,6	5,4	6,5	7, E

Figure 16. Stylised cross-section through landforms across the causeway joining north and south Bruny Island. The order of appearance of land capability classes reflects the areal extent within each landform.

Cretaceous Syenite

During the Cretaceous Period (146-65 million years BP) further intrusive igneous activity occurred, but this was of a much smaller scale and confined to areas centred about Cygnet and Oyster Cove. At that time alkaline rocks known as syenite were intruded into the surrounding sediments. Syenite occurs as numerous small dykes and sills which permeate rocks of early Permian age (eg Truro Tillite, Bundella Mudstone), although intrusions into younger rocks and dolerite are also recognised. Syenite is usually a drab grey or buff-coloured rock, which is generally hard and dense and contains abundant large feldspar minerals, embedded in a fine crystalline groundmass of ferromagnesian minerals. Distinctive landforms are generally not associated with Syenite rocks as they tend to occur scattered among Permian rocks. In places however, because syenite, like dolerite, is a hard rock and relatively resistant to erosion, it crops out along ridge tops, mountain tops (eg. Farewell Hill, Mt Mary, Silver Hill) or as narrow coastal headlands (Halliwells Point, Robleys Point).

Tertiary sediments and basalts

The end of the Cretaceous and beginning of the Tertiary period saw the formation of a sequence of northwest-southeast trending horst and graben structures in southern Tasmania. This time also marked initial development of many of the landforms and river systems we see in the region today. During the subsequent Tertiary Period (65 to 1.8 million years BP) geophysical evidence (Farmer 1985) indicates that large thicknesses of eroding sediment were deposited along the D'Entrecasteaux Channel, immediately offshore from Middleton and underlying the isthmus between North and South Bruny Island. Today, however, these rocks rarely outcrop as surface exposures, and the major development of Tertiary sediments on land relate to infill of the pre-Tertiary landscape peripheral to the main graben structure defined by the D'Entrecasteaux channel.

Tertiary sediments occupy less than 1% of the survey area. They are however, locally extensive, infilling valley floors north of Huonville, west of Oyster Cove, Port Esperance, Northwest Bay and Trial Bay. A thin veneer of Quaternary alluvium and aeolian deposits generally covers Tertiary surfaces. Where exposed, sediments are intensely weathered. These include ferricrete and silicastone (silcrete). Ferricrete is generally a deep red or reddish brown and represents intense oxidation and cementation of sand, gravel and clay deposits by iron oxides. Similarly, silicastone represents intense weathering and cementation of quartz rich sand and pebble conglomerates by secondary amorphous silica. Ferricrete often forms low rounded hills as can be seen either side of the highway towards the northern end of Great Bay on northern Bruny Island. Silicastone, while occurring as small discontinuous areas, is widespread and numerous among Tertiary deposits.

Another feature of the Tertiary period was the eruption of basalt flows and associated pyroclastics along valley margins. Subsequent intense weathering and erosion during the Tertiary has largely denuded and diminished the areal extent of basalt in the survey area. Surviving remnants of principally tephra and pyroclastic materials occur near Margate, at the lower end of Tinderbox peninsula, on South Arm, a hill west of Kaoota, and in the Huon and Mountain Rivers.

Quaternary sediments

The Quaternary Period in Tasmania is generally characterised by fluctuating climatic conditions: between colder glacial periods and warmer interglacials. During interglacial periods, climatic conditions were not dissimilar from the present and forest vegetation covered the survey area. In contrast, glacial periods were characterised by much lower tree lines and the prevalence of solifluction processes and freeze thaw activity on mountain slopes. A fluctuating climate and vegetation pattern almost certainly had an important role to play in the development of soils and landforms. As a result, Quaternary deposits in the region encompass a range of depositional forms and these include fluviatile, aeolian, slope, and marine sediments.

Talus deposits composed of boulders or angular rock fragments supported by a finer clay matrix occur about the base of many of the steeper and higher elevation hills and mountains in the region. These are interpreted to represent locally derived solifluction and fan deposits, which accumulated during glacial periods. Significant areas of dolerite talus, often containing boulders up to 4m in diameter, occur northwest of Snug Tiers, on south Bruny Island, in hills west of Middleton, the northern slopes of Mount Esperance and in western mountain lands. Syenite talus, which is usually comprised of angular rock fragments less than 250mm in diameter, occurs as reasonably extensive areas about the main Cretaceous syenite intrusives in hilly terrain west of Cygnet and Oyster Cove. Talus derived from Permo-Triassic sediments is generally much less extensive.

Aeolian coversands are extensive on Bruny Island and on South Arm. In most places these represent uniform fine to medium grade sands with no distinct dune morphology, and in which well developed Podosol soils have invariably developed. It is suggested (Farmer 1985) that these sands were deflated from the exposed beds of the Derwent River and D'Entrecasteaux channel during colder glacial periods. In contrast, recent aeolian sands and associated dune complexes with comparatively little profile development can be found contiguous with coastal bays. These areas include Cloudy Bay, The Neck joining north and south Bruny Island, Halfmoon Bay, and the causeway joining Cape Direction to Goat Bluff. Aeolian sand sheets also appear to cover older Quaternary and Tertiary alluvial sediments in coastal areas from Margate south and along Huon and Mountain Rivers.

The dissected remnants of Pleistocene gravel and boulder beds occur intermittently at elevations of 20 to 40m above present water levels bordering the Huon River, as localized deposits on Cygnet Peninsula, in the Randalls Bay area and along lower reaches of North West Bay River, and at Margate. These are generally well sorted and consolidated deposits consisting of well rounded clasts, usually less than 150mm in diameter. A primary distinction is made between deposits composed mainly of siliceous clasts and those composed mainly of dolerite clasts. Siliceous clasts remain relatively unweathered while dolerite clasts are often decomposed.

Recent alluvial deposits, comprising finer silts and sands over terrace gravels, occur along most of the major rivers systems in the survey area. While these deposits are relatively extensive in the region about, and south from Huonville, elsewhere they are generally confined to narrow strips of land following river courses. Lagoonal deposits on Bruny Island and South Arm represent infilling of depressions behind frontal foredunes. Raised beach deposits, corresponding to the high sea level at c.6 000 yrs BP,

also occur in a number of localities immediately adjacent to present beaches. At higher elevation, for example on the Snug Tiers, swamp and marshland deposits have accumulated in depressions.

5.4 Soils

Little soils information is available for the survey area. The earliest survey (Taylor and Stephens 1935) was undertaken to assess apple-growing soils in the Huonville district. This still remains the most detailed survey to date, and while providing only very general information, it illustrates the often complex pattern of soils occurring along valley flats. A broad scale 1:1 800 000 soil map of Tasmania (Nicolls and Dimmock 1965) indicates the dominate soil groups in the region to be either grey-brown podzolic soils (Kurosols, Sodosols) derived from basic parent materials or yellow podzolic soils formed from siliceous parent materials. In addition, very small extents of Krasnozems (Ferrosols) are indicated to the west of Geeveston and on south Bruny Island, while podzols (Podosols) are indicated on South Arm and Bruny Island.

During the course of this survey, a broad range of soil types was recognised to occur on the main geological formations. Because profile form and morphology has a strong bearing on land capability classifications, indicating such limitations as rooting depth, stone content, drainage condition, particle dispersion and erodibility, the general soil types encountered during the survey are briefly described below in relation to the principal parent materials on which they occur. Their order of appearance reflects a general decreasing versatility for agricultural use. The Australian Soil Classification (Isbell 1996) has been used when classifying soils, while descriptive nomenclature follows the suggested standards, which appear in the Australian Soil and Land Survey Handbook (McDonald *et al* 1990).

Soils derived from Tertiary basalt

Small areas of basalt soils occur south of Kingston, near Margate, towards the end of Tinderbox Peninsula, and along Mountain River near Huonville. Just south of Kingston, basalt soils extend over the boundary between the Derwent Land Capability map and the present survey. These soils have previously been mapped as red-brown gradational soils from basalt (Dimmock 1957). They represent an association between neutral, well drained, clay loam soils on ridge crests and steeper slopes, and acid, mottled clay soils on the lower slopes, flats and along drainage lines (Brown Ferrosols, Black Dermosols). Profiles generally exhibit dark brown or black, strongly structured surface horizons which grade to less well structured dark brown or reddish brown horizons with increasing depth.

Similar dark brown soils from basalt occur on terrace risers near Margate. These are moderately well drained soils with alkaline pH trends. Basalt gravels and less commonly cobbles may occur in most soil horizons. On Tinderbox Peninsula, basalt soils occupy steeper slopes and are prone to tunnel erosion along drainage lines. This indicates the presence of sodic subsoil horizons. Large stones and boulders are common along ridge crests.

Soils derived from recent Quaternary alluvium

Alluvial soils occur on narrow strips of land either side of many of the major rivers and smaller rivulets and streams throughout the survey area. These soils have formed in relatively recent accumulations of fine sediment from flood events. They are gradational soils with sandy loam to sandy clay loam textures. The typical profile consists of a 20cm thick dark brown surface horizon over reddish brown, brown, or dark greyish brown subsoil (Brown Kandosols, Brown Dermosols, and Red Kandosols). This in turn overlies gravel at depths normally exceeding 80cm, although shallower soils may be present adjacent to streams. The brighter coloured soil members are associated with alluvium that has been locally derived from erosion of basalt materials, such as on alluvial flats just north west of Margate. Soil structures are generally weak or massive, although surface horizons may have moderate to strong polyhedral structures in undisturbed sites (eg. pasture). Alluvial soils tend to have high subsurface permeabilities and are commonly well drained. However, soils may become poorly drained where significant runon occurs from surrounding hillslopes, or where relatively high water tables are encountered near to major rivers and estuaries. In these cases, soils have dark grey to grey subsoils and strong mottling patterns and iron stains which extend into surface horizons (Grey Kandosols, Redoxic Hydrosols).

Much finer textured black clay soils occur along some drainage flats on Bruny Island (Saltwater Creek). These soils consist of a black self-mulching light clay surface horizon over a black to very dark grey medium clay subsoil, that is weakly structured and plastic (Black Vertosol). These are neutral pH, saline soils (ECe ≈ 14 - 18 ds m^{-1}) that remain wet during winter months but crack out during dry summer months.

Soils derived from Jurassic dolerite

Soils developed in dolerite rocks extend across a broad range of landforms, and exhibit a similarly broad range of profile form. By far the most common are texture contrast soils similar to the ‘Podzolic Soils on Dolerite’ mapped on the Hobart, Brighton, and Sorell reconnaissance soil surveys (Loveday 1955, Dimmock 1957, revised by Spanswick 2000). These soils, which are generally widespread throughout the survey area, comprise greyish brown sandy loam surface horizons over brown, light to medium clay subsoils (Brown Sodosols, Brown Kurosols). They commonly show either acid or strongly acid pH trends and nearly always have imperfect to poor drainage with ferrous mottles extending into surface horizons. This is commonly the case on low angle slopes where runoff is restricted and perching of water occurs above the low permeability subsoil. Surface horizons generally consist of a 9-15cm organic enriched A1 horizon and an underlying, sporadically to conspicuously bleached, A2 horizon. In places a layer of iron stone gravels may be present towards the base of surface horizons. These horizons show large textural variation ranging from fine sandy clay loams to loamy sands.

The sandier soils tend to have a loose consistency while those with significant clay content tend to hard set in summer months. Subsoils are of a more uniform clay texture and have moderate subangular blocky to prismatic structures. They are also dispersive and susceptible to gully and tunnel erosion. Some colour variation was noted from the usual brown or yellowish brown to olive browns in wetter sites. On footslopes, subsoils generally grade through to a light yellowish brown mealy weathered dolerite at depths

between 80 and 100cm. On steeper slopes, subsoils grade to exfoliating dolerite boulders at much shallower depths of between 30 and 60cm. In addition, the A2 horizon is commonly absent and profiles are stony throughout and the ground surface may be littered with abundant surface stones and boulders. This is the common soil of steeper country.

Gradational brown soils, although less common than texture contrast soils, can be found in some coastal localities (eg, Bruny Island, Tinderbox Peninsula) and on footslopes and flats in some inland valleys where deeply weathered dolerite deposits occur (Brown Dermosols). These soils have neutral to acid pH trends and are generally unlike brown soils mapped in drier areas to the east and northeast of Hobart, which commonly have alkaline pH trends and occasionally calcareous subsoils. Within the survey area, shallow and stony brown soils tend to occupy north facing slopes. These are moderately well drained soils with weakly structured, dark brown, fine sandy clay loam topsoils over brown, moderately structured, clay subsoils. Deeper relatively stone free soils can occur on footslopes and valley flats. These soils commonly have a 20-30cm dark greyish brown fine sandy clay loam surface horizon, over dark yellowish brown, light clay subsoil horizons which may extend to depths exceeding 1m. They also have fine polyhedral or subangular blocky structures throughout and are generally moderate to imperfectly drained. In contrast, some soils have a weakly structured subsoil overlying compact mealy dolerite at shallower depths (Brown Kandosols). In these situations, poor drainage was indicated by paler coloured dark greyish brown horizons with distinct ferrous mottles, which may extend to the surface.

Black soils on dolerite, although rare, were encountered in a number of localities. Shallow black clay soils, passing to compact mealy fine dolerite gravel at depths as little as 40cm, were encountered along broad ridge crests on eastern Bruny Island. Deeper, uniform, clay loam soils that abruptly overlying relatively unweathered dolerite rock at depths of about 70cm, were encountered on steep north facing slopes southwest of Woodbridge (Black Dermosols).

An association between Krasnozem-like soils and those transitional to red podzolics was encountered on deeply weathered dolerite deposits in areas of higher rainfall towards the southwest. These soils are moderately well to well drained and characterised by much brighter coloured reddish brown to dark brown subsoil horizons, which may extend to depths greater than 1m, before passing to mottled, intensely weathered, dolerite material. Gradational profiles consist of a 20cm dark brown clay loam to light clay surface horizon, over a moderate to strongly structured light to medium clay subsoil horizon (Brown Ferrosols). Upper soil horizons sometimes include a paler A2 horizon and are generally of yellower hue. Dolerite stones are common in surface horizons. In most places, these Ferrosols are associated with texture contrast soils, to which they can grade laterally over relatively short distances. Texture contrast soils are characterised by loam textured surface horizons, the presence of a bleached subsurface A2 horizon and the presence of a layer of hard iron stone nodules at the top of the B horizon (Brown Chromosols). Soils similar to the yellow-brown soils of solifluction deposits (Loveday 1955) can be found at elevations above about 500m about the main dolerite mountain peaks (eg. Snug Tiers, Southeast Bruny Island).

Soils derived from early Quaternary gravel deposits

The type of soil developed on the older dissected gravel deposits depends very much on whether gravel beds are composed primarily of dolerite or siliceous clasts. The former produce either gradational or texture contrast soils akin to those developed on dolerite bedrock. For example, slightly stony gradational brown clay soils occur on raised terrace remnants north of Margate. Elsewhere, strongly acid, texture contrast soils appear to be the norm. On flats to the west of Margate poorly drained soils occur. Here, surface horizons comprise a shallow very dark brown structured loam over a massive, relatively compact, dark greyish brown sandy loam. These in turn overly a light olive brown, structured, gravelly medium clay subsoil which passes to weathered dolerite gravels at depths of about 70cm. Mottle patterns are most intense in the A2 and upper B horizons suggesting low permeability and perching of water during the wetter months of the year. South of Huonville, terrace remnants along the Huon River carry similar soils. However, in contrast, these soils are imperfect to moderately well drained, and have overall brighter soil colours together with a brown moderately developed fine angular blocky structured subsoil. The subsoil gradually passes to weathered gravel at depths greater than a metre. This soil is a Dystrophic Brown Kurosol and has previously been named the Woodbridge brown podzolic (Loveday 1959).

Siliceous gravel deposits composed primarily of well-sorted and rounded clasts produce quite different soils. These are very shallow soils, which typically comprise a very shallow organic sand surface horizon over a bleached gravelly sand that in turn overlies weakly weathered compact gravels and cobbles.

Cretaceous syenite

Syenite generally does not produce distinctive soils, as it tends to crop out as narrow dykes among predominantly Permian terrain. On hillslopes, soils are derived from a mixture of parent materials. However, the influence of the predominantly feldspathic mineralogy can be seen in the form of stronger brown soil colours and more gradational profiles. Where syenite rocks are more extensive, typically as Quaternary slope deposits west of Oyster Cove or west of Cygnet, gradational brown soils with strong fine polyhedral structured surface horizons have formed. These soils are commonly stony and confined to moderate to steeper mid to upper slope positions. In some coastal areas, such as south of Cygnet, deep loam textured soils have developed over syenite. These are well drained soils consisting of a 30cm dark brown loamy fine sand surface horizon over a yellowish brown sandy loam subsoil. Surface horizons have strong fine granular structures while subsoils tend to be weakly structured.

Soils derived from Triassic sandstone

Triassic sandstone, like dolerite, produces a range of soils from those with gradational profile forms to those exhibiting strong textural contrasts. In coastal areas (eg. Northwest Bay, Bruny Island) and some inland localities (eg. Garden Island Creek) Podosols are the normal soil encountered. These have developed in the coarser textured quartz sandstones, which may include aeolian cover sands. Soil profiles typically comprise a surface horizon consisting of 20-30cm of organic enriched black sand overlying variable thickness loose grey coarse sand. This in turn overlies ‘coffee rock’ (Bhs horizon), an organic hardpan which may occur at depths exceeding 1m (Aeric

Podosols). Soils are invariably strongly acid throughout and nutrient poor. Subsoils are rarely examined due to the impenetrable nature of hardpans. However, where exposed subsoils are commonly mottled yellow-brown, weakly structured, clayey sand. While most soils are well drained as a result of rapid permeabilities in surface horizons, those in low lying areas become poorly drained due to a lack of runoff and perching of groundwater (Aquic Podosols). These soils can remain wet for considerable periods during winter months.

Triassic sandstones also carry soils that have sandy loam textured surface horizons, that lack characteristics of Podosols (eg. no Bh or Bhs horizon). These soils usually consist of a dark grey to black surface horizon over a grey sporadically bleached subsurface A2 horizon. This in turn overlies a yellowish brown or olive brown, medium clay subsoil that is strongly mottled and dispersive (Brown Kurosols). They are also usually imperfectly drained on slopes, but become poorly drained on lower slopes and flats. As with Podosols, these Kurosols have acid to strongly acid pH trends with depth.

Gradational soils (Brown Kandosols) were also recognised to have developed on Triassic sandstones in a number of localities. These areas are usually located further inland on steeper mid slope positions (eg. east facing slopes south of Middleton, slopes south of Kaoota). While not examined in any detail, these soils consist of structured fine sandy clay loam surface horizons over mottled greyish brown subsoils.

Extensive areas of Triassic sandstone flats and peat swamps to the southwest of the survey area remain largely undeveloped and carry very poorly drained soils. Soils examined near Southport Lagoon consist of 15cm of decomposed black peat over mineral soil horizons (A/B) before contacting hard bedrock at 95cm. Subsoil horizons are a dark grey massive sandy clay loam. All horizons are strongly acid (pH = 4.2) and surface horizons have significant salinity (ECe $\approx$ 4 ds m^{-1}). Further inland (although most fall within exclusion zones), low lying areas carry very poorly drained soils that are characterised by intensely mottled and leached massive grey to light grey sandy clay subsoils (Redoxic Hydrosols).

Soils derived from Permian mudstones

Permian soils encompass a diverse range in soil type from those with gradational profile forms to those exhibiting strong texture contrasts, of which some contain massive hardsetting bleached horizons or hardpans. Despite this variability, the vast majority of soils examined in this survey were deeply weathered, nutrient poor, and had strongly acid pH trends. In addition, most soil horizons were weak or massive structured. Soil drainage conditions were highly variable, reflecting both variations in subsoil permeability and topographic position.

Gradational soils with structured surface horizons were commonly associated with the finer grained Permain rock types (Truro Tillite, Woody Island Siltstone), particularly those centred about Cygnet, on hills to the west of Oyster Cove, and on lower slopes near Woodbridge. These soils generally consist of a 20-30cm very dark greyish brown clay loam, silty loam or fine sandy clay loam surface horizon, over a brown, greyish brown, yellowish brown or olive yellow, light to medium clay subsoil. The subsoil commonly extends to depths exceeding 80cm before passing to weathered mudstone (Brown Kandosols, Grey Kandosols, Yellow Dermosols). Surface horizons normally

have a moderate fine subangular blocky or polyhedral structure while subsoils have a weak angular blocky structure and are invariably mottled to some degree. Grey subsoil colours and bright ferric mottles indicate restricted subsurface drainage. The wide range in soil colour and degree of mottling suggest an equally wide range in drainage conditions. Most soils are imperfectly drained, while those in low-lying areas have distinct mottling patterns extending to within 10cm of the surface, and are considered poorly drained. In places, poor drainage conditions can extend onto steeper slopes. Moderately well drained soils can occur on steeper slopes and along ridge crests. These have subsoils with faint mottling patterns, brighter colours and generally stronger soil structure.

Gradational soils with generally weak structures and massive subsurface horizons are common on Permian rocks in the higher rainfall areas towards the western portion of the survey area (Photo 1). These soils typically have a shallow (≈10cm) dark grey fine sandy clay loam topsoil over a massive, dark grey to grey, thixotropic silty loam or silty clay loam subsurface A2 horizon that extends to between 20 and 40cm depth. This in turn overlies a strongly mottled light to medium clay subsoil that varies in colour from a dark greyish brown to light grey or light olive brown (Grey Kandosols, Brown Kandosols). These are exceedingly leached, very strongly acid soils (pH values as low as 3.4 were recorded in some subsoil horizons).



Photo 1. Grey Kandosol on Permian rocks. These are nutrient poor strongly acid soils, characterised by shallow topsoils, massive bleached A2 horizons and mottled clay subsoils. They require a high level of inputs to develop into pasture and are unsuited to arable cropping.

Texture contrast soils are associated with the younger and generally more siliceous Permian rock types (Abels Bay Formation, Mini Point Formation, Deep Bay Formation) occurring in the north and northeastern areas. These are similar to grey-brown podzolic soils described by Dymock (1953), although they are overall deeper soils. On hillslopes about Huonville, these soils are mapped as the Huon loam (Stephens and Taylor 1935). Soil profiles usually consist of a shallow very dark greyish brown, fine sandy loam to fine sandy clay loam surface horizon that abruptly overlies a greyish brown or grey, fine sandy clay loam to silty loam, bleached subsurface A2 horizon. The A2 may extend to depths of between 30 and 60cm (Grey Kurosol, Brown Kurosol). Surface horizons have little structure, are often hardsetting and may contain a layer of compact quartz gravels in the A2 horizon. In places the A2

horizon may form a dense indurated pan (duripan) which provides a barrier to root development and perches water during wetter months. The subsoil is commonly a dark grey or dark greyish brown light to medium clay. It is weakly structured and nearly always mottled to some degree, suggesting restricted drainage at depth in soil profiles. These soils are nearly always strongly acid and have exceedingly low natural fertility.

In some coastal localities (South Arm, Bruny Island), Podosols have developed on Permian rocks, possibly due to the localized influence of aeolian cover sands. These soils generally consist of a dark grey sandy loam to loamy sand surface horizon over grey bleached loamy sand to sand subsurface A2 horizon. This in turn overlies a thin (5-20cm) black, organic enriched, structured clay (Bh horizon), which may rest upon unweathered rock or a dark greyish brown medium clay subsoil (Semiaquic Podosols). The A2 horizons are commonly thixotropic and occasionally cemented into a dense hardpan. These soils have acid to strongly acid pH trends and can be moderately saline where drainage is restricted (ECe ≈ 2 - 10 ds m^{-1}).

Soils derived from Tertiary sediments

Tertiary sediments, despite their relatively small aereal extent, carry a diverse range of soils, most of which show a relatively advanced stage of soil development. These include podzols, ground water podzols, yellow-grey podzolics, lateritic podzolics and lateritic soils.

The most extensive area of Tertiary sediments extends north from Huonville. A detailed soil survey of the area (Taylor and Stephens 1935) shows the main soils to be, the Huon silty loam, loam, sandy loam and sand, Grove sand, Lucaston sand and Woodbridge series. With the exception of the Woodbridge series, these soils are all characterised by strongly acid pH trends, pronounced massive bleached A2 horizons and heavily mottled grey to olive yellow, medium to heavy clay subsoils.

The Huon sand is the most extensive of these soils and occurs adjacent to, or contiguous with, recent alluvial soils described above. It usually consists of dark grey and grey sand or loamy sand surface horizons overlying a mottled yellow heavy clay, or less commonly clay loam, subsoil (Yellow Kurosols, Grey Kurosols). This soil is particularly prone to hardpan formation with indurated layers containing considerable gravel common in places. Soils are prone to water logging in low lying areas and where hard pans occur. On elevated sites, soils with lighter textured subsoils generally have better drainage. Nearer to hillslopes, the Huon silty loam can be found in low-lying areas. This is a poorly drained soil developed in colluvial deposits from surrounding Permian rocks. It generally consists of silty loam surface horizons over strongly mottled heavy clay subsoil. The A2 is relatively thick (20-45cm) and strongly thixotropic.

The Grove and Lucaston sands are ground water Podzols having developed in the deeper coarse textured sand accumulations on small knolls and rises scattered along valley flats. The Grove sand consists of a dark grey sand surface horizon, over relatively thick (60cm) light grey massive sand that in turn overlies a largely impenetrable black or very dark brown thick organic hard pan (Semi-Aquic Podosol). The Lucaston sand is similar except that the grey subsurface A2 horizon also forms an extremely dense hardpan containing considerable quantities of embedded gravel. Both soils, while

appearing well drained, are prone to severe waterlogging during wet months of the year. They are also strongly acid, nutrient poor soils.

Soils similar to the Grove and Lucaston sands are common on flats south of Margate, slopes west of Oyster Cove and on valley flats about central Bruny Island. In most cases these represent aeolian sand sheets overlying Tertiary or Quaternary sediments. Soils with profiles similar to the Lucaston sand are generally associated with silicastone and Quaternary lag deposits.

Intensely weathered lateritic soils occur on small knolls on central Bruny Island. These are predominantly duplex soils consisting of a very dark grey sand or loamy sand surface horizon over a variable thickness bleached sandy gravel composed largely of fine rounded ironstone nodules. This in turn overlies a yellowish red, moderate to weakly structured, medium clay subsoil (Red Kurosols). Where cultivation appears to have occurred in the past, surface layers are largely absent and the soil consists of a very shallow, very gravelly surface horizon directly overlying red clay subsoil. Although well drained soils, they support extremely poor pastures.

Soils derived from Quaternary aeolian sands

Soils with minimum profile development occur in association with recent sand dunes and rolling terrain on South Arm, about central Bruny Island and at Cloudy Bay, and as small areas along beach frontages in coastal regions. These soils usually consist of a slightly organic enriched loose surface horizon over coarse light brownish grey sand (Arenic Rudosols).

Elsewhere, Podosols are the dominant soil associated with aeolian sand sheets. These again occur predominantly on Bruny Island and South Arm. They may also occur as a thin blanket covering Tertiary and Quaternary sediments, and occasional older rock types. On southern Bruny Island extensive sand sheets occur in association with dolerite terrain, and quite deep accumulations of sand can be found along some of the lower elevation ridgelines rising to 100m. These soils are all characterised by an organic enriched surface sand horizon over a relatively thick (>30cm) grey coarse sand, which in turn overlies a very dark brown organic hardpan at depth. This may rest on bedrock or weathered clay enriched sands. In low lying areas these soils are prone to waterlogging (Aquic Podosols) while on slopes they are particularly drought prone (Aeric Podosols).

5.5 Vegetation

The vegetation of the study area has been described by Davies (1987), Kirkpatrick and Dickenson (1984) and in the Vegetation of Tasmania (University of Tasmania). Hence, a broad overview of only the principal vegetation associations is presented here.

The dominant vegetation communities identified are:

- dry sclerophyll in coastal areas and in the northeast,
- wet eucalypt forest towards the southwest and at higher altitude,
- dry coastal vegetation predominantly on Bruny Island,
- moorland and scrub mainly in the south, and
- cleared land consisting of introduced or native grasses

The distribution of native vegetation is broadly correlated with geology, altitude and climate. Remnant vegetation is generally confined to upland areas where a combination of soil and/or climatic conditions severely limits agriculture. Lowland and coastal areas have largely been cleared of the original forest cover and replaced by introduced grasslands. Some small areas of forest occur on private land in low lying areas where either slopes are steep or soils are excessively stony, wet, or acid and nutrient poor.

Within agricultural areas, improved pastures consist of perennial ryegrass (*Lolium perenne*) and white clover (*Trifolium repens*) among others. In wet or poorly drained sites rushes become common (eg. *Juncus spp*), while along saline valley flats, Buck's Horn Plantain (*Plantago coronopus)* is often the dominant plant. On sandier soils, poor pastures are often characterised by hardier plants such as bracken fern *(Pteridium esculentum*) or saggs (*Lomandra longifolia*). Unimproved pastures also commonly consist of a range of native grasses, which may include such species as Wallaby grass (*Danthonia spp*), Weeping grass (*Ehrharta stipoides*) and Tussock grass (*Poa spp*), together with a large number of volunteer weed species.

Dry coastal vegetation generally consists of a closed heath comprising a variety of species including Tea Tree (*Leptospernum spp*), Paperbark (*Malaleuca spp*), Banksia (*Banksia marginata*) and Sheoak (*Casuarina spp*). Drooping Sheoak (*C. stricta*) is common on very steep, stony dolerite hillslopes. Coastal dune systems typically support a grassland dominated by Marram grass (*Ammophila arenaria*) or shrubland dominated by Coastal Wattle (*Acacia sophorae*).

Dry sclerophyll forests consist of a wide variety of species that are usually characterised by floristic structure. Permo-triassic landforms are characterised by Black Peppermint Gum (*E. amygdalina*), Silver Peppermint Gum *(E. tenuiramis*), or Blue Gum (*E. globulus*) with a heathy understorey. Dolerite landforms generally carry grassy woodland dominated by Blue Gum, White Gum (*E. viminalis*) or White Peppermint Gum (*E. pulchella*). Poorly drained sites, particularly those on Permian landforms, carry open stands of Swamp Gum (*E. ovata*) or Stringybark (*E. obliqua*) with a shrubby or sedgy understorey.

Wet sclerophyll forests occur in areas of higher moisture availability and are characterised by a taller understorey of *Acacia* species and green leafy (mesophyll) shrubs. Typical forests consist of open stands of White Topped Stringybark *(E. delegatensis*) or Stringybark, with Swamp Gum *(E. regnans*) becoming increasingly common in gullies and on protected slopes. Where poorer soils occur, Smithton Peppermint Gum (*E. niteda*) may become the dominant tree species.

Moorland to the southwest generally consists of open woodland dominated by Stringybark, Swamp Gum or Black Peppermint Gum on rises, or sedgeland dominated by Buttongrass (*Gymnoschoenus sphaerocephalus*) and Swamp heath (*Sprengelia incarnata*).



Photo 2. View looking south along the eastern coast of Bruny Island at Trumpeter Bay showing dolerite cliffs in the foreground and landforms developed on Permian rocks in the background. There is often a close association between remnant native vegetation and geological units carrying the poorer soil types.

5.6 Land Use

The majority of lowland and coastal areas have been cleared of the native vegetation for agriculture. Land use is dominated by horticultural enterprises or grazing for beef, sheep and dairy production. Tourism is also an important component of the local economy and is focuses largely in coastal areas such as on Bruny Island, or in areas where the lands remain relatively undeveloped (mountain lands). The region has an important timber industry, which is located primarily in forests to the southwest of Huonville. There are few significant mineral deposits in the area. Mining of coastal alluvial gravel deposits and the more deeply weathered dolerite is undertaken for roading materials.

The area is traditionally recognised for its apple industry, although the production of berry fruits and stone fruits is also common in places. The area is ideally suited to this type of perennial horticulture due to a suitable climate of relatively cold winter months, ample rainfall during the growing season, and warmer and drier summer months for ripening of fruit. Although orchards are planted across a broad range of landforms and soil types, they are generally sited on footslopes and valley floors. Soil drainage can be a problem in many sites. Consequently mounding about tree roots is a common practice to help improve aeration and alleviate relatively poor drainage. The remnants of mounds and furrows are a common feature of many pastured hillslopes where apple trees have been removed. In recent years, there has been a move towards alternative horticultural enterprises in coastal areas such as hazelnuts, olives, and grapes for wine production. However, these are still in their infancy, with only relatively small plantings to date.

Broadacre cash cropping is generally not undertaken within the survey area largely due to a combination of unsuitable climate and poor soil types. In some coastal localities however, where a more moderate climate results in warmer winter and springs months, arable cropping is undertaken on the better alluvial soils along river flats. These sites are ideally suited to crops such as potatoes, cereals, corn, brassica, lettuce, beans and peas. The relatively small extent of these soil types, however, and lack of any significant industry for food processing, means that in most cases they have been utilised for propagation of fruit trees. In a few places, market gardens that supply the local domestic market are located on alluvial soils. Market gardening is also undertaken on some of the sandier soils where a higher intensity of inputs (eg. fertilizer, irrigation) is needed. The occasional crop of potatoes is also grown where sandier soils occur with reasonable drainage (eg. ridge tops). While maximum plant growth can be expected during the warmer late spring and summer months, irrigation is often required to offset risks associated with crop failure during dry periods.

The remainder of agricultural land is given over to grazing for sheep and beef production. Some fodder crops are occasionally established where better soils occur. Pasture renewal is often undertaken during summer and autumn months when paddocks are easier to cultivate. The higher rainfall experienced throughout much of the survey area provides for very productive pastures when compared to drier eastern areas such as the Coal River Valley. Production of sheep for fine wool tends to occur in the drier northeast, while beef cattle herds can be found throughout the survey area, particularly on gentle to moderate sloping hill country. Dairy farming also occurs in areas yielding

good summer pastures. In recent years there has been a trend towards land subdivision for small lifestyle blocks, particularly in areas centred on townships.

The timber industry in southeast Tasmania is also centred in the Huon region. Timber is extracted from extensive wet sclerophyll and rainforests towards the southwest for sawlogs or for wood chipping and pulping for the export market. Plantation forests are being established in areas previously milled for timber or in some pastureland peripheral to forest further inland.

6. LAND CAPABILITY CLASSES ON THE D'ENTRECASTEAUX MAP

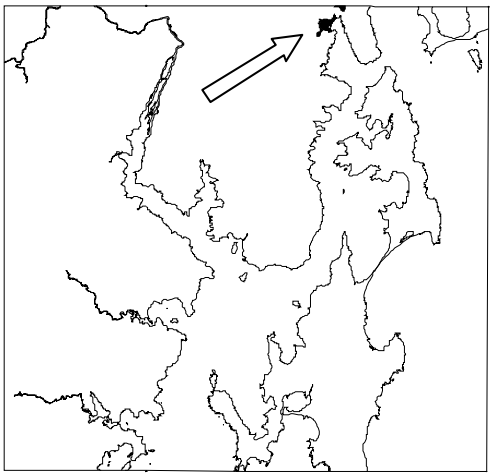
This chapter describes the different classes of land that have been identified during the course of the survey. General information on the nature of the land, climate, soil type and geology are given together with an indication of the major limiting factors to agricultural production. Throughout the text references are made to subclass codes and these are shown in parenthesis. A figure is presented for each class indicating its distribution across the map. The area of each map unit is also shown in hectares.

6.1 CLASS 1 AND 2 LAND

No Class 1 or 2 land is found in the survey area. Generally poor soil conditions (s) and low fertility coupled with an unsuitable climate of cold winter and spring months (t), together with low annual rainfall in coastal localities (p), limits land capability to Class 3 or poorer.

6.2 CLASS 3 LAND

Class 4+3 229ha



Small areas of Class 3 land occur on Quaternary alluvium and Tertiary basalt where average annual rainfall exceeds 700mm. These are relatively small areas where the dominant limitations restricting agricultural versatility are climate, stoniness, soil depth and erodibility. They are mapped in association with Class 4 land due to limitations imposed by map scale.

Class 3 Land on Tertiary Basalt

Small areas of Class 3 land occur where Brown and Red Ferrosols have developed on the sloping ridge crests of basalt flows near Kingston and on dissected basalt risers to the west of Margate. These are well drained, fertile soils limited in their productive capability by low rainfall (p), stoniness (g) and soil depth (l). Near Kingston, these soils tend to occur in association with imperfectly drained heavier textured Black Dermosols that are situated on flats or along drainage depressions and are classified as Class 4 land. In addition, on slopes bordering basalt flows where gradients exceed 12%, there is a moderate risk of erosion without careful management.

The small size of these areas, together with the intricate nature of their distribution, has meant that these areas can only be identified at the 1:100 000 scale as complex Class

4+3 map units. Current land use is primarily animal grazing while a few fields are cultivated for vegetable production. Some areas of this prime agricultural land, such as between Kingston and the Huon highway, have already been subdivided for residential development.

Class 3 Land on Quaternary Alluvium

Small areas of Class 3 land occur on alluvial flats immediately to the west and north of Margate (Photo 3). Due to their small size and limitations of map scale, these areas have been mapped as a complex with Class 4 land occurring on adjacent higher elevation terraces. Class 3 land carries brown to reddish brown structured alluvial soils (Brown Dermosols) which are ideally suited to cultivation and production of a range of crops. The moderate coastal climate provides for a reasonable growing season from early spring to early summer months. However, the dominant limitation restricting the range of crops that can be grown is low rainfall (p). Summers are relatively dry and if cropping is to be considered at this time of year, irrigation will normally be required. While these are relatively free draining soils, care needs to be taken during wetter winter months to avoid soil compaction and structural decline. This is particularly relevant to the sandier and weaker structured soils with higher ground water tables. These areas, which are often located nearer to streams or coastal margins, thus have an additional wetness (w) and soils (s) limitation.

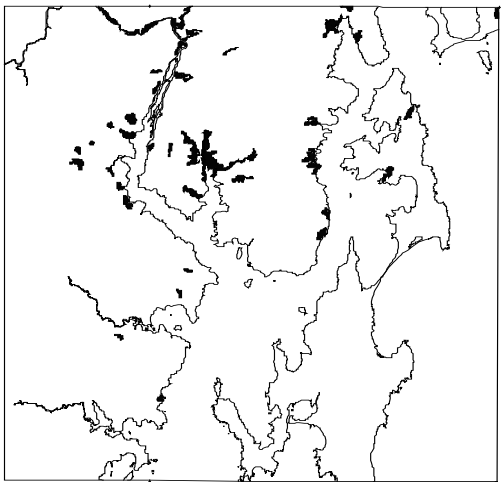
Inclusions of Class 5 land occur on steep terrace risers at the outer margins of lower terraces.



Photo 3. Small extents of Class 3p land occur on alluvial terraces in some coastal locations. Climate is the dominant limitation restricting the range of arable crops in this situation (Margate, GR. E521000 N5237300).

6.3 CLASS 4 LAND

Class 4	2 502ha
Class 4+3	229ha
Class 4+5	972ha



Class 4 land occupies relatively small areas and is generally situated on the better soils of valley floors or gentle lowerslopes. In some instances, Class 4 land is mapped in association with Class 5 land. The dominant limitations that restrict broadacre cropping include climate (c), poor soil conditions (s), wetness (w), erosion risk (e), and high stone content (g). Present land use is dominated by grazing or horticulture enterprises.

Class 4 Land on Quaternary Alluvium and Gravel Deposits

Class 4 land on Quaternary alluvium includes most areas of the modern day floodplain of rivers and the smaller streams and rivulets. These are generally relatively narrow strips of land immediately adjacent to rivers. Most extensive areas occur west from Huonville following the Huon River. Narrow strips of land also follow rivulets draining into Port Cygnet.

These areas of Class 4 land support relatively fertile light textured brown to reddish brown soils (Brown Kandosols, Brown Dermosols) which are ideally suited to cultivation and the occasional cash crop in rotation with pasture. However, soils are often weak structured (s) and care needs to be taken to avoid soil compaction and resultant loss in permeability and air fill porosity. Climate (c) and soil wetness (w) are the major limitations restricting the range of crops and agricultural versatility of these sites. Historically, cereals have been grown in places, although today horticultural crops are most common. Until recently, hops have been grown near Huonville.

Most valleys are relatively narrow and prone to cold air drainage and frosts during winter and spring months. Furthermore, dry summers restrict arable crops to short rotation late spring varieties suited to cooler climates. Wet soil conditions can further reduce the growing season by restricting vehicle access. Careful tillage management may be required to avoid risks of soil degradation through compaction and loss of soil porosity. Drainage in alluvial soils can be quite variable due to runon from surrounding slopes and high water tables in places (Photo 4). Terraces often have a backslope away from the river and this can cause waterlogging and ponding of water to occur at the break in slope between hillslopes and the terrace tread. Here, Class 4 land often merges with poorly drained Class 5 land over relatively short distances.



Photo 4. Class 4wc land can be found along valley flats adjacent to most rivers and streams in inland localities (Judbury, GR. E495600 N5237500). Here, late frosts and wet soil conditions towards the base of slopes (foreground) are the main limitations.

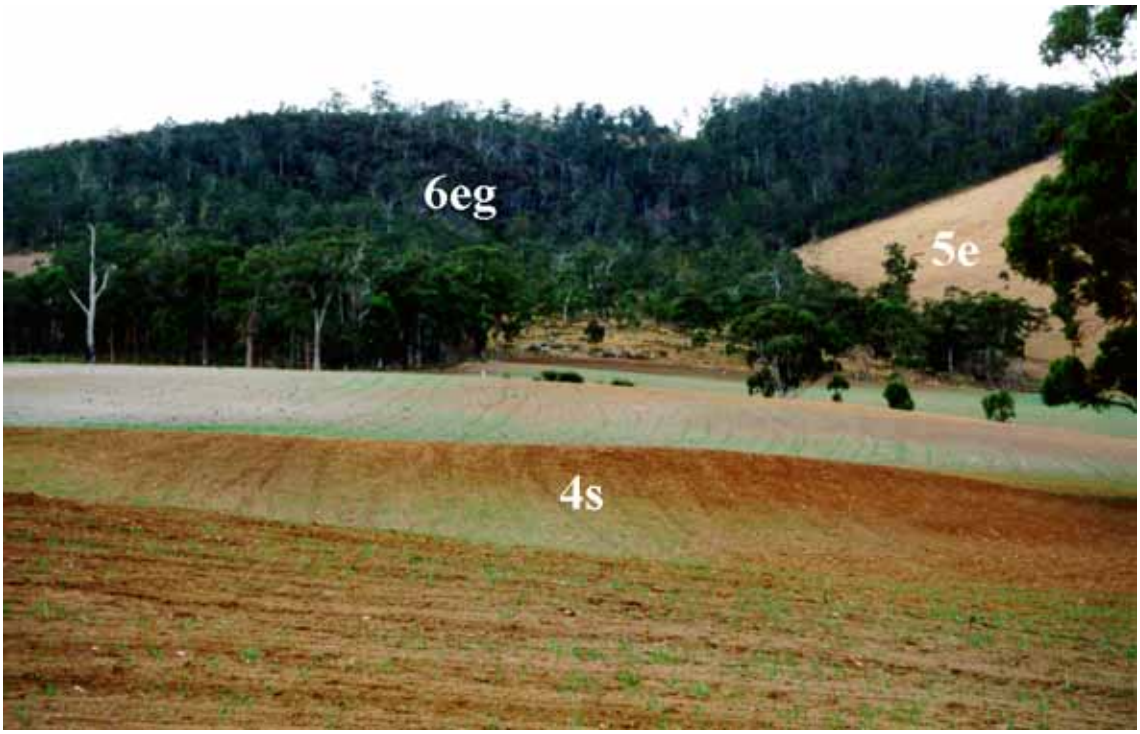


Photo 5. Class 4s land on Jurassic dolerite with Class 5e and 6eg in the background. Texture contrast soils are evident in areas with lighter surface colours.

Class 4 land also occurs on higher dissected terraces north of Margate and between Huonville and Franklin. Here, although drainage is good, high stone content at shallow depths in soils (g), and risks of soil erosion (e) on the steeper terrace risers, greatly restrict the ability to cultivate soils and would further restrict the range of crops that could be grown. In addition, areas carrying duplex soils are prone to soil degradation and require careful management due to the shallow and poorly structured nature of topsoils. These soils are also strongly acid and nutrient poor, requiring reasonable fertiliser applications in order to maximise productivity from crops.

Class 4 Land on Cretaceous Syenite

Small areas of Class 4 land are mapped on syenite and related slope deposits on sloping ridge crests west of Cygnet and on coastal slopes south of Cygnet, along the western shore of Port Cygnet. These areas carry relatively free draining light textured and structured soils (Brown Dermosols) that could support occasional cropping. However, the combination of moderate slope (up to 18%) and light surface textures, indicate that there is a significant erosion risk (e) if regular cultivation were to be undertaken. Most areas presently remain under pasture.

Class 4 Land on Jurassic Dolerite

Small extents of Class 4 land can be found scattered throughout the survey area wherever soils with reasonable drainage have formed from dolerite parent materials (Photo 5). These are usually located on elevated sites along valleys or on footslope positions and include either moderately well drained gradational soils (Brown Dermosols, Brown Kandosols) or imperfectly drained texture contrast soils (Brown Kurosols, Brown Sodosols). The main limitations, which greatly restrict the use of these soils for broadacre cropping, include high stone content (g), imperfect drainage due to low subsoil permeability (d) and erosion potential on steeper slopes (e). Most areas of Class 4 land are limited to slopes of less than 18% in the case of better structured soils, or to slopes of less than 12% in the case of texture contrast soils. The latter soil types are more prone to soil degradation and to surface and tunnel or gully erosion processes owing to the weak soil structure and the slowly permeable and dispersive nature of subsoils which promotes runoff.

In narrow enclosed valleys, low temperatures (t) restricts the growing season and range of potential crops that can be grown as a result of cold air drainage and spring frosts. Similarly, a climate limitation (t) was also recognised for some Class 4 land identified at higher elevation of around 200m, principally west of Geeveston. This is a cold and wet region, but because rainfall is higher during summer months compared with coastal areas to the east, some cropping could be considered at this time of year. Additional limitations include a high stone and sometimes boulder content (g) and soil wetness, both of which would make areas difficult to cultivate. While soils are moderately well drained Brown Ferrosols, waterlogging can occur during wetter periods of the year. These usually coincide with winter months when evapo-transpiration rates are low.

By far the majority of Class 4 land on dolerite has been used for apple production, although many areas still remain under pasture and some areas at higher elevation in western areas are being used for plantation forestry.

Class 4 Land on Triassic Sandstone

Class 4 land on Triassic sandstones is relatively uncommon due to the lack of this rock type cropping out in favourable localities. In addition, most soils are coarse textured and prone to erosion. However, narrow strips of Class 4 land on sandstone occur along coastal localities south of Woodbridge. Imperfect drainage (d) caused by the low permeability of clay subsoils is the dominant limitation restricting access to land and the ability to cultivate soils without causing degradation. In general, Class 4 land on sandstone is confined to slopes between about 5 and 12% where drainage is better. Gentler slopes are generally poorly drained while steeper slopes have too high an erosion risk for cultivation other than irregular fodder crops. Most areas of Class 4 land remain under pasture.

A small area of Class 4 land was mapped on the western slopes of Tinderbox Peninsula near Howden. Here, there is a significant risk from aeolian erosion (a) due to the coarse sandy loam to loamy sand surface soil textures. Structured soils do occur in a few places on Triassic sandstone, although these are largely confined to steeper slopes. In this case potential cropping sites occur on slopes up to 18%. These could not be mapped owing to their small size and scale limitations of this survey.

Class 4 Land on Permian Mudstone

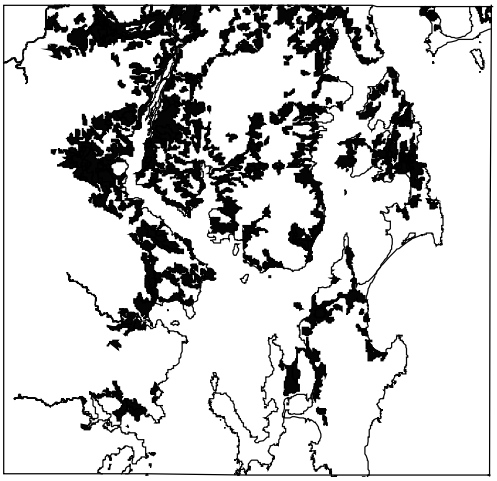
Class 4 land on Permian mudstone is largely confined to the gradational soil types (Brown Kandosols) possessing reasonable structure and drainage. These areas were generally found on the gently sloping crests and slopes of dissected benches along valley margins. Examples include slopes west of Woodbridge and valleys to the north and east of Cygnet. In places, the better soil types appear to relate to influences from colluvial igneous rock types such as dolerite and syenite. The dominant limitation restricting agricultural versatility is a short growing season resulting from imperfect subsoil drainage (d) and relatively cold and wet spring months. Furthermore, the low natural fertility of most soil types (s) greatly restricts the potential range of cropping varieties that can be grown. On steeper slopes, up to 18% in places, there is an increasing risk of soil degradation from erosion.

These areas of land are considered to be extremely marginal for broadacre cropping. Climate has a large role to play in this, not only due to frosty early spring months, but also wet conditions which can prevail through to December (see Figure 13). This maintains soils in a relatively plastic state during spring months, which means that machinery operations need to be carefully timed to avoid soil compaction and degradation. Only cold tolerant, short rotation late spring or summer cropping varieties are suited to this region. However, this land also produces high yielding pastures and grazing is the dominant land use, although the occasional fruit orchard can be found in places. Additions of lime and routine fertiliser applications are essential to maximise productivity.

In the Cygnet area, Class 4 land is mapped as a complex with Class 5 land owing to common inclusions of poorly drained soils along channels and flats and the steeper slopes of risers.

6.4 CLASS 5 LAND

Class 5	35 265ha
Class 4+5	972ha
Class 5+6	1 718ha
Class 6+5	575ha



Class 5 land is the second most common capability class, and makes up the bulk of currently utilised agricultural land within the D'Entrecasteaux survey area. Class 5 land is limited to grazing enterprises due to a combination of adverse climate (c) and poor soil conditions (s), which effectively prohibit broadacre agricultural enterprises. Other limitations on Class 5 include soil drainage (d), wetness (w), stoniness (g), and erosion risk (e) on steeper slopes where cultivation is precluded other than for pasture improvement or occasional fodder crops. Perennial horticultural crops such as apple orchards are commonly established on this class of land.

Class 5 Land on Quaternary Alluvium and Gravel Deposits

Class 5 land on alluvium is relatively uncommon, but occurs as narrow strips of land following rivers and smaller streams wherever soils are poorly drained due to periodic waterlogging (w). Many of the narrow valleys are characterised by poorly drained soils as the result of runoff from surrounding hills. In coastal areas, similar conditions result from high water tables. Where little land improvement has been implemented, flats are characterised by relatively poor pastures with scattered rushes. However, where drains have been installed this land provides excellent summer pastures and is ideally suited to grazing enterprises such as dairy production. Examples include alluvial flats near Huonville and following the eastern shore of the Huon River towards Cradoc. Garden Island Creek is a good example of a narrow valley system with poorly drained alluvial flats along its extent.

On Bruny Island, the majority of alluvial flats are also poorly drained (Photo 6). In addition, Black Vertosols that occur adjacent to streams (eg. Saltwater Creek) carry poor pastures due to high salinity levels (k).

In a few places, either immediately adjacent to streams or on older Quaternary gravels, land use is restricted to grazing due to physical limitations of shallow soil depth (l) and the stony nature of subsoils (g). On flats southeast of Margate, poor drainage (d) was recognised as the dominant limitation on deeper Brown Kurosols.

Class 5 Land on Tertiary Basalt

Several small extents of Class 5 land on basalt occur on Tinderbox Peninsula and near Kaoota. Slopes are relatively steep and consequently there is a high risk of erosion (e) if soils are cultivated or overgrazed. Furthermore, soils can be very stony along ridge crests making cultivation impracticable.



Photo 6. Class 5kw land on flats and 5as on sandy knolls. Poor drainage and high salinity levels can restrict land use to grazing on some alluvial flats in coastal areas with low rainfall (Saltwater Creek, Bruny Island, GR. E531000 N5220600).



Photo 7. Class 5w land on dolerite colluvium. Cultivation of this land for pasture renewal needs to be carefully timed to avoid clodding and soil compaction (Lunawanna, GR. E518900 N 5198250).

On Tinderbox Peninsula, tunnel erosion was evident along drainage lines indicating the presence of dispersive, sodic subsoils and the need for erosion control measures. Here Class 5 land is limited to slopes less than 28%. In contrast, the basalt soils on slopes near Kaoota have few apparent erosion problems due to strong soil structure and good subsoil drainage. In this situation, Class 5 land is mapped on slopes of up to 56%.

Class 5 Land on Cretaceous Syenite and associated Slope Deposits

Class 5 is the most common capability class on areas of hill country underlain by syenite dykes and associated Quaternary slope deposits (talus). Significant extents of this land occur on gentle to moderate slopes to the west of Oyster Cove and to the west of Cygnet in the region of Silver Hill and Mount Windsor. Here, high stone content (g) makes cultivation impracticable. Soils are comparatively more fertile than surrounding Permian slopes and consequently provide for good grazing land. On hillslopes from 12 to 28%, relative risks of erosion increase, and areas of land should be carefully managed to avoid overgrazing and to prevent erosion when cultivation for pasture renewal is undertaken.

Class 5 Land on Tertiary Deposits

Gently sloping Tertiary terrain consists predominantly of Class 5 land. This is due to a range of soil limitations (s) imposed by generally poor physical and chemical properties of most soils which restrict land use to grazing or perennial horticulture. In addition many areas are poorly drained or lie wet for considerable periods in winter and spring months due to a combination of low subsoil permeability (d) and lack of runoff (w).

Flats to the north of Huonville form the most extensive area of land underlain by Tertiary sediments. These carry a broad range of soil types, with the most common being the Huon series. A high risk of soil degradation due to poor physical properties and generally wet subsoil conditions throughout winter and spring months, makes these soils (Kurosols and Aquic Podosols) unsuitable for broadacre cropping. Careful grazing management is also required to avoid severe pugging at wet times of the year. They are also strongly acid and nutrient poor soils requiring significant fertiliser inputs to improve pasture yields. Pasture renewal is often undertaken during summer when access to paddocks can be gained. Class 4 inclusions are associated with soils having better subsoil drainage (eg Woodbridge loam, Huon sand light subsoil phase). These occur along some of the smaller rises, but are relatively small areas of only a few hectares.

Areas of Class 5 land are also associated with particularly sandy soils, such as the Grove and Lucaston sands which overlie Tertiary sediments. These soils usually contain hardpans (Aquic Podosols) which can cause perching of water in low-lying areas during winter and spring months. Consequently, these areas are also unsuited to cropping due to wet (w), as well as, poor soil conditions (s). Drainage is often somewhat better on rises and slight knolls, but the coarse surface textures result in rapid permeability and low soil moisture retention. As a result soils are drought prone during summer months. There is also a high risk of wind erosion (a) in exposed localities because of the lack of organic matter or clay to help provide soil cohesion and structure. Pasture renewal should be confined to aerial seeding or direct drilling unless intensive conservation management practices are implemented (eg. use of shelter belts).

Class 5 land is also associated with Red Chromosol and Red Ferrosol soils on gently rolling terrain on Bruny Island. Although well drained, these soils are unsuited to cropping due to either very shallow topsoil (l) or the highly erodible (e) nature of the coarse sand texture of topsoils. A layer of sandy iron stone gravels at or near the soil surface would also restrict root development for arable crops (g). Where land appears to have been cultivated in the past, topsoils are almost non-existent and pasture cover is very poor. In undisturbed sites, the coarse texture and lack of soil structure in surface horizons indicate a high risk of wind erosion (a).

In areas underlain by silicastone deposits, the cemented A2 horizon at shallow depths provides a barrier to root development (l), as well as imparting extremely poor soil physical and chemical properties. These areas often represent small inclusions of Class 6 land. Where significant areas of silicastone deposits occur, such as east of Oyster Cove, this has led to mapping of a complex of Class 5 and Class 6 land.

Class 5 Land on Jurassic Dolerite

Class 5 land is common throughout the survey area on mid to lowerslope positions in areas underlain by dolerite rocks. The dominant factors limiting the ability to cultivate and crop these sites include low subsoil permeability (d), seasonal inundation (w), high stone content (g) and erosion risk on the steeper slopes (e). Low temperatures (t) are an additional limitation restricting land use to grazing at elevations above about 450-500m. Most Class 5 land on dolerite is utilised as grazing for sheep and beef production, although some areas are used for orchards and berry fruit production (Photo 8).

Poorly drained soils are a feature of many lowerslope positions due to runoff from hillslopes and perching of water over slowly permeable subsoils (Brown Kurosols and Sodosols). Wet soil conditions often prevail during winter and spring months and this makes many areas unsuitable for broadacre cropping due to a high risk of soil degradation through soil compaction and clodding (Photo 7). Cultivation for pasture renewal or fodder cropping should only be considered at drier times of the year, although this may lead to wind erosion on soils with light textured surface horizons.

High stone content (g) makes Class 5 land unsuitable for cropping in most places. These areas tend to occur on steeper slopes and along ridge crests. For example, extensive areas of stony Class 5 land occur across northern Bruny Island. In many places a high level of surface stones (floaters) gives a good indication of this land type. In some places however, perhaps because of previous stone picking, fields at first impression can appear relatively stone free. In these instances, capability ratings were based on a high level of stones observed in soil pits or road cuts.

On moderately steep slopes (usually > 12%), the risk of soil erosion (e) becomes the main factor limiting agricultural versatility of this land. A reasonable level of management is generally required to maintain a good pasture cover and avoid generation of overland flow, which can lead to sheetwash, tunnel and gully erosion. Slope limits for Class 5 land on dolerite vary considerably, as some soil types are more susceptible to erosion than others. For example, coarse textured Brown Sodosols and Kurosols are considered very highly erodible and Class 5 land is restricted to slopes of less than 18%. Where topsoils are heavier textured (eg. sandy clay loams) and contain some structure, then risks of soil erosion are considered lower and good grazing

pastures can extend onto steeper slopes of up to 28%. Similarly, Brown Dermosols and Ferrosols usually have heavier textured and well structured surface horizons. These soils are considered to have low erodibility and consequently Class 5 land is mapped to 56% in places, although in general these are of relatively small areal extent.

Class 5 Land on Triassic Sandstone

Class 5 land is the most common capability class mapped on Triassic sandstone and is locally extensive is some areas. The main physical limitations, which restrict land use to non-arable activities, relate to either the coarse soil textures and associated erosion risks (e) or wet soil conditions in areas of poor drainage (w, d). Most Class 5 land on Triassic sandstone is ideally suited to grazing although some areas could be considered for horticultural enterprises.

Podosols are the main soil type in coastal areas and some inland valley systems (eg. Garden Island Creek). These have particularly coarse surface textures lacking any structure. In general plant roots from grasses and shrubs provide the main source of soil cohesion. There is a relatively high risk from wind erosion (a) if plant cover is disturbed. These soils are also relatively infertile and drought prone during summer months. However, with careful management and fertiliser inputs these sites can yield good quality pastures. Pastoral grazing is the dominant land use, although some small areas of land are utilised for market gardening given the very easy tillage of soil. Potatoes could be grown on some of the flatter land where soils have higher organic levels in the topsoil, but such areas of potentially Class 4 land are too small to map at 1:100 000 scale. Dry summers pose a risk of crop failure and irrigation is generally required for economic yields.

On relatively flat land or along drainage depressions, poor soil drainage makes areas unsuitable for cropping because of problems associated with soil tillage, compaction, clodding and general vehicle access. Poor drainage is due to a combination of low subsoil permeability (d) and lack of runoff (w) in cases of low topographic relief. Principal soil types associated with this class of land are Brown Sodosols and Brown Kurosols, although Aquic Podosols can occur in some locations (eg. raised plateaux along Police Point Road). Wet soil conditions also become increasingly common in areas of higher rainfall as occurs towards the south and southwest of the survey area.

In some places (eg. Middleton), Class 5 land is mapped as a complex with better drained Class 4 land situated on risers and gentle footslopes. In most places however, Class 5 land limited by poor drainage is contiguous with Class 5 land on steeper slopes where risks from erosion (e) require major soil conservation and restrict land use to non-arable activities such as grazing or horticulture. On hillslopes carrying highly erodible coarser textured soils, Class 5 land is generally restricted to slopes of less than 18%. Where there is less risk of erosion, as is the case with heavier textured soils (Brown Kandosols) grazing land can extend onto steeper slopes of around 28%, but these areas will still require careful management. Examples of this land include hillslopes south of Kaoota, hillslopes southwest of Middleton, and hillslopes near Glendevie.

Class 4 inclusions of extremely limited areal extent are identifies in a few places where gradational soils with strongly developed surface structure occur on slopes with gradients of 12-18%.

Class 5 Land on Permian Mudstone

Class 5 land occurs extensively over areas underlain by Permian mudstones. These range from valley bottoms, through gentle footslopes along the perimeter of valleys, to moderately sloping hill country (Photo 9). Across most of the survey area, the main physical limitations restricting land use to non-arable agriculture are a combination of wet climate and poor soil conditions (s). In addition, hillslopes with gradients over 12% are considered to have a significant erosion potential (e). Low subsoil permeability (d) and excess soil wetness (w) in winter and spring months together with strongly acid and nutrient poor soils make these areas of land difficult to manage and generally unsuitable for broadacre crops. Most land use is restricted to grazing for beef and sheep production although fruit orchards are common in more favourable localities and where some of the better soil types are found.

Areas of Class 5 land are often unsuitable for broadacre cropping due to the poor physical and chemical properties (s) characteristic of most soil developed in Permian mudstones. Surface horizons are commonly a silty loam texture and are often massive showing little apparent structure. As with other soils in the Huon series, the thixotropic nature of massive A2 horizons limit vehicle access during wetter months of the year, which usually lasts from July through to December. Furthermore, the low permeability of clay subsoils can lead to surface ponding and extremely wet soil conditions resulting in low lying areas (w). This is most prevalent along concave breaks in slope where runoff from further upslope can lead to significant accumulation of water. These wet areas are subject to pugging and soil degradation unless carefully managed. It is also not uncommon for wet soil conditions to extend onto steeper slopes due either to low subsoil permeability (d) or lateral seepage through parent rocks. Soil wetness (w) is also the dominant limitation in areas of higher rainfall to the southwest where Grey Kandosols are the main soil type.

In drier coastal areas these soils are particularly prone to wind erosion (a), as surface horizons will turn to a fine powder if cultivated. On hillslopes, soils are subject to overland flow, with tunnel erosion evident along convergent zones in some localities. Careful grazing and conservation management practices are required to offset risks of erosion on steeper slopes. In general, Class 5 land is restricted to slopes of less than 18% for the more highly erodible soil types.

Class 5 land extends onto steeper slopes where gradational soil types are encountered. Most of this land occurs on moderately sloping hill country (Photo 9) with gradients ranging from 12 to 28%. Although these soils are less erodible than their coarser textured counterparts, careful management is still required on the steeper slopes to minimize risks from erosion (e). Any cultivation should be restricted to pasture renewal and undertaken during the drier summer months. These areas produce high yielding grazing land particularly with regular additions of fertiliser and lime to alleviate the strong acidity and low natural fertility common to soils.



Photo 8. Class 5ge land. In some locations at higher elevation, stony but fertile Brown Ferrosols occur on dolerite. These soils are ideally suited to fruit production (Kaoota, GR. E515400 N5237500).



Photo 9. Rolling hills of Class 5e land. Structured Permian soils produce good pastures on steeper slopes (Cradoc, GR. E506000 N5226700). Forested Class 6 and 7 land appears in the background.

Areas carrying the more freely draining soils, and with slopes less than 12%, are relatively small and comprise Class 4 inclusions. Where areas are more extensive, such as near Cygnet, limitations of mapping scale have led to identification of Class 4 + 5 land. Inclusions of Class 6 land may also occur on the steeper landforms where slopes locally exceed 28%.

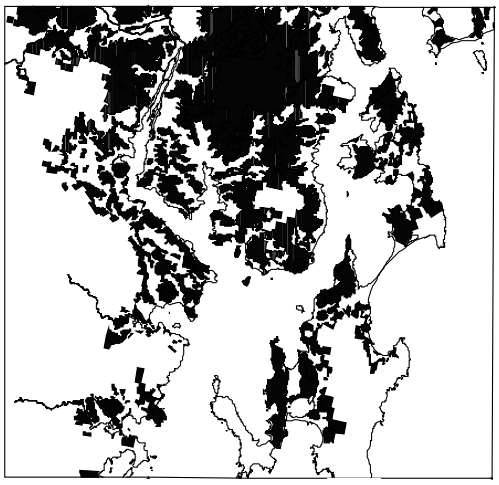
Class 5 Land on Aeolian Sands

Class 5 land occurs on gentle slopes less than 12% wherever wind blown sand deposits overlie basement lithologies, such as Triassic sandstone or Tertiary sediments. These areas are most extensive on South Arm and along the central to southern portion of north Bruny Island. Smaller areas occasionally occur in coastal areas, such as near Esperance Point, or west from Dover. The main soil type in most places is an Aeric or Semi-Aquic Podosol. These are coarse textured soils, which are nutrient poor and drought prone in summer months.

The main capability limitation is related to the poor physical and chemical properties of soils (s) which support relatively poor pastures. In addition there is a high risk from wind erosion (a) as there is little or no soil structure or clay content to help maintain soil cohesion. Most cohesion is provided by plant roots, or occasionally high organic matter contents. Pasture renewal should be restricted to aerial seeding or direct drilling techniques.

6.5 CLASS 6 LAND

Class 6	59 030ha
Class 5+6	1 718ha
Class 6+5	575ha
Class 6+7	394ha
Class 7+6	86ha



Class 6 land is the most extensive capability class and covers relatively large areas across the D'Entrecasteaux survey area. It identifies all marginal agricultural land. The dominant physical limitations, which severely restrict agricultural activities include excessive stoniness (g), soil wetness (w), extremely poor soil conditions (s) and steep slopes with high erosion risk (e). Most areas of Class 6 land remain under native vegetation although some areas support relatively poor improved pastures.

Class 6 Land on Quaternary Alluvium and Gravel Deposits

Small extents of Class 6 land occur on low-lying alluvial flats along the Huon River between Huonville and Cradoc. Class 6 land is also found on valley flats to the west and southwest of Strathblane. These areas carry very poor pastures and lie wet for most of

the year. Thus, prolonged periods of soil saturation (w) due to high but fluctuating water tables is the main limitation restricting agricultural use of these areas. Where drainage has been installed, it appears to have had little success in improving pasture condition.

Class 6 is also the main class of land associated with higher dissected terraces underlain by siliceous gravel deposits. Here limiting factors are the high gravel and stone content (g) close to the ground surface, which create a barrier to root development (l). Most extensive areas of this land occur near Randalls Bay and Gourlays Bay, either side of Port Cygnet. Smaller areas can be found along the Huon River to the west of Huonville.

Class 6 Land on Jurassic Dolerite

Class 6 land is extensive across the survey area in regions underlain by Jurassic dolerite rocks. It is largely confined to the steeper slopes in inland locations where a combination of high stone content (g) and erosion risk (e) are the main limitations severely restricting use of this land. Class 6 land can extend onto gentle slopes if stone contents remain high. Most areas remain under native forest cover. Attempts have been made to remove surface stones during pasture establishment in areas of more gentle terrain on Bruny Island. Often, high surface stone contents are still visible in areas bordering forested hillslopes. Most stones are between 200-600mm in diameter and well rounded through weathering processes (exfoliation). In general, profile stone contents were in the region of 50-70%, with increasing levels present along ridgelines and on steep slopes. Any attempts at cultivation generally bring these stones to the surface and this can result in reduced net pasture cover. Inclusions of Class 7 land are common in places where stone cover locally exceeds 90% (Photo 12). These areas are invariably forested with sparse understorey vegetation. Similarly inclusions of Class 5 land, of generally not more than a few hectares, may occur within Class 6 land as patches where stone contents are low and soils deeper.

A high risk of soil erosion is the main limitation restricting land use on the steeper areas of Class 6 land. These areas require a high level of conservation management and are only marginally suited to grazing activities. They should retain their forest cover to help protect soils and are therefore more suited to well managed forestry. As most areas are currently protected by forest, active erosion processes are rarely seen. However, it is not unusual to see surface compaction and sheetwash of topsoils where ground had been laid bare by stock trampling along forest margins.

Slope limits for Class 6 land limited by erosion vary somewhat because some soils are more erosion prone than others. Brown Sodosols for example are highly erodible and Class 6 land extends onto gentler slopes as low as 18%. Removal of forest from these slopes will lead to increased overland flow and could result in the development of rill and gully erosion. Where soils are heavier textured (eg. Brown Kurosols intergrading to Brown Dermosols) there is generally less potential for erosion and Class 6 land is confined to steeper slopes of 28 to 56%. Similarly, clay textured soils with strongly developed soil structure (Brown Dermosols and Brown Ferrosols) have low erodibility and a high risk of erosion is only recognised on the very steep hillslopes above 56% gradient.

Class 6 Land on Triassic Sandstone

Class 6 land on Triassic sandstone is largely confined to the steeper hillslopes where erosion risk (e) is the major limitation affecting agricultural versatility. This class of land is common near Blackmans Bay and on hillslopes southeast of Snug and foothills of the Snug Tiers. Class 6 land can also be found on hillslopes to the southwest of Middleton near Mt Grosse and across to Coulsons Hill, from Pelverata to Upper Woodstock, and on hillslopes to the west of the Huon River such as near Police Point. Most areas of Class 6 land currently remain under native vegetation, although towards the southwest some areas are clear-felled for the forest industry.

As with Class 6 land on dolerite, slope limits for Class 6 land on sandstone vary depending on the erodibility of soils, and this in turn relates to the surface texture and degree of structural development within soils. In general, the coarser textured and more dispersive soil types require a higher level of conservation management for the same slope, when compared with less erodible soils. Progressively coarser textured soils have weaker soil structure and cohesion, and have less ability to withstand vegetation and soil disturbance before eroding. This is reflected in the lower slope limits for the different areas of Class 6 land occurring on Triassic sandstones, which are 12% for coarse textured Podosols, 18% for Brown Kurosols and Brown Sodosols, and 28% for the more gradational, heavier textured soil types (Brown Kandosols). The slope limits to some degree also reflect differences in fertility and resistance to drought.

Coarse textured soils often carry very poor pastures due to low natural fertility and poor soil moisture retention. Consequently these areas require a higher level of management in order to avoid soil degradation.

Class 6 land is occasionally associated with very shallow depths of soil (l) overlying sandstone. This severely limits soil moisture availability and rooting depths for plants. These areas are not always confined to steep slopes and may occur along the crest of dissected benches. For example, shallow soils consisting of 30cm of sandy surface horizons, overlie impenetrable “coffee-rock” or bedrock on gentle hillslopes to the east of Blackmans Bay and on slopes south of Margate. These are extremely drought prone soils supporting scrubland or poor pastures dominated by bracken fern. Similarly, shallow sandy soils are typical of steep dissected hillslopes, such as those bordering the Huon River near Police Point. Here, inclusions of Class 7 land also occur due to localised areas of bare rock (r) and very steep slopes of over 56% gradient. Inclusions of Class 5 land can obviously occur where slopes are locally less than the lower slope limits for Class 6 land, and these commonly represent broader ridge crests.

Some areas of Class 6 land is associated with peat swamps towards the southwest of the survey area near Southport Lagoon (Photo 10). Here, the strongly acid peat soils and lack of topographic runoff on flats support swamp vegetation dominated by button grass.



Photo 10. Class 6ws land. Coastal button grass plains carry acid nutrient poor peat soils which are marginally suited to grazing (Southport, GR. E493300 N5184100).



Photo 11. Class 6sl land (background) is often associated with Permian rock types producing extremely hardsetting, nutrient poor, gravelly soils. These areas carry very poor pastures. Class 5eg land (forground) is more suited to development for grazing athough some areas can be extremely stony (Bruny Island, GR. E5227500 N5226600).

The very poor soil conditions (s) severely restrict any grazing activities and prolonged periods of soil wetness (w) restrict access by vehicles as well as stock. These areas are best suited to conservation reserves.

Class 6 Land on Permian Mudstone

Class 6 land on Permian mudstones can cover locally extensive areas across most of the D'Entrecasteaux region. It is largely confined to mid to upper slope positions with slope gradients exceeding 28%. The dominant limitation is a very high erosion risk (e) which restricts potential land use to marginal grazing or forestry. Examples of this land type include Collins Spring Hill on South Arm, steep hillslopes from Allens Rivulet to Farwell Hill and along the eastern margin of the Snug Tiers. It also includes similarly steep slopes running from the western slopes of Woodbridge hill to Port Cygnet, and locally steep slopes in the area about, and to the west of, Cygnet township itself. Extensive areas of Class 6 land may also found either side of the Huon River to the west of Huonville. Most areas carry native forest, although some areas on Bruny Island have been recently developed for grazing.

As with other rock types, slope limits for Class 6 land on Permian sediments depend on soil type. Soils with strong texture contrasts, such as Podosols or others with coarse, massive sandy surface horizons (Kurosols), require a very high level of management to avoid soil erosion and degradation. Class 6 land in this instance extends onto gentler slopes of 18% or more. In contrast, the finer textured Brown Kandosols generally have some degree of structural development in surface horizons (albeit weak in many cases), and are less erosion prone, only requiring a similarly high level of conservation management on slopes above 28%. The main erosion process is considered to be surface wash, although tunnel and gully erosion is often evident where concentration of overland flow occurs. Some shallow soil slips may occur on very steep slopes if cleared of forest cover. Inclusions of Class 7 land are present wherever erosion risks are too high to support any form of agricultural use. These are typically steeply incised hillslopes with slopes exceeding 56%.

Some areas of Class 6 land carry very poor pasture cover (Photo 11) due to very poor soil conditions (s). This results from the very low natural fertility and very poor physical properties of some soils, which have gravelly and massive hardsetting surface horizons (Grey Kurosols). In places, bleached subsurface A2 horizons can set into an impenetrable concrete-like mass during dry periods. Most root development for smaller plants is confined to the shallow topsoil and consequently a depth limitation (l) is recognised in these soils. Heavy fertiliser applications can help to alleviate the poor nutrient status and acidity in these soils, but is unlikely to be economic in most situations. Most areas of this class of land remain forested. Examples of this land class include hillslopes near Turners Hill on south Bruny Island, and coastal footslopes southeast of Geeveston from White Bluff to Killara Bay.

Class 6 Land on Aeolian Sands

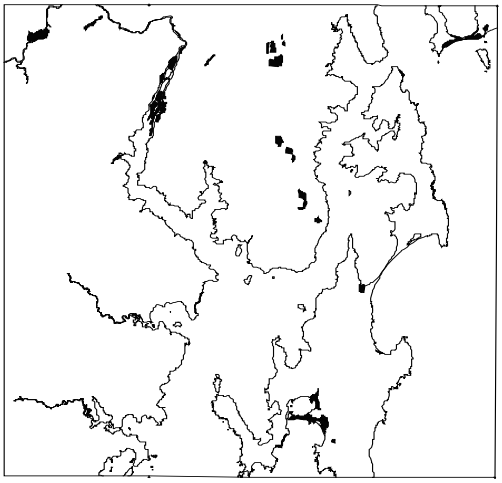
Recent aeolian sands carry soils with little profile development (Rudosols). The general lack of cohesion in surface horizons composed mainly of sand grains makes these soils particularly prone to wind erosion (a) if disturbed in any way. Since there is a very high risk from erosion, any agricultural use should ensure minimal impact on topsoils.

Pasture renewal and fertilising should be restricted to aerial application only. As this Class of land occurs in areas of relatively low rainfall, it is also particularly drought prone. This can further exacerbate the potential for erosion unless stocking rates are kept to an absolute minimum during summer months. The most extensive areas of this land occur on gently sloping grassed dunes on South Arm Neck.

Class 6 land also occupies small areas where sand has been deflated from coastal sites or from ancient riverbeds and blown onto surrounding hills. Most extensive areas of this land occur on south Bruny Island in the region of Cloudy Bay. The main soil types in this instance are Aeric Podosols on slopes, or Semi-Aquic or Aquic Podosols along depressions and valley flats. These are characterised by a thick bleached subsurface horizon consisting of almost pure quartz sand grains. In contrast to recent aeolian sand deposits, surface horizons can contain significant organic matter contents, and this can improve moisture retention and impart a somewhat less risk of erosion. Consequently, Class 6 land is restricted to moderate slopes with gradients from 12 to 28%. On these slopes, overgrazing and stock "bathing" can cause sand blowouts. Class 7 inclusions occur where slope gradients locally exceed 28%.

6.6 CLASS 7 LAND

Class 7	1 961ha
Class 6+7	394ha
Class 7+6	86ha



Class 7 land represents areas unable to support agricultural activities on a sustainable basis. These are usually either very steep slopes with extremely erodible soils (e), patches of ground with excessive stone content (g), very wet swamps with high ground water tables, or mountain tops which have a cold and windy exposure (c). Although some Class 7 land can be found within the survey area at elevations above 800m, most exists as small areas in coastal localities. These areas are usually complexed with Class 6 land owing to limitations of map scale.

Class 7 Land on Jurassic dolerite

Areas of Class 7 land on dolerite are found at high elevation along mountain tops and plateaus or in some coastal areas, generally as inclusions within Class 6 land (Photo 12). Examples include the Snug Tiers and associated mountains in that area, coastal cliffs predominantly on Bruny Island (see Photo 2), and forested low coastal hills south of Southport.



Photo 12. An almost complete cover of stones illustrates Class 7g land. Due to their small individual extent, these patches of ground are often mapped in association with Class 6 land (Southport, GR. E497300 N5187800).



Photo 13. Class 7w land. Very high water tables in coastal alluvial swamps makes grazing impracticable (Cradoc, GR. E501700 N5228400).

In most cases the physical limitations prohibiting agricultural activities are either an excessive ground cover (visually > 70-90%) of stones and small boulders (g) or large areas of bare rock (r) associated with very steep coastal cliffs.

Class 7 Land on Quaternary alluvium

Small areas of Class 7 land can be found on alluvial sediments in coastal bays and on low lying flats adjacent to the Huon River (Photo 13). These are essentially wetlands supporting dense swamp vegetation dominated by rushes. Water is at or near the ground surface for most of the year and consequently the main limitation is one of wetness (w).

Class 7 Land on Triassic sandstone

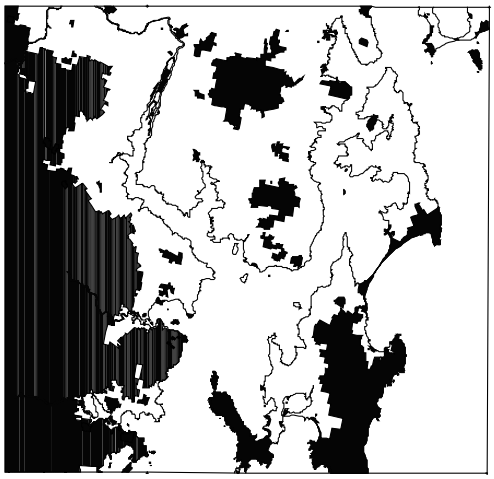
Occasionally, fluvial dissection of sandstone plateau has produced rocky bluffs towards the top of steep slopes in some coastal localities (eg. Police Point north of Dover). These represent small areas of Class 7 land where the main limitation is bare rock (r). An erosion limitation is also recognised as slopes are often above 56%. These areas are not been mapped separately and occur as inclusions within Class 6 land.

Class 7 Land on aeolian sands

Class 7 land on aeolian sand is associated with coastal dune systems where very fragile loose sandy soils are susceptible to degradation by wind erosion (a) if vegetation disturbance occurs. Dunes are stabilised predominantly by coastal vegetation communities. The most extensive dune systems occur along South Arm Neck, along the Neck on central Bruny Island and adjacent to Cloudy Beaches on southern Bruny Island. A general erosion limitation (e) is also recognised on steeper hillslopes above 28% slope where the more organic enriched Aeric Podosols are found. The dense root mat of the native vegetation provides the only cohesion in what would otherwise be loose sands. An example of Class 7e land occurs on the southeast facing slopes of Collins Springs Hill on South Arm.

6.7 EXCLUSION AREAS

Exclusion areas 92 656ha



The D'Entrecasteaux survey area contains areas of State Forest and other reserves, which are not included in the land capability classification survey. Many of these areas represent high land or rugged hills and include most of the Snug Tiers, the greater proportion of land to the west of Geeveston and Dover, and mountainous land on southern Bruny Island. These areas, together with major urban areas, Conservation Areas, State Recreation and Protected Areas, Hydro Electric Commission areas and Commonwealth administered areas are collectively termed Exclusion areas and do not form part of the area surveyed. These areas appear as white with the letter E on the accompanying Land Capability map.

The boundaries for these areas have been supplied by Forestry Tasmania and some discrepancies have been identified in comparison to the published 1:100 000 scale Land Tenure maps. In addition, arbitrary boundaries have been defined by the survey team and represent areas excluded from agricultural activity on the basis of current land use (usually urban). These boundaries are not intended to represent the boundaries of individual land titles or local council planning schemes and do not purport to identify exact cadastral locations.

6.8 SUMMARY TABLES

Table 3 summarises the major land capability map units and their characteristics. It does not represent an exhaustive list of all possible units, but instead identifies the most common groupings present within each land capability class. The table attempts to draw upon links between land capability, landforms and geology identified during mapping, and is therefore useful as a guide to the nature of map units identified within the survey area. It also provides an indication of agricultural versatility for each unit in relation to broad-acre cropping and stock grazing. A general indication is given of the main land management practices required to sustain this versatility.

Land Capability Class	Land Characteristics						Land Management Issues		
	Geology	Slope range	Topography and elevation	Erosion type and potential severity	Climatic limitation	Principal soil	Main limitations to agricultural use	Main land management requirements (under cultivation)	Agricultural versatility
3	Tertiary basalt	0-12%	crests of low hills <120m	minor sheet and rill	low rainfall <850mm	Red Ferrosol Brown Ferrosol	rockiness (g), soil depth (l), low rainfall (p)	stone picking, moderate soil conservation	restricted range of crops, very good grazing
3	Quaternary alluvium	0-5%	alluvial plains <30m	very minor sheet	low rainfall <850mm	Brown Dermosol Brown Kandosol	low rainfall (p)	minor soil conservation	restricted range of crops, very good grazing
4	Recent alluvium	0-5%	narrow flood plains <120m	very minor sheet and minor wind	moderate frost, minor flood risk	Brown Kandosol Red Kandosol	frosts (c) wetness (w), soil structure (s)	soil drainage, moderate soil conservation	severely restricted range of crops, good grazing
4	Quaternary gravel deposits	0-12%	dissected terrace remnants <40m	moderate sheet and wind	minor frost	Brown Kurosol	soil structure and fertility (s), erosion (e), some stones (g)	moderate soil conservation, erosion control	severely restricted range of crops, good grazing, horticulture
4	Tertiary basalt	0-18%	slopes and footslopes of risers <120m	minor sheet and rill	-	Black Dermosol	wetness (w) and permeability (d), erosion (e)	minor soil conservation, soil drainage	severely restricted range of crops, good grazing
4	Cretaceous syenite	0-18%	ridge crests, coastal footslopes <260m	minor sheet and rill	minor frost, wind exposure	Brown Dermosol	erosion (e) stoniness (g)	erosion control, moderate soil conservation, stone picking	severely restricted range of crops, good grazing
4	Jurassic dolerite	0-18% (>12%)*	north facing footslopes of coastal regions <100m	minor sheet and rill	low rainfall (to the east), frosts (to the south)	Brown Dermosol	stoniness (g), erosion (e) climate (c)	minor soil conservation, erosion control	severely restricted range of crops, good grazing
4	Jurassic dolerite	0-12%	colluvial footslopes and valley floors <150m	moderate sheet, rill and wind	low rainfall, minor frost	Brown Sodosol Brown Kurosol	erosion (e), permeability (d), stoniness (g), soil structure (s)	erosion control, moderate soil conservation, stone picking	severely restricted range of crops, good grazing
4	Jurassic dolerite	0-18% (>12%)*	ridge crests and upperslope of low hills <240m	minor sheet and rill	moderate frost risk, wind exposure	Brown Ferrosol Brown Chromosol Brown Dermosol	climate (c), stoniness (g), wetness (w)	stone picking, erosion control, moderate soil conservation	severely restricted range of crops, good grazing, horticulture
4	Triassic sandstone	5-12%	colluvial footslopes, northeast aspect <100m	moderate sheet, rill and wind	wet spring months	Brown Sodosol Brown Kurosol	permeability (d) erosion (e) soil structure (s)	erosion control, moderate soil conservation	severely restricted range of crops, good grazing
4	Triassic sandstone	12-18%	mid-upper slopes of low hills < 150m	minor sheet and rill, and moderate soil creep	moderate frost, wet spring months	Brown Kandosol	erosion (e) climate (c)	erosion control	severely restricted range of crops, good grazing
4	Permian mudstone	0-12%	gentle slopes and crests of low hills <100m	minor sheet	moderate frost, wet spring months	Brown Kandosol Brown Dermosol	permeability (d), fertility and structure (s)	moderate soil conservation, drainage	severely restricted range of crops, good grazing, horticulture

Table 3: Characteristics of Class 3 and 4 Land identified in the D'Entrecasteaux survey area.

Land Capability Class	Land Characteristics						Land Management Issues		
	Geology	Slope range	Topography and elevation	Erosion type and potential severity	Climatic limitation	Principal soil	Main limitations to agricultural use	Main land management requirements (under cultivation)	Agricultural versatility
5	Tertiary basalt	18-56%	mid to upper slopes and ridge crests <500mm	minor sheet and creep, moderate tunnel	low rainfall	Brown Ferrosol Brown Dermosol	erosion (e), stoniness (g)	erosion control, moderate soil conservation	grazing, fodder crops
5	Cretaceous syenite	0-28%	mid to upper slopes and ridge crests <500m	moderate sheet	moderate frost	Brown Dermosol	erosion (e), stoniness (g)	erosion control, moderate soil conservation	grazing, fodder crops
5	Jurassic dolerite	0-28% (>18%)*	lower to mid slopes of hills <200m	minor to moderate sheet	low rainfall	Brown Dermosol Brown Kandosol Brown Chromosol	stoniness (g), erosion (e), permeability (d)	moderate soil conservation, erosion control	grazing, fodder crops, horticulture
5	Jurassic dolerite	0-18% (>12%)*	valley flats to slopes of hills <500m	moderate sheet and gully, major wind	low rainfall moderate frost, wet spring	Brown Sodosol Brown Kurosol	stoniness (g), erosion (e), wetness (w)	erosion control, major soil conservation, stone picking	grazing, fodder crops, horticulture
5	Jurassic dolerite	12-56% (>18%)	mid to upper slopes of hills <550m	minor to moderate sheet and creep	high frost, wet spring	Brown Ferrosol Black Dermosol	stoniness (g), erosion (e)	stone picking, erosion control, moderate soil conservation	grazing, fodder crops, horticulture
5	Quaternary alluvium & gravel beds	0-12%	terrace flats and back slopes <120m	minor sheet, moderate wind	high frost wet spring	Brown Kandosol Brown Kurosol	wetness (w), stoniness (g), rooting depth (l)	soil drainage, moderate soil conservation	grazing, fodder crops, horticulture
5	Quaternary alluvium	0-3%	low lying areas and depressions <30m	very minor sheet	low rainfall	Black Vertosol	salinity (k) wetness (w)	salt tolerant pasture species, surface drains	grazing, pasture improvement
5	Tertiary sediments	0-12%	raised terraces <40m	major wind, moderate sheet	high frost, wet spring	Yellow/Grey Kurosol Grey Kandosol Semi-Aquic Podosol	wetness (w) thixotropic A2 (s) wind erosion (a)	major soil conservation and erosion control	grazing, horticulture
5	Tertiary laterites	0-12%	knolls along valley flats <40m	major wind	low rainfall	Red Chromosol Red Ferrosol	wind erosion (a), gravels (g) rooting depth (l)	major erosion control, moderate soil conservation	grazing, pasture improvement, fodder crops
5	Triassic sandstone	0-12% or 0-18%	lower to mid slopes and benches of hills <200m	major wind, sheet and tunnel	low rainfall,	Aeric/Aquic Podosol Brown Kurosol Brown Sodosol	wind erosion (a), wetness (w) coarse texture (s)	major erosion control and soil conservation	grazing, pasture improvement, horticulture
5	Triassic sandstone	0-28% (>12%)*	lower to upper slopes and benches of hills <550	moderate sheet and minor slumping	moderate frost, wet spring	Brown Kandosol Brown Kurosol	erosion (e), wetness (w)	moderate erosion control, major soil conservation	grazing, pasture improvement, horticulture
5	Permian mudstone	0-18%	lower - mid slopes and ridge crests of hills <300m	major wind and tunnel	moderate frost, wet spring	Grey Kurosol Yellow Kurosol Aeric Podosol	erosion (e), thixotropic A2 (s), wetness (w)	major soil conservation and erosion control	grazing, pasture improvement, horticulture
5	Permian mudstone	0-28% (>12%)*	hillslopes and rolling hills and benches <450m	moderate sheet and tunnel, minor soil slip	major frost, wet spring	Brown Kandosol Grey Kandosol	erosion (e) permeability (d) fertility (s)	major soil conservation and erosion control	grazing, pasture improvement, horticulture
5	Aeolian sand	0-12%	lowerslopes and valley floors <100m	major wind	low rainfall	Aeric Podosol Semi-Aquic Podosol Chernic Tenosol	fertility (s), wind erosion (a), wetness (w)	major soil conservation and erosion control	grazing, pasture improvement

* For erosion limitation only

Table 3: Characteristics of Class 5 Land identified in the D'Entrecasteaux survey area.

Land Capability Class	Land Characteristics						Land Management Issues		
	Geology	**Slope range**	**Topography and elevation**	**Erosion type and potential severity**	**Climatic limitation**	**Principal soil**	**Main limitations to agricultural use**	**Main land management requirements (under cultivation)**	**Agricultural versatility**
6	Jurassic dolerite	all (>28%)*	rolling to steep hills <400m	major creep and sheet	minor frost wind exposure	Brown Dermosol Brown Kandosol Brown Chromosol	stoniness (g) erosion (e)	no cultivation erosion control	limited grazing, silviculture
6	Jurassic dolerite	<56% (>18%)*	rolling to steep hills <500m	severe sheet, rill and gully	moderate frost wind exposure	Brown Sodosol Brown Kurosol	erosion (e) stoniness (g)	no cultivation erosion control	limited grazing, silviculture
6	Jurassic dolerite	all (<56%)*	steep hills <800m	major creep and sheet	very high frost, wind exposure	Brown Ferrosol Black Dermosol	stoniness (g), erosion (e), temperature (t)	no cultivation erosion control	limited grazing, silviculture
6	Quaternary alluvium	level	coastal flats	-	minor frost major flood	Redoxic Hydrosol	wetness (w)	no cultivation	limited grazing
6	Quaternary gravel beds (siliceous)	0-56%	raised terraces and steep risers	severe sheet moderate wind	moderate frost	Brown Kurosol Leptic Rudosol	stoniness (g) rooting depth (l)	no cultivation erosion control	limited grazing, silviculture
6	Triassic sandstone	>12% or >18%	slopes of hills <500m	major wind, severe sheet and tunnel	wind exposure moderate frost low rainfall	Aeric/Aquic Podosol Brown Kurosol Brown Sodosol	erosion (e) rooting depth (l) rock outcrop (r)	no cultivation erosion control	limited grazing, silviculture
6	Triassic sandstone	>28%	slopes of steep hills and incised benches <700m	major sheet and creep, minor slumping	major frost, wind exposure	Brown Kandosol Brown Kurosol	erosion (e) temperature (t)	no cultivation, erosion control	limited grazing, silviculture
6	Triassic sandstone	0-12%	coastal plains and inland valley flats	-	major frost high rainfall	Redoxic Hydrosol	wetness (w) fertility (s)	no cultivation	limited grazing, silviculture
6	Permian mudstone	0-56% (>18%)*	low to mid slopes and ridge crests of hills <450m	severe sheet, rill and tunnel	moderate wind moderate frost wet spring	Grey Kurosol Yellow Kurosol	erosion (e) rooting depth (l) fertility (s)	no cultivation, erosion control	limited grazing, silviculture
6	Permian mudstone	0-56% (>28%)*	low to mid slopes and benches of hills <450m	major sheet moderate soil slip minor slumping	high frost, wet spring	Brown Kandosol Brown Dermosol Grey Kandosol	erosion (e) fertility (s) wetness (w)	no cultivation, erosion control	limited grazing, silviculture
6	Recent aeolian sands	0-12%	footslopes and rounded dunes. <50m	severe wind	wind low rainfall	Arenic Rudosol	wind erosion (a),	no cultivation, erosion control	limited grazing
6	Quaternary aeolian sands	12-28%	lower-mid slopes of low hills <100m	major wind	wind low rainfall	Aeric Podosol	wind erosion (a), soil fertility(s)	no cultivation, erosion control	limited grazing

*For erosion limitation only

Table 3: Characteristics of Class 6 Land identified in the D'Entrecasteaux survey area.

Land Capability Class	Land Characteristics						Land Management Issues		
	Geology	**Slope range**	**Topography and elevation**	**Erosion type and potential severity**	**Climatic limitation**	**Principal soil**	**Main limitations to agricultural use**	**Main land management requirements (under cultivation)**	**Agricultural versatility**
7	Recent sand dunes	variable	coastal dunes <20m	severe wind	wind low rainfall	Arenic Rudosol	wind erosion (a), soil texture (s)	protection	unsuitable for agriculture
7	Quaternary aeolian sands	>28%	mid to upper slopes of coastal hills <100m	severe wind	wind low rainfall	Aeric Podosol	wind erosion (a)	protection	unsuitable for agriculture
7	Recent sediments	level	river and tidal flats <1m	very minor sheet	none	Extratidal Hydrosol	high water table (w), salinity (k)	protection	unsuitable for agriculture
7	Jurassic dolerite	variable	mountain tops and slopes. >500 m, steep coastal cliffs, coastal hills	minor rock fall on slopes, severe sheet	severe frost, strong winds	Brown Ferrosol, Brown Kurosol Clastic Rudosol	boulder fields (g) stoniness (g) rock outcrops (r) erosion (e)	protection	unsuitable for agriculture
7	Triassic sandstone	>56%	very steep slopes and cliffs	moderate rock fall, severe sheet	sever frost at high elevations	Brown Kurosol	rock outcrop (r) erosion (e)	protection	unsuitable for agriculture

Table 3 (cont): Characteristics of Class 7 Land identified in the D'Entrecasteaux survey area. Note: most Class 7 land occurs as inclusions within, or is complexed with Class 6 Land at the 1:100 000 scale of mapping.

GLOSSARY

Aggradation: The sequential accumulation of sediment in fluvial environments.

Alluvial deposits: Sediment transported by rivers and deposited on flood plains.

Basalt: Rock rich in base cations formed from the cooling and solidification of volcanic lava.

Clay: Soil particles of diameter less than 0.002mm.

Coarse fragments: Particles of diameter greater than 2mm which have not formed in soil profile.

Colluvial deposits: Weathered rocks and soil transported and redeposited by gravity, generally at the base of slopes or in hollows.

Complex: A map unit where two land classes are identified but cannot be separated at the scale of mapping. In a complex unit the proportion of the two land classes is between 50/50 and 60/40.

Chromosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having strong texture contrast, is not sodic in the upper B horizon and a pH in the upper B horizon greater than or equal to 5.5.

Degradation: Deterioration of a resource through inappropriate or uncontrolled management or use.

Dermosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having structured B-horizons and no strong texture contrast.

Dispersive Soils: Soils composed of aggregates which break down to primary particles as they absorb water. Dispersive soils are inherently unstable and easily eroded. In most cases, dispersive soils are sodic.

Dolerite: A medium grained, basic rock formed from the cooling and crystallisation of magma near the surface of the earth's crust.

Drainage: A description of local soil wetness conditions as defined in the *Australian Soil and Land Survey Field Handbook* (McDonald, et al. 1998). Drainage is controlled by landscape position, soil permeability, and the extent of impediments to water movement within the soil profile.

EC_e: Electrical conductivity of the saturation extract of soil. This is usually derived by multiplying the 1:5 soil:water mixture electrical conductivity by a constant that is a function of soil texture.

Ferrosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having a free iron content in the greater part of the B2 horizon greater than 5%.

Ferruginous gravel: Gravel which is composed dominantly of iron-rich materials; also known as ironstone or laterite gravel. It often forms within the soil profile.

Fine sand: Particles of diameters from 0.06 to 0.1mm. They are just visible with the naked eye and feel similar to coarse flour or table salt.

Glacio-marine: Refers to sediments that accumulated in marine environments offshore from glaciated landmasses.

Graben: Down faulted area of land generally forming a valley.

Horizons: Layers within a soil profile, which have morphological properties different from those above and below (Northcote 1979).

Horst: Elevated areas of land between grabens.

Hydrosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) other than Organosols, Podosols and Vertosols which is saturated for at least 2 to 3 months in most years.

Kandosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having no strong texture contrast and a weakly structured B-horizon which is not calcareous.

Kurosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) other than Hydrosols, as having strong texture contrast and a pH in the upper B-horizon less than 5.5.

Land Capability: The potential of the land to support a range of practices or uses without degradation. In this report only agricultural uses are considered. Land Capability considers only the physical attributes of the land.

Land Suitability: The potential of the land to support a defined land use. Land suitability usually considers the economic and cultural suitability of a land use in addition to the physical attributes of the land. A comparison of land suitability evaluations for a range of different uses can identify the most suitable use for a particular area.

Limitation: The physical factors or constraints, which affect the versatility of uses of a land unit. Dominant limitations determine land capability for long term agricultural use.

Moisture availability: A measure of the amount of moisture held in the soil which is available for plant uptake. It is defined as the difference between the field capacity and the wilting point of the soil.

Natural fertility: Nutrient status of the soil as determined by organic matter content, cation exchange capacity and the degree of base saturation.

Nutrient availability: The ability of a soil to retain and supply nutrients for plant growth. It is principally governed by the CEC, the organic matter content and the pH of the soil.

Organosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having profiles dominated by organic materials which is not inundated by tides.

Permeability: A description of the potential of a soil to transport water internally as defined in the *Australian Soil and Land Survey Field Handbook* (McDonald, et al. 1998).

Podosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having B-horizons dominated by the accumulation of compounds of organic matter and aluminium, with or without iron.

Profile: A vertical cross section of a soil extending from the surface down to the lower limit of soil development.

Rudosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having negligible pedological development.

Saline soil: Where the electrical conductivity of the saturation extract (Ec_e) of soil material indicates the presence of salts. The following approximate categories were used to indicate relative salinity levels in this report:

Low:	$<2 ds\ m^{-1}$
Moderate:	$2 - 8 ds\ m^{-1}$
High:	$>8\ ds\ m^{-1}$

Scree: Accumulation of rocks and boulders at the foot of a cliff or steep slope, often with little vegetative cover.

Sedimentary rock: Rock formed from particles which have been transported, deposited and fused through cementing and/or compaction.

Siliceous: Pertaining to rocks or soils, which contain a high proportion of silicon rich minerals such as quartz.

Sodic soils: Soils with a proportion of the cation exchange capacity occupied by sodium ions of greater than 6%. With respect to land use, a soil is considered sodic when the sodium concentration reaches a level that affects soil structure.

Soil pH: A measure of the acidity or alkalinity in a soil. A pH of 7 denotes a neutral soil with a log scale of increasing alkalinity of pH 7 to 14, and a log scale of increasing acidity of pH 7 to 1.

Soil structure decline: The degradation of soil structure. Soil aggregates may be destroyed by excessive cultivation/harvesting or trampling by stock, leaving a compacted, massive or cloddy soil. Soils are particularly susceptible to structural decline when wet.

Sodosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having strong texture contrast, a sodic upper B horizon and a pH in the upper B horizon greater than or equal to 5.5.

Subsoil compaction: Potential for development of traffic compaction pan below the surface, usually 10 to 30cm deep. Pans restrict root growth into the subsoil. Yield response can be obtained on some soils by deep ripping to break the traffic pan.

Sustainable agriculture: The use of farming practices and systems which maintain or enhance economic viability of agricultural production; the natural resource base; and other ecosystems which are influenced by agricultural activities. There are five principles of sustainable agriculture.

1. Farm productivity is sustained or enhanced over the long term.

2. Adverse impacts on the natural resource base of agriculture and associated ecosystems are ameliorated, minimised or avoided.

3. Residues resulting from the use of chemicals in agriculture are minimised.

4. The net social benefit derived from agriculture is maximised.

5. Farm systems are sufficiently flexible to manage risks associated with the vagaries of climate and markets.

Syenite: An alkaline igneous rock dominated by large phenocrysts of alkali feldspars and containing little or no quartz.

Talus: Accumulation of clastic sediments at the foot of a cliff or steep slope.

Tenosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having only weak pedological development.

Texture contrast soils: Soils in which the boundary between two horizons (usually the A and B horizons) is smaller than 50mm (clear, abrupt or sharp), **and**
the clay content in the upper horizon is less than 20% and the clay content in the lower horizon double that of the upper horizon (In this case the clay content must be greater than 20% in the upper B horizon), **or**
the clay content in the lower horizon is 20% higher than the upper horizon where the upper horizon is between 20 and 35% clay.

Thixotropic: Tendency of soil material to liquefy under vibration. Relates to soils with low strength in a moist state and characterised by “spewy” surface horizons.

Vertosols: A soil order defined in the *Australian Soil Classification* (Isbell 1996) as having shrink swell properties with strong cracking when dry, slickensides and/or lenticular structure, and a clay field texture of more than 35% throughout.

Water erosion hazard: The potential for sheet, rill, tunnel or gully erosion to occur on a land surface. The land surface is most prone to water erosion when cultivated and/or when little or no vegetative cover is present. Land management to suit site conditions can minimise the severity, and often prevent most occurrences of water

erosion. The degree of hazard depends on soil erodibility, amount of ground cover, slope gradient and length, and rainfall (intensity and amount).

Wind erosion hazard: The potential for a land surface to erode by the action of wind. The land surface is most prone to wind erosion when cultivated and/or when little or no vegetative cover is present. Appropriate land management including maintaining good ground cover will protect the soil surface from wind erosion. The degree of hazard depends on soil erodibility (especially particle size and soil structure), amount of ground cover, the timing and degree of exposure to the wind and wind speed. Loose, structureless soils are most at risk.

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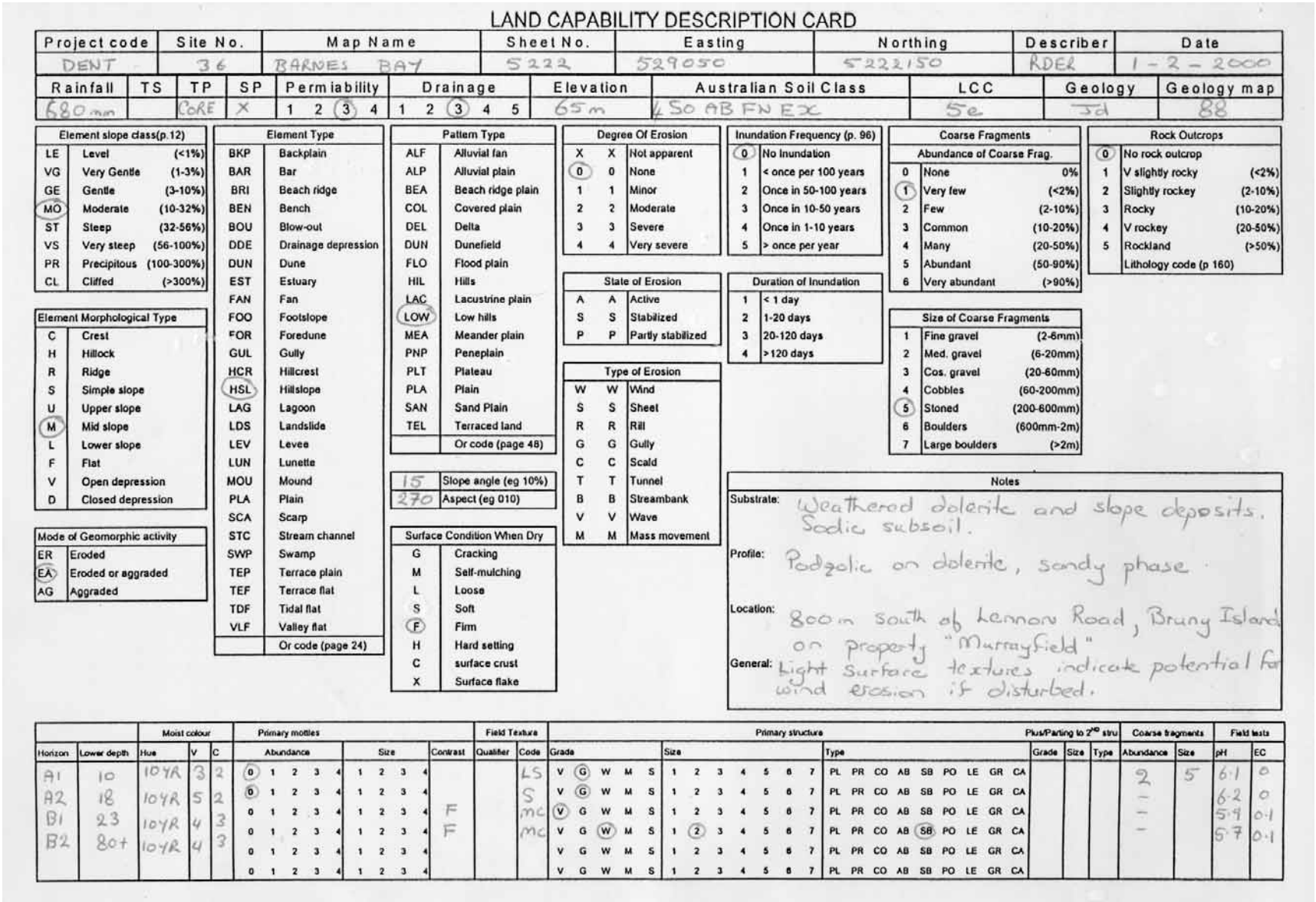
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APPENDICES

APPENDIX A Example of a completed Land Capability site description.

APPENDIX A. Example of a completed Land Capability site description.



LAND CAPABILITY DESCRIPTION CARD

Project code	Site No.	Map Name	Sheet No.	Easting	Northing	Describer	Date
DENT	36	BARNES BAY	5222	529050	5222150	RDEL	1-2-2000

Rainfall	TS	TP	SP	Permiability	Drainage	Elevation	Australian Soil Class	LCC	Geology	Geology map
680 mm		CORE	X	1 2 (3) 4	1 2 (3) 4 5	65 m	4 SO AB FN EX	5e	Jd	88

Element slope class(p.12)

LE	Level	(<1%)
VG	Very Gentle	(1-3%)
GE	Gentle	(3-10%)
(MO)	Moderate	(10-32%)
ST	Steep	(32-56%)
VS	Very steep	(56-100%)
PR	Precipitous	(100-300%)
CL	Cliffed	(>300%)

Element Morphological Type

C	Crest
H	Hillock
R	Ridge
S	Simple slope
U	Upper slope
(M)	Mid slope
L	Lower slope
F	Flat
V	Open depression
D	Closed depression

Mode of Geomorphic activity

ER	Eroded
(EA)	Eroded or aggraded
AG	Aggraded

Element Type

BKP	Backplain
BAR	Bar
BRI	Beach ridge
BEN	Bench
BOU	Blow-out
DDE	Drainage depression
DUN	Dune
EST	Estuary
FAN	Fan
FOO	Footslope
FOR	Foredune
GUL	Gully
HCR	Hillcrest
(HSL)	Hillslope
LAG	Lagoon
LDS	Landslide
LEV	Levee
LUN	Lunette
MOU	Mound
PLA	Plain
SCA	Scarp
STC	Stream channel
SWP	Swamp
TEP	Terrace plain
TEF	Terrace flat
TDF	Tidal flat
VLF	Valley flat
	Or code (page 24)

Pattern Type

ALF	Alluvial fan
ALP	Alluvial plain
BEA	Beach ridge plain
COL	Covered plain
DEL	Delta
DUN	Dunefield
FLO	Flood plain
HIL	Hills
LAC	Lacustrine plain
(LOW)	Low hills
MEA	Meander plain
PNP	Peneplain
PLT	Plateau
PLA	Plain
SAN	Sand Plain
TEL	Terraced land
	Or code (page 48)

15	Slope angle (eg 10%)
270	Aspect (eg 010)

Surface Condition When Dry

G	Cracking
M	Self-mulching
L	Loose
S	Soft
(F)	Firm
H	Hard setting
C	surface crust
X	Surface flake

Degree Of Erosion

X	X	Not apparent
(0)	0	None
1	1	Minor
2	2	Moderate
3	3	Severe
4	4	Very severe

State of Erosion

A	A	Active
S	S	Stabilized
P	P	Partly stabilized

Type of Erosion

W	W	Wind
S	S	Sheet
R	R	Rill
G	G	Gully
C	C	Scald
T	T	Tunnel
B	B	Streambank
V	V	Wave
M	M	Mass movement

Inundation Frequency (p. 96)

(0)	No Inundation
1	< once per 100 years
2	Once in 50-100 years
3	Once in 10-50 years
4	Once in 1-10 years
5	> once per year

Duration of Inundation

1	< 1 day
2	1-20 days
3	20-120 days
4	>120 days

Coarse Fragments

Abundance of Coarse Frag.

0	None	0%
(1)	Very few	(<2%)
2	Few	(2-10%)
3	Common	(10-20%)
4	Many	(20-50%)
5	Abundant	(50-90%)
6	Very abundant	(>90%)

Size of Coarse Fragments

1	Fine gravel	(2-6mm)
2	Med. gravel	(6-20mm)
3	Cos. gravel	(20-60mm)
4	Cobbles	(60-200mm)
(5)	Stoned	(200-600mm)
6	Boulders	(600mm-2m)
7	Large boulders	(>2m)

Rock Outcrops

(0)	No rock outcrop	
1	V slightly rocky	(<2%)
2	Slightly rockey	(2-10%)
3	Rocky	(10-20%)
4	V rockey	(20-50%)
5	Rockland	(>50%)
	Lithology code (p 160)	

Notes

Substrate: Weathered dolerite and slope deposits. Sodic subsoil.

Profile: Podzolic on dolerite, sandy phase.

Location: 800 m south of Lennon Road, Bruny Island on property "Murrayfield"

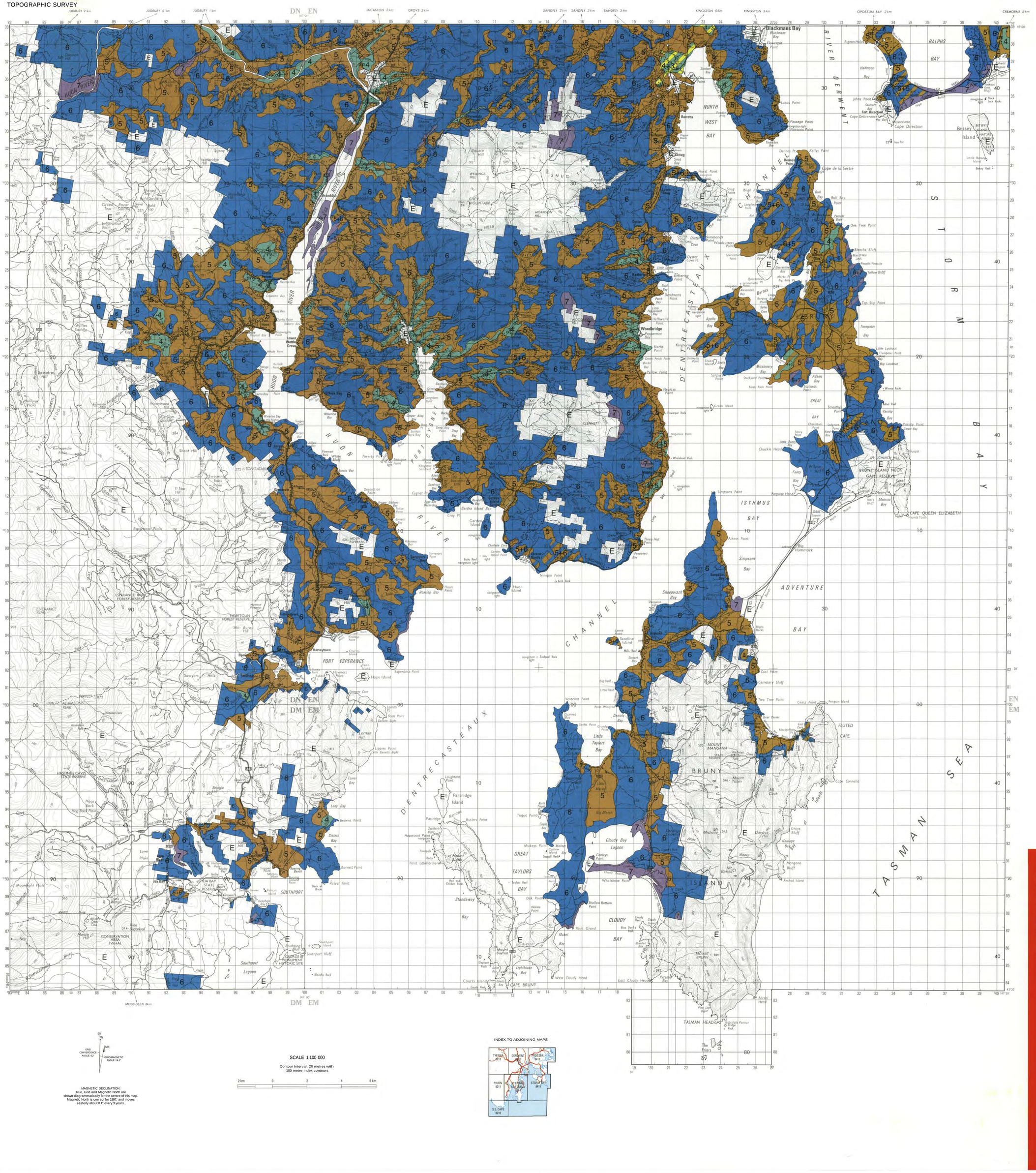
General: Light surface textures indicate potential for wind erosion if disturbed.

Horizon	Lower depth	Moist colour: Hue	V	C	Primary mottles: Abundance	Size	Contrast	Field Texture: Qualifier	Code	Primary structure: Grade	Size	Type	Plus/Parting to 2° stru: Grade	Size	Type	Coarse fragments: Abundance	Size	Field tests: pH	EC
A1	10	10YR	3	2	(0) 1 2 3 4	1 2 3 4			LS	V (G) W M S	1 2 3 4 5 6 7	PL PR CO AB SB PO LE GR CA				2	5	6.1	0
A2	18	10YR	5	2	(0) 1 2 3 4	1 2 3 4			S	V (G) W M S	1 2 3 4 5 6 7	PL PR CO AB SB PO LE GR CA				–		6.2	0
B1	23	10YR	4	3	0 1 2 3 4	1 2 3 4	F		mc	(V) G W M S	1 2 3 4 5 6 7	PL PR CO AB SB PO LE GR CA				–		5.9	0.1
B2	80+	10YR	4	3	0 1 2 3 4	1 2 3 4	F		mc	V G (W) M S	1 (2) 3 4 5 6 7	PL PR CO AB (SB) PO LE GR CA				–		5.7	0.1
					0 1 2 3 4	1 2 3 4				V G W M S	1 2 3 4 5 6 7	PL PR CO AB SB PO LE GR CA							
					0 1 2 3 4	1 2 3 4				V G W M S	1 2 3 4 5 6 7	PL PR CO AB SB PO LE GR CA							

D'ENTRECASTEAUX

TASMANIA 1:100 000
TOPOGRAPHIC SURVEY

SHEET 8311 EDITION 6 1992 & SHEET 8211 EDITION 6 1997



GN
TN
MN
GRID CONVERGENCE ANGLE 0.2°
GRID-MAGNETIC ANGLE 14.6°

MAGNETIC DECLINATION:
True, Grid and Magnetic North are shown diagrammatically for the centre of this map. Magnetic North is correct for 1997, and moves easterly about 0.1° every 3 years.

SCALE 1:100 000

Contour Interval: 20 metres with 100 metre index contours

2 km 0 2 4 6 km

INDEX TO ADJOINING MAPS

LAND CAPABILITY CLASSES

(based on the capability of land for long-term sustainable agricultural production)

1 CLASS 1
Land well suited to a wide range of intensive cropping and grazing activities. It occurs on flat land with deep, well drained soils, and in a climate that favours a wide variety of crops. While there are virtually no limitations* to agricultural usage, reasonable management inputs need to be maintained to prevent degradation of the resource. In many cases more than two crops in a single growing season are possible.

2 CLASS 2
Land well suited to a wide range of intensive cropping and grazing activities. It occurs on flat to gently inclined land with deep, well drained soils, and in a climate that favours all but the most frost sensitive crops. Limitations to use are slight, and these can be readily overcome by good management and minor conservation practices. However, the level of inputs is greater, and the variety and/or number of crops that can be grown is marginally more restricted, than for Class 1 land.

3 CLASS 3
Land suited to cropping and intensive grazing. Moderate levels of limitation restrict the choice of crops or reduce productivity in relation to Class 1 or Class 2 land. Soil conservation practices and sound management are needed to overcome the.moderate limitations to cropping use.

4 CLASS 4
Land well suited to grazing but which is limited to occasional cropping or to a very restricted range of crops. The length of cropping phase and/or range of crops are constrained by severe limitations of erosion, wetness, soils or climate. Major conservation treatments and/or careful management is required to minimise degradation.

5 CLASS 5
Land with slight to moderate limitations to pastoral use but which is unsuitable for cropping, although some areas on easier slopes may be cultivated for pasture establishment or renewal and occasional fodder crops may be possible. The effects of limitations on the grazing potential may be reduced by applying appropriate soil conservation measures and land management practices.

6 CLASS 6
Land only marginally suited to grazing activities due to severe limitations. This land has low productivity, high risk of erosion, low natural fertility or other limitations that severely restrict agricultural use. This land should be retained under its natural vegetation cover.

7 CLASS 7
Land with very severe to extreme limitations which make it unsuitable for agricultural use.

4/5 COMPLEXES
For example, Classes 4+5, where Class 4 land is more dominant than Class 5 land. Due to the complexity at this scale of mapping the two classes have not been separately mapped.

E EXCLUSION AREAS
Land other than Private Freehold and Leased Crown Land, eg. State Forests, State Reserves and Conservation Areas, major urban areas, major water bodies, National Parks and other Conservation Areas.

* LIMITATIONS
In the above descriptions, limitations refer to physical factors or constraints which affect the versatility' of the land and determine its capability for long-term sustainable agricultural production. Limitations include erosion hazard, slope, climate, flooding, poor drainage, stoniness, salinity, topographic fragmentation and poor soil structure.

Information on the dominant limitations within each map unit may be obtained from DPIWE's Land and Water Management Branch, Prospect Offices, Launceston.

MAP USERS NOTE:

This map provides an appraisal of land capability based on landscape, soils, climate and agronomic factors. The land capability class boundaries have been delineated by field work and aerial photo-interpretation. Computer generated elevation and slope maps were used to further assist with the placement of class boundaries. This map is reliable only at the published scale and should not be enlarged. It should be used in conjunction with the accompanying land capability report, which gives further details on the interpretation and use of this map. Only Private Freehold and Leased Crown land has been mapped.

The information on this map has been prepared by the Tasmanian Department of Primary Industries, Water and Environment to assist in land use planning and management. The Crown in the right of the State of Tasmania does not accept responsibility for any loss or damage which may result to any person arising from reliance on all or part of this information, whether or not that loss or damage has resulted from negligence or any other cause.

Field work by R. DeRose & M. Lawless, 2000.
Compiled by R. DeRose, 2000.
GIS work by S. Lynch & M. Brown, 2000.
Base map and production by Tasmap, 2001.
Printed by Printing Authority of Tasmania, Hobart, 2001.

Refer to this map as:
DeRose R. (2001) Land Capability Survey of Tasmania, D'Entrecasteaux, 1:100 000 map. Department of Primary Industries, Water and Environment, Tasmania.
Accompanies report titled "Land Capability Survey of Tasmania. D'Entrecasteaux Report." by R. DeRose", Department of Primary Industries, Water and Environment, Tasmania, 2001.

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D'ENTRECASTEAUX

includes part of Huon

1:100 000

LAND CAPABILITY SURVEY
TASMANIA

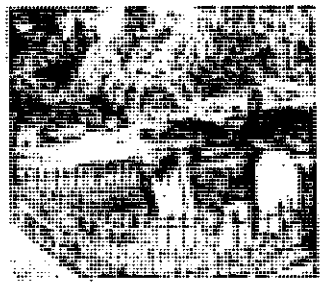
LAND CAPABILITY SURVEY of TASMANIA

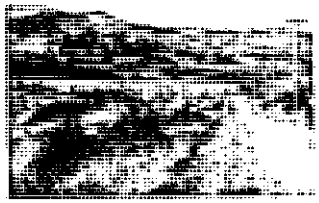
ABOUT THIS MAP
This map depicts an assessment of land capability at a scale of 1:100 000. It is part of a series of Land Capability Maps covering all the Private Freehold and Leased Crown land in Tasmania. The land capability information is shown over a topographic base. The classification system used to generate this map consists of seven classes based on the capability of the land for long-term sustainable agricultural production.

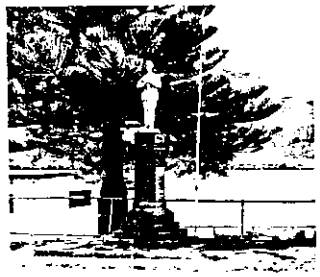
Tasmania
DEPARTMENT of PRIMARY INDUSTRIES, WATER and ENVIRONMENT

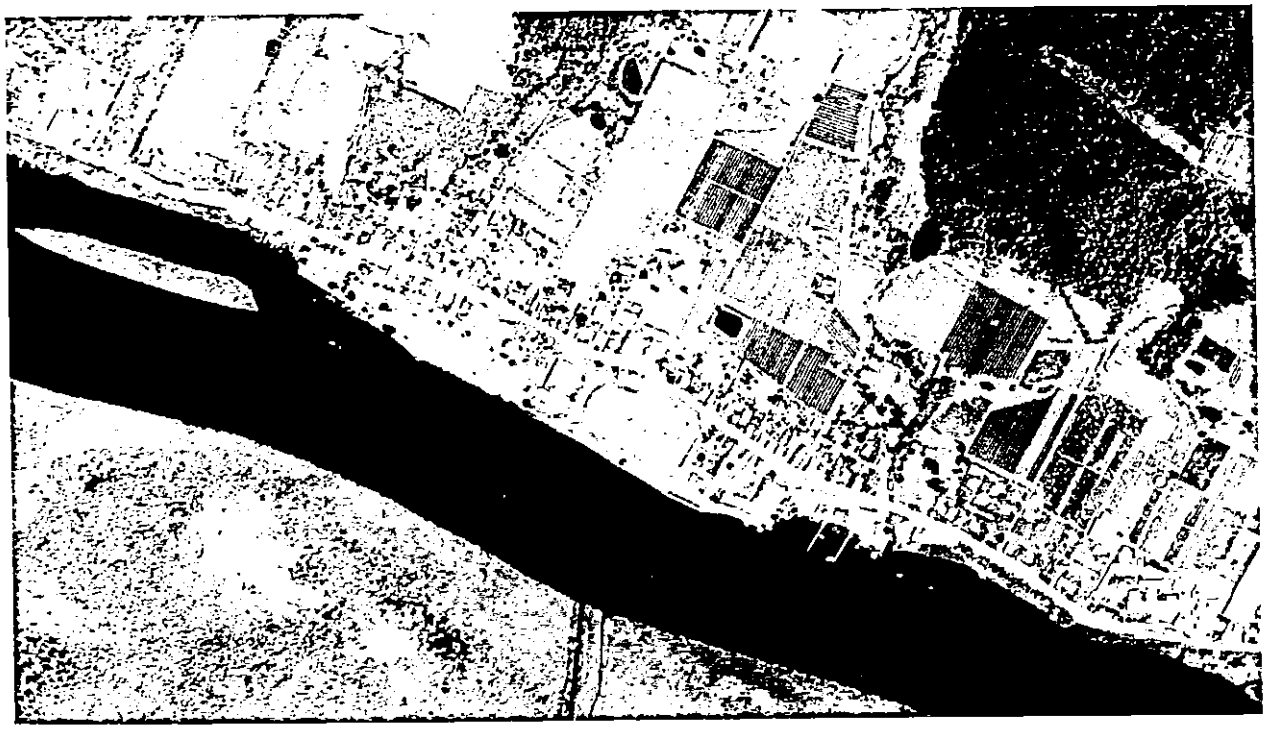
Natural Heritage Trust
Helping Communities Helping Australia

Franklin Heritage Study









National Estate Grant Program
Project Number 9621

For the Huon Valley Council

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LOCAL
STUDIES

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PUU

2003



Acknowledgments

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Of invaluable assistance has been the work previously done on this project by Lesley Gulson, Catherine Duggan, Mike Shields and Associates and Gillian Winter in their interim report of 20 August 1997.

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Executive Summary

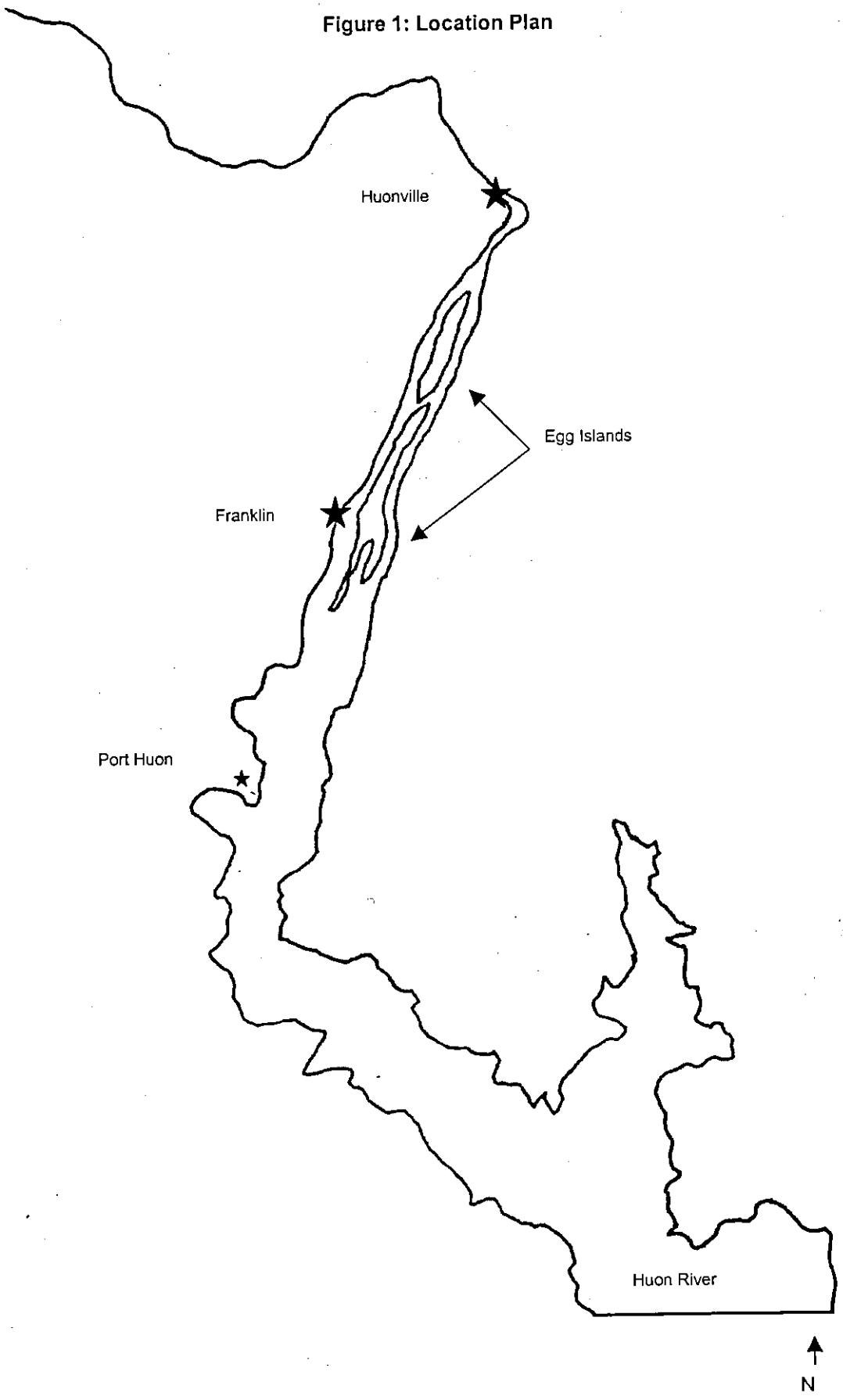
The *Franklin Heritage Study* was a project carried out under the National Estate Grants Program with the assistance of funds made available by the Commonwealth of Australia. The original brief was to identify, record and interpret the cultural significance of places within Franklin and make any necessary nominations for the Register of the National Estate. Given proposed changes to the Commonwealth heritage regime, this brief has been revised to record and interpret the cultural significance of places within Franklin and make any necessary nominations to the Tasmanian Heritage Register. These nominations have been made and are found at the end of this Study. The work of *Franklin Heritage Study. Work in Progress – Interim Draft* (1997) is acknowledged for its assistance in this Study. This, and the Interim Study should be read in conjunction. However, to provide meaning to the nominations of places to the Tasmanian Heritage Register, further historical research work has been undertaken.

The aim of the *Franklin Heritage Study* is to conserve Franklin's important cultural heritage. Through survey work, fifty-three individual places have been identified as having varying degrees of heritage significance. Twenty-seven of these places are ***recommended*** for their entry in the Tasmanian Heritage Register.

Although the entry of places in the Tasmanian Heritage Register will help ensure the conservation of these individual places, it is recognised that broader heritage issues also require adequate protection. Part of this Study looks at the creation of a Franklin Heritage Precinct. The call for Franklin to be declared a heritage precinct is not a new concern. A Precinct recognises and protects the townscape values and those character elements important to Franklin as a town. A ***recommendation*** is made to the Huon Valley Council to pursue this issue.

Similarly, an attachment has been included that introduces the concept of cultural landscapes. This is not intended as a comprehensive cultural landscape assessment or management plan for Franklin. Further work is required to develop a state-wide strategic approach to cultural landscape assessment and protection which converts theoretical discussion into practical management systems.

Figure 1: Location Plan



Introduction

The 1996 agreement between the Crown and the Huon Valley Council had a two-fold purpose:

1. To identify, record and interpret the cultural significance of places within Franklin.
2. To make any necessary nominations for the Register of the National Estate.

From this agreement the document *Franklin Heritage Study. Work in Progress – Interim Draft* (20 August, 1997) was produced. The interim draft has formed the basis of this final report. For reasons of clarity, and in acknowledgment of the work already completed on this project, the final report includes and elaborates on certain themes and concerns as previously identified. However those matters raised in Parts B and C (Conservation Translation and Foreshore Plan) of the interim draft have not been readdressed in this report. Both reports should be read in conjunction.

From the original 1996 agreement, the dual purposes of the project were amended in January 2002 with a suggested brief of:

> *To assess the individual places identified in the Franklin Heritage Study Interim draft 1997 for their possible nomination and entry on the Tasmanian Heritage Register, and the preparation of electronic data-sheets for those places in accordance with the format required by the Tasmanian Heritage Council.*

This revised brief encapsulates the concerns of the 1996 agreement with the identification, assessment, protection and conservation of places having historic cultural heritage significance.

This report has assessed the individual places identified in the interim draft for entry in the Tasmanian Heritage Register and summary information of these nominations is included. Electronic data-sheets have also been prepared in accordance with the required format. The reasons for the change in focus from the Register of the National Estate to the Tasmanian Heritage Register are included in this report.

Largely working from the historical themes included in the interim draft, this report has included an historical overview of the history of Franklin. This repetition is considered important as it provides context and meaning for the prepared data-sheets. Attention has also been given to issues broader than individual places in the form of a heritage precinct and cultural landscapes. These topics have been included for their importance to Franklin as a whole, beyond what protection of individual places can provide.

Historical Context

Summary of Aboriginal Heritage

Although this study does not address issues of Aboriginal heritage within Franklin or the broader Huon region, it is appropriate that recognition is given to the first custodians of the land. This is only intended as a brief introduction to the continuing presence of indigenous communities within the Huon.

Franklin and the Huon region are parts of the traditional territory of the South East Group of Tasmania. The South East people were one of three maritime tribes in Tasmania, with a territory of around 3, 100 square kilometres. This territory extended from the west bank of the Derwent, to New Norfolk, Storm Bay, the D'Entrecasteaux Channel and Bruny Island, and inland through the Huon Valley. Prior to European settlement, Ryan proposes that around seven bands existed in this group, each band consisting of between seventy to eighty people. In the Huon area, European contact noted the presence of the Mellukerdee band.

Unlike other groups, the South East people did not extensively move inland in Spring and Summer, finding sufficient resources of shellfish, birds, kangaroos and wallabies along the coast and immediate interior and harvesting these food sources on a seasonal basis. As the most 'maritime of the Aboriginal Tasmanians' the South East tribe also created bark catamarans capable of making short journeys around the coastline and to the adjacent islands.[1]

European contact with the peoples of the South East began in the late eighteenth-century. In 1792 Bruni D'Entrecasteaux's expedition made landings at Recherche Bay, Bruny Island and documented the channel area. Later in 1802, the Baudin expedition included the prolific writer Francois Peron. It is from the writings of Peron that we are provided with some of the more balanced commentary on the local people, written within the context of the French Revolution, republicanism and the eighteenth-century Enlightenment ideals of humanity. With this cultural background, Aboriginal Tasmanian's were often perceived as the height of the 'noble savage' unencumbered by civilisation. Such interpretations were certainly more generous than the views developed by the British after colonisation, however both perceptions are equally culturally bound and show no real insight or understanding of the indigenous people of Tasmania.[2]

Such 'positive' impressions did not last. Race relations rapidly deteriorated shortly after the British established their southern outpost on the Derwent. The rapid and violent colonisation which resulted, precluded any prolonged and meaningful contact between the indigenous communities and the emerging colony. As a consequence of this, European documentation of Aboriginal society within the Huon region is almost non-existent and it is from nearby regions that most accounts are written. Ryan argues that the Aboriginal Tasmanians were not incapable of adjusting to the European settlement of Tasmania. Instead she proposes that the disastrous consequences of British colonisation were a result of how colonisation occurred and the restrictions placed on the local inhabitants very existence.[3]

It must also be acknowledged that the Aboriginal Tasmanians of the Huon and their history did not end in the nineteenth-century. It is not appropriate for this study to detail their stories however it is necessary to recognise their continuing presence and relationship with the Huon. Robyn Friend has compiled a series of oral histories and poetry from the Aboriginal people of the Huon region. Common themes emerge in this work. Friend documents the continuity and relationship which exists between the people, the land, their cultural practices and their history. This text also records the changing personal opinions towards Aboriginality.

---

[1] L. Ryan, *The Aboriginal Tasmanians*, (St Leonards, 1996), pp. 39-43, R.N. Wooley, *Above the Falls: Some Notes on the People and the History of the Upper Huon*, (Hobart, 2000), p. 7

[2] Ryan, *The Aboriginal Tasmanians*, pp. 53, 57, P. Kostoglou, *Historic Timber-Getting Between Glendevie and Franklin Block 3*, (Hobart, 1995), p. 9

[3] *Ibid.*, p. 44, Kostoglou, *Historic Timber-Getting Between Glendevie and Franklin Block 3*, p. 9

From shameful denial of ancestry, many of the histories indicate a rediscovery of ancestry and a renewed pride in their aboriginality.[4]

Early British Contact with the Huon

British contact with the Huon region began almost as early as the settlement on the Derwent. The reports back to the fledgling colony contained mixed responses. Soon after Collins' arrival in 1804, orders were given to explore the region. Two groups were sent, one by land the other by boat. Although recognising the quality of the timber in the region, both parties did not recommend settlement. In contrast, another early report by the Harbour Master told that the area was "the most eligible land for settlement", finding praise in the safe anchorage, arable land, timber and water supplies. He was also able report of welcoming reception of the local Aboriginal people.

Later in 1804, the Reverend Knopwood and party navigated their way up the Huon River. Travelling as far as the first falls, the reports of this group were again critical. In his diary, Knopwood presents a pessimistic view of the Huon, writing that "the river is by no means as fine as the Derwent and as for the land there is none, not even fit for a garden".[5] Knopwood was also the first to bring back Huon Pine specimens to Hobart.[6] Such pessimistic impressions of the Huon continued in the early years of white settlement. Lieutenant John Oxley writing in 1809-1810 that:

> It is impossible to fancy a more miserable country than is presented the eye. On the banks of the river, above the falls, however, there is some good land, but none that would repay the trouble of getting at it.[7]

With more easily accessible land available around Hobart, early European contact did not recommend settlement of the thickly forested Huon region. Although settlement of the Huon region was not a priority of the early colonial administration, transitory inhabitation occurred with early timber getters in the area. For example, in 1821 an application for the new timber cutting licence was received from a woman that refers to her living with her husband in the Huon forests for nine years.[8]

More substantial settlement was reliant upon access to the region. In the late 1820's an overland bridle track was cut through from Hobart to the Huon River. The *Hobart Town Gazette* reported in 1830 that:

> [P]arties in search of land for location have now the power of penetrating with facility into the heart of an unexplored country in the south west portion of the colony.[9]

Permanent European settlement of the Huon began in the 1830s once access and official government land grants were available. In the mid 1830s two adjacent grants were made in the North Franklin area to John Price and John Clark. In 1836 John Price was granted land opposite Egg Island on the Huon River while John Clarke purchased crown land north of where Franklin is currently situated. Shortly after taking up his grant, Clark was appointed as Police Magistrate in Hobart and was forced to find a buyer for his land. He was successful in this pursuit with the sale to Lady Jane Franklin who purchased a square mile of his land.[10]

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[4] R. Friend, *We Who are Not Here – Aboriginal People of the Huon and Channel Today*, (the Huon Municipal Association and SETAC, 1992), *passim*
[5] R. Knopwood, *The Diary of the Reverend Robert Knopwood 1803-1838*, Nichols, M (ed.), (Launceston, 1977), p. 68
[6] Kostoglou, *loc. cit.*, *Franklin Primary School 'Seize the Days' A History of the Franklin School and its District*, (Franklin, 1988), p. 1
[7] *Ibid.*, pp. 9, 14
[8] *Ibid.*, pp. 10, 14
[9] *Hobart Town Gazette*, February 13 1830, p. 53
[10] Kostoglou, *op. cit.*, p. 10, *Franklin Primary School*, *op. cit.*, p. 5

Lady Franklin and the Settlement on the Huon

The town of Franklin takes more than its nomenclature from Sir John Franklin. Key to the story of the town is the role played by Lady Jane Franklin. In a male dominated society, her influence and character cannot be understated. In combination with a husband who respected her abilities and social concerns, the Franklins were an innovative couple in the colonial society, an innovation which was not always appreciated or understood.

Franklin was the first concentrated settlement within the Huon region. Convict establishments at Port Huon and Lymington (near Cygnet) had previously failed. In 1838 Lady Franklin using her own funds purchased John Price's uncleared, thickly forested land on the banks of the Huon River. This land was privately subdivided and became known as 'the Settlement' (later Franklin).

A further 300 pounds was spent on the construction of the *Huon Pine*, a vessel to service the needs of 'the Settlement' in a time when water transport was the only reliable and efficient means. Profit was not the intent of the endeavour. The overriding aim was to promote free settlement to farmers with limited financial means by offering land on reasonable terms of 10s. 6d. an acre with repayments payable within seven years.[11]

Lady Franklin pursued a far more active role in the scheme than simply providing the funds. She involved herself in the selection of applicants, provision of services and other managerial roles. She wrote in 1839 that she had interviewed prospective purchasers and that the comment was made that before her plan, there were no options for the poor in the colony. The original intent was that 'the Settlement' would be open to free settlers. However, one applicant was an ex-convict. In his application he supplied character references which Lady Franklin accepted. The scheme was then extended to other ex-convicts who were capable of providing similar positive references.[12]

The early development of Franklin distinguishes it from other settlements. Whereas most early towns evolved as strategic centres for military and convict posts, and as travel stops, Franklin emerged from the direct involvement of its patron Lady Franklin. Her intentions were not economic. As with her other schemes, social development was key to her agenda. At a time when many settlers were leaving Van Diemen's Land for opportunities in the new colony at Port Phillip, Lady Franklin offered small holdings for free and later emancipated people. Land was subdivided into lots from five to one hundred acres, a practice not consistent with normal government surveying. The lack of a registered plan from this early period also shows that this was not a normal government plan. The intentions and methods paralleled the management of an English estate. Land purchase was offered under generous terms to encourage settlement, with available plots taken up by 1859.[13]

Understanding the character of Lady Franklin helps explain her involvement in 'the Settlement'. From her privileged background, Jane received an education typical of her class with its emphasis on accomplishments. Such training however was unsatisfying for a person witch such a developed intelligence, seeking out information and with an appetite for travelling and reading. In describing Jane's intelligence, her niece praised her reasoning and analytical abilities, and her capacities to rationally assess herself. Although contemporary critics would describe her as a fame seeking wild shrew, those who knew her well paint a different picture.

Her own correspondence and that of others show someone who was extremely shy but whose great charm and passion for life allowed her to succeed. According to Fitzpatrick, Lady Franklin's offence was her originality, intelligence and independence. Her role as wife

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[11] J. Franklin, *Some Private Correspondence of Sir John and Lady Jane Franklin (Tasmania 1837-1845)*, G Mackaness (ed.), Part 1, (Dubbo, 1977), p. 38, K. Fitzpatrick, *Sir John Franklin in Tasmania 1837-1843*, (Melbourne, 1949), pp. 39-40, 42, 239, 241, Jacob Allom Wade Architects, *Huon Area Heritage Study*, (Hobart, 1983), p. 7, L. Gulson, *Franklin Heritage Study. Work in Progress – Interim Draft*, Huon Valley Council, 1997, p .9

[12] Fitzpatrick, *Sir John Franklin*, pp. 239-240

[13] Gulson, *Franklin Heritage Study*, 1997, pp. 9-10

was one she was devoted to, with a real interest in Sir John's work both administrative and scientific. With her quick intelligence, Franklin found a full partner in his efforts.[14]

Within the social restrictions of nineteenth-century Van Diemen's Land, Lady Franklin enjoyed a full and active life. She was apparently the first white woman to climb Mount Wellington, and made extensive tours of the wilderness of the colony and mainland, not in an effort for fame, but from sheer curiosity and energy. Such behaviour was contrary to the expectations of a woman of the time, especially that of the Governor's wife. Custom dictated that her role should be conventional, that of paying and receiving callers, hosting functions, dressing elegantly, and importantly, being the image of graceful refinement.

Criticism often focussed on her social views and how through her position she pursued these agendas. In the highly stratified colonial society, these ideas were often met with indifference or even hostility. Like her husband, Lady Franklin believed that Van Diemen's Land had far greater potential than merely a gaol. For example, the Franklin's plans at establishing Christ College as a religious education institution open to all Christian denominations and the sons of the poor as well as those who could afford it. The story of Christ College and its establishment is both long and evolved. Although the scheme ultimately failed before Franklin's recall, it did set the course for the establishment of a superior school and the antecedent of tertiary education in Tasmania.[15]

The writings of Lady Franklin shed some light on her involvement in 'the Settlement' and the conditions for early residents. With the recall of Sir John in 1843, the involvement of the Franklins in the development of 'the Settlement' was prematurely cut short. However in the five-year period of their connection with the area, future development was laid out. For everyday administration of the community, she appointed the neighbour James Ross who took on the direct management of 'the Settlement'. Again this bears a strong relationship to the role of agent on an English estate.[16]

In August 1839 a report from the manager of 'the Settlement' informed her of:

> [T]he progress and prosperous condition of the settlement ... He hopes I shall be pleased with the improvements at the settlement for he must say that when he looks at what has been done, he is quite astonished.[17]

Although Lady Franklin could write of this astonishing progress, the difficulty in carving out homesteads and farms in the Huon should not be underestimated. Eleanor Franklin (Sir John's daughter) wrote:

> [T]he land is very heavily timbered, as you may imagine when I tell you that one man when he came to his allotment could not find room to land things from his boat and was obliged to clear the scrub with a hatchet before he could do so, so that he was very near giving up his allotment and returning to town.[18]

The active role in the development and management of her holdings also included commissioning government chemists to test the soil, who determined that it was excellent farmland. This initial purchase was augmented by a further 640 acres adjoining Clarke's land, bought for Ross by Lady Franklin in 1843. Although not her land, she gave directions for its subdivision and management similar to her own neighbouring property. These holdings were divided into lots of 100 and 50 acres provided to tenant farmers with the generous terms of being rent free for the first five years. Gulson hypothesises that that these transactions may

[14] Fitzpatrick, *op. cit.*, pp. 39-40, 42, 241
[15] *Ibid.*, 1949, pp. 42-43, 188-189, F.J. Woodward, *Portrait of Jane. A Life of Lady Franklin*, (London, 1951), p. 210
[16] Gulson, *op. cit.*, p. 10
[17] Fitzpatrick, *op. cit.*, p. 240
[18] *Ibid.*, p. 240

have been required to ensure some profit and completion of business for the Franklins prior to their departure.[19]

The Huon scheme was to provide land on reasonable terms to poorer settlers. As a result, many of those who took up land around 'the Settlement' were labourers and former convicts with little farming experience. Understandably then, establishing farms in the thick forests was far from an easy task. In terms of location, 'the Settlement' was not ideal being situated on the Huon River beside mudflats, swamps and shallow areas. Nonetheless, over the coming decades 'the Settlement' became the centre of the region. By 1840, cleared land was under production with early crops of potatoes. The region was able to support four mills and had a degree of self-sufficiency.[20]

The Huon scheme and the settlement at Franklin is key in demonstrating this conservative humanitarianism, a scheme Lady Franklin played a key role in. Although coming from comfortable means and occupying a position of power and prestige, Lady Franklin was not a rich woman herself. Yet, from her income she supported the various Tasmanian causes she became involved in, including founding 'the Settlement' on the Huon. How Lady Franklin envisaged the development of 'the Settlement' remains unknown however the early recall of her husband curtailed any fully developed plan. So attached were they to the scheme, that the couple spent their last night in Tasmania close to 'the Settlement' at the residence of Clarke. Following the tragic death of her husband during his Artic expedition in 1847, the town's name was changed to Franklin.[21]

Town and Industry Development

i.) Whaling

It was timber and bay whaling that bought the first large scale European contact with the Huon. Between April to September each year the Right whales sheltered in the bays and waterways around Tasmania to calve so close to the shore, they became a relatively easy source of income. The hunting of whales in the river estuaries began c.1815 with such intensity that populations in the Derwent were threatened with extinction by the 1820s pushing the industry further afield. With a ready demand for whale oil, Kostoglou states that transitory camps were established on the Huon, however larger official sites were located at Adventure Bay, Southport and Recherche Bay by the 1830s. The bay whaling industry was short lived. Over exploitation of the resource forced whaling from the coastline to the deeper waters.[22]

ii.) Timber Getting

The Huon region has long been recognised for its timber resources. The French explorers were amongst the earliest Europeans to appreciate the forests, Peron writing in 1802 of the Port Cygnet area that:

> Everywhere the must lush vegetation multiplies its productions. The shores are bordered with mighty trees, growing so thickly that they make the forest hardly penetrable.[23]

The early British explorers and surveyors were less complimentary. In 1804 the Deputy Surveyor General Collins declared of the Huon region that:

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[19] J. Franklin, *Some Private Correspondence of Sir John and Lady Jane Franklin (Tasmania 1837-1845)*, G Mackaness (ed.), Part 2, Dubbo, 1977, pp. 68-69, Kostoglou, *op. cit.*, pp. 10-11, Gulson, *loc. cit.*, p.10
[20] Kostoglou, *op. cit.*, p.11, *Franklin Primary School*, *op. cit.*, p. 5, Jacob Allom Wade Architects, *Huon Area Heritage Study*, p. 9
[21] Fitzpatrick, *op. cit.*, pp. 238-239, Gulson, *op. cit.*, pp.9-10, *Franklin Primary School*, *loc. cit.*
[22] Kostoglou, *op. cit.*, pp. 10, 14-15, Jacob Allom Wade Architects, *op. cit.*, 1983, p. 7, *Franklin Primary School*, *op. cit.*, pp. 3-4
[23] Kostoglou, *op. cit.*, p. 14

> The soil wherever we landed, or could judge from seeing it from the boat, had one uniform appearance, consisting of scarcely a blade of grass on it but thickly covered with fern or scrubby brush. The trees are principally blue gum and stringy bark, but none of any considerable size.[24]

Despite these initial critical reports, the quality of the timber was eventually realised. However its large-scale exploitation was delayed by difficulty with access and more readily available materials closer to Hobart. As the colonial population increased, the demand for timber and its products expanded. Timber getting in the Huon region was originally concentrated on hand hewn shingles, palings and rafters. Huon Pine was recognised early in the colonial establishment for its excellent ship building qualities. However early exploitation by convict labour was centred on the rich forests of the West Coast. With the degradations of this resource by the 1840s, the industry moved to Huon and Picton Rivers. Inturn, this brought more settlers to the area. In response to this influx, the government surveyed a series of townships around the region. These surveyed towns ultimately failed as workers concentrated around already established sawmills.[25]

In the Huon, many former whalers turned to forestry. Huon pine, celery-top pine, blackwood, stringy-bark, blue gum and swamp gum were prevalent and found suitable for boat building, barrel making, housing, and furniture. Before the advent of steam powered sawmills, all processing was pit-sawn by hand. The first steam-driven sawmill was not brought to Franklin until 1855. The climate of the region was found to be too wet for horses and high-wheeled vehicles. Although bullock teams were popular they were also expensive to maintain. As a result the felled timber was transported by 'Samsons' or stump-pullers and with hand winches.

Following the end to transportation and convict labour, greater reliance on technology over manpower was inevitable. By the 1850s, the tramways and water powered saw mills became vital tools in timber getting, allowing large volumes of material to be regularly moved and encouraging a new entrepreneurial spirit in the industry.[26]

Although the forests surrounding Franklin were not of the same extent as those further south, the main industry in the early settlement was felling, splitting and sale of timber. Greater access to the forests occurred with the advent of sawmilling in the area in the 1850s and the Franklin Tram Road Company. This demand for timber increased with the Victorian gold rush of the 1850s. The Huon region played an important role in supplying palings and roof shingles. However the fluctuations of the gold rush made this demand erratic and short lived. An export market was also developed in supplying timber to Britain for docks and wharves. International markets existed in India, China, Africa, the Philippines and New Zealand. In Europe, Tasmanian timbers were a popular choice for railway sleepers.

The poorer timber resources around Franklin were only capable of supporting a smaller number of large mills such as that of John Hay beginning in 1853. Such mills dominated timber getting around Franklin until the turn of the twentieth-century when larger establishments were created elsewhere. Following this downturn, emphasis changed to producing fruit case timber which was well suited for the smaller sized trees surrounding Franklin. The success of the timber industry was subject to fluctuations. Massive operations developed in the Huon region in the late-nineteenth century however their success was short lived with a down turn in the market prior to World War One. The focus of the timber industry returned to smaller operations providing timber packing cases for the fruit trade which enjoyed a relatively more stable economic situation.[27]

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[24] *Ibid*
[25] *Ibid.*, pp. 11, 15, *Franklin Primary School*, *op. cit.*, pp. 2-3
[26] *Ibid.*, p. 11, *Franklin Primary School*, *op. cit.*, pp. 4, 10-11
[27] Jacob Allom Wade Architects, *op. cit.*, p. 11, Kostoglou, *op. cit.*, pp. 38, 101, *Franklin Primary School*, *op. cit.*, p. 10

iii.) Transport and Shipping

From the beginning, the rugged terrain of the Huon made transport and communication a problem. The combination of thick forests and swampy foreshores made land access difficult resulting in a reliance on water transport which was the most reliable and efficient means. At its inception, Lady Franklin recognised this issue, using her funds for the construction of the ketch the *Huon Pine*. John Clarke purchased the boat following the Franklin's departure.

Although the most reliable means, water transport was still subject to variables of wind, current and tide. The trip to Hobart could take four to five days. So reliant was the Huon on water transport until the improvement of roads that at its height, around 80 jetties were constructed along its banks.

Given the dependence on water transport, the construction of boats and ships became an early and vital industry in Tasmania. With ample excellent timber, shipbuilding became a common practice of the banks of the Huon River. Huon Pine was especially prized for its ship building capacities. The harvesting of the Pine occurred on both the Huon and Picton Rivers. After felling, the trees were moved to the river edge where they would be taken downstream to Victoria (Huonville) or Franklin by the next flood. From here, the timber was either locally processed or further transported to Hobart. Beginning with smaller crafts, boats from the Huon soon became famous despite the problems caused by the mudflats and launching larger vessels at Franklin. It was not until the 1880s that steam powered boats began to replace the dominance of sail.[28]

Early land transport began in 1829 when Governor Arthur ordered government surveyors to construct a blazed trail from Hobart to the Huon. In turn, land access would encourage settlers to take up smallholdings. Expansion of the region was further assisted by the construction of sections of road from the River leading up to the farms. These roads were required to allow crops to be transported to the River edge from where they could be more easily transported by barge and boat. However this was still a difficult process given the poor quality of early roads, or tracks. An early technology development was the construction of a wooden tramway made from local timbers and pulled by horses or bullocks. This technology allowed for easier transportation of crops and Kostoglou identifies it as a precedent for later transportation methods in the timber industry.[29]

Connecting Franklin and the Huon by road to the rest of the colony remained an issue. So inadequate was the original bridal track that it was impassable by horses with packs. The situation in the settlement of Franklin was little better. It was noted that even people experienced difficulty in crossing the Main Road during winter.

This impossible situation continued until 1855 when two Victoria locals improved the track from Hobart so that a chaise could get through. This was followed in 1857 by a petition to Parliament requesting funds for the construction of a road from Hobart to the Huon River. With an increasing population and the considerable revenue being generated in the area, an improved road was essential. Even after the improvements the track was very rough, taking between six to seven hours to travel from Hobart to the Huon. It was not until 1869 that the first coach was driven from Hobart and regular services established.

However the problem still existed that the road finished at Victoria. West of the River, settlers and the townships relied on ferries to cross the Huon. At Franklin a ferry service operated to Cradoc. At the Egg Island canal though, passengers and their goods had to disembark while the ferryman carried the small boat. Even after the construction of the channel across the Island, in times of flood, the eastern shore remained inaccessible.

This situation continued until the construction of the bridge at Huonville in 1876. The bridging of the Huon connected the western populations with Huonville and still further, Hobart. Coach access was now available as far south as Geeveston. Reliable transport encouraged the

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[28] *Ibid.*, *Franklin Primary School*, *op. cit.*, pp. 11-12, 15-16, Kostoglou, *op. cit.*, p. 15, D. Hammond, A. Rushton Nuss, *Franklin Settlement in the Huon*, (Hobart, 1987), p. 31

[29] Kostoglou, *op. cit.*, p. 11, Gulson, *op. cit.*, p. 9

further development of the region, so much so that the Government even mooted the plan for a steam rail service to the Huon in the 1880s. These plans were eventually rejected in 1910 on economic grounds. The bridge was also responsible for shifting the administrative and economic centre of the region from Franklin to Huonville.[30]

Road transport also removed the former reliance on the River. With the introduction of motor vehicles goods and people could be transported more efficiently than by boat, one local stating in 1988 that:

> Franklin became a ghost town when the river traffic died and road traffic took over. It started in the 1920s. Up till then river traffic was vital. ... With the passing of river traffic Franklin died.[31]

iv.) Agriculture: the rise and fall of the orchard industry

With the clearing of the timber, crops were planted. The small size of land grants initiated by Lady Franklin was a practice continued in future subdivisions. The steep, densely covered land made clearing an expensive and time consuming practice. It could take several years to clear the land from its native vegetation. Cultivation often began amongst the remains of dying and ring-barked trees. With small sized plots, grazing was not a viable option.[32]

Figure 2: *Township of Franklin, Huon River*, c.1875[33]



The above image indicates the rural development of Franklin c.1875. The town and its buildings are clustered around the riverbank with farmlands stretching up the hills behind. Of interest, the practice of ring barking native trees and cropping around them is clearly evident

[30] Kostoglou, *op. cit.*, p. 12, Jacob Allom Wade Architects, *op. cit.*, 1983, p. 11, *Franklin Primary School op. cit.*, pp. 16, 18. Speculation exists as to the construction of the Egg Island Canal. Although early references are made to a 'cutting' across the Island, the present canal was put out to tender in 1884 and was won by Cradoc local Henry Clark at a cost of 364 pounds, 12 shillings. 'Canal Convict Built?', *The Huon News*, 8 May, 1997, p. 1

[31] *Franklin Primary School, op. cit.*, p. 22

[32] Jacob Allom Wade Architects, *op. cit.*, pp. 9, 11, Kostoglou, *op. cit.*, p. 15, *Franklin Primary School, op. cit.*, pp. 5-6

[33] S. Clifford, *Township of Franklin, Huon River*, c.1875, WL Crowther Library, State Library of Tasmania

After first supplying their own needs, the initial crops of the first settlers were potatoes which grew well with the ample rainfall. This soon developed into the main industry, supplying the needs for Hobart and other centres. With the further development of 'the Settlement' wheat was grown for both domestic consumption and trade. However it was discovered that the moist climate of the Huon made the wheat unsuitable for bread making. Although mills were established in the area, the availability of cheaper wheat from the mainland led to the end of its production as a commercial crop.

The crop that came to characterise the Huon region, and Franklin was apples and small fruits. It remains unknown when the first orchard was planted in the Huon. It has been suggested that it may have occurred as early as 1838 with John Clarke planting apple and pear seeds at his property 'Woodside'. Whatever the exact date, a flourishing industry soon developed. The small-scale export of apples began in 1849 to the colony of Victoria and New Zealand, and shortly afterwards to India. The success of this venture led others to join the field, quickly becoming the most important industry in the Huon. Overseas shipments of fresh and dried fruit became a major source of income, by 1880 shipments to Britain were worth 20, 000 pounds.[34]

At the commencement of the industry, the fruit was taken to Hobart in paling cases without sorting where it was often on-sold by the Captain of the ship which transported the apples from the Huon. Improvements in transport technology fully allowed the Huon to develop as a fruit-growing centre. In 1884 an experimental shipment was made of one hundred cases of apples to London. So successful was this venture that apples were regularly being shipped in the refrigerated holds on mail steamers by 1887.[35]

The ease of transport of apples made them an initial export, whilst small fruits were more problematic given their perishable nature. It was not until advances were made in transport and storage that small fruit production became a commercial concern. The Huon was noted for its excellent small fruit production such as raspberries and currants. Early techniques developed to preserve this fruit. George Peacock & Co started a jam pulp factory in Franklin using steam pans and later sulphur fumes to preserve the fruit. Jam production developed into a major export industry in Tasmania.

However it was the involvement of Henry Jones in the company which truly defined the role of the Huon as a fruit-producing region. This concentration also had a vast impact on the developing landscape with the dominance of orchards and subsequent jam making and fruit preserving plants. In 1891 the H Jones & Co Factory was established in Hobart with a branch in Franklin. Like other fields though, the small fruit industry fluctuated, being subject to seasonal production, market forces and increasing production costs.[36]

From its earliest days, the Huon fruit industry was subject to fluctuation. In the 1890s, fungus and insect problems decimated the export of fresh fruit. In response, fruit drying technology was brought to Franklin. The greatest expansion in fruit production occurred at the beginning of the twentieth-century. By the outbreak of World War One, exports almost exceeded one million cases, a market which had expanded to three million cases by 1925-26.

To cope with these demands an interstate jetty was constructed at Port Huon in 1917 allowing direct export from the region. This allowed growers to save on the costs of sending fruit to Hobart. World War One also placed pressures on the fresh fruit industry. The scarcity of hold space on ships in England led to a short-lived revival in the dried fruit process. However by the end of the War, the demand again turned to fresh fruit. Meeting this demand however proved a difficulty. The War weakened major enterprises including the orchard industry, and the effects of this economic disturbance were not rectified before the Great Depression.

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[34] Kostoglou, *op. cit.*, p. 12, *Franklin Primary School, op. cit.*, pp. 12-13 Jacob Allom Wade Architects, *op. cit.*, pp. 9, 11

[35] *Franklin Primary School, op. cit.*, p. 13

[36] *Franklin Primary School, op. cit.*, pp. 13, 15, Kostoglou, *op. cit.*, p. 12, Hammond, Rushton Nuss, *Franklin Settlement in the Huon*, p. 43

The apple industry reached its height in the 1950s, a pinnacle which led to the phrase 'apple isle' being coined. Tasmania, and specifically the Huon enjoyed an unparalleled monopoly over the apple market. These successes though were relatively short lived. Various factors led to the decline of the apple industry. The costs of labour, materials and insecticide increased dramatically. This was coupled with unprecedented competition from other countries and Britain's entry into the European Economic Community which removed former colonial ties. The net effect of these causes was the decimation of the orchard industry in Tasmania, most dramatically seen in the Huon. Between 1961-1975 nearly two-thirds of orchardists in the Huon went out of business. So extreme were the problems that government assistance was offered to farmers to scrub out their orchards.[37]

[37] *Ibid.*, p. 14-15, R.M. Richards, *The Effects of the 1930s Depression on the Rural Community of the Huon Municipality 1926-1935*, unpublished history dissertation, University of Tasmania, 1982, p. 103, Jacob Allom Wade Architects, *op. cit.*, 9-11, Kostoglou, *loc. cit.*

The Development of the Town

Social development

Beyond simply providing the land for the town, Lady Franklin was committed to 'the Settlement' being adequately provided with social infrastructure according to her cultural and social agendas. Key to this agenda was spiritual and education facilities. Small wooden churches were amongst the earliest institutional buildings to be constructed in Franklin. Lady Franklin supported the construction of a Methodist Church and paid for the construction of St Mary's, the first Anglican Church. Despite the construction of St Mary's, she wrote in 1843 prior to her departure that: "there is at present nothing but my wooden chapel, with no clergyman and no school master".[38] The present St John's later replaced this weatherboard building in 1863, designed by Henry Hunter. The Catholic Church also established its continuing presence in Franklin with the construction of St Mary's at the southern end of the town. Churches played an important role in society, far beyond that of only providing religious services. The church was often central to society, being the location of community functions and entertainment.[39]

Education was a fundamental part of Lady Franklin's social concerns. Following her departure from Tasmania, she provided that the sale of her Huon land was vested with Christ College to fund scholarships for local children to attend that institution. Formal education in the Huon region is first noted in 1848 when the Board of Education granted 13 pounds 6s 9d for six-month support to the school at 'the Settlement'.

From the 1850s, four schools existed in the Franklin district. The first Franklin school was located south of the Franklin Hotel. A report of 1860 noted that irregular attendance was particularly rife in Franklin, a combination of poor roads and children being withdrawn to work on farms. Although In 1868 school attendance was made compulsory, Franklin like other rural areas continued to suffer from poor attendance. School inspections in the 1850s found fault in both facilities and teaching staff. It was believed that with a good building and competent staff, that attendance could be increased from the current twenty students to around eighty. This proposal was accepted by the local community who raised funds for a new school building. However problems with attendance continued.

The current school building dates from 1919. At the time, its modern, brick construction made it the pride of the Huon. Included in the school grounds is the focal landmark of a Californian Redwood which was planted by Algernon Clark in 1901 as part of the Arbour Day celebrations. This tree continues to play an important part in school life.[40]

Organised sporting activities are not recorded in early documentation of Franklin, perhaps a reflection of the lack of free time for many settlers. However by 1870 Franklin established the first of several Huon Valley cricket clubs. Football also emerged in the late nineteenth-century with eleven teams existing in the Huon by the 1930s. Water sports have always heavily featured in the Huon's social activities, the first regatta occurring in the 1850s and eventually settling at Shipwrights Point. So popular was the event, that it was estimated that in 1858, two-thousand people attended. Annual regattas continued until the 1960s.

Rowing was perhaps the most popular of these early organised sports. Initially competitions were held in whaleboat-style vessels over five to ten miles. The Huon proved an excellent location for such events, a role that continues today. The social role of sport developed in the

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[38] Franklin, Part 2, *op. cit.*, p. 69

[39] Jacob Allom Wade Architects, *Report on the Building Fabric St John's Church Franklin*, Hobart: the National Trust of Australia (Tasmania), 1984, p. 2, *Franklin Primary School, op. cit.* p. 8, Hammond, Rushton Nuss, *op. cit.*, pp. 73-74, *St John's Anglican Church, Franklin. Back to Franklin Celebration*, Franklin: 1983,pp. 2, 5

[40] Hammond, Rushton Nuss, *op. cit.*, pp. 13, 49-50, *Franklin Primary School, op. cit.*, pp. 30-32, 38, 73. Public subscription for a new Franklin school began in 1859 when Sir James Ross (a major local landowner) gave 5 pounds, "at all times ready to subscribe towards any project for the promotion, in the district of Public Education and Public Worship." 'Franklin – the new School', *The Hobart Town Courier*, April 13, 1859

nineteenth-century is one that persists. The rowing competitions, bowling club, and football ground are all central social elements of Franklin.[41]

The Growth of Franklin

The work of the Interim Draft Report is acknowledged for its assistance in documenting the townscape development of Franklin. Little is known regarding the early years of growth in the town. The lack of any registered plan from this period itself highlights this difficulty, whilst also indicating that Franklin did not develop as a government planned town. A sense of a township did not emerge in this early period of settlement. What characterised the area were small farms. After burning, clearing and demarcation of the land, initial crops were planted. Wheat and potatoes were planted, later to be replaced by the orchards which are still an important element in the Huon and Franklin (see Figures 18 & 19 p. 120). With the success of orchards, fruit processors established themselves along the river edge. As with most developing regions, early buildings were of the simplest form – slab huts with bark roofs.[42]

Of interest, two early plans have been obtained for both the northern and southern ends of Franklin, although excluding the main part of the town itself. The 1851 *Township of Franklin* (p. 27) has street development centred off Kay Street. Other streets are shown leading off Kay Street at right angles. Smaller blocks are subdivided between these streets. The plan shows long narrow blocks leading up from the Huon River. Such practices are consistent with the common colonial pattern for rural lands on waterways with long rectangular blocks at right angles to the River, ignoring the undulating topography of the land. No connecting road is shown along the riverbank. Instead, several jetties are included while the larger blocks have direct river access, indicating the importance of water transport. It is of some interest that this original practice of long, narrow blocks is still a readable characteristic today. The 2002 (p.120) aerial photograph continues in demonstrating this pattern. Beyond these blocks, a more patchwork affect of field division is visible in this photograph. This plan also highlights the differences between plans and actual historical development. Although Kay, Cracroft, Jackson and Smyly Streets continue to exist, they are no longer straight roads meeting at right angles as shown in this plan, nor does their actual location correspond closely to that depicted in 1851. Their historical development has evolved into winding country roads.

The northern plan dates from 1859 (p. 28). Of interest it describes the township as 'Huonfernlands' (later reinscribed as Franklin). The language of this name (fernlands) is consistent with contemporary reports of the landscape as marshes and swamps.[43] This plan indicates what probably became the Main Road. River Street is shown in this approximate location running parallel to the River. Leading off River Street is a series of roads which correspond to the present New Road, Coleman Street and Church Street. Between these streets the land has been subdivided into town plots. Several structures are also included, as is the Glebe in the current location of St Johns, although no Church structure is shown. Of note a school reserve is depicted in the approximate location of the current Primary School.

The earliest found plan of the township itself dates from 1918 (see *Town of Franklin* p.29) depicting Franklin from south of Walpole Lane to north of New Road. The extensions of the side streets are not shown. The current townscape character of Franklin is largely consistent with this plan. The town is centred on the Main Road in a linear fashion running parallel to the Huon River. Many of the buildings shown in this plan exist today. As represented on this plan, most buildings in Franklin, as throughout the Huon are constructed from weatherboard, with masonry structures relatively uncommon.[44] Where brick and stone did emerge, it was commonly used for public or civic buildings. Most development is concentrated on the northern side of the Main Road. Residential and commercial buildings are commonly shown as having little set back from the Main Road. A total of twenty-seven commercial, public or civic buildings are depicted. There is no strong division between commercial and residential areas.

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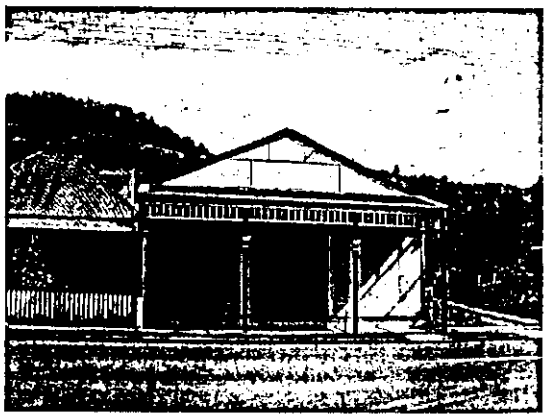
[41] *Ibid.*, pp. 46, 74
[42] Gulson, *op. cit.*, p. 11, *Franklin Primary School, op. cit.*, p. 7
[43] *Ibid*, p. 10
[44] Jacob Allom Wade Architects, *op. cit.*, p. 9

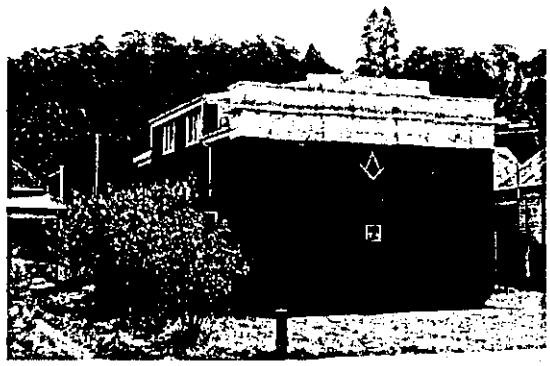
Of particular interest, in this section of the town six jetties are drawn. Three of these are small jetties, while the remainder are larger structures with buildings constructed on them. One belongs to the major store of Kennedy's Commercial Exchange, the other to the Federal Hotel and the third as an extension of New Street. The prevalence of these jetties indicates the heavy reliance on water transport. The riverbanks were known for their marshy, unpredictable nature. Transport by boat was more reliable than tackling the mudflats. Establishing an early 'corduroy' road (saplings layed in the mud) was an essential priority. The track along the shore was frequently a boggy quagmire with particularly bad sections reinforced with these bundles of tea-tree. With the further development of the town, the road was improved, with the addition of sand and metal in 1883.[45]

Such a situation was not unique to Franklin. With poor, unreliable roads, water transport was prevalent throughout the south of the island. Prior to the construction of the jetties, boats were forced to anchor in the River with goods and people transported to shore via punts and barges. Due to the immediate swamps and mudflats on the shoreline, access to the town was achieved via a series of canals connecting the hard land with the River.[46]

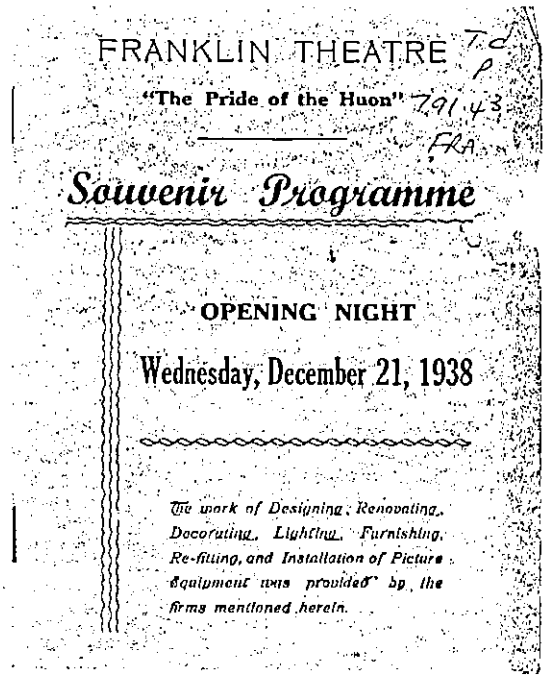
Many of the recognisable elements of Franklin date from the late nineteenth-century, a time when the town obtained a certain prosperity. Prior to the growth of Huonville, Franklin was the economic and administrative centre of the region, a result of the expansion of the timber and orchard industries. In a period of water based transport, Franklin was ideally located to take advantage of these emerging industries. With industry development and subsequent population growth, increasing services appeared. Several large stores operated to service the demands of the town as well as outlying settlements and farmers. Franklin became the commercial centre of the Huon with many shops, as well as banks, hotels, boarding houses, a jewellers, blacksmith, bakery, milliner, and for some time its own brewery. In 1904 the first bank in the Huon was established in Franklin. Franklin also distinguished itself from other Huon settlements for its footpaths and electric lighting – the first town in the Huon to do so.[47]

Figure 3: Social Development of Franklin (2003)





[45] Hammond, Rushton Nuss, *op. cit.*, p. 53
[46] Gulson, *op. cit.*, p. 11, Hammond, Rushton Nuss, *loc. cit.*
[47] *Ibid.*, Hammond, Rushton Nuss, *op. cit.*, pp. 54, 56-57, *Franklin Primary School, op. cit.*, pp. 20-21, C. Watson, *Full and Plenty. An Oral History of Apple Growing in the Huon Valley*, (Sandy Bay, 1987), p. 7


FRANKLIN THEATRE
"The Pride of the Huon"
Souvenir Programme
OPENING NIGHT
Wednesday, December 21, 1938
The work of Designing, Renovating, Decorating, Lighting, Furnishing, Re-fitting, and Installation of Picture Equipment was provided by the firms mentioned herein.

Above Left: Former shop shown on the 1918 plan as belonging to G Nichols.
Above Right: Masonic Lodge dedicated 27 November 1926 and a refined example of the Inter-War Free Classical Style.
Left: Souvenir Program from the opening night of the Franklin Theatre as a movie theatre.[48]

The above figures help demonstrate the former importance Franklin once enjoyed as a social and economic centre, well provided with shops and other services, community groups such as the Masons and cultural centres such as the Theatre, described as 'the Pride of the Huon'. Recently, the renovated Palais Theatre has reasserted its position as a cultural centre for the region.

Following the enactment of the *Franklin Lighting Act* 1913, Franklin became the first town in the Huon to have electricity made available. The initial supply came from a direct current taken from a water driver generator in New Road over Prices Creek where the electricity charged a bank of storage batteries. Initially the scheme was a great success with cheaply available electricity. In fact, such a success and so novel was the development, that for a period of time Franklin was lit twenty-four hours a day. The local provision of electricity lasted for thirteen years. It eventually became too expensive for the local council to supply such a small amount of power to a small population. In response, Franklin was connected to the state grid of the Hydro-Electric Department in 1926, with the Hydro taking complete charge of the service in 1930.[49]

The 1918 plan is also valuable for portraying the reclamation area. On the southern side of the Main Road less development is evident, although the land is divided into town blocks. Prior to the reclamation, the depiction of the high water mark shows the strong relationship which previously existed between the town centre and the River. The reclamation area includes later pencilled notes and diagrams of proposed roads and the esplanade. These diagrams correspond to Hayes Road and the other street accesses to the River.

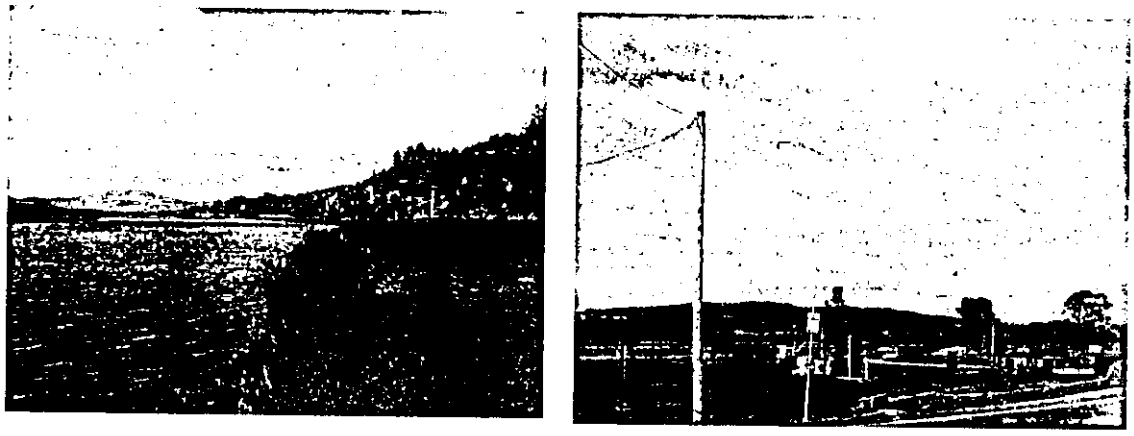
The reclamation of the mudflats in 1923 is perhaps the most significant twentieth-century development in Franklin. Reclaiming the mudflats endeavoured to improve river access and reassert the town's role as a deepwater port.[50] In January 1922, it was reported that:

> The Franklin reclamation work was designed seven years ago to provide much needed business and residential sites in the centre of the town of Franklin. When completed it will provide about 24 acres of land above the river level, and do away with an unsightly and useless swamp, most of which is under water at high tide. The cost of the work will be about 15, 000 pounds to which must be added the expenditure of 9, 000 pounds on sheath piling and dredging. The work also includes and improved system of drainage for the town of Franklin by means of reinforced concrete pipes.[51]

[48] *Franklin Theatre 'The Pride of the Huon'. Souvenir Programme Opening Night ,Wednesday, December 21 1931*, Tasmaniana Library, State Library of Tasmania
[49] Gulson, *op. cit.*, p. 12, Hammond, Rushton Nuss, *op. cit.*, pp. 68-69, *Franklin Primary School, op. cit.*, pp. 22, 25
[50] *Ibid., Franklin Primary School, op. cit.*, p. 21
[51] Hammond, Rushton Nuss, *op. cit.*, p. 71

A rail link with Hobart was even proposed. Through dredging, piling and filling the reclamation is without doubt the most striking development in the town. Undeniably these works altered the character of the town, removing the intimate relationship which had once existed with the Huon. Associated with these works was road widening and the proposed sale of waterside lots of land. With the need to widen the road, buildings from the lower side were demolished, again altering the 'tightness' of the town. However of great social benefit, the reclamation of the mudflats created large areas of public space and civic areas, such as the sports grounds and park. While the reclamation and associated works fragmented the town character, it has undeniably created a public asset of great value while adding a new dimension to the relationship with the River.

Figure 4: Reclaimed Land (2003)



The above images are of the area of reclaimed land. Above left shows the extent of the reclamation with the piles visible. The reclamation works are the most significant twentieth-century constructions to occur in Franklin. Although removing the close proximity between the town and the Huon, they have also created large and valuable areas of recreation space.

Other developments have had a negative impact on the townscape values of Franklin without obvious benefits. Road widening in the 1940s included the demolition of buildings on the Main Road. Further widening in the 1980s resulted in the loss of four more residences along the Main Road on the waterside, between New Road and Church Streets. Again this has altered the character of the town. The sense of a contained beginning/end of Franklin has been replaced by a more trailing effect.

The pivotal role Franklin played in the region was relatively short lived. The construction of a bridge over the River at Victoria (Huonville) in 1876 and the development of the more convenient shipping port at Port resulted in Franklin losing its once central role. A situation exacerbated when Franklin was absorbed into the new Huon municipality 1907.[52]

[52] Gulson, *op. cit.*, pp. 12-13, Hammond, Rushton Nuss, *op. cit.*, pp. 38, 75

Heritage Precinct

The call for Franklin to be declared a Heritage Precinct is not a new concern. As early as 1978, a National Trust urban areas study identified Franklin as a town worthy of being recorded by the Trust. The study continued that the need to do so was urgent with unsympathetic intrusions threatening the character of the town.[53]

Since this time other studies of Franklin and the Huon have made similar recommendations.[54] In the mean time works have occurred which have damaged the tight, contained form of Franklin. The need for townscape protection is no less urgent.

Recognition and protection of townscape values aims at identifying those character elements important to Franklin as a town. A Heritage Precinct is recommended as the appropriate means of conserving these elements. The Precinct consists of a collection of individual places and streetscapes which help demonstrate the history of Franklin where the combined presence of fairly consistent building forms creates a sense of identity for Franklin. The recommended Franklin Heritage Precinct contains places already entered on heritage lists, new nominations from this study, places of local heritage significance and other places not having heritage significance. Of note, the Franklin Heritage Precinct contains large areas of open space which have social, aesthetic and historic importance. An indicative sketch plan of the Heritage Precinct is included on page 26.

Proposed Boundaries of the Heritage Precinct

Fortunately Franklin's compact size makes delineating the boundaries of a Heritage Precinct relatively easy. Previous studies[55] have advocated similar areas and it is recommended that these are appropriate. Exact references should form part of any declaration of a Precinct. The two religious centres mark the northern and southern boundaries of the Precinct. To the north, St John's Church provides an historic entry to the town, physically accentuated by Price's Creek. At the southern end, St Mary's including the convent and presbytery creates a similarly important boundary and symmetry between the margins of the town. Further development along the Highway at the southern and northern boundaries of the Heritage Precinct should be carefully monitored. The northern end no longer exhibits a strong containment for Franklin where the compact, contained nature of the town has been eroded. Road widening in the 1980s at the northern entrance resulted in the demolition of a group of houses on the riverside which balanced against St John's. These works have blurred what was once a clear entrance to the town by, replacing the former tightness of the town form with a straggling entrance. If possible this entrance should be repaired. The southern end more effectively demonstrates the historical development of Franklin and future development which blurs this aspect should be discouraged.

The eastern boundary is clearly defined by the Huon River. The role of the River cannot be undervalued and its important visual, historic and social values should be respected. The relationship between the water and land are important character elements. The character of the riverbanks is largely that of soft, open public space of parklands and the recreation ground and other sport facilities. Development which encroaches on these roles should be excluded. Existing valuable views from Main Road to the River should be maintained.

The western boundary is perhaps the most difficult to define. One of the key aspects of Franklin's character is the interrelationship between built and natural elements. To the east is the Huon River. On the west, hills rise above the town. These hills provide a very aesthetic backdrop for the town with a combination of fields, orchards, native vegetation and sporadic farm buildings. This rural character should be retained.

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[53] K. Latona, *Tasmanian Urban Areas Study*, the National Trust of Australia (Tasmania), July 1978, p. 29
[54] Jacob Allom Wade Architects, *op. cit.*, p. 11-16, Gulson, *op. cit.*, pp. 16-24
[55] Latona, *Tasmanian Urban Areas Study*, p. 29, Jacob Allom Wade Architects, *op. cit.*, p. 11-16, Gulson, *op. cit.*, pp. 16-24

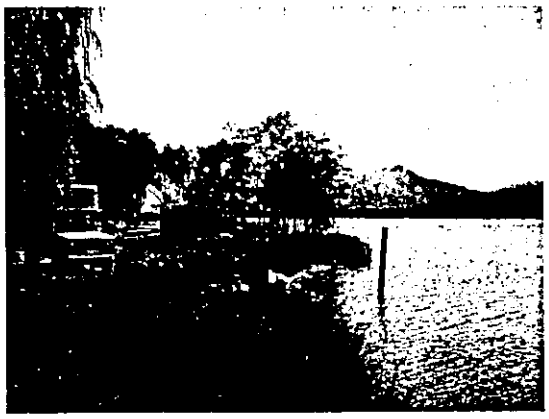
There are two possible solutions to defining the western boundary. Firstly, and more easily applied would be to take the western Heritage Precinct boundary as the relevant area marked 'Intensive Rural' on the *Huon Valley Planning Scheme 1979* map of Franklin. Conversely, the western boundary can be taken from the low point of Main Road up to the skyline. Irrespective of which method is used, the western area should retain its rural character.

Figure 5: Proposed Boundaries of Heritage Precinct (2003)

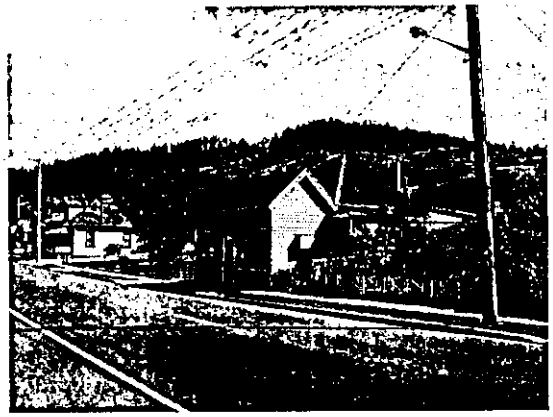




St John's and St Mary's Church complexes are recommended as being the northern and southern boundaries of the Heritage Precinct.



The River and the river edge bordered by parklands and open space is an important character element of Franklin and the eastern boundary to the Heritage Precinct.



The western boundary to the Heritage Precinct is recommended as the hills above the town. The combinations of fields, orchards and native forest are important character elements of the town.

Townscape Values

General

A common misconception regarding new development on heritage sites or areas is that 'historic' reproduction is required. Such a view often results in inappropriate historical revival or poorly designed buildings. Contemporary design is not inconsistent with heritage buildings. Well-conceived buildings should take into regard their setting. In Heritage Precincts, this may mean awareness of scale, materials, setback and roof form. It does not mean revivalism.

In recognising the distinctive townscape values of Franklin, a Heritage Precinct aims at protecting the character elements, with particular emphasis on streetscapes and open areas which have important social, historic or landscape values. Various factors contribute to these townscape character elements:

- The predominance of weatherboard residential and commercial structures, many with gabled roof forms, often in a simplified Gothic style.
- The mixed commercial and residential nature of Main Road

- The substantial public and civic buildings
- The relationship between the town and the Huon River
- The public, open spaces predominantly found in the area of reclaimed land beside the River
- The important backdrop of fields, orchards and native forests
- The narrow side streets

This list may not be exclusive. However it does indicate the core factors which add to Franklin's character appeal.

Private commercial and industrial use is found on the riverside of Main Road, key examples being the wooden boat building complex and Franklin Evaporators. Although these sites may not have easily recognised aesthetic qualities, their existence is nonetheless important. Franklin has from its earliest origins had industrial and commercial elements centred on the River, the main means of transport. A Heritage Precinct should not be an excuse for revisionism of Franklin's history. Not only is it historically irresponsible, but it detracts from the reality and character of the town, in effect resulting in a set piece.

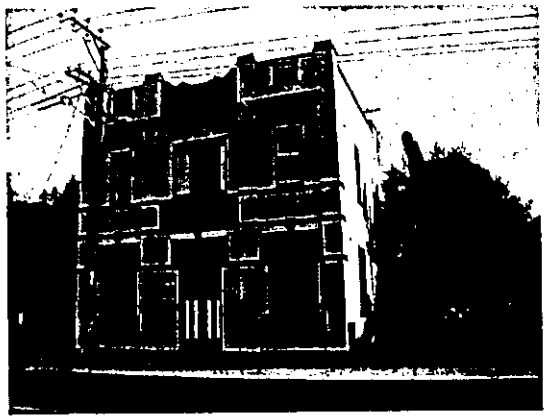
An important feature of Franklin is the extensive use of timber in residential and commercial buildings. Many of these buildings are of a single storey and date from the late-Victorian/Federation period, creating relatively intact streetscapes. The use of weatherboard is an important character element of the town indicating the historic role of forestry in Franklin and the greater Huon. This use should be encouraged to continue.

In contrast to the use of timber, Franklin has several fine public or civic buildings constructed from brick and some of two-storeys. Examples include two of the churches, the Palais Theatre, the former Bank and the Masonic Lodge. Such buildings indicate the historic importance of Franklin as a commercial and civic centre for the Huon.

Figure 6: Building Forms in Franklin (2003)



A fine example of a Victorian Rustic Gothic residence. This style of domestic building is common in Franklin where Gothic elements are reduced to a vernacular idiom with weatherboard construction, steeply pitched gabled roofs, and often elaborate bargeboards and other decorative elements.



This former bank is constructed in the Federation Free Style and is one of several important civic buildings constructed during a time when Franklin was the centre of the Huon.

Streetscape Values: Main Road

Within the boundaries of the Precinct, it is important that the streetscapes themselves are recognised for their significance. Town planning and the evolution of Franklin has largely occurred in a linear fashion, parallel to the River and concentrated on Main Road. The Main Road has historically developed with mixed commercial and residential uses. This varied land use should be encouraged to continue in demonstrating the historic evolution of the

town. Such patterns of development are reflected in Planning Scheme where Business-Commercial places are interspersed with Closed Residential.

Likewise, the Main Road includes a variety of architectural styles for both public and domestic architecture. The Main Road clearly demonstrates the evolution in planning and design practices. Nineteenth and early twentieth-century developments predominantly have very little setback from the road, while later Inter-War houses demonstrate more generous setback. Appropriate future developments should take into consideration the setback of the streetscape in that particular area.

Opportunity certainly exists for future built development on Main Road, concentrating in the area between Walpole Lane and New Road. The reclamation of the mudflats and later road works has degraded what was once a highly contained town. Further devolution of this streetscape should be discouraged, and where possible repaired. The important relationship between the River and the town in terms of vistas and public spaces should be protected.

Figure 7: Main Road (2003)



The Main Road is an important streetscape for Franklin. Although no longer exhibiting the tightness of form it once had, these values should be protected. Flexibility for future development exists along the Main Road with the continuation of mixed residential and commercial land use.

Streetscape Values: Side Streets

Beyond the Main Road, the side streets are important townscape elements and refer back to early planning patterns as seen in the town plans. Of note, Walpole and Temperance Lanes have great aesthetic appeal. These narrow lanes have built development concentrated near their entrances to Main Road. Building practices in the lanes have houses sited with very little set back from the road creating a sense of uniformity and containment. Such patterns should be maintained. Beyond the immediate housing concentration, these lanes continue to be identifiable as early rural roads. Important vistas are also gained looking down towards the River, while the winding nature of Walpole Lane helps create an element of surprise and anticipation. Gulson also cites the local history that Walpole Lane was originally a track used by the Aborigines.[56]

[56] Gulson, *op. cit.*, p. 11

Figure 8: Side Streets (2003)



Walpole Lane with its concentration of similar house forms at the start of the lane is an important streetscape. Beyond these houses, the character changes dramatically from residential to rural. Anticipation is created by the slight bend, while hawthorn hedgerows and willows conceal orchards. This vegetation has both aesthetic and historic importance.

The strong rural character of these lanes is intensified by the presence of vegetation. In Walpole Lane, hawthorn hedgerows and willows provide a soft, aesthetic border for the street. Hawthorn hedgerows also have historic importance, in addition to their landscape values. Hawthorn was brought to Van Diemen's Land in the 1820s and used extensively as boundary markers and for delineating fields. If a farmer neglected to grow hedgerows, the effect could be damage to both pastures and stock. Hedgerows altered the enclosed environment of the protected area by raising the temperature and humidity, whilst reducing extremes in temperature. However, hedgerows also involved considerable work with between 8000 to 10 500 plants required for a mile of hedge.[57]

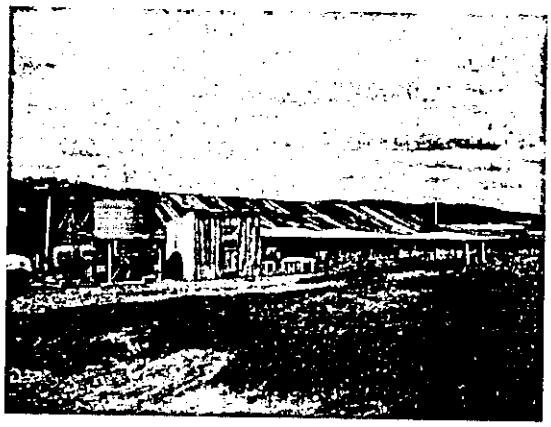
In other places, the streets are bordered by orchards and open paddocks. These elements should be conserved. The rural elements impart strong division between the rural and residential areas of Franklin and any development should be carefully monitored to ensure that it does not unduly affect the character.

[57] S. Morgan, *Land Settlement in Early Tasmania. Creating an Antipodean England*, (Cambridge, 1992), pp. 19, 95-96, 155

Figure 9: Rural Roads (2003)







Temperance Lane (above left), Old Road (above) and New Road (left). These narrow roads present a different atmosphere to that of Walpole Lane with its sense of containment. These open roads enforce the rural nature of the town and region, with the prominent presence of orchards. A strong interrelationship exists between farm buildings; the natural elements of river, mountains and forests; and, the organically evolved landscape of fields and orchards. Picturesque views are taken overlooking the town.

Recommendations

The following recommendations are made to the Huon Valley Council with regards to the declaration of a Heritage Precinct:

1. That the Huon Valley Council support an amendment of the *Huon Planning Scheme 1979* to incorporate a Heritage Precinct for Franklin which recognises and aims to conserve the heritage values of Franklin.
2. That the general area of the Heritage Precinct should be that shown on the Indicative Sketch Plan (p. 26) and that precise definition should be part of the amendment process.
3. That those places already entered in the Tasmanian Heritage Register, or those nominated as part of this study are retained or modified appropriately to the approval of the Huon Valley and Tasmanian Heritage Councils.
4. Modification of those places identified as having Local Heritage Significance should occur within the context of their contribution to the streetscape and broader Heritage Precinct.
5. Encouragement should be given to the modification of those places which detract from the character elements of Franklin.
6. That future development within the Heritage Precinct is sympathetic with the character elements of the town. Specifically:

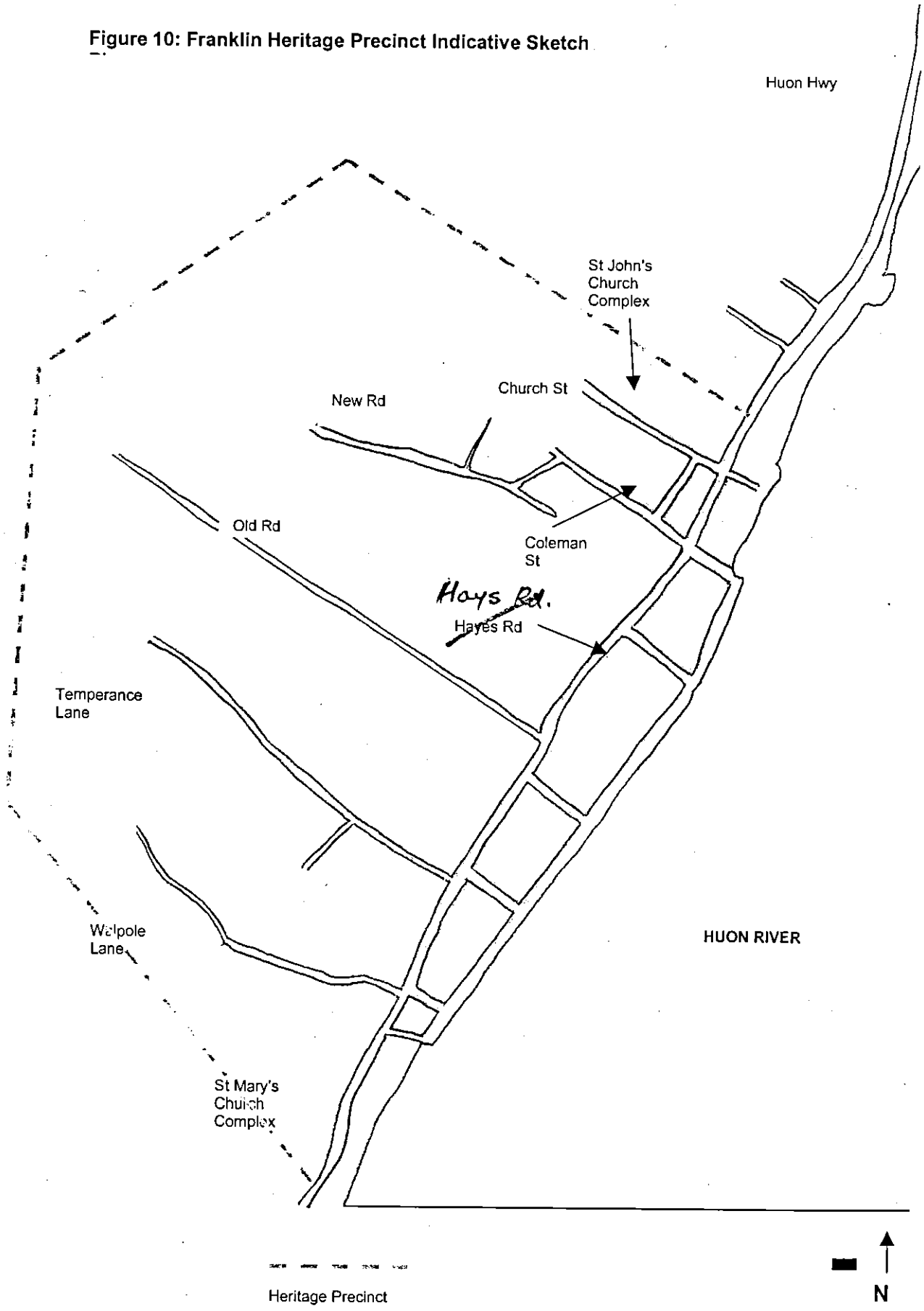
    i.) *Appropriate roof form and roof materials.* Franklin has many buildings with gabled roof forms, often in a rustic or vernacular Gothic style. Corrugated iron is the predominant choice of roof material.

    ii.) *Appropriate building materials.* The use of weatherboard as a construction material is a dominant and important historical theme for Franklin and its continued use should be encouraged. The exception being Franklin's fine group of public or civic buildings, many of which are constructed from brick and of two storeys.

iii.) *Appropriate building form.* In designing new buildings within the Heritage Precinct, reference should be made to their streetscape affect. This is often a question of scale, setback and the location of outbuildings and other structures.

iv.) *Appropriate building location.* Important character elements of Franklin are the open spaces on the riverside; the rural backdrop of the town; and the important vistas of both the hills and the River. Development that obscures these elements and vistas should be discouraged.

Figure 10: Franklin Heritage Precinct Indicative Sketch



1.

Figure 11: ***Township of Franklin***, 1851, F/12, 89071

89071

89071

F
21

FRANKLIN

Figure 12: *Plan of Valuable Allotments in the Township of Huonfernlands (sic Franklin), 1859, F/20, 89070*

PLAN

OF VALUABLE ALLOTMENTS

IN THE

TOWNSHIP OF HUDNFERSLANDS

TO BE SOLD BY PUBLIC AUCTION

IN

MARTINBURGH

AT THE MART FRANKLINHUON ON THE [redacted] 1852

15th OF OCTOBER



20070

Figure 13: *Town of Franklin*, 1918, F/24B, 89074

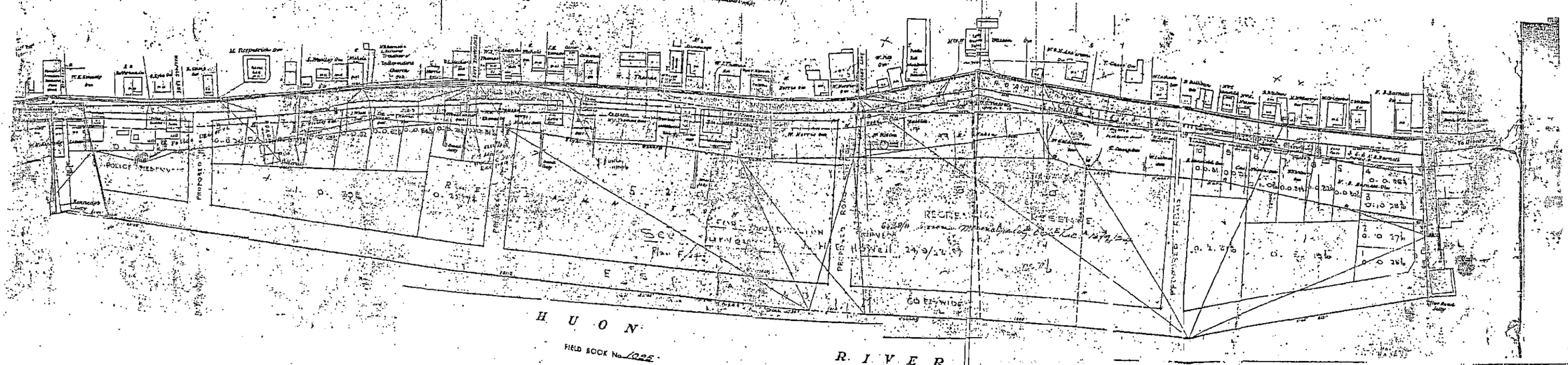
TOWN OF FRANKLIN

PLAN SHOWING HIGH WATER MARK, CROWN RESERVATION, AND PROPOSED RECLAMATION AREA

Scale-100 links to an inch

AREAS

Between H.W.M. and Sheet biling 10 Acres.
Between H.W.M and Main Road 53 -
Total including 0·5·h private property 163 Acres



80874

8907

The Heritage Listing of Places in Franklin

The Register of the National Estate and the Tasmanian Heritage Register

The revised brief for the *Franklin Heritage Study* has altered the previous focus from nomination of places to the Register of the National Estate (RNE) to nomination of places to the Tasmanian Heritage Register.

This change has come about because of amendments to the Commonwealth heritage regime. The RNE currently has more than 12, 000 places of natural, indigenous and historic significance listed on it. However listing on the RNE provides these places relatively little legislative protection. An acknowledged flaw of the RNE is that greater protection is offered via state registers.[58]

The Commonwealth is in the process of reforming its heritage system. In 2002 three Bills were introduced to Parliament to amend the *Environment Protection and Biodiversity Conservation Act 1999* with the purposes of identifying, conserving and protecting places of national heritage significance; providing for the management of Commonwealth heritage places and the establishment of the Australian Heritage Council. This new regime will function through a list of places of national heritage significance; the establishment of a Commonwealth Heritage List; and, the creation of the Australian Heritage Council. The new Council will act as an independent expert body to advise the Minister for the Environment and Heritage on the listing and protection of heritage places. These Bills have recently passed the Senate, although they are yet to come into force.[59]

The Australian Heritage Council will replace the Australian Heritage Commission as the Commonwealth heritage body. The new National Heritage List will comprise places or groups of places, that are of outstanding significance to the nation. The Australian Heritage Council, will assess nominated places against the listing criteria and the Minister will make the final decision on their entry.[60]

The RNE will be largely superseded by the new National Heritage List. Although the RNE will continue in a modified form, its focus will be directed at public education and the promotion of heritage conservation generally.[61]

Because of these planned amendments and to allow for the *Franklin Heritage Study* to have actual results, the focus has been changed from the RNE to the Tasmanian Heritage Register.

The Tasmanian Heritage Register

The *Historic Cultural Heritage Act 1995* (the Act) aims to promote the identification, assessment, protection and conservation of places having historic cultural heritage significance and to establish the Tasmanian Heritage Council. In pursuing these aims, the Act establishes the Tasmanian Heritage Register (Part 4). Places may be entered in the Heritage Register if a place is of 'historic cultural heritage significance'. This is defined in relation to a place as significance to any group or community in relation the archaeological, architectural, cultural, historical, scientific, social or technical value of the place.

In determining whether a place has historic cultural heritage significance, a place must meet one or more of the following criteria (s.16):

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[58] R. Hill, 'A New Heritage Protection System for the 21st Century' August 23, 2000, at: http://www/environment.gov.au/minister/env/2000/sp23aug00.html, p. 2

[59] 'Commission's role in development of new heritage laws', http://www.ahc.gov.au/infores/publications/newheritage.html

[60] 'Proposed New Commonwealth Heritage Regime', http://www/ea/gov.au/heritage/law/heritageact/background.html, 'Heritage laws: overview', http://www/ea/gov.au/heritage/law/heritageact/index/html

[61] 'Proposed New Commonwealth Heritage Regime'

(a) it is important in demonstrating the evolution or pattern of Tasmania's history (**evolutional pattern**);
(b) it demonstrates rare, uncommon or endangered aspects of Tasmania's heritage (**rarity**);
(c) it has the potential to yield information that will contribute to an understanding of Tasmania's history (**research potential**);
(d) it is important as a representative in demonstrating the characteristics of a broader class of cultural places (**representative of**);
(e) it is important in demonstrating a high degree of creative or technical achievement (**creative or technical**);
(f) it has strong or special meaning for any group or community because of social, cultural or spiritual associations (**community**);
(g) it has special association with the life or work of a person, a group or an organisation that was important in Tasmania's history (**association**).

The Act does not provide further explanatory material in considering how to apply these criteria. In preparing nominations of individual places in Franklin, most data-sheets were assessed against criteria d (representative of) and f (community). Several data-sheets included criteria a (evolutional pattern), c (research potential), and g (association). The following may be of assistance in understanding these criteria.

Key Criteria Used in Data-Sheets

(d) Representative Of
These places are representative in clearly demonstrating the principal characteristics of the range of human activities in the Tasmanian environment including way of life, custom, process, land-use, function, design or technique. To satisfy this criterion, the place should represent the principal characteristics of its class or show variation, evolution or transition which occurs within the class over time.[62]

In determining whether a place demonstrates a particular class of particular use, Apperly *et. al* in his well respected *A Pictorial Guide to Identifying Australian Architecture* has been used. This thorough work provides a detailed history of Australian architecture from 1788 to the present, breaking up this time into periods, and these inturn into set styles. Apperly provides comprehensive statements as the background, broad characteristics, style indicators and historical context.[63]

Although attempt has been made to classify buildings in Franklin according to set styles as noted in Apperly, it is acknowledged that many buildings are the result of a combination of various styles from different periods of architectural design. Where an architectural style is noted, it refers to the ability of a building to most closely resemble the established forms. The style referred to does not necessarily determine the date of construction. It is true that in Franklin, as in other rural areas, certain building forms and styles were adopted and used for longer periods than may of existed in more populated locations. It is also evident that often a building may not strictly fall into one of the set architectural style forms. In rural areas a rustic, or vernacular style demonstrating simplified forms is common. Where a building does not represent clearly the characteristics of its class, it has not been listed according to this criterion.

(f) Community
These places are significant because they are valued by the community for reasons of religious, spiritual, symbolic, cultural, education or social associations. This community attachment must be demonstrable, often it will be of a religious, social, scientific or recreational nature.

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[62] *Criteria for the Tasmanian Heritage Register. Application Guidelines*, Tasmanian Heritage Council, Version 4, 1999, pp. 6-7
[63] Apperly, R, Irving, R, Reynolds, P, *A Pictorial Guide to Identifying Australian Architecture. Styles and Terms from 1788 to the Present*, Sydney: Angus & Robertson, 1999, *passim*

This criterion has been used in two ways. Firstly it has been applied in recognition of a places contribution and importance to the landscape, townscape or streetscape. This inturn contributes to the community's sense of place or community.[64]

Secondly, community values have been recognised where a place has clear social value. Because original community consultation was beyond the brief of this study, this criterion has also been applied to those places which have clear community or civic use and value. For example the cemeteries, war memorials and the Primary School.

Other Criteria Used in Data-Sheets

(a) Evolutional Pattern
These places are important because they have associations with events, social patterns, developments or cultural phases which demonstrate a role in the human occupation and evolution of the State, region or community. This criterion applies where the contribution of an event, development or phase to the broad patterns of Tasmanian history can be clearly demonstrated, or where the place epitomises elements of those patterns. For example a place which have importance in demonstrating:

- the history of settlement
- the development of industries and enterprises
- changing economy, land use, political structures, social behaviour or intellectual developments.[65]

(c) Research Potential
This criterion is used where a place may yield information that will contribute to a wider understanding of the history of non-Indigenous occupation of Tasmania. This information may provide a new or original contribution to the information about the place or may corroborate other sources of information. Places with a strong presumption of research potential may fall within one of several fields, commonly in archaeology, architecture, engineering, and history.

In this heritage study, two cemeteries were identified for their research potential of an archaeological nature. This potential exists where the place is likely to contain material evidence of technological, architectural, cultural or scientific value. Cemeteries may contribute archaeological information because they are often highly intact places, containing physical evidence that demonstrates important aspects of our past. This may also apply where there is no or little above ground evidence of the cemetery.[66]

(g) Association
The association criterion is applicable where an individual or group played an important role in a facet of the life of the state such as the arts, sciences, politics or public life. The life of this person should be tangible. The length of the association between the individual or group with that place is also important. The degree of significance will increase the longer the period of association, as too, the extent to which this association has affected the fabric of the place. This criterion has been used in relation to the Jackson Point Catholic Cemetery which contains the monument and remains of its founder, Father John Murphy.[67]

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[64] *Criteria for the Tasmanian Heritage Register*, pp. 7-9
[65] *Ibid.*, pp. 2-3
[66] *Ibid.*, pp. 5-6
[67] *Ibid.*, pp. 10-11

Summary of Places Previously Entered in the Tasmanian Heritage Register

The following table details the 44 Franklin places already entered in the Tasmanian Heritage Register or those which had been nominated prior to the *Franklin Heritage Study*.

Table 1: Places already noted on the Tasmanian Heritage Register

File No.	Property Name	Address	Image
R3002	Former Uniting Church and Hall	Huon Highway	
R3003	House	171 Braeside Road	
R3004	House (Crosby)	Church Street	
R3005	House	10 Church Street	
R3006	House	RA 3049 Huon Highway	
R3007	House	RA 3082 Huon Highway	
R3008	House (Hanson)	Huon Highway	
R3009	House	RA 3501 Huon Highway	

R3010	St. Mary's Convent and School	Main Road	
R3011	St. Mary's Church	Main Road	
R3012	St. Mary's Presbytery	Main Road	
R3013	House (Roberts)	Main Road	
R3014	Franklin Lodge	Main Road	
R3015	Hall	Main Road	
R3016	Franklin Tavern	Main Road	
R3017	House (Salmon)	Main Road	
R3018	House (Salmon AandH)	Main Road	
R3019	Commercial Retail (Crowe)	Main Road	

R3020	Former Palais Theatre	Main Road	
R3021	House (Yeates)	Main Road	
R3022	House (Harrison)	Main Road	
R3023	House	3480 Main Road	
R3024	House	RA 2458 Main Road	
C3030	House (Gadd)	Huon Highway	
R3031	House (Ingham)	Huon Highway	
C3032	House	Huon Highway	
R3033	House	10 Kay Street	
R3034	House	3686 Huon Highway	
R3035	House	RA 3826 Huon Highway	

R3036	House (Moore)	Huon Highway and Church Street	
R3037	St. John's Anglican Church Hall	Huon Highway	
R3038	Former Bank - Bowmont Centre	Huon Highway and New Road	
R3039	St. John's Anglican Church	Huon Highway	
R3040	House	41 Jacksons Road	
R3042	House	RA 234 Jacksons Road	
R3043	House	97 Old Road	
R3044	House	RA97 Old Road	
R3045	House	RA 224 Swamp Road	
R3046	House	1 Swamp Road and Huon Highway	

R3047	House (Coghlan)	Temperance Lane	
R3048	House (Jenkins)	Temperance Lane	
R3049	House (Gadd)	Temperance Lane	
R3050	Hollywood House	Walpole Lane	
R6471	Former Bank	Huon Highway	

New Nominations to the Tasmanian Heritage Register

Following site surveys of Franklin, 53 data-sheets have been prepared. Of these, 27 are nominated for entry in the Tasmanian Heritage Register and 26 are submitted as having local heritage significance. It is acknowledged that previous heritage surveys have identified many of Franklin's fine heritage buildings. This Study has also included assessments of important twentieth-century structures and places of local heritage significance.

Local Heritage Significance

A distinction has been made between those places having heritage significance capable of entry in the Tasmanian Heritage Register, and those places having only local heritage significance. It is recommended that those places meeting the criteria of the *Historic Cultural Heritage Act 1995* be entered in the Tasmanian Heritage Register.

It is submitted that those places having local heritage significance do not meet the criteria provided in the Act. This may be because they have been substantially and unsympathetically modified or have no discernible architectural or design merit. The following prepared data-sheets note this status with 'Local Heritage Significance Only' and 'Statement of Local Heritage Significance'. Nonetheless, these places may have significance to the local community. Often, their importance is one of contribution to a streetscape as opposed to individual value. The local community and Huon Valley Council are best placed to determine future management and planning decisions for these places of local significance. Given the townscape values of Franklin, it is important that those places of local heritage significance are recognised.

Recommendations

1. That the Tasmanian Heritage Council consider the nomination of the following 27 places for entry in the Tasmanian Heritage Register.
2. That the Huon Valley Council in conjunction with the local community determines what management is required of places of local heritage significance.

Summary of Identified Places

The following table details the 27 Franklin places recommended for entry in the Tasmanian Heritage Register.

Table 2: Places Recommended for entry in the Tasmanian Heritage Register

File No.	Property Name	Address	Image
10280	House	Huon Highway Franklin	
10281	Franklin Masonic Hall	Huon Highway Franklin	
10283	House	Huon Highway Franklin	
10284	House	Huon Highway Franklin	
10289	House	Huon Highway Franklin	
10286	War Memorials	Huon Highway Franklin	
10287	Huondene	Huon Highway Franklin	
10288	House	Huon Highway Franklin	
10290	Post Office	Huon Highway Franklin	
10291	House	Huon Highway Franklin	

10292	Franklin Lolly Shop & Residence	Huon Highway Franklin	
10293	Wisbey	Huon Highway Franklin	
10294	Shop	Huon Highway Franklin	
3496	House	Huon Highway Franklin	
10295	House	Huon Highway Franklin	
10296	Former Kennedy's Residence	Huon Highway Franklin	
10297	Windsor Farm	RA 3520 Huon Highway Franklin	
10299	House	RA 3554 Huon Highway Franklin	
10300	House	RA 3586 Huon Highway Franklin	
10301	Jackson's Point Catholic Cemetery	Jacksons Road, Franklin	
10302	Congregational Cemetery	Maxfields Road, Franklin	
10303	House	Coleman Street, Franklin	

10304	House	Coleman Street, Franklin	
10305	Franklin Primary School	RA 10 New Road Franklin	
10306	House	RA 24 Old Road Franklin	
10309	House	Walpole Lane Franklin	
10310	House	Walpole Lane Franklin	

The following table details the 26 Franklin places recommended as having Local Heritage Significance Only.

Table 3: Places Recommended as having Local Heritage Significance Only

File No.	Property Name	Address	Image
1	House	3312 Huon Highway Franklin	
3	House	Huon Highway Franklin	
4	House	Huon Highway Franklin	
6	Blinkbonnie	Huon Highway Franklin	
10	House	Huon Highway Franklin	

11	Former Commercial & Residence	RA 3362 Huon Highway Franklin	
12	House	Huon Highway Franklin	
16	Former Cupits Truck Shop	Huon Highway Franklin	
17	House	Huon Highway Franklin	
19	Commercial & Residential Building	Huon Highway Franklin	
21	Franklin Grill	Huon Highway Franklin	
23	Aqua Grill	Temperance Lane (Huon Highway) Franklin	
24	Terry's Toys & Residence	Huon Highway Franklin	
26	House	Huon Highway Franklin	
31	House	3515 Huon Highway Franklin	
33	House	RA 3482 Huon Highway Franklin	
40	House	Corner New Road and Coleman Street Franklin	

41	House	2 New Road Franklin	
43	House	RA 20 New Road Franklin	
44	House	RA 33 New Road Franklin	
45	House	RA 44 New Road Franklin	
46	House	RA 12 Old Road Franklin	
48	House	Hayes Road (Huon Highway) Franklin	
49	House	Temperance Lane Franklin	
50	House	Temperance Lane Franklin	
53	House	Walpole Lane Franklin	

Prepared Data-Sheets

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 1 **Property Name:** House

Address: 3312 Huon Highway Franklin

Architectural Style: Federation domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: At the northern entrance to Franklin, 3312 Huon Highway is situated on the upward slope and is an important element in the streetscape.

Known History:

Description: 3312 Huon Highway is a single storey Federation domestic residence of an 'L' shaped plan. The building is clad in weatherboard with a corrugated iron roof over hipped roof forms. The prominent flying gable includes bargeboards and a simple arrangement of timber infill. Below this is a square bay window of grouped casements with small panes above. The front door has both transom and sidelights. The opposite corner is mitred and the two casements with small panes above are set on this angle.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 2 **Property Name:** House
THR ID: 10280

Address: Huon Highway Franklin

Architectural Style: Inter-War California Bungalow

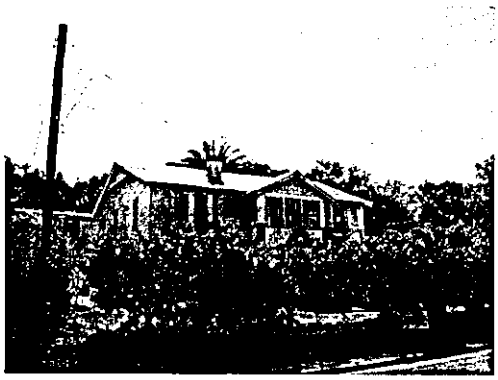
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: At the northern entrance to Franklin, this residence is situated on the upward slope and is an important element in the streetscape.

Known History: c.1930

Description: This residence is a single-storey Inter-War California Bungalow. Of a rectangular shaped plan the building is clad in weatherboard and has a gabled roof form enclosed in corrugated iron. It features a squat corbelled chimney. The overhanging eaves show the exposed roof timbers. The façade is symmetrically arranged around a central, projecting gable. This is enclosed in multiple small panes and supported by flat slab piers. Flanking on either side, are two faceted oriels of double hung sashes.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Inter-War California Bungalow. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 3 **Property Name:** House

Address: Huon Highway Franklin

Architectural Style: Federation domestic

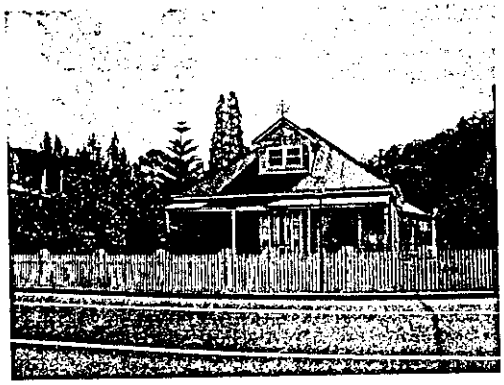
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

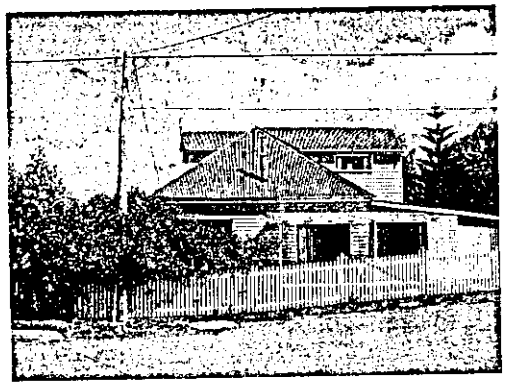
Setting: At the northern entrance to Franklin, this residence is close to the Main Road, and in conjunction with its neighbours is an important element in the streetscape.

Known History: c.1900

Description: This residence is a single storey Federation domestic residence with attic. Of a square plan design, the building is weatherboard with a steeply pitched pyramidal roof. An attic dormer is featured on the façade, and a modern extension continues this space to the rear of the building. The façade is symmetrically arranged around a central door with flanking, modern aluminium windows. Simple poles support a verandah under a separate roof. Extensions have been made to the rear of the property.

IMAGES





Integrity

This building has additions at various places.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 4 **Property Name:** House

Address: Huon Highway Franklin

Architectural Style: Federation domestic

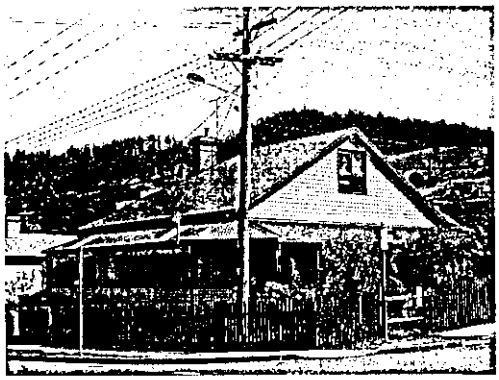
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

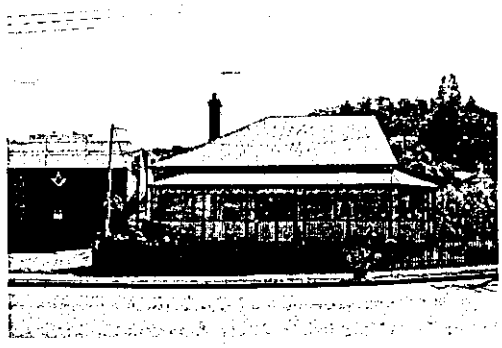
Setting: On the corner of Main Road and Church Street, this residence in conjunction with its neighbours is an important element in the streetscape.

Known History: c.1900

Description: This residence is a single storey Federation domestic building with attic. Of a rectangular plan design, the building is weatherboard with combination hipped and gable roof forms. A tall corbelled chimney is featured. An attic window is included on the side gable. On the lower level a verandah under a separate roof extends around both street fronts. Slender poles placed individually or grouped in pairs support this. The façade is symmetrically arranged around central doors with transom and sidelights flanked by double hung sash windows. Extensions have been made to the rear of the property.

IMAGES





Integrity

Predominantly intact with modified areas.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 5 **Property Name:** Franklin Masonic Hall
THR ID: 10281

Address: Huon Highway Franklin

Architectural Style: Inter-War Free Classical

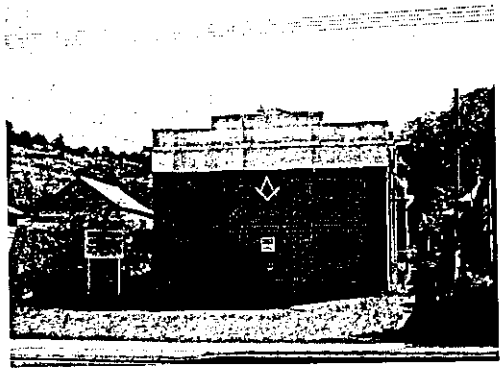
Floors: 1 **Roof:** Corrugated Iron **Walls:** Brick

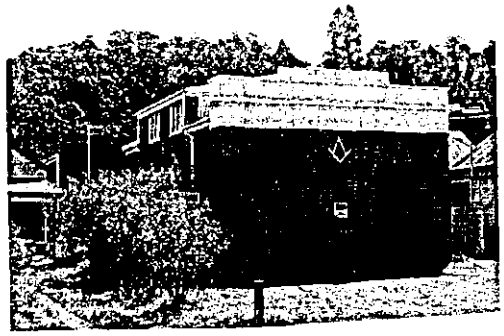
Setting: Setback from the Main Road, the Franklin Masonic Hall is an important element in the streetscape.

Known History: Dedicated on 27 November 1926

Description: The Franklin Masonic Hall is a single-storey brick, Inter-War Free Classical building. Of an overall simple and restrained style, it indicates the later stripped classical forms. On a rectangular plan design, the hipped roof form is concealed behind a large parapet and entablature. Strong contrasts are achieved between the deep red of the bricks and the white stucco. The façade is simply formed, and classical themes conveyed through thinly layered pilasters. Art Deco motifs are included in the stuccowork. Windows of multiple small panes are featured on the side of the building at the upper area.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey Inter-War Free Classical building. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 6 **Property Name:** Blinkbonnie

Address: Huon Highway Franklin

Architectural Style: Federation domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

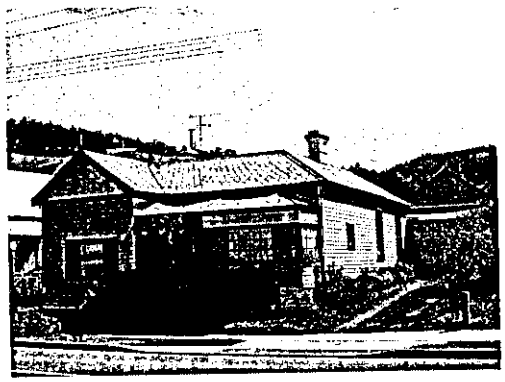
Setting: With little setback from the Main Road, Blinkbonnie is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1910

Description: Blinkbonnie is a single-storey Federation domestic residence. On an 'L' shaped plan, the building is clad in weatherboard with a corrugated iron hipped roof. Corbelled chimneys feature. The projecting gable features both carved bargeboards and pendant and finial. Beneath this is a casement of three large panes. To the side is a verandah. This has been enclosed with multiple small panes.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 7 **Property Name:** House
THR ID: 10283

Address: Huon Highway Franklin

Architectural Style: Federation Queen Anne

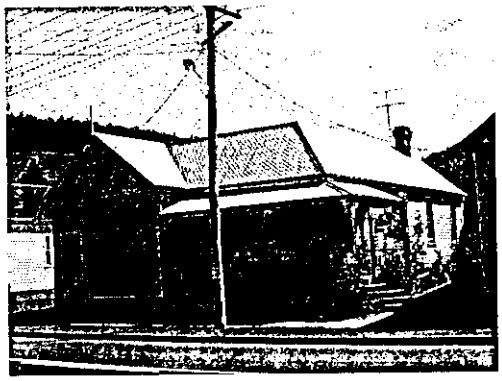
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With little setback from the Main Road, this residence is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1900

Description: This is a single-storey Federation Queen Anne residence on a rubble foundation. On an 'L' shaped plan, the building is clad in weatherboard with a steeply pitched corrugated iron hipped roof. A corbelled chimney features. The projecting gable features simple bargeboards and a finial. Beneath this are two double hung sashes. To the side is a verandah under a separate roof which partly extends around the corner of the house. Slender poles with a simple railing support this. Carved brackets are also included on the verandah.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Queen Anne building. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 8 **Property Name:** House
THR ID: 10284

Address: Huon Highway Franklin

Architectural Style: Federation Queen Anne

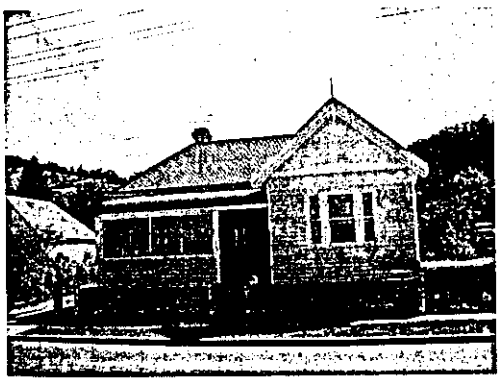
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

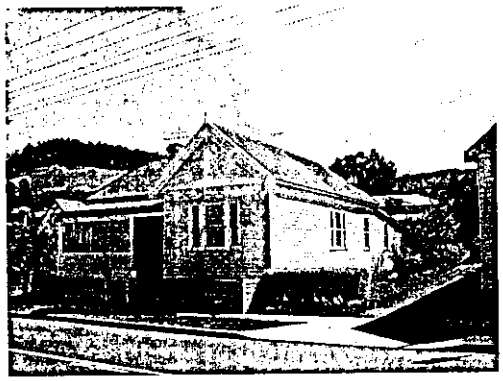
Setting: With little setback from the Main Road, this residence is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1911

Description: This is a single-storey Federation Queen Anne residence on an 'L' shaped plan. The residence is clad in weatherboard with a steeply pitched corrugated iron hipped roof. A corbelled chimney features. The projecting gable features elaborately carved bargeboards and a finial and pendant. Decorative brackets are included. Below this is a grouping of windows of a double hung sash flanked by two narrow casements. To the side is a verandah under a separate roof which has been enclosed with large panes. Double hung sashes are found on the side of the building.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Queen Anne building. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 9 **Property Name:** House
THR ID: 10289

Address: Huon Highway Franklin

Architectural Style: Inter-War California Bungalow

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Behind mature plantings, this residence contributes to the historic streetscape.

Known History:

Description: This is a single-storey Inter-War California bungalow residence of a rectangular plan design. The building is clad in weatherboard with a visually prominent gable roof form. It features a tall corbelled chimney. The façade includes a prominent street-facing gable providing a deep entrance. This inturn is supported by two slab-capped piles and slender poles.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Inter-War California bungalow. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 10 **Property Name:** House

Address: Huon Highway Franklin

Architectural Style: Inter-War domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Surrounded by mature plantings, this residence is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History:

Description: This is a single-storey Inter-War domestic residence on a rectangular shaped plan. The residence is clad in weatherboard with prominent gabled roof planes. It features simple chimneys with tapered ends. The projecting gable includes a bow window of narrow casements with small panes above. To the side is a decorative porthole window. Beneath the wide eaves of the main roof form is a ventilator grill. A mature palm tree features in the garden.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 11 **Property Name:** Former Commercial & Residence

Address: RA 3362 Huon Highway Franklin

Architectural Style: Inter-War commercial

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With no setback from the street, this building is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: The house to the rear dates from c.1870, while the shop dates from c.1920.

Description: This building is a combination of commercial and residential uses from the Victorian and later Inter-War periods. It can be described as two conjoined weatherboard buildings. The front commercial space is a building of narrow depth with a steeply pitched gabled roof. The façade is a simple symmetrical arrangement of a central door flanked by windows comprising of large casements with small panes above, including coloured glass. Immediately to the rear is the older residential section, comprising of a square plan building with a steeply pitched pyramidal roof. Double hung sashes feature on the side of the building. Skillion additions are found at the rear.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 12 **Property Name:** House

Address: Huon Highway Franklin

Architectural Style: Inter-War

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Set well back from the Main Road, this building is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1920

Description: This is a single-storey Inter-War residence of a square plan design. With its visually prominent low-pitched roof, it features tall corbelled chimneys. The façade is symmetrically arranged. The gable features a vertical timber infill. Below this is a projecting porch which replicates the lines of the main roof form including bargeboards. This is supported by slender poles with simple carved brackets and is enclosed by a shingle infill. Symmetrically flanking the porch are windows of grouped casements with smaller panes above.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 13 **Property Name:** War Memorials
THR ID: 10286

Address: Huon Highway, Franklin

Architectural Style: Inter and Post-War

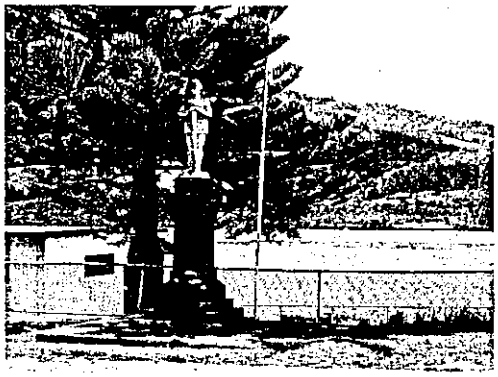
Floors: **Roof:** **Walls:**

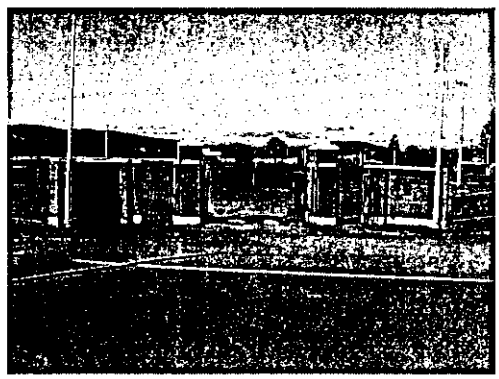
Setting: At either end of the Franklin sports ground, the War Memorials are important landmarks within Franklin.

Known History:

Description: These two War Memorials are located on the sports grounds at Franklin. The earlier is the World War One Memorial. This comprises of a granite base and plinth topped by a marble statue of a soldier in a slouch hat in a rest in arms position. Engravings note that the memorial was erected by the "people of Franklin in grateful remembrance of the brave men who died while serving". Two mature Norfolk Pines form part of the memorial. At the other end of the sports ground is a World War Two memorial. The memorials are distinct in their form and style. While the World War One tribute is in the form of a traditional statue, the World War Two Memorial takes the form of memorial gates. These simple structures have stylised Art Deco motifs with stepped pyramids, curved wall surfaces and contrasts between the brick and stucco. Two flagpoles flank either side of the gates while brass plates have been affixed commemorating the fallen.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

a.) Evolutional Pattern:

The War Memorials are of historic cultural heritage significance because they demonstrate Franklin's contribution to the World Wars within the broader historical themes of Federation and world events. They are also important because they show the evolution of memorial form and style and what this reflects about society.

f.) Community:

These monuments are of historic heritage significance because of their associations with Tasmanians who fought in the First and Second World Wars. These monuments are of high historic cultural heritage significance because they possess strong and special association with the general community as a cultural, historic and townscape landmark.

Survey Number: 14 **Property Name:** Huondene
THR ID: 10287

Address: Huon Highway Franklin

Architectural Style: Federation Queen Anne

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With little setback from the street, this building is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1900

Description: This is a single storey Federation Queen Anne residence on an 'L' shaped plan. The residence is clad in weatherboard with a steeply pitched corrugated iron hipped roof. A corbelled chimney features. The projecting gable features carved bargeboards and a finial and pendant. Below this is a single double hung sash. A large attic dormer is included on the façade, replicating the form of the main gable with bargeboards and finial. To the side is a verandah under a separate roof which is supported by simple poles enclosed by a wooden railing. Beneath the verandah is the front entrance with transom and sidelights flanked by double hung sashes. This window form is also found on the side of the building.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Queen Anne building. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 15 **Property Name:** House
THR ID: 10288

Address: Huon Highway Franklin

Architectural Style: Victorian Georgian

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: On an internal block, behind the later Huondene, this residence indicates earlier development practices and contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1860

Description: This is a single-storey Victorian Georgian cottage on a square shaped plan. This small residence demonstrates the simplicity of vernacular architecture of the nineteenth-century. The residence is clad in weatherboard with a steeply pitched hipped roof with tall, simple chimneys and close eaves. The façade is a symmetrical arrangement of twelve paned double hung sashes.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Victorian Georgian. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Victorian society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number:	16	**Property Name:**	Former Cupits Truck Shop
Address:	Huon Highway Franklin		
Architectural Style:	Federation & Post-War commercial		
Floors:	1	**Roof:**	Corrugated Iron
Walls:	Vertical Board		

Setting: Within a mixed commercial/residential area, the former Cupits Truck Shop is an important element in the in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: Was the former Cupit's Truck Shop. The main garage is a later structure, while the small commercial building is noted on a 1918 plan of Franklin (8907)

Description: This is a collection of two connected buildings from the turn of the twentieth-century and Post-War period. The earlier building is a small commercial structure of a simple square plan design. This building is set right on the street front. It consists of a vertical board shop under a medium pitched gabled roof. To the front is a simple verandah under a separate roof. This conceals large casements and the entrance. Large modern windows are found on the side. Recessed back from the street is the actual former truck stop. This Post-War building is constructed from vertical board with a gabled roof. A large gable projects from the main structure acting as an undercover shelter. To the side are large windows with evenly spaced glazing bars and a large sliding door allowing for vehicle access.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 17 **Property Name:** House

Address: Huon Highway Franklin

Architectural Style: Inter-War

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: On the corner of main and old roads, this residence contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History:

Description: This is a single-storey weatherboard Inter-War residence. Of a square plan design, the building is characterised by its wide, low gabled roof forms. The eaves extend widely with exposed roof timbers. Simple chimneys feature. The main roof form is replicated in the projecting gable which also repeats the simple taper-cut bargeboards. Beneath this is a verandah under a separate roof supported by slender poles with iron lace brackets. The carved railing has curvilinear motifs, reminiscent of the motifs of the Federation period. Double hung sashes feature throughout.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 18 **Property Name:** Post Office
THR ID: 10290

Address: Huon Highway Franklin

Architectural Style: Federation commercial

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With no setback, the Post Office contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1910 and noted on the 1918 plan (8907)

Description: The Franklin Post Office is a single-storey Federation commercial building and residence. Of a rectangular plan design, the residential section is weatherboard with a steeply pitched combination of hipped and gabled roof forms. The front section of the building is a later addition incorporated into the main building and is clad in weather and vertical boards. This includes large window areas with evenly placed glazing bars which are significant. To the side is a slightly recessed commercial area with similar window form.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 19 **Property Name:** Commercial & Residential building

Address: Huon Highway Franklin

Architectural Style: Victorian & Post War

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

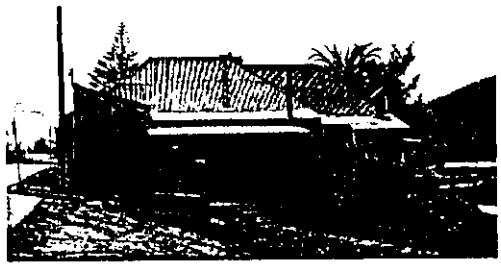
Setting: With no setback, this building compliments and contributes to the relatively intact late nineteenth and early twentieth-century streetscape.

Known History:

Description: This building is a single-storey Victorian structure. The façade section consists of a Post-War rectangular block with a skillion roof and arrangement of doors and large casements. This section conceals the original residence. The original house is a Victorian Georgian weatherboard residence with a medium pitched hipped roof.

IMAGES





Integrity

Predominantly intact with a modified front.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Victorian society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 20 **Property Name:** House
THR ID: 10291

Address: Huon Highway Franklin

Architectural Style: Federation Queen Anne

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Setback from the Main Road, this residence contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1900

Description: This is a single-storey Federation Queen Anne residence on an 'L' shaped plan. The residence is clad in weatherboard with a steeply pitched corrugated iron hipped roof. Corbelled chimneys feature. The projecting gable includes elaborately carved bargeboards and a finial and pendant. Below this is a grouping of windows of a double hung sash flanked by two narrow casements. To the side is a verandah under a separate roof which has been enclosed at one end. Slender poles featuring iron brackets and railings support the verandah. To the side is the front entrance surrounded by transom and sidelights. Double hung sashes are found on the side of the building.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Queen Anne building. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 21 **Property Name:** Franklin Grill

Address: Huon Highway Franklin

Architectural Style: Federation commercial

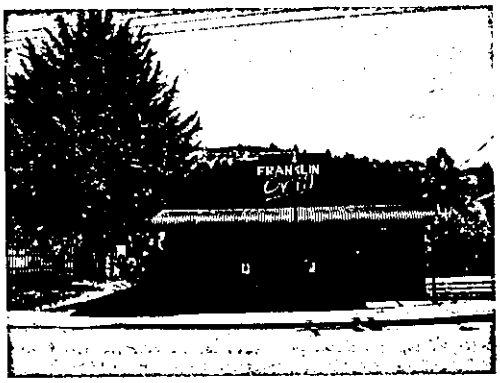
Floors: 1 **Roof:** Corrugated Iron **Walls:** Brick & Masonry Brick

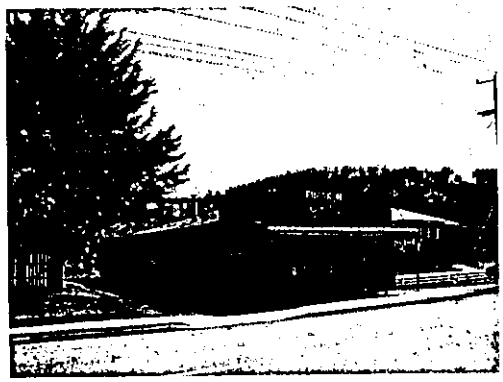
Setting: With no setback, the Franklin Grill compliments and contributes to the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1900

Description: The Franklin Grill is a single-storey commercial building. The main structure of the building dates from the early twentieth-century. This consists of a brick building on a rectangular shaped plan with a medium pitched hipped roof. The façade is a later modification. A masonry brick parapet is arranged in a stepped arrangement and conceals the roofline. Beneath this is a verandah supported by slender poles. The shopfront consists of large bays and the entrance.

IMAGES





Integrity

Partially intact with a modified front.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number:	22	**Property Name:**	Franklin Lolly Shop & Residence
THR ID:	10292		

Address: Huon Highway Franklin

Architectural Style: Federation Free Style

Floors:	2	**Roof:**	Corrugated Iron	**Walls:**	Brick & Weatherboard

Setting: This combined commercial and residential building, has the shop immediately on the street front with the residence recessed behind. These structures contribute and compliment the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1900

Description: This is a group of two connected buildings: an older Victorian residence and a later Federation Free Style shop. The shop is situated on the immediate street front. The shop consists of a brick building on a rectangular plan with a medium pitched gabled roof. This is concealed by a parapeted gable with non-pointed apex which follows the roofline. Decorative brackets are included. Below this the shopfront consists of large casements with smaller panes above. The entrance is on the side which also features similar window arrangements. Recessed behind the shop is the older residence demonstrating elements of the Victorian Rustic Gothic style. This single-storey, weatherboard building has medium pitched gabled roof forms with a central valley. An attic dormer features on the façade. Below this is a verandah and entrance. The sides of the building still retain highly elaborate bargeboards on the gable ends.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Free Style shop. These characteristics are found in the external form, construction methods and the detailing both

externally and internally. Victorian Rustic Gothic elements are also found on the older residence to the rear.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 23 **Property Name:** Aqua Grill

Address: Temperance Lane (Huon Highway), Franklin

Architectural Style: Victorian domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

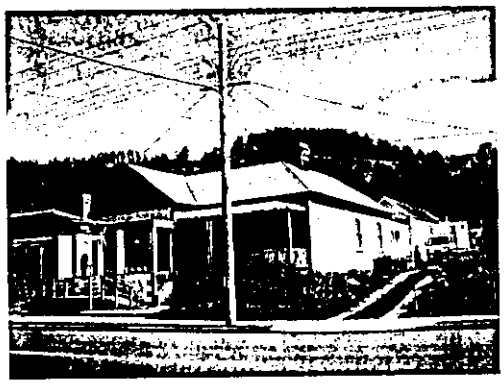
Setting: Although fronting the Main Road, this building is listed from Temperance Lane. It contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1890

Description: This is a single-storey Victorian domestic residence on an 'L' shaped plan converted to commercial uses. The residence is clad in weatherboard with a steeply pitched corrugated iron hipped roof. Corbelled chimneys feature. The projecting gable has been modified. It includes simple bargeboards below which is a modern glazed section. To the side is a verandah under a separate roof supported by iron poles. To the side is the front entrance surrounded by transom and sidelights. Double hung sashes are found on the side of the building.

IMAGES





Integrity

Predominantly intact with modified front.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 24 **Property Name:** Terry's Toys & Residence

Address: Huon Highway Franklin

Architectural Style: Inter-War

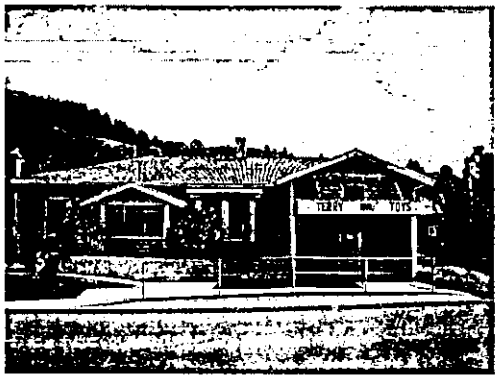
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: On the corner of the Main Road and Temperance Lane, this shop and residence contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1935

Description: This is a single-storey Inter-War shop and attached residence. The shop has no setback from the street and projects from the main residence. The building is clad in weatherboard with a hipped roof. The shop is contained within a large projecting gable. Taper cut bargeboards are included and the roof timbers left exposed. Below this is a wide projecting awning. The shop front itself is enclosed in glass with the central entrance recessed. The house itself demonstrates simplified Inter-War techniques with visually prominent roof planes and simple chimneys. On the façade is a prominent projecting gable which repeats the lines and form of the shop gable. To the side is a projecting bay. Double hung sashes are included.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 25 **Property Name:** Wisbey
THR ID: 10293

Address: Huon Highway Franklin

Architectural Style: Inter-War California Bungalow

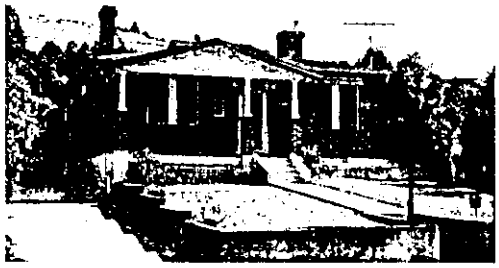
Floors: 1 **Roof:** Corrugated Iron **Walls:** Brick

Setting: With a considerable setback from the Main Road, Wisbey is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1930

Description: This is a single-storey Inter-War California Bungalow on a square shaped plan. The residence is of brick with a visually prominent low pitched half-gabled roof forms. Simple corbelled chimneys are featured. Wisbey includes a prominent street facing gable with wide overhanging eaves and timber infill. Beneath this gable is a large open entry area. Brick piers support this with slab capping and simplified Doric columns. The front entrance includes narrow sidelights. Inturn, this is flanked by pairs of double hung sashes.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single-storey brick Inter-War California Bungalow. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 26 **Property Name:** House

Address: Huon Highway Franklin

Architectural Style: Federation Domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Aluminium Cladding

Setting: With little setback from the Main Road, this is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1910

Description: This is a single-storey Federation Domestic residence on an 'L' shaped plan. The residence is clad in aluminium with a medium pitched corrugated iron hipped roof. The projecting gable includes simple bargeboards, below which is a pair of double hung sash windows. To the side is a verandah under a separate roof. This has been enclosed with multiple casements with small panes above. On the other side of the building is an unsympathetic addition with a flat roof and large aluminium windows.

IMAGES





Integrity

Altered unsympathetically.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 27 **Property Name:** Shop
THR ID: 10294
Address: Huon Highway Franklin

Architectural Style: Federation commercial

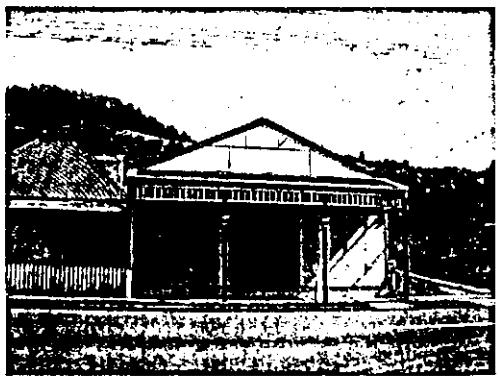
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

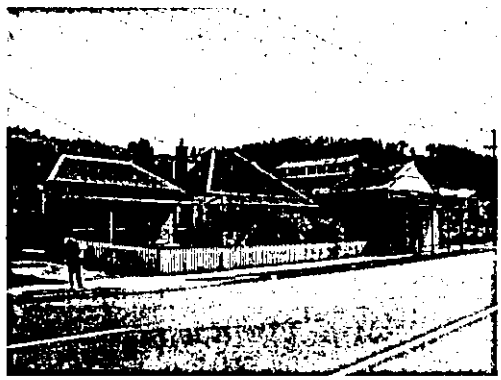
Setting: With no setback from the Main Road, this shop and its immediate neighbours contribute and compliment the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1914

Description: This is a single-storey Federation commercial building on a rectangular shaped plan. The shop is clad in weatherboard with a medium pitched gabled roof. A large gabled skylight is centred on the roof with small panes of glass. This provides natural light given that the sides of the building do not include windows. Below the gable is a verandah supported by slender poles. A simple, decorative screen has been included. The shopfront consists of large casements with a central recessed entrance.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 28 **Property Name:** House
THR ID: 3496
Address: Huon Highway Franklin

Architectural Style: Victorian Georgian

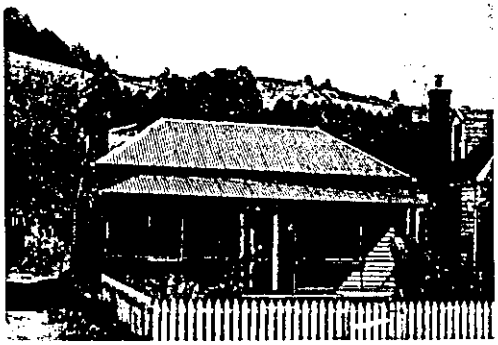
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Recessed from the Main Road, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1870

Description: This is a single-storey Victorian Georgian cottage on a square shaped plan. This small residence demonstrates the simplicity of vernacular architecture of the nineteenth-century. The residence is clad in weatherboard with a medium pitched hipped roof, corbelled chimney and close eaves. The façade is a symmetrical arrangement of a central door with transom, flanked by double hung sashes. A verandah under a separate roof supported by simple poles encloses the façade.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single-storey weatherboard Victorian Georgian residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Victorian society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 29 **Property Name:** House
THR ID: 10295

Address: RA 3444 Huon Highway Franklin

Architectural Style: Victorian Rustic Gothic

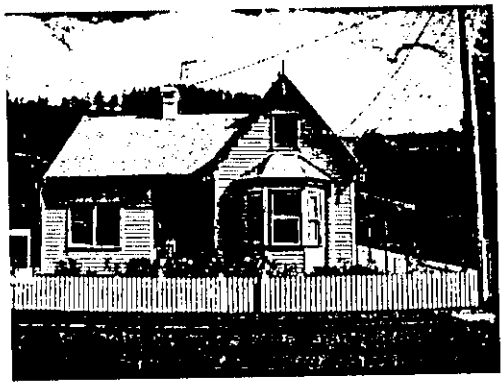
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: On the corner of the Main Road and Walpole Lane, this residence contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1890

Description: This is a single storey Victorian Rustic Gothic residence on an 'L' shaped plan. The residence is clad in weatherboard with a steeply pitched corrugated iron roof in gable forms. Corbelled chimneys feature. The projecting gable features elaborately carved bargeboards and a finial. Immediately below this is a small, double hung sash. Similar windows are found on the ends of the main gable. Below the projecting gable is a faceted bay of three double hung sashes. To the side is the front entrance of a central four-panelled door with elaborate transom and sidelights. Beside the entrance is an enclosed area. This was probably an earlier open verandah. It now includes a pair of double hung sashes. Extensions have been made to the rear of the property.

IMAGES





Integrity

Predominantly intact with some modifications.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Victorian Rustic Gothic residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Victorian society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number:	30	**Property Name:**	Former Kennedy's Residence
THR ID:	10296		

Address: Huon Highway Franklin

Architectural Style: Inter-War California Bungalow

Floors:	1	**Roof:**	Corrugated Iron	**Walls:**	Weatherboard

Setting: With a considerable setback from the Main Road, this residence is an important element in the relatively intact late nineteenth, early twentieth-century streetscape.

Known History: c.1930

Description: This is a single-storey Inter-War California Bungalow on a square shaped plan. The residence is of weatherboard with visually prominent low pitched gabled roof forms. A simple corbelled chimney is featured. This building includes two prominent gables with wide overhanging eaves, exposed roof timbers and ventilator grills. On the corner of the building is the entrance porch. This features a picket railing and screen. The windows are predominantly paired double hung sashes, with the upper casement consisting of multiple panes.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Inter-War California Bungalow. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 31 **Property Name:** House

Address: 3515 Huon Highway Franklin

Architectural Style: Inter-War Domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Surrounded by mature trees, this residence contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1932

Description: This is a single-storey Inter-War domestic cottage on a square shaped plan. This small residence demonstrates the simplicity of vernacular architecture of the Inter-War period. The residence is clad in weatherboard with a medium pitched hipped roof and close eaves. The façade has a simple verandah which is enclosed at one end. This includes an arrangement of coloured glass.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 32 **Property Name:** Windsor Farm
THR ID: 10297

Address: RA 3520 Huon Highway Franklin

Architectural Style: Victorian Georgian

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

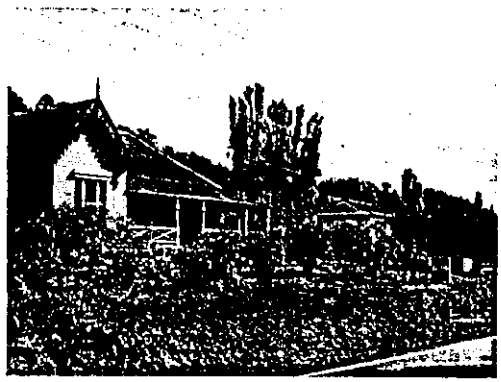
Setting: On the southern end of Franklin and in a semi-rural location, Windsor Farm is an important element in the streetscape.

Known History: c.1870

Description: Windsor Farm is a single-storey Victorian Georgian residence on an 'L' shaped plan. It appears that in the late nineteenth-century, the original house was modified with the addition of a gable section with Rustic Gothic indicators. Style differences can be seen in the window form and fenestration between the main house and the gable. The residence is clad in weatherboard with a steeply pitched corrugated iron roof in hipped forms. It features a corbelled chimney. The projecting gable includes elaborately carved bargeboards and a finial and pendant. Below this is a double hung sash flanked by two narrow casements. The verandah extends around two sides of the building. Slender poles with iron lace brackets and screens support the verandah. Beneath this is the front entrance of a four-panelled door with transom. Double hung sashes of twelve panes feature.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Victorian Georgian residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally. Rustic Gothic elements are also evident.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Victorian society and in a semi-rural location it contributes a sense of history and built character to the landscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 33 **Property Name:** House

Address: RA 3482 Huon Highway Franklin

Architectural Style: Federation domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: On the southern end of Franklin and in a semi-rural location, this residence is an important element in the streetscape.

Known History: c.1915

Description: This is a single-storey Federation domestic residence on an 'L' shaped plan. The building is on a rubble foundation and is clad in weatherboard with a steeply pitched corrugated iron hipped roof and close eaves. Corbelled chimneys feature. The projecting gable includes simple bargeboards, and a half-timbered effect. Below this is a grouping of windows of a double hung sash flanked by two narrow casements. To the side is a verandah under a separate roof which has been supported by slender poles featuring carved brackets. To the side is the front entrance surrounded by transom and sidelights. Double hung sashes are found on the side of the building. A skillion extension exists at the rear.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes to the rural landscape.

Survey Number: 34 **Property Name:** House
THR ID: 10299

Address: RA 3554 Huon Highway Franklin

Architectural Style: Inter-War California Bungalow

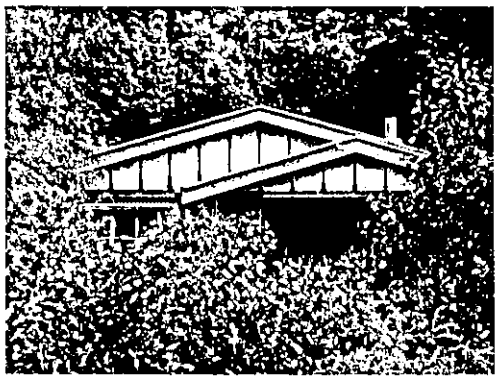
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

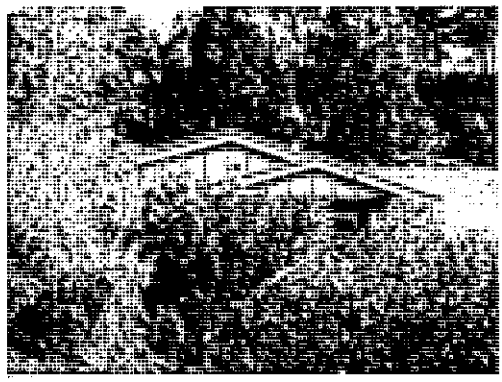
Setting: On the southern end of Franklin and in a semi-rural location, this residence is an important element in the streetscape.

Known History: c.1930

Description: This is a single-storey Inter-War California Bungalow on a square shaped plan. The residence is of weatherboard with a visually prominent low pitched gabled roof forms. Simple tapered chimneys are featured. This house includes a prominent street facing gable with wide overhanging eaves, taper cut bargeboards and a half-timbered effect. Beneath this gable is a large open entry area. This inturn is enclosed by a bow railing with a shingle infill. To the side of this is a faceted bay of narrow casements with small panes above, sheltered by a small awning. Similar window arrangements are found at the side of the building.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Inter-War California Bungalow. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and in a semi-rural location it contributes a sense of history and built character to the landscape.

Survey Number: 35 **Property Name:** House
THR ID: 10300

Address: RA 3586 Huon Highway Franklin

Architectural Style: Victorian Georgian

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

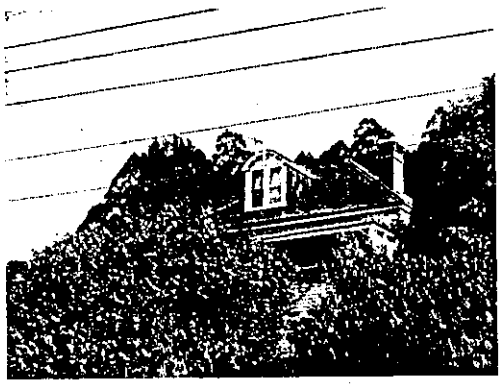
Setting: On the southern end of Franklin and in a semi-rural location, this residence is an important element in the streetscape.

Known History:

Description: This is a single-storey Victorian Georgian house on a square shaped plan. This residence demonstrates the simplicity of vernacular architecture of the nineteenth-century. The house is clad in weatherboard with a medium pitched hipped roof, corbelled chimneys and close eaves. Some decorative effect is achieved in the dormer. Centred on the façade is an attic dormer with a rounded top. This contains a pair of narrow double hung sashes, finial and moulded architrave. The façade is enclosed by a verandah under a separate roof which is enclosed at either end.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey Victorian Georgian building. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects Victorian society and in a semi-rural location it contributes a sense of history and built character to the landscape.

Survey Number: 36 **Property Name:** Jackson's Point Catholic Cemetery
THR ID: 10301

Address: Jacksons Road, Franklin

Architectural Style:

Floors: **Roof:** **Walls:**

Setting: Overlooking the Huon River in a semi-rural location, the Catholic Cemetery is an important element in the landscape with mature plantings.

Known History: Established in 1856 by Father John Murphy.

Description: The Jackson's Point cemetery is a large cemetery on a sloping site in a semi-rural location overlooking the Huon River. Still operating, the older areas exist at the bottom of the cemetery, with new graves further up the hill. It contains various monument forms and styles including, sandstone, marble, granite and wood. Sandstone is used extensively in the older section. Several graves include iron or cement surrounds. Intact and highly detailed sculpture is included on several of the monuments. Notable, is the large Celtic cross and surrounds to the founder of the cemetery, Father Murphy. The Murphy monument includes very sophisticated and precise floral and figural carvings. Also of note are the numerous grave markers consisting of shards of stone vertically positioned in the ground. Many mature plantings are included.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

a.) Evolutional Pattern:

The Jackson's Point Catholic Cemetery is of historic heritage significance as a place which demonstrates the growth of a Catholic community in the Franklin area.

c.) Research Potential:

The Jackson's Point Catholic Cemetery has the potential to yield important information, of an archaeological nature, that has the potential to contribute to a greater understanding of Tasmania's history.

f.) Community:

The Jackson's Point Catholic Cemetery is of cultural heritage significance because its social and spiritual associations have special meaning to the community.

g.) Association:

The Jackson's Point Catholic Cemetery is of cultural heritage significance because it is associated with Franklin's early Catholic inhabitants, especially Father Murphy who established and is buried in the cemetery.

Survey Number: 37 **Property Name:** Congregational Cemetery
THR ID: 10302

Address: Maxfields Road, Franklin

Architectural Style:

Floors: **Roof:** **Walls:**

Setting: In a rural location, the Congregational Cemetery is an important element in the rural landscape with a mature pine.

Known History:

Description: The Congregational Cemetery is a small cemetery in a rural location overlooking farmlands. This small cemetery contains several stone monuments, mostly with semi-circular or Gothic shaped headstones. A family group is enclosed in a large iron surround. A mature pine is part of the cemetery.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

a.) Evolutional Pattern:

The Congregational Cemetery is of historic heritage significance as a place which demonstrates the growth of the Congregational community in the Franklin area.

c.) Research Potential:

The Congregational Cemetery has the potential to yield important information, of an archaeological nature, that has the potential to contribute to a greater understanding of Tasmania's history.

f.) Community:

The Congregational Cemetery is of cultural heritage significance because its social and spiritual associations have special meaning to the community.

Survey Number: 38 **Property Name:** House
THR ID: 10303

Address: Coleman Street Franklin

Architectural Style: Victorian Georgian

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

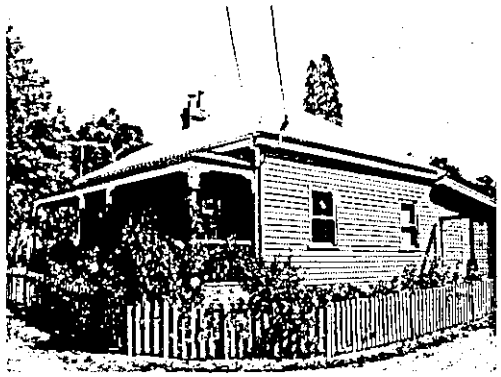
Setting: On the corner of Coleman and Church Streets, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1880

Description: This is a single-storey Victorian Georgian cottage on a square shaped plan. This small residence demonstrates the simplicity of vernacular architecture of the nineteenth-century. The residence is clad in weatherboard with a medium pitched hipped roof, corbelled chimney and close eaves. The façade is a symmetrical arrangement of a central four-panelled door with transom and sidelights, flanked by double hung sashes. A verandah under a separate roof supported by simple poles and carved brackets encloses the façade. Double hung sashes feature on the side and a skillion extension to the rear.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Victorian Georgian residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Victorian society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 39 **Property Name:** House
THR ID: 10304

Address: Coleman Street Franklin

Architectural Style: Victorian Georgian

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

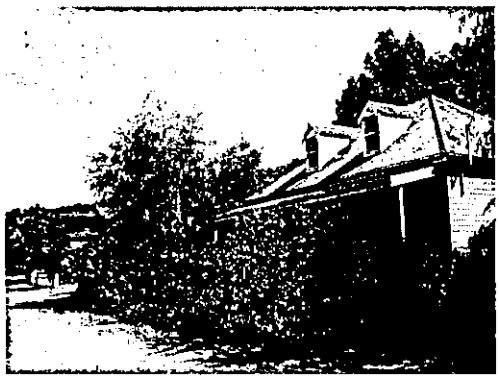
Setting: With little setback, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1880

Description: This is a single-storey Victorian Georgian cottage on a square shaped plan. This small residence demonstrates the simplicity of vernacular architecture of the nineteenth-century. The residence is clad in weatherboard with a medium pitched hipped roof and close eaves. Two attic dormers with simple bargeboards and twelve paned double hung sashes are symmetrically arranged on the façade. Below this, the façade is a symmetrical arrangement of a central door with transom flanked by double hung sashes of twelve panes. A verandah under a separate roof supported by simple poles encloses the façade. Inturn, this is enclosed by a simple picket railing.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Victorian Georgian residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Victorian society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 40 **Property Name:** House

Address: Corner New Road and Coleman Street Franklin

Architectural Style: Inter-War

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: On the corner of Coleman and New Road, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History:

Description: This is a single-storey Inter-War residence on a rectangular shaped plan. The house demonstrates a variety of different style indicators. The residence is of weatherboard with a visually prominent gabled roof forms indicative of a California Bungalow. However, other aspects portray earlier styles, for example the tall corbelled chimneys. This building includes three prominent gables with wide overhanging eaves, decorative brackets and shingle infill. The windows are predominantly paired and triple double hung sashes. Some of these windows have been arranged as oriels.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes to the rural landscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 41 **Property Name:** House

Address: 2 New Road Franklin

Architectural Style: Federation domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With little setback, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1900

Description: This is a single-storey Federation domestic residence on an 'L' shaped plan. The building is clad in weatherboard with a medium pitched corrugated iron hipped roof with close eaves. A corbelled chimney features. The projecting flying gable includes simple bargeboards, and a shingle infill effect. Below this is a bay of double hung sashes flanked by two narrow casements. To the side is a verandah under a separate roof which is partially enclosed with later casements. To the side is the front entrance of a six-panelled door surrounded by transom and sidelights. Double hung sashes are found on the side of the building.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Survey Number: 42 **Property Name:** Franklin Primary School
THR ID: 10305

Address: RA 10 New Road Franklin

Architectural Style: Federation

Floors: 1 **Roof:** Corrugated Iron **Walls:** Brick & Weatherboard

Setting: On a quiet, narrow street at the northern end of Franklin, the Franklin Primary School is landmark element in the town.

Known History: From the 1850s, four schools existed in the Franklin district. The first school was located south of the Franklin Hotel. Although In 1868 school attendance was made compulsory, Franklin like other rural areas suffered from poor attendance. Early school inspections in the 1850s found fault in both facilities and teaching staff. It was believed that with a good building a competent staff that attendance could be increased from the current twenty to around eighty. This proposal was accepted by the local community who raised funds for a new school building. However problems with attendance continued. A report of 1860 noted that irregular attendance was particularly rife in Franklin, a combination of poor roads and children being withdrawn to work on farms. The current school building dates from 1919. At the time, its modern, brick construction made it the pride of the Huon. Included in the school grounds is the focal landmark of a Californian Redwood which was planted by Algernon Clark in 1901 as part of the Arbour Day celebrations. This tree continues to play an important part in school life.

Description: The main brick schoolhouse is a Federation building showing the continuing influence of the Queen Anne Style. This can be seen in the dominant gable roof form including a half-timbered effect and tall corbelled chimney. Below the gable end is a grouping of four large double hung sashes of twelve panes each with stone lintels and sills. To the rear is a contemporary weatherboard skillion addition. In front of this building is a mature redwood. The school grounds also include a Federation style weatherboard residence. This single storey building is clad in weatherboard with an ensemble of varied roof forms including flying gables with simple bargeboards and ventilator grills. The fenestration is largely double hung sashes with multiple panes above.

IMAGES





Integrity

Predominantly intact with surrounding later buildings.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

The Franklin Primary School is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single brick Federation school building. These characteristics are found in the external form, construction methods and the detailing both externally and internally with simple Queen Anne elements.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape. The Franklin Primary School holds special meaning for several generations of Franklin residents who attended the school.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 43 **Property Name:** House

Address: RA 20 New Road Franklin

Architectural Style: Federation Domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: Concealed behind a hedge, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1900

Description: This is a single-storey Federation Domestic residence on an 'L' shaped plan. The building is on a rubble foundation and clad in weatherboard. It features a medium pitched corrugated iron hipped roof with close eaves. The projecting gable includes simple scalloped bargeboards and a pendant. Below this is a large casement. To the side is a verandah under a separate roof.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 44 **Property Name:** House

Address: RA 33 New Road Franklin

Architectural Style: Federation domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: In a rural location and with little setback from the street, this house is an important element in the streetscape.

Known History: c.1910

Description: This residence is a single-storey Federation domestic residence on an 'L' shaped plan. The residence is clad in weatherboard with a medium pitched corrugated iron roof in hipped forms. It features corbelled chimneys. The projecting flying gable includes simple bargeboards. Below this is a bay of double hung sashes flanked by two narrow casements. The bay also includes pressed metal infill. The verandah extends to the side and is supported by later metal poles. Beneath this is the front entrance of a four-panelled door with transom and sidelights. Double hung sashes and larger casements feature throughout.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 45 **Property Name:** House

Address: RA 44 New Road Franklin

Architectural Style: Federation domestic

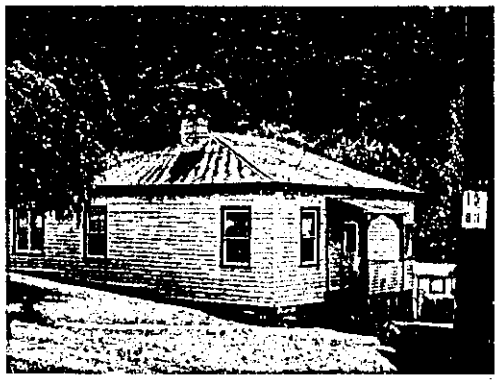
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: In a rural location this residence is a significant element in the rural landscape.

Known History: c.1900

Description: . This is a single-storey cottage on a square shaped plan, with a simplicity indicative of vernacular architecture. The residence is clad in weatherboard with a medium pitched hipped roof, close eaves and a corbelled chimney. The façade is a symmetrical arrangement of a central door with transom and sidelights. To one side is a double hung sash and on the other, a corner window showing the mid-twentieth century influences. A portico encloses the front door with simple carved brackets, indicating Inter-War motifs. Double hung sashes feature on the side.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes to the rural landscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 46 **Property Name:** House

Address: RA 12 Old Road Franklin

Architectural Style: Inter-War

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: In a semi-rural setting this building is an important element in the rural landscape.

Known History: c.1935

Description: This residence is a single-storey Inter-War house. Of a rectangular shaped plan the building is clad in weatherboard and has hipped roof forms enclosed in corrugated iron. It features a squat block chimney. The façade features a prominent projecting gable with taper cut bargeboards, timber infill and supported by brick piers. This acts as a portico and is flanked by pairs of double hung sashes.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes to the rural landscape.

Survey Number: 47 **Property Name:** House
THR ID: 10306

Address: RA 24 Old Road Franklin

Architectural Style: Inter-War California Bungalow

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: This residence is located in a rural context and is an important element in this landscape.

Known History: c.1935

Description: This is a single-storey Inter-War California Bungalow on a rectangular shaped plan. The residence is of weatherboard with an ensemble of varied roof forms. It includes a prominent projecting gable with timber infill and an ornamental frieze below. The fenestration consists of faceted bays of narrow casements with small panes above. Extending along the façade is a wide verandah supported by brick piers with timber posts.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Inter-War California Bungalow. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Inter-War society and in a semi-rural location it contributes a sense of history and built character to the landscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 48 **Property Name:** House

Address: Hayes Road (Huon Highway) Franklin

Architectural Style: Inter-War

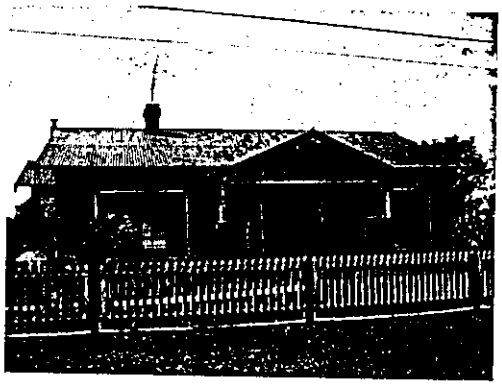
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With some setback from Hayes Road, this residence contributes to the Inter-War streetscape.

Known History:

Description: This is a single-storey Inter-War residence of a rectangular plan design. The building is clad in weatherboard with a visually prominent gable roof form. It features a squat corbelled chimney. The façade includes a prominent street-facing gable providing a deep entrance. Two slab-capped piles and slender poles support this. Behind this are two double glass doors. Modern aluminium windows have been installed.

IMAGES





Integrity

Unsympathetic modifications.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Inter-War society and contributes, in conjunction with its neighbours to a relatively intact Inter-War streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 49 **Property Name:** House

Address: Temperance Lane Franklin

Architectural Style: Federation domestic

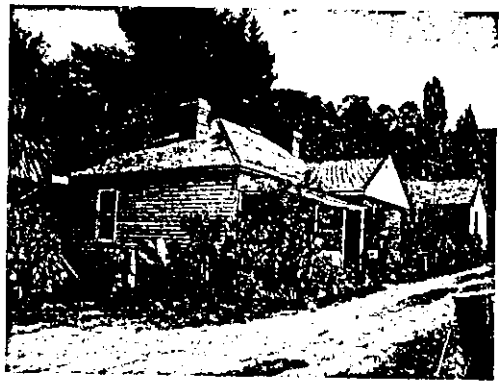
Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: In a semi-rural setting this building is an important element in the rural landscape.

Known History: c.1910

Description: This is a single-storey Federation domestic residence on an 'L' shaped plan. The building is clad in weatherboard with a medium pitched corrugated iron hipped roof with close eaves. Corbelled chimneys feature. The projecting flying gable includes simple bargeboards. Below this is a single double hung sash. To the side is a verandah under a separate roof which is supported by simple poles. Double hung sashes are found on the side of the building. A skillion addition exists to the rear.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes to the rural landscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 50 **Property Name:** House

Address: Temperance Lane Franklin

Architectural Style: Federation domestic

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: In a semi-rural setting this building is an important element in the rural landscape.

Known History:

Description: This is a single-storey Federation domestic residence on an 'L' shaped plan. The building is clad in weatherboard. The roof consists of medium pitched gable forms clad in corrugated iron with close eaves. A simple block chimney features. The projecting gable includes scalloped bargeboards and finial. A finial is also found on the end gable. Below this is a single double hung sash...To the side is a verandah under a separate roof which is supported by rubble piers. Various window forms are used on the building.

IMAGES





Integrity

Predominantly intact.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes to the rural landscape.

Survey Number: 51 **Property Name:** House
THR ID: 10309

Address: Walpole Lane Franklin

Architectural Style: Federation Queen Anne

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With little setback, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1910

Description: This is a single-storey Federation Queen Anne residence on an 'L' shaped plan. The building is on a brick foundation and clad in weatherboard. It has a medium pitched corrugated iron hipped roof with close eaves. Corbelled chimneys feature. The projecting gable includes simple bargeboards and finial. The gable has a pressed metal infill. Below this is a grouping of a double hung sashes flanked by two narrow casements. To the side is a verandah under a separate roof which is supported by simple poles with carved brackets. The front door includes both transom and side lights. Flanking this is a pair of double hung sashes. This window arrangement is repeated elsewhere.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Queen Anne residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

Survey Number: 52 **Property Name:** House
THR ID: 10310

Address: Walpole Lane Franklin

Architectural Style: Federation Queen Anne

Floors: 1 **Roof:** Corrugated Iron **Walls:** Weatherboard

Setting: With little setback, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1910

Description: This is a single-storey Federation Queen Anne residence on an 'L' shaped plan. The building is clad in weatherboard with a medium pitched corrugated iron hipped roof with close eaves. Corbelled chimneys feature. The projecting gable includes simple bargeboards and has a pressed metal infill. Below this is a grouping of a double hung sashes flanked by two narrow casements. To the side is a verandah under a separate roof which is supported by simple poles with carved brackets. The front door includes both transom and side lights. Flanking this is a double hung sash. This window form is repeated elsewhere.

IMAGES





Integrity

Predominantly intact.

CRITERIA FOR ENTRY IN THE TASMANIAN HERITAGE REGISTER

d.) Representative Of:

This building is of historic cultural heritage significance for its ability to demonstrate the principal characteristics of a single storey weatherboard Federation Queen Anne residence. These characteristics are found in the external form, construction methods and the detailing both externally and internally.

f.) Community:

This place has strong meaning for the community because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact late nineteenth / early twentieth century streetscape.

LOCAL HERITAGE SIGNIFICANCE ONLY

Survey Number: 53 **Property Name:** House

Address: Walpole Lane Franklin

Architectural Style: Federation domestic

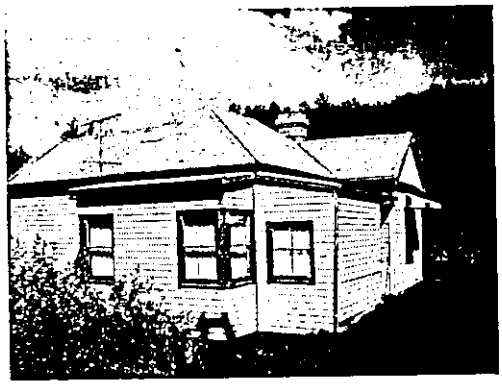
Floors: 1 **Roof:** Corrugated Iron **Walls:** Aluminium Cladding

Setting: With little setback, this residence and its immediate neighbours contributes and compliments the relatively intact late nineteenth and early twentieth-century streetscape.

Known History: c.1900

Description: This is a single-storey Federation domestic residence clad in aluminium with medium pitched corrugated iron hipped roof forms. It features a corbelled chimney. The gable includes simple bargeboards and has a pressed metal infill. Below this is a double hung sash window. To the side is an enclosed area which may have been a verandah. Later corner windows are featured elsewhere on the building.

IMAGES





Integrity

Altered unsympathetically.

Statement of Local Heritage Significance

This building is of local significance because it demonstrates aspects of Federation society and contributes, in conjunction with its neighbours to a relatively intact early twentieth-century streetscape.

Attachment A: An Introduction to Cultural Landscapes

This section aims at introducing the concept of cultural landscapes and is not intended as a comprehensive cultural landscape assessment or management plan for Franklin.

Integrating cultural landscape management into planning decisions is relatively well accepted in North America and Europe. In Australia and Tasmanian however, little has been done in translating theoretical discussion into conservation practice.[68] Part of the difficulty lies in the very definition. In a general sense a cultural landscape refers to:

> [T]hose parts of the land surface which have been significantly modified by human activity, to distinguish them from natural or wilderness landscapes, which have little or no apparent evidence of human intervention.[69]

Ingerson provides the following by way of introductory definition "a way of seeing landscapes that emphasizes [*sic*] the interaction between human beings and nature over time."[70]

Relating the concept to the Australian context, Lennon and Matthews have developed the following:

> A cultural landscape is a physical area with natural features and elements modified by human activity resulting in patterns of evidence layered in the landscape, which give a place its particular character, reflecting human relationships with and attachments to that landscape.[71]

From such definitions, natural features; physical components from historical use; and readable patterns or layers, appear to be common elements to any definition. Beyond this, definition becomes more problematic. It is noted that discussion of cultural landscapes also includes such concepts of how people perceive landscapes; the interaction and interrelationship between various elements; and the attachment placed on these elements as a whole.

If the above definitions provide some explanation, why then are cultural landscapes important? Following a series of workshops on the subject held by the Tasmanian Heritage Council, cultural landscapes were confirmed as being important to Tasmania. Cultural landscapes provide insight into the past and are integral to many people's sense of place, where both individuals and communities place great value on the landscape in which they exist. Recognising and respecting cultural landscapes therefore allows society to understand past practices and appreciate the physical environment.[72]

Cultural landscape conservation also provides protection beyond what conserving individual places can achieve. By this, the importance of cultural landscapes is the relationship between the landscape itself and the individual parts, or character elements which compose the area. Therefore to remove significant elements potentially diminishes the value of the landscape as a whole, where neither the broader landscape nor its components can be understood without reference to the other.[73]

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[68] P. James, 'Chapter 1: An Introduction, by Mr Peter James AM, Chairman, Tasmanian Heritage Council' in *Cultural Landscapes2001: Consolidated Proceedings of a Series of Three Workshops on Cultural Landscapes in Tasmania*, (Hobart, 2001), p. 1

[69] Blair and Truscott, 1989, p. 3 cited in J. Lennon, S, Matthews, *Cultural Landscapes Management. Guidelines for identifying, assessing and managing cultural landscapes in the Australian Alps National Parks*, (Jane Lennon and Associates, 1996), p. 3

[70] A. E. Ingerson, 'What Are Cultural Landscapes?", at http://www.icls.harvard.edu/language/whatare.html

[71] Lennon, Matthews, *Cultural Landscapes Management*, p. 4

[72] K. Bennett, *Cultural Landscapes: Tasmania*, Hobart: Tasmanian Heritage Council, 2002

[73] Lennon, Matthews, *op. cit.*, pp. 4, 5

The Rural Landscape and Franklin

Work on exploring Tasmania's rural cultural landscapes has previously been investigated by Tassell where the character elements and the potential threats to the rural cultural landscape are identified. The factors that have shaped Tasmania's rural landscape are chiefly the agricultural practices adapted to the island, combined with specific factors of climate, soil, topography and the introduced cultural elements. Given these factors and the period of colonisation, contemporary English farming practices were transplanted to Tasmania, with particular emphasis on enclosure according to the customs of the planned countryside which developed in Britain during the eighteenth-century.

Tassell's discussion is done so within the context of finding similarities with those landscapes in Britain. However describing Tasmania in English terms does have limitations. The archetypal English landscape is a confluence of various elements resulting from different agricultural and historical practices and processes, therefore the Tasmanian rural landscape cannot be truly defined as 'English'. Instead, Tassell proposes that the Tasmanian rural landscape elements are not specifically English in character, but rather evocative of an English landscape.[74]

Tassell's work is acknowledged for its value in identifying various rural character elements, however it is submitted that defining Tasmania's landscape in English terms is limiting. Namely, it does not adequately address those elements which are not English, specifically the ancient land use patterns and the vernacular elements unique to Tasmania.

There is merit however in approaching the Tasmanian rural landscape with reference to England. The value comes from understanding the history of British colonisation in Tasmania. Lennon and Matthews propose that awareness of the historic importance of the character elements is the primary task in assessing the value of cultural landscapes. The historical elements are what provide the cultural landscape with meaning, by demonstrating through identifiable features past human attitudes and values and how contemporaries perceived their environment.[75]

European settlement of Tasmania was overwhelmingly British. This racial origin was fundamental in how the settlers viewed and shaped the land. In the attempt to 'improve' the environment, settlers introduced species of plants and animals from Europe. With sparrows, rabbits hawthorn and willows, the colony was anglicised without regard or understanding for what had existed prior.

It was inevitable that British colonisation would ensure major changes to the environment. By its very nature, farming created a different landscape from that found before white settlement. Tasmania was particularly suited to this imposed environment, in terms of aesthetics, climate and geography. What pleased the colonists most were the perceived similarities between Tasmania and England. Lieutenant Bowen was one of the first to strike this resemblance when in 1803 he described Hobart as 'more like a nobleman's park in England than an uncultivated country'. England was indeed the benchmark for judging new places against, an absolute beauty. It was somewhat natural then that the early settlers regarded lush greenness as the indicator of a desirable landscape.[76]

It is possible that settlers described Tasmania in English terms because this was their only frame of reference. Conversely, an exaggerated perception of the colony could express both the joy of finding this 'new' land and the opportunities for its exploitation. Edward Curr went so far as to say:

> after all ... our highest aim is to exhibit on a small scale something like the beauties which rise at every step in the land to which we have bid adieu.[77]

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[74] C.B. Tassell, *Tasmanian Rural Cultural Landscapes: A Study*, (Launceston, 1988), pp. 4, 8-9
[75] Lennon, Matthews, *op. cit.*, p. 7
[76] Morgan, *Land Settlement in Early Tasmania*, pp. 43-44, 109-110, 119-121
[77] Morgan, *op. cit.*, pp. 109-111

The approach taken to the Tasmanian landscape must also be viewed in the context of the prevailing thought that nature could and should be 'improved'. This drive towards improvement may also of been strengthened by the alien nature of much of the Australian flora and fauna.[78]

Although green fields and hedgerows had a nostalgic, sentimental quality, they were above all a practical consideration. Just as the English environment evolved in a search for greater productivity, the Tasmanian experience was also premised on profit. Upon acquiring land, one of the first tasks was to establish the boundaries and clear the ground. It was therefore natural to associate productive green pastures with England. The agricultural practices of nineteenth-century Britain were transplanted to Tasmania. Key amongst these practices was enclosure of open areas, most commonly done with hedges. During the eighteenth century, hawthorn became the dominant plant species in England, and field boundaries increasingly followed straight lines.[79] Such methods were directly applied in Tasmania.

How does Franklin fit into this historical context? In many ways, Franklin and the Huon Valley differs from the experience of other early settled areas. Initial land settlement in Tasmania was centred around the southern and northern population centres and developed through the Midlands. Contemporary reports of the 'park like' nature of Tasmania are therefore more accurately descriptions of the more open areas of the Island. As already shown in this study, the Huon Valley presented a very different image, with early explorers finding little of worth in the steeply forested hills and riverbank swamps.

Unlike the large pastoral land grants elsewhere, Lady Franklin's scheme was for smaller holdings for poorer settlers. Therefore, following land clearing, Franklin developed into a landscape of small farms. Where Franklin and the broader region established its own unique character was in the emergence of the orchard industry.

The importance of the orchard industry to the Franklin and Huon Valley cultural landscape cannot be understated. Beginning in the 1840s, orchards, primarily growing apples became the dominant industry in the region. The virgin soils, regular rainfall, sloping hills for drainage and wind protection made the area ideal for fruit production at an unprecedented scale and intensity. Given the reliance on water transport, the first orchards were planted close to the Huon River for ease of movement. The reliance on the River was a role which continued throughout the nineteenth-century, culminating in the development of Port Huon as a deep water port allowing international export direct from the region. The apple industry also formed strong links with forestry. Cleared land was converted to orchards, and inturn the orchards relied on the forestry infrastructure and the production of fruit cases. The success of this enterprise encouraged further settlement in the region and the introduction of services and community facilities. Franklin established itself in this central role.[80]

The dominance of the apple industry continued until the 1960s-70s. Between 1961-1965 nearly two-thirds of Huon Valley orchardists ceased production. Nearly 50% of these orchards were destroyed in the 1970s through the Government Tree Pull Scheme. With the removal of the orchards, much of the associated built infrastructure was also lost. The cultural landscape of the Valley was vividly altered.[81]

This changing cultural landscape and historical development can be traced through images. Paintings, prints and photographs not only provide the historian with evidence of the physicality of a place, but are also important in showing how a landscape is perceived, Nevard writing that:

---

[78] *Ibid.*, p. 110
[79] O. Rackham, *The Illustrated History of the English Countryside*, (London, 2000), pp. 81, 84
[80] A. McConnell, N. Servant, *The History and Heritage of the Tasmanian Apple Industry – a Profile*, Launceston: Queen Victoria Museum and Art Gallery, 1999, pp. 260-261
[81] McConnell, Servant, *The History and Heritage of the Tasmanian Apple Industry*, p. 261, Watson, *Full and Plenty*, p. 3, Gulson, *op. cit.*, p. 13

> One of the techniques one can use for tracing these cultural layers in the landscape is to use early colonial landscape pictures. In Tasmania we are very lucky in this context. Many of the early settlers who came here were very well educated, had capital, were able to commission artists, and were also, having both capital and leisure, able to write down what they had and what they saw.[82]

Figure 14: Detail of *Franklin, north end showing Congregational Church* c.1870[83]



The above shows a detail of Franklin, c.1870. Built elements are not dominant. Field delineation can be seen, and dying native vegetation is prominent. The presence of orchards can not be determined.

[82] T. Nevard, 'Chapter 6: An Introduction to Cultural Landscapes in Tasmania, by Mr Tim Nevard, Honorary Project Director', in *Cultural Landscapes2001: Consolidated Proceedings of a Series of Three Workshops on Cultural Landscapes in Tasmania*, (Hobart, 2001), p. 12

[83] S. Clifford, *Franklin, north end showing Congregational Church*, c.1870, WL Crowther Library, State Library of Tasmania

Figure 15: *Franklin Looking South*[84]



The above image probably dates from the turn of the century. Note the expansion of the built elements of Franklin along the Main Road and the close relationship which existed with the River. The built townscape elements continue to be readable today in a similar manner. Contrasting this with the previous image shows a marked landscape change. Gone is the remnant native vegetation, to be replaced by orchards stretching along and up the foothills. Field delineation using vegetation is also evident. The tone of this image is quite different to earlier depictions. Beattie has romantically portrayed an idyllic rural scene of orchards, village, river and mountains in the distance.

[84] J.W. Beattie, *Franklin Looking South*. By permission of the National Library of Australia

Figure 16: *The Huon River at Franklin*[85]



Figure 17: *From Hobart through the Huon the Appleland of the South*[86]



The above three images show the changes occurring in how the Huon Valley and Franklin were perceived. The visual depictions are romantic interpretations of a beautiful rural and natural area. The tourism potential of these landscapes was quickly realised. The charm and beauty of the Huon began to be recognised and marketed in the late nineteenth-century, capitalising on stunning scenery and analogies to an English landscape. Early tourism ventures were quick to utilise the combination of river, mountains, rolling hills and picturesque orchards. Franklin provided the quintessential Huon image and destination - a contained village overlooking the River with orchards lined by hedges stretching up the hills behind.[87] *The tourist guide to the right shows how the Huon Valley and Franklin were perceived and marketed as an 'appleland'. The guide contains information on accommodation in Franklin and accessing the region from Hobart by steamer.*

This role continues today, Tassell commenting on the tourism importance of Tasmania's rural cultural landscape, in addition to its direct economic, aesthetic and cultural values.[88]

[85] J.W. Beattie, *The Huon River at Franklin*. By permission of the National Library of Australia
[86] *From Hobart through the Huon the Appleland of the South*, J Walch & Sons: Hobart, 19?, Tasmaniana Library, State Library of Tasmania
[87] Gulson, *op. cit.*, pp. 11-12
[88] Tassell, *Tasmanian Rural Cultural Landscapes*, p. 4

Figure 18: 1965 aerial photograph of Franklin[89]

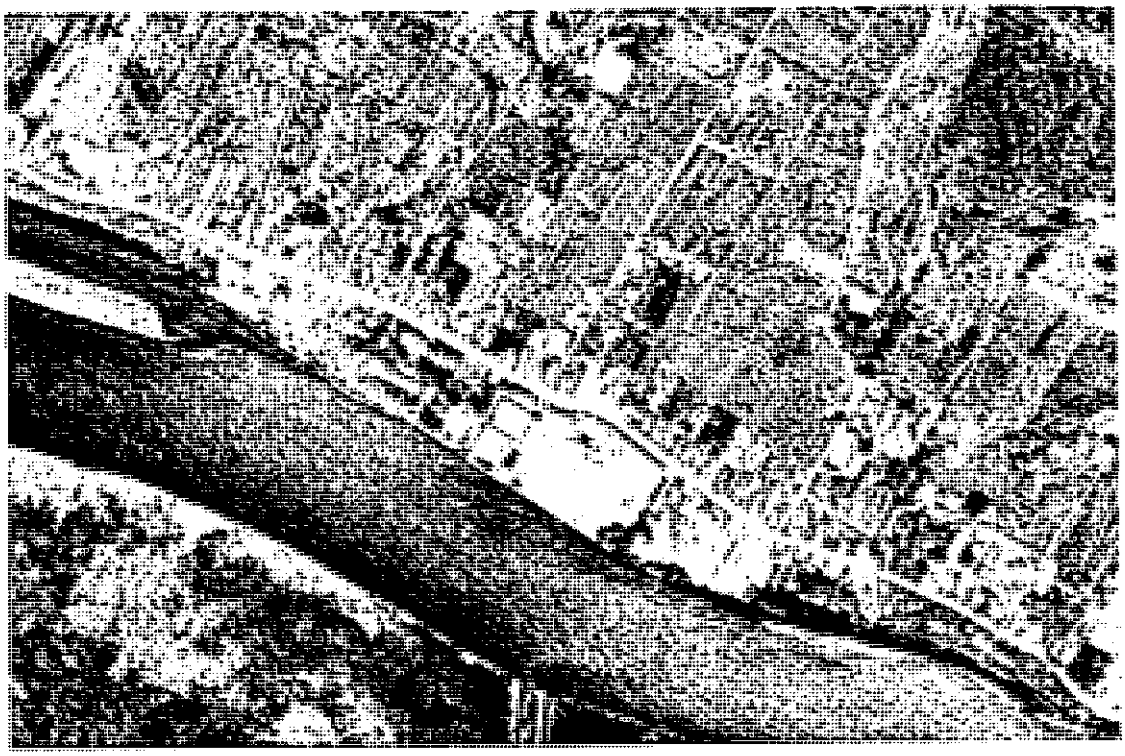


Figure 19: 2002 aerial photograph of Franklin[90]



The above are reproductions of the earliest known, and the most recent aerial photographs of Franklin, providing excellent overviews of the town as a whole. The linear nature of Franklin continues as a prominent characteristic, and relatively little new built development has occurred. The town remains contained by both the River and the hills behind. The reclaimed land with public, open space is clearly readable. The area behind the town demonstrates the most visible and graphic changes. The 1965 photo shows orchards closely following the highway south of the town and extending broadly behind Franklin. These orchards now occur in a much reduced form, though their contribution to the character of Franklin is still highly significant. Despite the loss of orchards, the long, narrow fields at right angles to the River are still a readable feature. Beyond these, a patchwork affect of smaller fields is evident interspersed between remnant native vegetation.

[89] Aerial Photograph of Franklin, 4/2/1965, 1527-28, T437-95

[90] Aerial Photograph of Franklin 14/02/02, 1354-158, A086

Identifying the Significant Elements

There are various ways of classifying cultural landscapes. Australia ICOMOS (International Council on Monuments and Sites) has adopted the guidelines used by UNESCO within the context of the World Heritage List:

Cultural landscapes fall into three main categories, namely:

1. **The Designed or Created Landscape:** Those landscapes designed and created intentionally by man. This includes gardens, parks, cemeteries and can extend to isolated landscape elements such as groups or individual trees.
2. **The Organically Evolved Landscape:** Those landscapes where historical layers of social, economic and administrative forces have evolved in association with and in response to its natural environment.
3. **The Associative Cultural Landscape:** Those landscapes where there is little apparent human or material use of the land but where important association nonetheless exists with the environment often for aesthetic, artistic or literary reasons. Within the Tasmanian context this may also refer to ancient land management practices such as seasonal hunting and burning. [91]

The rural nature of Franklin most appropriately makes it an organically evolved landscape. However it is possible for this landscape to be part of a broader cultural landscape for the Huon Valley with the presence of associative, or ancient landscape elements and also designed landscapes.[92]

Various methods have been developed for identifying the character elements which form part of the wider landscape. McConnell and Servant cite the United States National Park Service Guidelines for Evaluating and Documenting Rural Historic Landscapes. Lennon and Matthews also adopt this approach. Character elements are divided into two areas: the processes which created that element, and the resulting physical component. Eleven components are given, although not all characteristics will apply to each situation.[93] The following table reproduces this approach:

Table 4: The Land-Shaping Processes and Physical Components of Rural Historic Landscapes[94]

Land Shaping Processes	
Land Uses and Activities	Historical appreciation of the way in which the land has been used, eg. mining, farming, timber getting, recreation
Patterns of Spatial Organisation	eg. farm size, settlement or structure location, access to water. These elements may be influenced by politics, economics, technology and natural environmental features
Response to Natural Environment	The way people, their traditions and practices have adapted to the local environment and technology
Physical Components	
Circulation networks	Systems for transporting people, goods and raw materials
Boundary demarcations	Eg. property, paddock or stockyard marked boundary
Vegetation	Vegetation related to land use (eg. hedge, shade tree, crop, logged forest)
Buildings, Structures and Objects	Buildings shelter human activities; structures serve functions other than shelter; while objects are relatively small but important stationary or moveable constructions, including markers and monuments
Archaeological Sites	Sites of historic activities or occupation marked by structural remains or surface or sub-surface remains.

[91] Article 39, 'World Heritage List. General Principles', at: http://whc.unesco.org/nwhc/pages/doc/mainfsearch.htm, Bennett, *Cultural Landscapes*
[92] McConnell, Servant, *op. cit.*, p. 120
[93] McLelland (1990), Lennon and Matthews (1996) cited in McConnell, Servant, *op. cit.*, p. 121
[94] *Ibid*

Small-Scale Elements	Individual elements such as road signs, gates, footbridges, etc, that collectively may form boundary demarcations, circulation networks etc.

This system has been used to assess the character elements of Franklin. Again it is stressed that this is not a comprehensive cultural landscape survey of Franklin. It is designed merely to highlight Franklin's cultural landscape values. It is recommended that a cultural landscape assessment and management plan for the Huon Valley is produced.

The following table highlights the core character elements for Franklin. This information is produced in a table for reasons of clarity. It is emphasised that individual elements should not be singled out, as cultural landscapes are premised on the interrelationship between various elements and the broader landscape.

Table 5: Core Character Elements of Franklin

Land Shaping Processes	**Historical Summary**
Land Uses and Activities	Franklin and the Huon valley is the traditional home of the Mellukerdee band of the South East Tribe, one of three maritime tribes. The town of Franklin developed as a rural centre following Lady Franklin's scheme of providing land for poorer settlers. Original enterprises were centred on timber getting and later agriculture, dominated by orchards. The town developed into the regional centre of the Huon Valley until Huonville surpassed this role following the bridging of the River.
Patterns of Spatial Organisation	Original land grants were of smallholdings of between 5 to 100 acres. These holdings were commonly arranged as long narrow blocks at right angles to the Huon River, ignoring the undulating topography of the land. The town developed in a linear fashion, running parallel to the edge of the Huon River. Commercial and industrial buildings were concentrated on the River. With the expansion of the fruit industry in the late nineteenth-century, Franklin's residential aspects emerged, coupled with the various commercial, social, cultural and civic facilities of a regional centre.
Response to Natural Environment	Franklin natural landscape character type is that of South-East Coastal Hills where steep, isolated hills and foothills rise to the mountain ranges in the west. Development is centred along the major rivers and estuaries. Extensive areas of tall wet forest in the west are important for timber production.[95] Unlike other groups, the South East people did not extensively move inland in Spring and Summer, finding sufficient resources of shellfish, birds, kangaroos and wallabies along the coast and immediate interior and harvesting these food sources on a seasonal basis. The landscape impact of Aboriginal management of the land is not easily readable by Europeans. In other regions it is noted that the Aborigines were responsible for the wide distribution of the eucalypt forest and for the open, grasslands as a result of their firing practices, to accommodate hunting.

[95] Forestry Commission of Tasmania, *A Manual for Forest Landscape Management*, (Hobart, 1990), p. 163

	Access to Franklin was an early obstacle to growth. Water transport on the Huon was the only reliable means. However accessing the town was still difficult due to the swampy foreshore, rectified by a series of canals and jetties. Major land reclamation works aimed at ensuring Franklin's position as the centre of the Huon, a role which was not regained.
Physical Components	**Character Elements**
Circulation networks	Living as seasonal nomads, the South East tribe moved throughout the region according to the availability of various food sources. As the most 'maritime' of the Tasmanian tribes, the people of the South East also created catamarans capable of reaching the coastal islands. Gulson reports that Walpole Lane is reputed to have been an original track used by the local people in accessing the hills above Franklin. The rugged terrain of the region made transport and communication a problem resulting in a reliance on the Huon River. Although an early trail to the Huon existed from 1829, reliable road access did not occur until the late nineteenth-century. The development of road transport removed the former reliance on the River. With the introduction of motor vehicles, goods and people could be transported more efficiently than by boat and following the bridging of the River at Huonville, Franklin's central role diminished. The Main Road has existed in various forms since the establishment of the town, following closely the river edge. The early 'corduroy' road proved unreliable, forcing the addition of sand and metal. In the twentieth-century, the Main Road has been widened. Beyond the Main Road, narrow side streets stretch up into the hills linking the interior with the town and river. These streets continue to be identifiable as early rural roads. As a result of the topography of the surrounding hills, these roads tend to have both winding and straight sections.
Boundary demarcations	Various field forms exist within Franklin and its immediate area. The original subdivision of long, narrow blocks at right angles to the River continues to be a readable character element north and south of the town centre. Those fields immediately behind the town (commonly used for orchards) tend to be smaller. However both field forms are predominantly of a regular, squarish shape, common to nineteenth-century subdivision and creating a patchwork effect. These features are clearly seen in the aerial photographs. Historical photographs also show the prominent use of hedges for boundary delineation. Hawthorn was the common material for hedges. Remnants of these hedgerows exist.
Vegetation	Remnant natural bushland shaped by ancient and contemporary land management practices exists in the hills behind Franklin. This native vegetation also provided protection for the orchards from the wind. As a result, planted windbreaks are not a prominent feature.[96]

[96] McConnell, Servant, *op. cit.*, p. 261

	Cleared land in Franklin is largely of two forms: open pastures, and orchards. Although the number of orchards has greatly been diminished in the Post-War period, the orchards remain one of Franklin's most important character elements, with relatively small sized orchards existing immediately behind the town and extending into the hills. Their proximity to the town reinforces the historic character of Franklin and the broader region. The 1965 aerial photograph shows the former extent of orchards surrounding Franklin, notably their presence along the Highway. Introduced tree species are important character elements to Franklin, providing shapes, colours and seasonal changes contrasting to indigenous species. Within the town itself, specimen trees form landmarks. Willows are featured beside watercourses and the created environment of the reclaimed land. Throughout the town, poplars and conifers are featured providing strong vertical elements and focal points. Several of these trees have historical associations, such as the Californian Redwood at the Primary School and the Norfolk Pines at the War Memorial.
Buildings, Structures and Objects	Within the town itself, buildings are centred on the Main Road and the immediate areas of the side streets. Enclosed between the hills and the River, a sense of containment exists, although this has been reduced at the northern entrance. Nonetheless, a sense of town definition continues to exist. The prominent construction theme is of single-storey weatherboard residential and commercial buildings. Older buildings are frequently situated with very little setback. Many earlier residences, and some commercial buildings exhibit elements of Gothic revival. Constructed from weatherboard, these buildings have a 'lighter' quality than masonry examples. Although some fine examples exist, most demonstrate rustic or vernacular interpretations of the style, with steeply pitched gabled roof forms and decorative elements restricted to barge boards, valances, and pendants and finials. Public and civic buildings are also important elements of Franklin, creating built landmarks. At either end of the town are the Catholic and Anglican Church complexes. Other important buildings include the former banks, the Masonic Lodge and the Palais Theatre. These buildings contrast with residential development, being constructed from masonry and frequently of two-storeys. Beyond the town itself, farmhouses and associated farm buildings are featured in pastures and in orchards. Such buildings are frequently in rustic or vernacular styles and provide focal points within the general rural environment, often being located in prominent locations. Through dredging, piling and filling the reclaimed land is the most prominent non-building structure within the town. Undeniably these works altered the character of the town, removing the intimate relationship which had once existed with the Huon and the timber jetties and industrial buildings which once lined the River. However of great benefit, the reclamation

	of the mudflats created large areas of public space such as the sports grounds and park, adding a new dimension to the relationship between the town and the River. Monuments are featured within Franklin. The two War Memorials are focal landmarks, with the World War Two memorial serving a functional purpose of gates to the recreation ground. The churchyard attached to St Johns includes a small graveyard, while Catholic and Congregational cemeteries are located outside of the town in rural settings. These cemeteries also include plantings.
Archaeological Sites	The three identified cemeteries have the potential to yield important information, of an archaeological nature, that has the potential to contribute to a greater understanding of Tasmania's history.
Small-Scale Elements	Not assessed

Understanding these character elements is best done visually. It also emphasises the point that cultural landscapes are a question of the interaction between the various character elements and the physical environment and not isolating individual elements.

Figure 20: Franklin seen from Old Road Showing Core Character Elements (2003)

Remnant natural bushland shaped by ancient and contemporary land management practices.

Focal point of public buildings, here St John's is indicated.

Vertical focal point of introduced species of trees.

Contained nature of town between the River and the orchards and fields Immediately behind.

The Huon River with its important visual, historic and social values.



Farm building surrounded by rural environment.

Willows beside water features.

Narrow side streets extend up from the Main Road to the hills behind.

The dominant element of orchards behind the town contained in small fields, predominantly with straight edges.

Remnant boundary delineation using hawthorn hedgerows.

Management of the Cultural Landscape

Although establishing management plans for Franklin's cultural landscape is outside the brief of this heritage study, appropriate planning decisions are vital for Franklin, the Huon Valley and Tasmania in general. The Tasmanian Heritage Council is currently undertaking work on further exploring the subject and developing a systematic and consistent approach to cultural landscape identification and conservation. Given that the Huon Valley presents some of Tasmania's most well known and significant cultural landscapes, it would be highly desirable that further work on this subject is progressed.

How future management of cultural landscapes emerges remains unknown. As Tassell points out, it must be acknowledged that the Tasmanian rural landscape is in a constant state of evolution and change and will continue to respond and reflect market and agricultural developments.[97] One possible starting point for management would be the Burra Charter, the

[97] Tassell, *loc. cit.*

nationally accepted charter for the conservation of places of cultural significance. Although originally designed to be 'place' specific, the Burra Charter acknowledges and includes in the definition of 'place' broader considerations such as landscape, the importance of setting, related places, spaces and views. It may be appropriate that the Burra Charter process is incorporated in some sense into any cultural landscape management. Seven basic principles underline this process:

1. The place itself is important
2. Understand the significance of the place
3. Understand the fabric
4. Significance should guide decisions
5. Do as much as necessary, as little as possible
6. Keep records
7. Do everything in a logical order.[98]

[98] P. Marquis-Kyle, M. Walker, *The Illustrated Burra Charter*, ACT: Australia ICOMOS, pp. 10-11

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FRANKLIN TOWNSHIP PLAN

prepared for
Huon Valley Council and the
Franklin Streetscape Reference Group



Inspiring Place Pty Ltd.

July 2003

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CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

Situated on the Huon River, Franklin is a historic riverside town approximately 30km south east of Hobart (Map 1.1). The area has strong links with the indigenous Mellukerdee people of the Huon River, who utilised the coastal zone and hinterland throughout the year[1], and reportedly used the route that Walpole Lane now follows to travel between the foreshore and surrounding hills[2]. Much later, Lady Jane Franklin is popularly attributed with establishing the Huon Settlement in 1838; and in 1850 the town name was changed to Franklin to acknowledge her involvement[3].

Founded upon a diverse industry base including forestry, agriculture, and both industrial and subsistence farming[4], Franklin's riverside setting later contributed to a high degree of activity and prosperity in the late 19th and early 20th Centuries. Circumstance, particularly road transport and the collapse of the apple and small fruit markets, has at times eroded the prosperity of the Franklin[5].

Today Franklin has approximately 1000 residents[6], many of whom commute to Huonville, Hobart and other service centres for employment or study. Yet for a peripheral town, Franklin is increasingly vibrant; supporting an active primary school, a strong community progress association, a volunteer fire brigade, training organisations and a diverse range of commercial ventures including newer cafes, restaurants and galleries, alongside established business such as pubs, the post office, Franklin Evaporators, a take-away, service station and a regional newspaper and printery.

Within the town, several community projects such as the restoration of the Palais Theatre, revegetation of Prices Creek and reconstruction of the wharf have been recently undertaken. The reclaimed foreshore continues its major community and recreation focus with rowing regattas, cricket matches, walking and informal camping all being popular. Photographs 1.1 to 1.3 are illustrative photos Franklin.

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2 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council. (historic precincts mapping).

3 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council. p4.

4 Young, J., 1995. "Back to the Future: Choosing a Meaning from Regional History" **Tasmanian Historical Studies**, Vol.5:1 pp. 114-131.

5 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council. p5.

6 Huon Valley Council, pers com.



Map 1.1 Location of Franklin in southern Tasmania.



Photograph 1.1 Franklin Main Road looking south into the Town from near the Wooden Boat Centre.



Photograph 1.2 Franklin Main Road looking north from the Palais Theatre.



Photograph 1.3 The view south along the Franklin foreshore from adjacent the Recreation Ground.

1.2 THE CURRENT STUDY

In September 2002 the Huon Valley Council and the Franklin Streetscape Reference Group prepared a Consultant Brief for securing expertise in the development of a Township Plan for Franklin. A key component of this project was for an inclusive and transparent consultation process to ensure that identified issues are valid, and that the project outcomes are of benefit to the Franklin community.

Inspiring Place Pty Ltd was engaged to provide plan management, advice and oversight of the consultation process in the preparation of a concept township plan for Franklin. The study area is illustrated in Map 1.2.

The development of a township plan for Franklin furthers a resurgence in civic pride in Franklin. Such pride has so far gained Council support for programs including; the Shipwrights Point School of Wooden Boat Building; the preparation of a township heritage study[7]; the completion of the *Franklin Foreshore Landscape Plan*[8], and restoration of the Palais Theatre.

Whilst the *Franklin Township Plan* focuses upon Franklin's main street and adjacent foreshore, the character, significance and history of the connecting side streets and lanes informs the planning context of the *Franklin Township Plan*.

The following report outlines the key components of the *Franklin Township Plan*, including:

the background to, and approach taken in preparing the *Franklin Township Plan* (Chapter 1);

the development context of the plan, including the site conditions, cultural and statutory requirements (Chapter 2);

particular recommendations for strengthening each of the township precincts (Chapter 3);

discussion of key issues within the township and recommended responses (Chapter 4); and

the implementation strategy for the *Franklin Township Plan*, including an action plan, the recommended staging of development and order of cost estimate (Chapter 5).

7 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council.

8 Inspiring Place Consultants Pty Ltd., 1998. "Franklin Foreshore Landscape Plan: Stage 1- Franklin Boat Harbour Concept Plan" prepared for Huon Valley Council in association with the Shipwrights Point School of Wooden Boat Building, the Living Boat Trust and the Franklin Progress Association.



Map 1.2 The *Franklin Township Plan* extends from Huon Eldercare southward to the Catholic Church, focusing primarily upon Franklin Main Road (the A6 Huon Highway).

Attached to this report are plans, perspectives and images illustrating the key recommendations made within the *Franklin Township Plan* (Appendix A).

The development of the *Franklin Township Plan* was undertaken in the four broad stages detailed below. This approach is based on two key tenets:

a desire for a strong outcome that is practical, achievable and resource efficient; and

allowing for an effective community consultative program.

Stage 1. Initial Briefing

An initial meeting was held with the Franklin Streetscape Reference Group on the 19th February 2003, during their scheduled meeting time at the Palais Theatre. This meeting provided a briefing about planning and issues involved with the Township Plan project. The meeting served to confirm the work program and established targets for the completion of tasks. Information resources and local contacts were also identified.

Stage 2. Organisation

The second stage of the project focused upon organising resources for the proceeding consultation and township planning stage. This stage involved preparing base maps, undertaking research and finalising all arrangements for community and stakeholder consultation. A media release was provided to the Huon News, so as to promote Stage 3 of the project, and is included at Appendix B.



Photograph 1.4 Stage 3 of the project involved a practical consultation workshop in Franklin.

STAGE 3. CONSULTATION AND TOWNSHIP PLANNING

This stage revolved around a three-day 'intensive' planning program (Sunday 2nd through to Tuesday 4th March 2003). This involved:

a half-day workshop involving the broad community and key stakeholders in an assessment of the opportunities, constraints, issues and options associated with the township (the workshop included a community walk, slide show, and subsequent discussion of issues and opportunities raised);

on-site meetings with Huon Valley Council staff, and the Department of Infrastructure, Energy and Resources (Transport Division) on Monday 3rd March;

brief and informal meetings with representatives from businesses and organisations wishing to have input into the development of the Franklin Township Plan on Monday and Tuesday;

preparation of a *Preliminary Township Plan*; and

presentation of the preliminary concept landscape plan to the Streetscape Reference Group for an initial response to the ideas and directions taken, and a subsequent site visit with some reference group members.

STAGE 4. COMMUNITY REVIEW AND FINAL DOCUMENTATION

This stage documented work of the previous stages and develops the *Franklin Township Plan*, in response to issues identified during the initial presentation to the Streetscape Reference Group on 4th March, whilst also expanding upon the level of detail documented within the *Franklin Township Plan*. Detail provided within accompanying plans includes graphics and photo-montages illustrating key features of the *Franklin Township Plan*.

During this fourth stage of the project, the report was developed to provide the planning context for the *Franklin Township Plan*; illustrating both the identified constraints and establishing the strategic context for development.

A preliminary plan and report was presented to the Management Executive (MANEX) Meeting of the Huon Valley Council on 8th April 2003 to confirm strategic positioning of the developing plan.

The *Franklin Township Plan* was released for public review and comment on the 28th April 2003, and finished on Friday 2nd June 2003. The public review was advertised through an article in the Huon News, and is included at Appendix C.

The large format plan was placed on display at the Franklin Post Office, and reports were displayed at the Huon Valley Council Offices, Arthurs Takeaway and the Franklin Post Office. A comment book was provided at each of the above locations to record public responses

An evening workshop was held with the Franklin Streetscape Reference Group on Tuesday 3rd June 2003 to gain further review and comment.

The four-week public review period culminated in the review and/or incorporation of responses and commentaries, a review of public comment, including the consultant's response is included as Appendix D. The implementation strategy (Chapter 5) is the work of the final stage of the project.

1.2 ACKNOWLEDGMENTS

Inspiring Place Pty Ltd wish to thank those members of the community who volunteered valuable information, advice and feedback during the various stages of the project.

Similarly, the assistance of Maureen Oates of the Huon Valley News, Tony Leddiman of the Franklin Post Office, and Sheila and Arthur Salmon of Arthurs Take Away with the publicity and display component of the project is greatly appreciated.

The consulting team is also grateful for the advice and support given by the Huon Valley Council through officers of the Environment and Development Services, Engineering Services, and Community Development Departments; in particular Daniel Smee, Grant Tollond and Tony Coulson. Russell Bower and Ray Dyer, from the Department of Infrastructure, Energy and Resources (DIER), are similarly thanked for their assistance with various components of the project.



CHAPTER 2
BIO-PHYSICAL, CULTURAL AND STATUTORY CONTEXT FOR DEVELOPMENT

This chapter describes the bio-physical, cultural and statutory context for the development of the *Franklin Township Plan*. The chapter is in four parts:

an overview of the biophysical setting, including geomorphology, hydrology, flora and fauna (Section 2.1);

a description of the cultural values apparent within Franklin (Section 2.2); and

an outline of the statutory requirements and responsibilities (Section 2.3).

2.1 PHYSICAL AND BIOLOGICAL SETTING

The key physical and biological features of Franklin are provided in Table 2.1.

Feature	Comment	Influence on town setting and township planning
Climate	• Franklin is sited within a 'Humid Cool' climatic zone[9] • approximate annual rainfall is 750-1000mm with a winter maximum[10] • temperatures are moderate relative to the warmer north eastern and eastern parts of the State[11] • relative to other parts of the State, the area is more susceptible to frosts and has a lower annual sunshine duration average[10]	• rainfall and temperature are adequate to support existing agriculture • climate does not severely limit outdoor recreation activities • climatic conditions support ornamental irrigation without requirement for irrigation

9 Gentilli, J., 1972. **Australian Climate Patterns** Thomas Nelson Limited, Sydney, p.254.
10 DeRose, R. C., 2001. **Land Capability Survey of Tasmania, D'Entrecasteaux, Report** Department of Primary Industries, Water and Environment, Tasmania.
11 Bureau of Meterology, 1993. **Climate of Tasmania** Department of the Arts, Sport, Environment and Territories, Canberra.

Feature	Comment	Influence on Town setting and townscape planning
Geology/ Geomorphology [12]	• the Franklin township is situated on Quaternary alluvial deposits, primarily river terrace deposits • the hills rising to the west of the township are Jurassic dolerite formations • the Huon Highway traverses the divide between the above two formations • 1km to the south of Franklin, there are some Permian siltstone, sandy siltstone and minor sandstone beds • the reclaimed foreshore consists of Quaternary alluvium dredged from the adjacent Huon River	• the underlying geology of Franklin, when coupled to climatic and soil conditions limits the amount of arable land • in the past (1920's) there was major reclamation works of the river to create the current foreshore areas used for public recreation • the flat reclaimed area is conducive to community recreation ground. • flatness of fill areas has caused drainage problems in some areas
Landform	• Franklin is situated on the River's edge between the Huon River to the east, and Mansfield and Phillips Hills' to the west • without treatment, the foreshore consists of shifting mudflats and sand spits • much of the foreshore area between the Huon Highway and the Huon River was reclaimed in the early 1920s[13]	• difficulty of travel over river flats established a predominance upon riverine transport and communication • riverside setting provided catalyst for the enduring boat building legacy • linear spread of Franklin attributed to both riverine access and physical boundaries established by adjacent landforms • the foreshore reclamation reflected an aspiration to provide a community facility including an esplanade,[14] which is reflected in the location of recreational facilities in the foreshore precinct • the Huon Highway traverses just inland of what was the historic foreshore

12 This component drawn from information in, Farmer, N., 1981. **Geological Survey of Tasmania Kingborough 1:50 000** Department of Mines, Hobart.
13 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council, p.5.
14 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council, p.9.

Feature	Comment	Influence on Town setting and townscape planning
Soils[15]	• riverine flats consist of a deep gradational soil >1.4m • light clay surface over medium clays • problems of inundation/waterlogging evident on foreshore areas and drainage flats, particularly some reclaimed areas • soil depth generally decreases upslope onto the elevated and well drained areas to the west • land capability class is likely to be 4 for the lower slopes above the Huon Highway, and class 5 for slopes above 60m, no class was surveyed for the foreshore area east of the Huon Highway[16]	• the majority of land around Franklin has been used for apple production and some improved pasture due to restrictions upon agricultural versatility[17] • restrictions upon agricultural use of class 4 and 5 land overlying Jurassic dolerite include climate, stoniness and soil permeability
Surface Hydrology	• Franklin is bounded by the Huon River estuary to the east • small creeks drain through the town from the ridge to the west of Franklin • parts of the foreshore reclamation are subject to poor drainage and hence inundation under flood/high tide conditions	• the Huon River provided the initial development impetus for Franklin • the riverside setting provides important definition, identity and recreation for Franklin • the Huon River provides an important visual focus throughout the town from the Huon Highway • Prices Creek and other drainage lines provide physical connections between the Huon River and township development • Prices Creek powered a small Hydro-electric scheme for Franklin until 1929[18]

15 Unless otherwise indicated, this component is drawn from material within Davies, J., 1988. **Land Systems of Tasmania Region 6:South, East and Midlands – A Resource Classification Survey** Department of Agriculture, Tasmania.
16 DeRose, R. C., 2001a. Land Capability Survey of Tasmania, D'Entrecasteaux, 1:100 000 map, Department of Primary Industries, Water and Environment, Tasmania.
17 DeRose, R. C., 2001b. **Land Capability Survey of Tasmania, D'Entrecasteaux, Report** Department of Primary Industries, Water and Environment, Tasmania.
18 Young, J., 1995. "Back to the Future: Choosing a Meaning from Regional History" **Tasmanian Historical Studies**, Vol.5:1 pp. 114-131.

Feature	Comment	Influence on Town setting and townscape planning
Flora[19]	• drainage flats support an open forest dominated by *Eucalyptus ovata*, and an understorey that includes *Melaleuca squarrosa, Leptospermum lanigerum* and *Lomandra lonigfolia.* • the lower slopes and protected gullies support an open forest to tall open forest dominated by *Eucalyptus regnans* and *Eucalyptus obliqua* with an understorey that includes *Acacia dealbata, Pomaderris apetala, Pteridium esculentum, Acacia melanoxylon, Dicksonia antarctica* and *Acacia verticillata* • cleared areas for development have established lawns and ornamental gardens, that include numerous significant exotic tree species	• only small pockets of native vegetation remain within Franklin, with much of the riparian vegetation dominated by willows (*Salix* spp.) and blackberry (*Rubus* spp.).
Fauna	• the area would have supported a suite of species adapted to the local habitat types.	• cleared developed areas support a mixture of fauna including common native and exotic species

Table 2.1 A summary of the biological and physical context, and their influences upon township development within Franklin.

2.2 CULTURAL CONTEXT

Franklin is situated within a region inhabited by the indigenous Mellukerdee people, a band of the South East Tribe of Tasmanian Aborigines. The Mellukerdee band occupied a territory centred upon the Huon River, and unlike other tribes, bands of the South East Tribe did not move inland during spring and summer. Therefore the landscape around the Huon River may well have been inhabited year round, extending into the surrounding waterways as the South East Tribe were certainly the most maritime of the Aboriginal Tasmanians[20].

[19] Unless otherwise indicated, this component is drawn from material within Davies, J., 1988, *Land Systems of Tasmania Region 6:South, East and Midlands – A Resource Classification Survey,* Department of Agriculture, Tasmania.

[20] Ryan. L., 1996. **The Aboriginal Tasmanians** 2nd Edition, Allen and Unwin, Pty Ltd, St Leonards, p39-42.

The establishment of a packhorse trail through the Huon Valley in 1829 initiated European settlement in the Franklin area. Nine years after that initial opening up of the Huon Valley, Lady Jane Franklin (wife of then Governor Sir John Franklin) sub-divided a small holding on the Huon riverside, and established the Huon Settlement[21]. Although relatively short, the Franklin's involvement in establishing the town is recognised in the subsequent re-naming of the town.

The majority of residential development within Franklin has historically occurred to the west of the Huon Highway, with the foreshore reclamation in the 1920s subsequently allowing limited development for both residential and commercial purposes to the east of the Huon Highway. Due to the historic riverine dependence of Franklin, much development has occurred in a linear fashion enabling maximum access to the foreshore.

The construction of the Huon Highway combined with the local landform has exacerbated the tendency for linear development within Franklin. Recognising this, the local planning scheme suggests that further linear development along the Huon Highway at either end of Franklin should not be permitted, and future development should occur to the west of the Main Road.[22]

In 1992 the historic value of Franklin was further recognised by the declaration of Franklin as a Historic Town by the then Department of Environment and Planning, with the support of the National Trust of Australia (Tasmania)[23]. Several features within Franklin are recorded on the Register of the National Estate by the Australian Heritage Commission (AHC), these include listings of:[24]

> St Johns Anglican Church, Hall and Churchyard as a registered site; and
>
> Egg Islands Geoheritage Area and McMullens Leithbridge Sawmill Complex are listed as Indicative Places.

21 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council, p4.

22 Huon Valley Council, 1979. **Huon Planning Scheme 1979** Schedule 5. p37

23 Declared in correspondence between the Department of Environment and Planning, Planning Division, and the Huon Valley Council, 16.09.92.

24 Australian Heritage Commission, 2003. "Register of the National Estate Database" available: http://www.ahc.gov.au/cgi-bin/register/fsearch.pl 31.03.03.



Within Franklin, the *Huon Planning Scheme 1979* identifies St Mary's Church of England; Prices Rivulet Cemetery; the Methodist Church; John Surtees White Brick Cottage, the Roman Catholic Cemetery; Walpole House and the Federal Hotel as 'buildings of historic or architectural interest or of special beauty'[25]. The planning scheme also recognises that Franklin has a unique character, and that this character and contingent buildings should be maintained, with new developments sympathetic to the existing fabric[26].

Much of the *Franklin Township Plan* reinforces the recommendations made by *The Franklin Heritage Study 1995*. Particularly, the *Franklin Township Plan* aims to:

strengthen the civic role of the war memorial;

support the selective use of conifers (Norfolk Pines) as landmarks within the town at key locations on the Huon Highway;

strengthen and reclaim the role of the foreshore precinct for the local community; and

provide interpretation of local history and art works to further cultural tourism within Franklin.

The *Franklin Heritage Study* recommends the retention of river views from both the Recreation Ground and Franklin Main Road, therefore some controls on buildings and vegetation maybe required to maintain these views[27]. Recommendations within the *Franklin Township Plan* regarding streetscape, foreshore and formal plantings are limited so as to maintain these riverine views.

2.3 STATUTORY CONTEXT

The zoning of the areas relevant to the *Franklin Township Plan* are set out in the *Huon Planning Scheme 1979,* these include:

the majority of the foreshore area is zoned Public Open Space;

on the eastern side of Franklin Main Road there are several land use zonings, including, Closed Residential, Business Commercial, Public Purpose and Light Industrial;

25 Huon Valley Council, 1979. **Huon Planning Scheme 1979** Schedule 5. p47.
26 Huon Valley Council, 1979, **Huon Planning Scheme 1979** p37.
27 Gulson, L., 1995. "Franklin Heritage Study" unpublished report to the Huon Valley Council, p14

similarly, the western side of Franklin Main Road has mixed zonings including Closed Residential, Business Commercial, Public Purpose and Village; and

westward up the hill from the residential development, the land is zoned Intensive Rural, and then Rural.

Being a State Highway, the Department of Infrastructure, Energy and Resources (DIER) retain responsibility for the Huon Highway and thus the suitability and approval of access points onto the highway.

CHAPTER 3
STRENGTHENING COMMUNITY PRECINCTS

For the purposes of preparing the *Franklin Township Plan*, the town was divided into a number of precincts:

township entrances;

Franklin Main Street;

maritime heritage;

sporting and recreation; and

public space.

These precincts are identified on the *Franklin Township Plan* attached to this report (Appendix A).

The following chapter of the *Franklin Township Plan* describes each precinct within Franklin, and makes recommendations about strengthening the role and unique features of each precinct. Issues evident within each precinct are also identified.

The responses draw upon principles designed to increase township amenity through:

retaining the character of Franklin as a regional residential town with a human scale;

restoring the historic connections between Franklin and its foreshore precinct;

strengthening and *promoting* pedestrian linkages between the different precincts within Franklin;

focusing township and community activity by means of landscape design and improvements; and

rectifying unsafe conditions related to vehicle movements through Franklin.

3.1 COMMUNITY PRECINCTS

3.1.1 Township Entrances

Currently there are no well-defined entrances to Franklin along the Huon Highway, however the existing lay-by areas and potential for obtaining panoramic views provide good opportunities for improving the entrances to the township.

At both the northern and southern approaches to Franklin there is considerable room to establish an improved 'entry' experience to the town. This includes creating a more formal lay-by and parking area, creating a safe and attractive viewing platform, landscaping and links to the foreshore.

Other recommendations for the entrance precincts shown on the *Franklin Township Plan* include:

removing environmental weeds, particularly Willow (*Salix* spp.) and blackberry (*Rubus* spp.), from the foreshore area to provide views and restore the native riparian vegetation;

continuing the foreshore trail northward from the Wooden Boat Centre to the northern lay-by area;

strengthening the *Eucalyptus* plantings at the northern entrance, perhaps with matching plantings on the opposite side of the Huon Highway;

establishing a foreshore trail from the southern playground area, behind the Courthouse Café, to the lay-by opposite the Catholic Church;

establishing matching *Eucalyptus* plantings at the southern lay-by; and

establishing entrance signage to signify the welcome to Franklin, and the facilities and experiences within the town (e.g. use of interpretation, information and symbols).

Within these entrance precincts several key issues have been identified that constrain the functionality and amenity of these areas, including:

traffic management, particularly speed and parking;

township amenity including landscaping; and

safe pedestrian movement and access through the town.

Specific recommendations for responding to these broader issues are discussed in Chapter 4.

3.1.2 Franklin Main Street

Essential commercial and community services are located along the main street within Franklin. The main road is both a State Highway and the core commercial district of the town, it therefore caters for local community needs as well as its established transport function as a strategic road to southern parts of Tasmania.

Other recommendations for the main street precinct shown on the *Franklin Township Plan* include:

selective street plantings of *Calitrus* spp. located between property boundaries so as not to impact upon residents' views;

lowering of the speed limit from 60 km/h to 50km/h through the Main Street precinct;

the upgrading of the western roadside footpath to establish a high quality pedestrian link between Huon Eldercare and the Catholic Church;

construction of new pedestrian and multiple use linkages on the eastern side of the road;

removal of street edge fence around the perimeter of the Recreation Ground;

use of selected Norfolk Pine plantings as 'landmark plantings' at entrances to major community facilities (Recreation Ground, War Memorial and proposed Village Square);

establishment of ornamental flower gardens to strengthen the role of the War Memorial in this precinct;



establish better entry and car parking to the proposed Village Square;

formailse the car parking and landscaping around the Palais Theatre car park; and

establish formal crossing points of Franklin Main Road;

Many issues have been identified for the main street precinct, these include:

traffic management, particularly speed and parking;

township amenity including landscaping; and

safe pedestrian movement and access through the town.

Specific recommendations for responding to these issues are discussed in Chapter 4.

3.1.3 Maritime Heritage

The Maritime Heritage precinct is that area surrounding the Wooden Boat Centre and Living Boat Trust buildings at the northern end of the town. Already these operations have become a major attraction for visitors to the town.

The rationale of establishing this precinct is to highlight these maritime heritage related activities and to provide a context within which surrounding landscaping and development can take place. The extension of the foreshore through this precinct, and past the workings of these properties, reinforces the vibrant nature of maritime activities within Franklin.

The *Franklin Township Plan* illustrates a landscaped edge to Franklin Main Road, and the provision of public access trail along the foreshore. If current lease negotiations are agreed, this area could be developed providing additional parking, improved access and other facilities as indicated.

The *Franklin Township Plan* illustrates:

formalisation and consolidation of access and egress;

provision of parking for small vehicles whilst maintaining safe movement for buses and larger vehicles;

retention of public access to the foreshore and continuation of the foreshore trail through this precinct;

construction of a pedestrian and viewing platform incorporating the wharf near the Franklin Evaporators;

retention and upgrading of the wharf behind the Franklin Evaporators so as to provide an access facility for short term boat visits;

upgrading the existing boat ramp to an all-weather community facility;

construction of public toilets in the car parking area; and

establishment of substantial landscaping to improve visual amenity and shade.

Within the maritime precinct several key issues have been identified that constrain the functionality and amenity of this areas, including:

traffic management, particularly formalised parking and access/aggress from the precinct;

township amenity including landscaping; and

safe pedestrian movement, particularly access and crossing of Franklin Main Road.

Specific recommendations for responding to these issues are discussed in Chapter 4.

3.1.4 Sporting and Recreation

The sporting and recreation precinct builds upon the historic aspiration to provide a major community space and facilities including an Esplanade.[28] This precinct is sited predominantly upon the reclaimed foreshore, and strengthens the established role of the foreshore for sporting and recreational activities including rowing, cricket, lawn bowls, walking and other passive recreation uses.

The *Franklin Township Plan* recommends the following development within the sport and recreation precinct:

reconstruction of the tennis court to provide a useful facility for community use (if community support exists);

provision of netball and half-court basketball opportunities using the tennis court;

28 Gulson, L., 1995, Franklin Heritage Study, unpublished report to the Huon Valley Council, p.9.



retention of robust and trafficable landscaping that can cater for the large parking and vehicular movement demands during key sporting events;

sealing of the access road around the Recreation Ground;

restore WWI memorial gates and add Norfolk Pine plantings to formalise the entrance to this precinct;

the removal of the surplus fence running around the oval;

robust grassed parking areas and shade trees around the perimeter of the Recreation Ground;

investigate relocation of practice cricket nets to a site near the changing rooms as shown on the *Franklin Township Plan* (thus balls are hit into the oval rather than into public spaces and locating the practice nets adjacent the other cricket facilities); and

formal parking adjacent to the Bowls Club, tennis court, and opposite the Palais Theatre (next to the change rooms).

Within the sporting and recreation precinct several key issues have been identified that constrain the functionality and amenity of this area, including:

traffic management, particularly access, parking and movement;

township amenity including landscaping and provision of facilities; and

safe pedestrian linkages to business and facilities within the town.

Specific recommendations for responding to these issues are discussed in Chapter 4.

3.1.5 Public Space

The public space precinct builds upon the strong connections between Franklin residents and the foreshore area, and in part, regains some of the foreshore area for continued public access and enjoyment.

Elements recommended for the public space precinct shown on the *Franklin Township Plan* include:

creating a formal Village Square to be used for various community events, festivals and functions, repeating the use of Norfolk Pines to identify an entrance to this area, and re-enforcing the functionality of this area with formal but robust landscaping;

formalising access and parking through the Public Space precinct, so as to return the immediate foreshore area as a vehicle free space for safe passive recreation;

containing the potential camping to the area shown in the *Franklin Township Plan* and providing informal tree plantings for shade and amenity;

establishing art installations or sculptural elements along the foreshore trail;

providing picnic tables and facilities at selected locations along the foreshore;

providing new toilet facilities at two sites as indicated on the plan; and

upgrading the existing play ground facility at the southern end of the foreshore, including new play and barbeque equipment, and relocation of the picnic shelter.

Within the public space precinct several key issues have been identified that constrain the functionality and amenity of this area, including:

traffic management, particularly access and parking;

township amenity including landscaping and provision of facilities; and

safe pedestrian movement, recreation opportunities and access to the foreshore.

Specific recommendations for responding to these issues are discussed in Chapter 4.

CHAPTER 4
KEY RECOMMENDATIONS

This Chapter details the responses to the key issues identified in consultation with the Franklin community during both the planning workshop and during subsequent site visits. The Chapter also sets out a response to the key issues identified within the precincts, those being:

traffic movement (Section 4.1);

pedestrian movement (Section4.2); and

township amenity (Section 4.3).

4.1 TRAFFIC MOVEMENT

Franklin was established as riverside town, and subsequently became a regional centre with the Huon River as the primary connection to other parts of Tasmania for trade and communication. Yet the Huon Highway now bisects the township, effectively separating the town from its foreshore commons and its riverside heritage. The regular flow of heavy vehicular traffic, establishes a sense that Franklin is a 'transport corridor'[29] rather than a *town*, and further marginalises the foreshore.

The Huon Highway will always remain fundamental to southern Tasmanian road transport; there are no plans for by-passing the town or developing new road links for the Huon Highway that will reduce the current traffic use. Subsequently it will continue to service heavy vehicles and also a high volume of traffic, with an expected increase in visitors traveling in the Huon Valley[30].

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29 Young, J., 1995. "Back to the Future: Choosing a Meaning from Regional History" **Tasmanian Historical Studies**, Vol.5:1 pp. 114-131.

30 Long term historic traffic growth at sites on the Huon Highway to the northern and south of Franklin has been equivalent to compound rates of about 2.2% per annum and 2.5% per annum respectively (R. Dyer, 2002. *pers. comm.* [Engineer, Traffic Information Asset Information Group, Transport Infrastructure Branch, Roads and Public Transport Division Department of Infrastructure, Energy and Resources])

Table 4.1 show illustrates 2002 Franklin derived traffic flow data[31]:

Traffic Count	Volume
Average Annual Daily Traffic (AADT)	**3885 vpd**
Truck Traffic[32]	
(as % of AADT)	8.53%
(as trucks per day)	327 vpd
Semi-Trailer Traffic[33]	
(as % of AADT)	2.44%
(as semi-trailers per day)	93 vpd
Average Annual Weekday (workday) Traffic	**4135 vpd**
Truck Traffic	
(as % of AAWT)	10.23%
(as trucks per weekday)	416 vpd
Semi-Trailer Traffic	
(as % of AAWT)	2.98%
(as semi-trailers per weekday)	121 vpd

Table 4.1 Summarised traffic volume data for Franklin, as vehicles per day (vpd) and percentage (%) of average volumes.

The summary traffic data for Franklin Main Road illustrates several pertinent trends, including:

> the average annual traffic flow through Franklin is nearly 3885 vehicles per day (VPD);
>
> weekday traffic is slightly higher than weekend traffic, being 4135 vpd; and
>
> heavy traffic accounts for just over 10% of the average annual traffic volume, and slightly higher at 13.21% on weekdays;

Within this context, the *Franklin Township Plan* must respond to traffic flow in a pragmatic and achievable manner, utilising simple planning instruments and design elements that improve pedestrian amenity.

This component of the plan responds to traffic movement through several measures, the combined result essentially being to slow vehicular traffic down through both direct (e.g. speed limits) and indirect means (e.g. reducing sight lines).

31 The DIER has no recent traffic data for Franklin, the traffic data provided is an average of results from (1) Huon Highway, 700m south of Glen Huon Main Road, Southbridge and (2) Huon Highway, 300m east of Scotts Secondary Road (Northern Junction), Geeveston. In 1992/1993, traffic counts showed that traffic in Franklin was very nearly the average of traffic at these two sites (R. Dyer, 2002. *pers. comm.*).

32 A Truck is any vehicle with more than 3.2 metres between the 1st and 2nd axles or with twin steer axles (i.e. AUSTROADS 1994 Classification).

33 A Semi-Trailer is any Truck (as above) with more than two axle groups (i.e. AUSTROADS 1994 Classification).



4.1.1 Speed Limit Reductions

The current speed limit through Franklin is 60km/h, with the 60km/h zoning starting just north of the Huon Eldercare and south of the Catholic Church. There is neither 50km/h urban or shopping limit, nor 40km/h school zone on Franklin Main Road. Both site observations and community commentaries suggest there is regular traffic traveling through the town above this maximum speed limit.

The key recommendations to improve safety through speed limit reductions are:

establishment of a 50km/h zone through the length of Franklin, recommended to start at least 100m north of the Wooden Boat Centre, and continue to at least 100m south of Walpole Lane; and

retaining the 60km/h zoning at the northern and southern ends within Franklin as step down zones from 80 km/h approaches to the town along the Huon Highway.

4.1.2 Roadway Line Markings

Within Franklin there are several areas where road lane markings are absent, and whilst not uncommon in many rural and residential districts, the absence of such markings does reduce the formality of Franklin Main Road and encourage higher traffic speeds.

This argument can particularly be applied to areas of Franklin Main Road shown in Photograph 4.1, where no lane markings are evident. This notionally defines the trafficable lanes as much wider than they are, encouraging an incorrect perception of a more open and wider highway rather than an enclosed road within a residential and commercial precinct.

The key recommendations to address line markings along Franklin Main Road are:

the completion of lane markings to define the formal width of the lanes ; and

the completion of lane markings to formalise roadside parking opportunities.



Photograph 4.1 The absence of edge markings along Franklin Main Road aids an incorrect perception of an open and unrestricted roadway.

4.1.3 Street Plantings

Whilst the urban avenue style street plantings is both impractical and received limited community support (mainly due to loss of views), selective street plantings along the Main Road are recommended to aid the reduction of traffic speed. These plantings, as shown on the *Franklin Township Plan* aid traffic management through:

the use of selective street plantings of *Calitrus* spp. to reduce the long site lines now available through Franklin; and

establishing dense native plantings close to the road edge will also reduce sight distances and help provide a reduction in both the perceived width of the roadway.

4.1.4 Crossing Points

The need to delineated crossing points across Franklin Main Road is established by the spread of commercial properties along both sides of the road where adjacent parking may not be available, and by students from Franklin Primary School who regularly cross the Main Road to utilise the facilities at the Living Boat Trust and Recreation Ground.

No formal crossing points of Franklin Main Road are provided within the township. Yet adjacent New Road, opposite the Palais Theatre and near the proposed Village Square are regularly used as crossing points.

The *Franklin Township Plan* recommends formalising these crossing points through a combination of:

bulbed curbing to provide greater visual prominence of the crossings;

identifying crossing points through a different pavement colour and possibly traffic islands; and/or

using road line markings to identify crossing points.

More detail on pedestrian movement is provided in Section 4.2

4.2 PEDESTRIAN CIRCULATION

Within Franklin, there is considerable pedestrian circulation occurring within the town. This includes movement across the Main Road to access both the foreshore area and commercial properties, walking to work, school, and shops, walks are also being undertaken by visitors to the town. The linear spread of the town, the dispersal of commercial premises and business through the town, and the extensive use of the foreshore area all generate pedestrian movement that can be in conflict or competition with vehicular traffic.

Events including rowing regattas, cricket matches, use of the Palais Theatre, and primary school activities can all produce large numbers of people traversing and crossing the Main Road.

The above commentary recognises that the Franklin Main Road will always remain a vital and busy road; therefore the priority for pedestrian circulation is to provide pedestrian facilities that remove unsafe situations between pedestrians and vehicles.

The responses detailed below strive to both return and strengthen pedestrian amenity within Franklin, and include the upgrade up existing footpaths, completion of missing pedestrian links between precincts and services, and the establishment of new passive recreation opportunities.

4.2.1 Multiple Use Tracks

The *Franklin Township Plan* identifies the foreshore trail as a multiple use trail for walking, running, jogging and bike riding. Aside from sections along the northern boardwalk, where steps and timber surfacing may be impractical (and the use of ramps should be investigated), the foreshore trail is recommended to provide:

suitable surfacing such as cement stabilised gravel;

adequate drainage to provide all-season use; and

suitable width of 1.8m to 2.1m to allow safe passing for all users.

Recognising the heavy traffic load using Franklin Main Road, new multiple use links are shown on the *Franklin Township Plan* to:

connect the War Memorial and crossing outside the Palais Theatre to the public space adjacent the proposed Village Square; and

construct a multiple use path along the gravel drive to the change rooms between the recreation ground and the Main Road.

4.2.2 Pedestrian Tracks

On the *Franklin Township Plan*, the pedestrian only tracks would be those at the extreme northern and southern ends of the Foreshore Trail. At these points the requirement for steps and timber decking may inhibit other uses, wherever possible though, the construction of the foreshore trail should accommodate a range of recreational uses.

4.2.3 Crossings Points

As discussed at Section 4.1.4 above, there are three distinct points at which people current cross Franklin Main Road, and certain improvements than can be made to improve traffic management at these points. Similarly, the recommendations at 4.1.4 would improve pedestrian circulation within Franklin.

4.2.4 Upgrade and Establish New Footpaths

A priority within Franklin must be the upgrading of the existing footpath along the western edge of the Main Road. In the absence of a complete footpath along the opposite roadside, most pedestrians would use this footpath. Currently the western footpath is of a generally poor and inconsistent standard, including poor and uneven surface, occasional inundation, considerable obstructions and narrow width.



The *Franklin Township Plan* recommends a considerable upgrade of the western footpath so as to provide a high standard of pedestrian access through Franklin from Eldercare southward to the Catholic Church. Such an upgrade would provide increased mobility and safety for residents, Eldercare residents, school children and visitors alike, and would include:

upgrade western footpath a consistent 1.8m to 2.1m width and even cement surfacing;

remove obstructions and provide adequate drainage;

investigate options for improved street lighting; and

integrate footpath upgrading with establishment of formal crossing points of Franklin Main Road.

On the eastern roadside it is impractical to establish a continuous footpath through the town due to constraints by commercial and residential development. Instead, the continuity and amenity of the eastern roadside can be improved by:

establishing a footpath between Arthurs Takeaway and the recreation ground;

constructing a multiple use path along the gravel drive to the change rooms between the recreation ground and the Main Road;

develop multiple use path leading from in front of the bowls club, passing behind the residential development, connecting to the proposed Village Square;

proving a pedestrian access along the eastern roadside from in front of the Fire Station to the foreshore access (opposite Walpole Lane); and

integrate footpath and multiple use paths with formal crossing points of Franklin Main Road.

4.2.5 Establish Recreation Loop

The implementation of the above recommendations would effectively provide a multiple use loop through and around Franklin running along the upgraded western footpath through the commercial areas, and along the foreshore path, crossing the Main Road at delineated crossing points. This pedestrian loop may include:

street furniture (e.g. seats, rubbish bins);



incorporation of sculptural or artistic elements along the Foreshore Trail;

interpretative elements at selected sites to further cultural tourism and interpretation of Franklin's history (see Section 4.3.3); and

construction of steps leading between the War Memorial and the proposed parking area near the change rooms, thus improving linkages to and from the Palais Theatre to over-flow car parking areas.

A recreation loop would provide for walking and some cycling, and be of benefit to residents and visitors alike, supplementing the playground, picnic, viewing, barbeque and recreation facilities envisaged for the foreshore area. The pedestrian loops would actively promote public access and recreation throughout the town and foreshore area, helping to re-establish historic connections between the Main Road and foreshore precincts of Franklin.

4.3 TOWNSHIP AMENITY

4.3.1 Vegetation

Currently there is limited substantive ornamental vegetation within the Franklin. Private gardens include a number of exotic trees that compliment the historic ambience of the town. There are some scattered trees along the foreshore area, and some formal plantings such as those around the war memorial, but the remainder of the area is open and largely un-landscaped.

Regular avenue style street plantings were considered by the community to be neither practical, nor in keeping with the values of Franklin (many do not want Franklin to become a 'gentrified' village). Space for such extensive plantings is unavailable due to in ground services and road layout. Rather, the *Franklin Township Plan* recognises that limited and selected street plantings and scattered tree plantings elsewhere can have a functional role in traffic management as well as improving township amenity and comfort.

The application of vegetation for the improvement of township amenity includes:

limited and negotiated plantings of *Calitrus* spp. along Franklin Main Road to reduce sight lines, provide shade and increase visual amenity within the Town centre;

formal plantings around the Recreation Ground to delineate the ground;

formal plantings around the proposed Village Square to enclose the area;

the repetitive use of Norfolk Pines as 'landmark plantings' to mark the entrance to important community facilities (Recreation Ground, War Memorial and proposed Village Square);

informal native tree species plantings behind the Village Square, extending through the potential camping area and along the southern foreshore area;

extension of the native revegetation works along Prices Creek to provide a connection from the foreshore to the town; and

limited garden bed and street plantings to constrain sight lines and assist in traffic calming; and

rehabilitation of foreshore vegetation and wetlands, and other native vegetation within the entrance precincts to the Town.

4.3.2 Viewing Areas

The *Franklin Township Plan* shows three viewing areas; the establishment of two viewing areas as a component of the foreshore trail, and one originally recommended in the *Franklin Foreshore Landscape Plan*[34] The viewing areas and the foreshore trail effectively connect the foreshore with the entrances to Franklin, and are supplemented by the viewing opportunities available from jetties and wharves along the foreshore.

The recommendations for the viewing areas include:

a new viewing area with car parking and limited interpretive installations opposite Eldercare at the northern end of the town in the existing lay by area;

a new viewing and car parking area at the southern end of Franklin opposite the Catholic Church;

at the corner of the wharf behind Franklin Evaporators; and

the low key interpretative facilities can be located on viewing decks located part way down embankments to reduce visual impact.

34 Inspiring Place Consultants Pty Ltd., 1998. "Franklin Foreshore Landscape Plan: Stage 1- Franklin Boat Harbour Concept Plan" prepared for Huon Valley Council in association with the Shipwrights Point School of Wooden Boat Building, the Living Boat Trust and the Franklin Progress Association.



4.3.3 Interpretation

Good interpretation provides a means to communicate and explore the importance of the history, people and activities centred upon Franklin; thus enhancing the experience of residents and visitors alike.

Interpretation provides an approach to communication that translates technical language into readily understandable and identifiable themes.[35] To be successful, interpretation needs to:

> *be pleasurable*- it must hold the audiences attention and be presented in a creative manner that is authentic, entertaining, interesting and motivating;
>
> *be relevant*- it must be tailored to have meaning (e.g. it must connect with something the audience already knows) and be personal (e.g. it must link to something the audience cares about);
>
> *have a theme*- it must have a central message rather than just a series of topics- "the story is the thing"[36] – it must have a moral.

There are then, excellent opportunities to investigate the ideas and relationships evident within Franklin and its history through strong, innovative and creative themes and sub-themes. Be they indigenous[37], maritime, historic, or contemporary messages, themes provide the take home messages that the community wishes to impart.

The *Franklin Township Plan* provides many opportunities to provide a range of interpretive elements, including, fixed interpretation, artistic and sculptural works, and dynamic elements incorporating activities such as those of the Wooden Boat School, the Living Boat Trust or Palais Theatre. Planned elements, particularly those adjacent the foreshore trail, provide opportunity for a strong, creative and integrated interpretation strategy.

The *Franklin Township Plan* recommends the development of an interpretation strategy, which includes:

> the development of clear themes and sub-themes, that directly correspond to the authenticity of Franklin and the wishes of its community;

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35 Ham, S. 1992. **Environmental Interpretation** North American Press, Golden Colorado.

36 Tilden, F. **Interpreting Our Heritage** University of North Carolina Press, Chapel Hill.

37 It is critical to note that the development of any interpretation that portrays Aboriginal people, their history or activity, must be prepared in collaboration with the Aboriginal community



the identification of the best delivery mechanisms for the distilled themes;

the identification of how themes can be integrated with the overall identity and promotion of Franklin; and

clear proposals for implementation.

CHAPTER 5
IMPLEMENTATION STRATEGY

This Chapter sets out an action plan, a recommended staging for development and an order of cost estimate for the *Franklin Township Plan*.

5.1 ACTION PLAN

This Section provides an action plan for the works recommended in the *Franklin Township Plan*. Table 5.1 identifies the recommended action, the suggested priority of the works along with the responsibility for its implementation.

Within the table, the following abbreviations are used:

HVC – Huon Valley Council

DIER – Department of Infrastructure, Energy and Roads

FSRG – Franklin Streetscape Reference Group

FPA – Franklin Progress Association

A priority has been assigned to each recommended action. High priority actions are defined as those which:

meet identified needs for high priority user groups (youth and family) (e.g. implementation of reduced speed limits, provision of improved play and sporting facilities);

require immediate action to alleviate existing public liability concerns (e.g. upgrade of western roadside footpath);

create a strong community focus (e.g. removal of surplus fencing around Recreation Ground);

provide benefits for a diversity of users (e.g. completion of the Foreshore Trail);

have high recreational potential, particularly where they extend the value of an existing asset (e.g. completion of the Foreshore Trail); and/or

are important operational matters with minimal cost.

Moderate priority actions are defined as those which:

- improve the safety of the precinct (e.g. formailised parking and vehicle access to the Pubic Space and Sport and Recreation precincts);
- are required to enable staging of other works (e.g. upgrading of existing wharf and connection of Foreshore Trail behind the Evaporators);
- enhance the recreational experience and extend opportunities for visitor use (e.g. establish Township Entrances precincts); and/or
- improve the amenity of the precinct (e.g. ongoing implementation of the proposed plantings).

Low priority actions are defined as those which:

- are ongoing measures in response to localised problems;
- have high costs associated with them and can be forgone until such time as funds are available (e.g. Village Square); and/or
- require further planning and involvement of other agencies.

The designation of a high priority to an item does not necessarily imply an immediate time frame for its implementation. In many cases, additional planning and design development is required before a recommendation can be acted upon. While an action may have been assigned a particular priority within the *Franklin Township Plan* it does not necessarily imply a fixed order of development. The availability of funding may well change the order in which components of the *Franklin Township Plan* are implemented.

No.	Recommended Action	Initiating Stakeholder	Priority	Ref.
1	Adopt the *Franklin Township Plan* as the basis for future planning and development in Franklin.	HVC, DIER, FSRG, FPA	High	n/a
2	Investigate future funding options for implementing the *Franklin Township Plan* with Commonwealth and State Government Programs, HVC and service and community clubs etc.	HVC, DIER, FSRG, FPA,	High	n/a
3	Monitor and review the implementation of the *Franklin Township Plan* each year internally	HVC, FSRG	High	n/a
4	Establish 50km/h zone through Franklin and retain 60km/h zoning at the northern and southern entrances through town	DIER, HVC, FSRG	High	S4.1.1
5	Completion of road line markings along Franklin Main Road to define width and parking opportunities	DIER, HVC, FSRG	High	S4.1.2
6	Identification and delineation of safe crossing points for Franklin Main Road	DIER, HVC, FSRG	High	S4.1.4
7	Implement tree plantings along Franklin Main Road, including revegetation of Prices creek and continued environmental weed removal from foreshore areas	DIER, HVC	High	S4.1.3 S4.3.1 S3.1.2
8	Upgrade footpath along western roadside of Franklin Main Road to a consistent 1.8 to 2.1 m width, with improved drainage and obstructions removed	DIER	High	S4.2.4 S3.1.2
9	Construct a multiple use foreshore trail between township entrances	HVC	High	S3.1.1
10	Remove existing toilet and reconstruction of the public toilet at the site(s) within the Public Space precinct as shown on the *Franklin Township Plan*	HVC	High	S3.1.4
11	Formalise and consolidate the parking, access and movement adjacent the Living Boat Trust and Wooden Boat centre, including the upgrading of the existing boat ramp, landscaping and construction of public toilets	DIER, HVC and relevant leasees	High	S3.1.2
13	Remove surplus fencing and establish formal plantings around the Recreation Ground, including the restoration of the memorial gates and Norfolk Pines plantings	HVC	High	S3.1.3 S3.1.2
14	Upgrade existing playground at the southern end of the foreshore, including new picnic and barbeque facilities and relocation of the picnic shelter	HVC	High	S3.1.4
15	Reconstruction of the existing tennis court into a useful tennis, netball and half-court basketball facility, investigate relocation of cricket practice nets	HVC	High	S3.1.3

Table 5.1 Action plan for the implementation of the *Franklin Township Plan.*

No.	Recommended Action	Initiating Stakeholder	Priority	Ref.
16	Upgrade the existing wharf and construct the foreshore trail around Franklin Evaporators	HVC	High	S3.1.2 S4.2.1
17	Formalise and develop northern and southern entrances to Franklin, including formalised parking, environmental weed removal, native plantings and entrance signage	DIER, HVC, FSRG	Moderate	S3.1.1
18	Formailse vehicle access to and within the public space precinct, including the consolidation and surfacing of the proposed access road, provision of parking and picnic facilities, and containment of the potential camping area	HVC	Moderate	S3.1.4
19	Construct new pedestrian linkages between Arthurs Takeaway and the Recreation Ground, along the gravel drive to the change rooms between the recreation ground and Franklin Main Road, and multiple use path	DIER, HVC	Moderate	S4.2.4 S3.1.2
20	Formailse vehicle access to the sport and recreation precinct, including the consolidation and surfacing of the access road, robust landscaping, and parking adjacent the change rooms, tennis court and bowls club	HVC	Moderate	S3.1.3
22	Establish ornamental flower gardens at WWII memorial, formailised car parking and landscaping around the Palais Theatre, and steps between the WWII memorial and the propose parking area near the change rooms	HVC	Moderate	S3.1.2 S4.2.5
23	Construction of the proposed Village Square, including formailsed parking off Franklin Main Rd, plantings, landscaping, drainage, public toilets and multiple use tracks connecting to this precinct	HVC	Low	S3.1.2 S4.2.1 S3.1.4
24	Continued implementation of the recommended plantings and provision of picnic facilities throughout the Public Space precinct	HVC	Low	S3.1.4 S4.3.1
25	Prepare and implement an interpretation and community art strategy for inclusion within township planning	HVC, FSRG	Low	S3.1.4
26	Construction of the foreshore viewing platforms, and the foreshore decking adjacent the southern picnic and play area	HVC	Low	S4.3.2 S3.1.2

Table 5.1 (cont.) Action plan for the implementation of the *Franklin Township Plan*.

5.2 Recommended Staging of Development

It is acknowledged that current funding availability may not cover the complete package of works recommended in the *Franklin Township Plan*. Therefore, the long term implementation of the plan should be staged over a number of years.

A practical staging of developments is suggested for the short (1-2 years), medium (3-5 years) and long terms (5+ years). An adaptive approach to planning and development should be adopted. Such an approach would, over time, make best use of available funding opportunities for different recommendations within the plan.

Short Term

Implement reduced speed limits and complete road markings along Franklin Main Road, and delineate safe crossing points.

Establish street plantings along Franklin Main Road and upgrade western footpath throughout the length of the town.

Construct the multiple use Foreshore Trail.

Develop the Maritime Heritage precinct, including vehicular movement and access, parking, landscaping, and improvements to the boat ramp.

Reconstruct the public toilets, upgrade picnic and play facilities at the southern end of the Public Space precinct, upgrade tennis court to a multiple use facility.

Develop the Sporting and Recreation precinct, including removal of surplus fencing, consolidation and formalisation of vehicular access and parking along sealed link roads, removal of surplus fencing, and landscaping.

Medium Term

Upgrade existing wharf and provide boardwalk access behind the Franklin Evaporators.

Develop northern and southern Township Entrance precincts.

Develop the Public Space precinct, including the consolidation and formalisation of vehicular access and parking along sealed link roads, provision of picnic facilities and the containment of the potential camping area.

Establish plantings, landscaping and pedestrian access around the WWII memorial.



Preparation of interpretation and community art strategy for Franklin.

LONG TERM

Develop the Village Square facility, including improved drainage and parking, and substantial landscaping.

Construct pedestrian linkages on the eastern side of Franklin Main Road, and those between the proposed Village Square and the Recreation Ground.

Continue river edge stabilisation and erosion control works as required.

Construct the three viewing platforms integrated with the Foreshore Trail.

5.3 ORDER OF COST ESTIMATE

A cost estimate for the recommendations made in the *Franklin Township Plan* has been prepared for the Franklin Streetscape Reference Group and the Huon Valley Council which shows the total cost of all works plus professional fees as being in the order of $1.9M. This total is broken down into appropriate sub-totals in Table 5.2.

Sub-Total Works	$1,411,800
- Site preparation, demolitions and preliminaries (20%)	$282,360
Total Works	$1,694,160
- Contingencies (10%)	$169,416
- Professional fees (7.2% AILA fee scale)	$121,980
Total	**$1,985,556**

Table 5.2 Order of cost estimate for *Franklin Township Plan.*

The total budget includes allowances for site preparation, demolitions and preliminaries (20%). Professional fees (7.2%) and contingencies of 10% are based on total works estimate of costs, including preliminaries. Professional fees are based on the Australian Institute of Landscape Architects (AILA) recommended scale of percentage fees, and vary as a percentage in relation to the total scope of works.

Saving would be made were design, documentation or tendering undertaken by Council staff, and where Council staff, day labour or some form of community employment scheme, undertakes the work. In some instances an estimate of the scope of works has been made based on the Consultants experience of projects of a similar nature to those envisaged.

The estimate of cost are based on the following method:

the *Franklin Township Plan* was divided into 12 landscape types of comparable development recommendations;

typical key maps were selected as indicative of the materials and works within these landscape types;

the typical key maps were costed to determine an order of cost per square metre;

this cost rate was then applied to the relevant landscape type to determine the total order of cost estimate.

Appendix E contains the landscape types map, typical key maps and workings used to determine the order of cost estimate.



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APPENDIX A
FRANKLIN TOWNSHIP PLAN

Franklin Township Plan

Franklin Township Plan

APPENDIX B
HUON NEWS RELEASE PROMOTING WEEKEND WORKSHOP

CONCEPT PLAN FOR FRANKLIN TOWNSHIP

Inspiring Place Consultants, John Hepper, Jerry de Gryse and their team, are returning to Franklin to work with the local community to help prepare a concept plan for the Franklin township.

Having prepared the Franklin Foreshore Landscape Plan for the area surrounding Shipwrights Point, the Inspiring Place team has been engaged by the Huon Valley Council and the Franklin Township Reference Group to help develop a concept township plan for the whole of Franklin.

The plan is to encompass the township of Franklin, from the Catholic Church in the south, northward to Huon Eldercare. The township plan is to address a range of issues related to the Huon Highway and the adjacent foreshore, including foreshore development; car parking and traffic management; landscaping, public toilets and playgrounds; recreational walks; street furnishings and amenity; and protecting Franklin's inherent historical values.

The Inspiring Place team sees their role as working with the local community to:

expand on the ideas generated in their previous work surrounding Shipwrights Point;

respect the significant heritage values of the town;

draw inspiration from the town's beautiful river setting; and

address community concerns for township amenity, presentation and civic development.

The preparation of the concept township plan is envisaged to take approximately two months, including an intensive on-site planning program during the forthcoming weekend, and a four-week public review and comment period.

The initial development of the Township Plan is to be conducted over a three-day intensive planning and consultation program. The Inspiring Place team will be in Franklin to work on the project each day from Sunday, 2nd March, through to Tuesday, 4th of March.

Community involvement is critical to the success of the project. Therefore, public input is sought throughout the project, particularly through a public 'Walk and Talk' program starting at the Palais Theatre at 10:00am on Sunday, 2nd March.

This walk will be followed by morning tea in the Palais Theatre at 11:30am, and a discussion session with maps starting at 12:00pm; ideally the program will help identify the opportunities, constraints, issues and options within Franklin.

On Monday, 3rd March, main street residents and businesses will be invited to share their ideas and information with the planning team via informal doorstep visits, allowing further input and participation in the development of the township plan.

The draft concept plan developed over the intensive program will then be presented to the Streetscape Reference Group for an initial response to the ideas and directions being taken.

A draft township plan and accompanying report will then be prepared, and later presented to the Huon Valley Council, Franklin Streetscape Reference Group and the Franklin community for public review and comment.

All community members are invited to share their knowledge and thoughts with the Inspiring Place team throughout the project, to ensure that the resultant plan responds to community needs and provides a practical way of improving the township.

APPENDIX C
HUON NEWS RELEASE PROMOTING PUBLIC REVIEW PERIOD

INVITATION TO REVIEW DRAFT FRANKLIN TOWNSHIP PLAN

The Inspiring Place consultant team has completed the Draft Franklin Township Plan, and the plans and accompanying report will be on public display from 28th April to 2nd June 2003.

Having completed an enjoyable and successful planning workshop in Franklin in early March, the Inspiring Place team has built upon the initial ideas and responses discussed with the local community. Over the past month the preliminary plan has been refined and further detail added, whilst the accompanying report has been prepared.

The plan encompasses the township of Franklin, from the Catholic Church in the south, northward to Huon Eldercare. The project addresses a range of issues related to the Huon Highway and the adjacent foreshore, including foreshore development; car parking and traffic management; landscaping, public toilets and playgrounds; recreational walks; street furnishings and amenity; and protecting Franklin's inherent historical values.

As community involvement is a critical component of the project, both the plan and report will be released for public review from Monday the 28th April through to Friday 2nd June 2003. During this four-week period the community is invited to view both the plans and report, with community responses and comments sought.

Franklin Post Office is kindly displaying the large format plan and copies of the report, which includes a smaller format plan, are displayed at the Huon Council Chambers, Arthurs Takeaway and the Franklin Post office.

The Draft Franklin Township Plan has been prepared as a large format, board mounted plan, which illustrates the overall plan, perspectives and illustrations of what components of the plan may look like.

The accompanying report provides the background to the project, the approach taken in preparing the Draft Franklin Township Plan, the context for development, the strategic framework, design rationale, and suggested responses. The recommended approach to staging will be completed in consultation with the community, stakeholder and the Huon Valley Council during the public review period.

A workshop will be held with the Franklin Streetscape Reference Group to discuss comments to the Draft Franklin Township Plan. This meeting will be held on Tuesday 20th May at 5:00pm in the Supper Room of the Palais Theatre.

All community members are invited to share their responses with the Inspiring Place team throughout the review period, to ensure that the resultant plan reflects community needs and provides a practical way of improving the township.

Comments and responses can be recorded in the comments books accompanying the reports and plans, or forwarded to:

Inspiring Place Pty. Ltd.
Attn: Matt Lindus
208B Collins Street, Hobart, 7000
mattlindus@inspiringplace.com.au

APPENDIX D
REVIEW OF PUBLIC COMMENT

Nine written comments were received during the public review period. The bulk of the comments were positive and some good suggestions for improving the report and plan were made. The table below identifies the key points made by each of the respondents and the consultant's response. Underlining is used to identify those changes that are to be made to the plan or the report in response to the public's comments.

Name	Comment	Response
S. Dolling	• excellent plan • concern re height of trees near Palais but loves the development opposite the Palais • boardwalk great idea • court sports very needed	No change to the plan is required.
K. Howell	• wonderful plans • will attract more people to stop, visit and live	No change to the plan is required.
M. Riddle	• continuous walkway excellent idea • more trees (but understand concern of others re views) • village square idea good if drainage can be solved • agree that traffic speeds should be slowed • before/after views excellent • doesn't think all trees need to be native, choose trees for what they do/look like, etc.	We have looked at the location and number of the trees carefully and consider that a balance has been struck for the moment between the number of trees and the retention of views. The use of exotic trees should be considered and the text will be amended accordingly. Judicious use of fill and agricultural drainage can be used to overcome the flooding issues on the village square site. No change to the plan is required.
D. Sales	• likes and supports: the planting of trees, boardwalk, formalising of roads and access, village green, functional parking areas and drainage of camping area • would like to see: more trees, use of exotic trees, use of a ramp in place of stairs at Eldercare end of the boardwalk, increase the size of the 50kph zone	We have looked at the location and number of the trees carefully and consider that a balance has been struck for the moment between the number of trees and the retention of views. The use of exotic trees should be considered and the text will be amended accordingly. The steepness of the bank at the Eldercare facility likely works against the use of a ramp, however, this option should be examined as part of the detailed design process before it is formally ruled out. In the current plan, the option is there for a relatively level walk into town using the footpath before crossing the road at say the Wooden

Name	Comment	Response
		Boat School and walking along the rest of the foreshore. This option will be noted as requiring investigation in the text of the report. An expanded 50 kph zone was discussed with DIER but was ruled out. The existing plan represents an improvement on the existing situation. No change to the plan is required.
D. van Velzen(sp?)	• really likes simple flows of roads and paths and their separation • clearer marking of bus parking areas required on plan (including bus parking at Skillshare) • does path width allow sharing between people, prams, bicycles, etc.? • would like more trees and not necessarily native trees... why are trees on one side of oval only? • swimming area is a good idea • provide a ramp at Eldercare not steps • foreshore walkway an excellent idea • really likes the village square and the separation of the parking from the walkways and trees • organised sport precinct is great • slowing the speed is critical... provide pedestrian islands ... supports 50kph zone • seems to over-emphasise the foreshore side of the road	The plan will be amended to identify bus parking areas. There is a considerable cost difference between a standard path (which may be 1.5m wide) and a shared use path (which would need to be 2.1 to 2.4m wide). The community will need to decide its priorities. The text will be amended to identify these options. We have looked at the location and number of the trees carefully and consider that a balance has been struck for the moment between the number of trees and the retention of views. There are no trees on the river side of the oval to maximise the turning area for cars with boat trailers. The use of exotic trees should be considered and the text will be amended accordingly. The steepness of the bank at the Eldercare facility likely works against the use of a ramp, however, this option should be examined as part of the detailed design process before it is formally ruled out. In the current plan, the option is there for a relatively level walk into town using the footpath before crossing the road at say the Wooden Boat School and walking along the rest of the foreshore. This option will be noted as requiring investigation in the text of the report. Three crossing areas are designated on the plan. These could incorporate traffic islands. The text will be amended to note this possibility. The western side of the main road has a number of constraints which limit the possibility for doing much. We have indicated that the footpath should be widened (there is a typo in the text) to 1.8m. The eastern side is even more constrained in terms of footpath development. We have made a number of proposals to improve this situation

Name	Comment	Response
		(Section 4.2.4) No change to the plan is required.
P. Sales	• likes trees, wants more and on river side of oval, tree planting in consultation with residents • supports 50kph zone through town centre (extend past Eldercare) • village green is great providing drainage can be fixed	We have looked at the location and number of the trees carefully and consider that a balance has been struck for the moment between the number of trees and the retention of views. There are no trees on the river side of the oval to maximise the turning area for cars with boat trailers. The use of exotic trees should be considered and the text will be amended accordingly. An expanded 50 kph zone was discussed with DIER but was ruled out. The existing plan represents an improvement on the existing situation. No change to the plan is required. Judicious use of fill and agricultural drainage can be used to overcome the flooding issues on the village square site. No change to the plan is required.
M. Sweeney	• foreshore is for people, not roads everywhere • don't plant trees everywhere (creates damp and blocks light) • children seem to have been forgotten about	The designation of roads on the foreshore is required to prevent people from driving everywhere and to allow visitors access to the various facilities that have been proposed. No change to the plan is required. The separation of roads and footpaths is intended to provide safe paths for a variety of recreational pursuits including walking, running, bike riding, roller-blading, skate-boarding, etc. The path network which links the whole of the foreshore with the town's footpaths provides a safe circuit and links to numerous other play opportunities for children including the expanded and upgraded playground shown near the courthouse, numerous decks and walkways along the river for fishing, a multi-purpose sports court for basketball, netball, tennis, the oval, the rowing area, etc. No change to the plan is required. We have looked at the location and number of the trees carefully and consider that a balance has been struck for the moment between the number of trees and the retention of views. There are no trees on the river side of the oval to maximise the turning area for cars with boat trailers. The use of exotic trees should be considered as it alleviates some of the shade concerns of this

Name	Comment	Response
		writer. The text will be amended accordingly.
J. Young	• creative approach to the opportunity – congratulations • identified current plans to upgrade the Palais Theatre and the need to retain the view to the side of the building for advertising which occurs there. • plan does not include floating pontoon between jetties that has been approved • toilet location at the Living Boat Trust too close • plan mentions eucalypts as part of the restoration program... the community is working to a broader mix of species as was historically present in the area	The plan will be amended to account for the proposed plans at the Palais. Plan will be amended to show floating pontoon. Plan will show the toilet further to the south. Report will be amended to mention a broader mix of species for use in restoration.
G. Mitchell	• plan makes assumptions about traffic movement without supporting data • plantings on the western side of the road will have problems with overhead wires and services • plan does not mention other traffic calming measures that may be available beyond trees • plan should have costings, priorities, responsibilities, etc. listed • recent works on foreshore make plans obsolete	Traffic data and projections (if any) will be sought from DIER and included in the report. The plan notes a limited number of locations for trees on the western side of the road. These were selected so as not to interfere with overhead wires and/or views. No change required. The crossing areas shown on the plan could incorporate crossing islands. Other traffic calming measures require detailed design investigations and would be part of the overall plan that DIER would prepare as part of any changes to the road. No change to the plan is required. The purpose of the plan is to get the basis for the plan agreed. The final report will now include an order of cost estimate and an action plan showing responsibilities for the various recommendations. No change to the plan is required. The recent works are temporary in nature and can be modified to suit the proposals in this plan. No change to the plan is required.

Name	Comment	Response
Anon.	• plan looks fantastic, just what we need – access without mud • acknowledge indigenous people through interpretation	The report will be amended to include a recommendation regarding the development of an interpretation plan.

APPENDIX E
ORDER OF COST ESTIMATE

cost estimate map



cost estimate map

Key maps

1. Typical car parking (gravel)

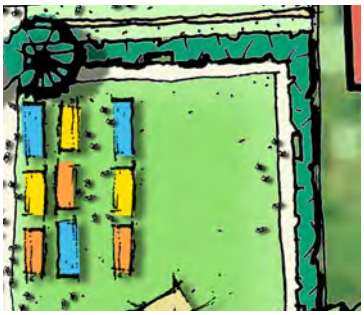


Order of cost estimate for typical key maps

Note that rates per m2 are used to calculate total cost for each landscape type, refer landscape types plan.

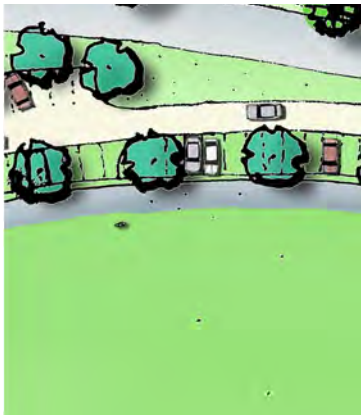
Item	Description	Unit	Rate	Quantity	Value
Advanced Trees	Selected 50L in ground, 2m high	@	180	4	720
Garden bed	Allow for tube stock 3/m2, 50mm Soil conditioning, timber edge, 75mm multch	m2	30	120	3600
Vehicle grade gravel parking	Allow for red gravel, 100mm max depending on exisitng surface	m2	18	480	8640
				Total Value	12960
				Calculated key map area	600
				Order of costs rate per m2	21.6

2. Typical intensive landscape



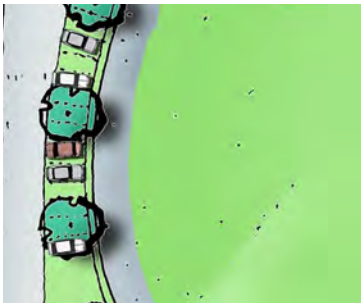
Item	Description	Unit	Rate	Quantity	Value
Advanced tree	Selected 50L in ground, 2m high	@	180	1	180
Garden bed	Allow for tube stock 3/m2, 50mm Soil conditioning, timber edge, 75mm multch	m2	30	18	540
Bench	3 seater, proprietory, timber	@	350	1	350
Gravel Path	Screened, 75mm, 2100mm wide, timber edge	m2	25	105	2625
Hedge	1/Lm, 300mm pot, timber edge, 50mm soil conditioner	Lm	24	20	480
Seeded turfing	75mm Topsoil Preparation, 50mm soil conditioning, seeding	m2	18	400	7200
Drainage	Sub-soil drain, geotextile fabric, screenings. Drains to be every 5000mm, tap into main	Lm	20	60	1200
Features	Retaing wall/ artwork	Lm	200	20	4000
Hard pavement	Exposed coloured concrete, with artwork inserts/ tiles.	m2	70	24	1680
Earth works	Trim and grade to 300mm max	m2	6	200	1200
				Total Value	19455
				Calculated key map area	690
				Order of costs rate per m2	28.2

3. Typical oval (gravel road)



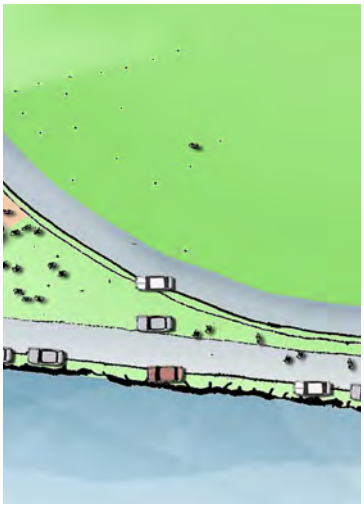
Item	Description	Unit	Rate	Quantity	Value
Bollards	Standard treated pine pos, chamfered topt	@	20	6	120
Advanced tree	Selected 50L in ground, 2m high	@	180	3	540
Vehicle grade gravel parking	Allow for red gravel 100mmax depending on existing surface	m2	18	180	3240
New Fence	Post and rail type treated pine	Lm	40	30	1200
				Total Value	5100
				Calculated key map area	1050
				Order of costs rate per m2	4.9

4. Typical oval (sealed road)



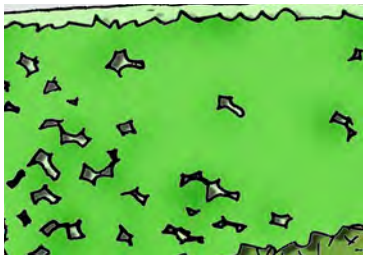
Item	Description	Unit	Rate	Quantity	Value
Bollards	Standard treated pine pos, chamfered topt	@	20	4	80
Advanced tree	Selected50L in ground, 2m high	@	180	2	360
Sealed Road	On 100mm compacted subgrade, biitumen top coat	m2	35	180	6300
New Fence	Post and rail type treated pine	Lm	40	30	1200
				Total Value	7940
				Calculated key map aArea	1050
				Order of costs rate per m2	7.6

5. Typical oval (sealed / waters edge)



Item	Description	Unit	Rate	Quantity	Value
Bitumen paving	On existing100mm compacted subgrade, biitumen top coat	m2	35	150	5250
New Fence	Post and rail type treated pine	Lm	40	35	1400
Foreshore edge erosion repair	Dry rock placement, assume 300 diameter min, rocks placed at 1500min wide	Lm	160	15	2400
				Total Value	9050
				Calculated key map area	900
				Order of costs rate per m2	10.1

6. Typical native revegetation



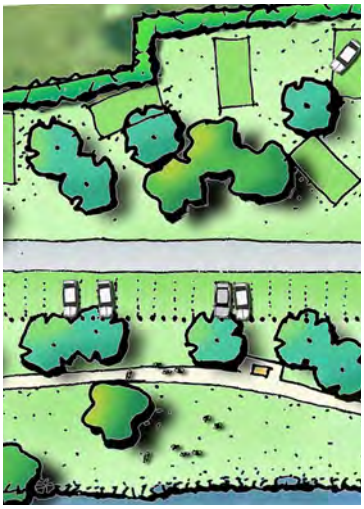
Item	Description	Unit	Rate	Quantity	Value
Naitive revegetation	50% of area calculated(based on existing density), tube stock 3/m2	m2	22	1050	23100
				Total Value	23100
				Calculated key map aArea	2100
				Order of costs rate per m2	11

7. Typical boardwalk



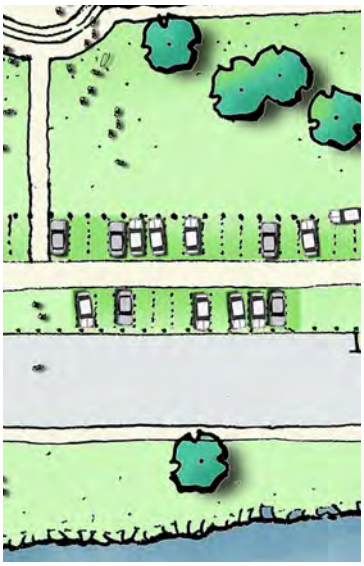
Item	Description	Unit	Rate	Quantity	Value
Boardwalk	Nominal 12oomm wide treated pine decking	Lm	250	45	11250
Native revegetation	10% of calculated area	m2	20	80	1600
				Total Value	12850
				Calculated key map area	800
				Order of cost rate per m2	16.0625

8. Typical foreshore (sealed road / parkland)



Item	Description	Unit	Rate	Quantity	Value
Bollards	Standard treated pine pos, chamfered topt		20	26	520
Advanced tree	Selected 50L in ground	@	180	8	1440
Bitumen paving	On existing100mm compacted subgrade, biitumen top coat	m2	35	200	7000
Bench	3 seater, proprietory, timber	@	350	1	350
Gravel Path	Screened, 75mm, 2100mm wide, timber edge	m2	25	105	2625
Hedge	1/m, 300mm pot, timber edge, 50mm soil conditioner	Lm	24	45	1080
Turf renovation	10% of caculated area	m2	18	140	2520
Subsoiil Drainage	Geotextile fabric, screenings. Drains to be every 5000mm, tap into main	Lm	20	300	6000
Foreshore edge erosion repair	Dry rock placement, assume 300 diameter min, rocks placed at 1500min wide	Lm	160	20	3200
				Total Value	24735
				Calculated key map area	1405
				Order of costs rate per m2	17.6

9. Typical foreshore (gravel road / parkland)



Item	Description	Unit	Rate	Quantity	Value
Bollards	Standard treated pine pos, chamfered topt		20	50	1000
Advanced tree	Selected 50L in ground, 2m high		180	6	1080
Vehicle grade gravel parking	Allow for red gravel 100mmax depending on existing surface	m2	18	200	3600
Gravel Path	Screened, 75mm, 2100mm wide, timber edge	m2	25	84	2100
Turf renovation	10% of caculated area	m2	18	260	4680
Subsoil drainage	Geotextile fabric, screenings. Drains to be every 5000mm, tap into main	Lm	20	300	6000
Foreshore edge erosion repair	Dry rock placement, assume 300 diameter min, rocks placed at 1500min wide	Lm	160	20	3200
				Total Value	21660
				Calculated key map area	2600
				Order of cost rate per m2	8.3

11. Typical Main Road



Item	Description	Unit	Rate	Quantity	Value
Concrete footpath	25% new to 1800mm wide	Lm	120	415	49800
Concrete footpath	35% widen to 1800mm	Lm	60	581	34860
Concrete footpath	40% repair to existing	Lm	25	664	16600
Advanced trees	150L 4m high in ground		250	18	4500
Tree planters	Curb and channel, multch		350	5	1750
					107510

11. Typical hard court area



Item	Description	Unit	Rate	Quantity	Value
Tennis court	Includes net, fence, surface etc.	@	40000	1	40000
Basket ball hoop	Includes back board and installation	@	3000	1	3000
Net ball hoop	Includes installation	@	1000	1	1000
				Total Value	44000
				Order of costs	44000

12. Typical play ground area



Item	Description	Unit	Rate	Quantity	Value
Play ground	Includes 3 shelters, 2 electric barbeques, 5 benches, average size playground, viewing platform	@	150000	1	150000
				Total Value	150000
				Order of costs	150000

13. Public toilet facilities

Item	Description	Unit	Rate	Quantity	Value
Toilet Small	2 female pans, 1 male pan, 1 male urinal	@	40000	2	80000
Toilet large	To replace existing toilet block and its facilities	@	100000	1	100000
				Total Value	180000
				Order of costs	180000

Title	**HUON VALLEY LAND USE AND DEVELOPMENT STRATEGY - FINAL REPORT**
Agenda Number	18.029/07*
Strategic Plan Reference	NA03 (Strategic Land Use Planning) NA04 (Development Control)
File Reference	17/18
Author	Manager Environment and Development Services
Responsible Officer	Manager Environment and Development Services
Reporting Brief	The Manager Environment and Development Services presenting a report on the Proposed Huon Valley Land Use and Development Strategy – Final Report and preparation of a single and integrated Planning Scheme for the whole of the municipal area.

Background

Council had engaged Gutteridge Haskins Davey Pty. Ltd. (GHD) to finalise the Huon Valley Land Use and Development Strategy (Strategy) and to prepare a new planning scheme consistent with the Tasmanian Government template for planning schemes.

Report

Councillors had previously been briefed on planning legislation; the framework of a new planning scheme; and policy requirements of the State Government and the Resource Planning and Development Commission (RPDC); and key land use and development issues that require the Council to consider in relation to future policy directions to inform the preparation of a new planning scheme and guide future land use and development throughout the municipal area.

The Strategy identifies existing land use issues and recommends strategic directions and guiding principles to overcome those issues with a clear link to objectives for the new planning scheme to ensure good land use planning outcomes.

Councillors had attended a series of workshops systematically working through key issues and reaching consensus on intended future land use and development outcomes.

The Council (acting as the Planning Authority) at its meeting on 11 July 2007, resolved 'in-principle' support for the Strategy that provided an overview of the following key land use considerations: Regional Context; The Huon Valley Community; Natural Resource Management; Natural Hazards; Heritage; Transport; Infrastructure; The Economy; Sustainable Tourism; and Providing for Housing Needs.

The Council had also endorsed a consultation strategy and approved it for public exhibition until the 17 August 2007, calling for submissions on the Strategy for the purpose of informing the preparation of a new Planning Scheme for the whole of the municipal area, to replace the three existing planning schemes.

Public consultation commenced on 16 July 2007, with 66 submissions having been received. Council officers have acknowledged each submission in writing.

GHD has prepared the Huon Valley Council Land Use and Development Strategy - Response to Public Consultation, September 2007 report (Included in the Attachments to the Reports). This consultation report provides an outline of the process undertaken to develop the Strategy and the analysis of comments received during public consultation along with a response. The report provides a description of the response and the changes made to the Strategy.

The final report on the Strategy (included in the Attachments to the Reports) is recommended to the Council for endorsement as a policy document.

Once the Council has endorsed the above public consultation report and the Strategy they will both be referred to the RPDC, for information. The Strategy document along with the above report would be placed on the Council's Website together with a Public Notice in the Mercury and local newspapers.

The Strategy can then be relied on to support any amendment to each of the three existing planning schemes prior to the introduction of a single integrated Planning Scheme for the whole of the municipal area.

Legislative Requirements

Both the Strategy and the (yet to be finalised) planning scheme are consistent with the requirements of the *Land Use Planning and Approvals Act 1993*, and the State government *Planning for Better Outcomes* paper, and template for a performance-based planning scheme.

Risk Implications/Council Policy/ Options

Not Applicable

Human Resource and Financial Implications

The project is currently adequately resourced by Council officers and GHD staff, and is funded through the operational budget for 2007/08.

18.029/07*
RESOLVED **CR WILSON** **CR RICHARDSON**

That:

a) **The report on the Proposed Huon Valley Land Use and Development Strategy – Final Report and preparation of a single and integrated Planning Scheme for the whole of the municipal area be received and noted.**

b) **The Huon Valley Council Land Use and Development Strategy - Final Report be adopted by Council subject to the following alterations:**

1. **Urban Growth Areas**

Geeveston	**- reduction of area near Fourfoot Road** **- Kent Street – inclusion of Tennis Court area**
Port Huon	**- inclusion of area on northern side of Palmers Road**
Huonville	**- inclusion of Knights Road area** **- inclusion of eastern side of Flood Road to Melrose Street**
Ranelagh	**- inclusion of corner of Ranelagh and Louisa Streets** **- inclusion of corner of Ranelagh and Elizabeth Streets**

2. **Textual**

Dover	**- reposition arrow for foreshore recreational opportunities** **- re-word infrastructure comments**
Population data	**- upgrade to 2006 Census data**
Change reference of Municipality to Municipal area	

c) **A copy of the Huon Valley Council Land Use and Development Strategy - Response to Public Consultation report and the Huon Valley Council Land Use and Development Strategy - Final Report be made available to the RPDC.**

d) **Notification of the Council's adoption of the Huon Valley Council Land Use and Development Strategy – Final Report be made in the Mercury and local newspapers, and that the Strategy and public consultation report be placed on the Council's Website.**

- *Councillors Armstrong, Dillon, Heron, Paul, Wilson, Smith, Doyle, Duggan & Richardson voted for the motion & no Councillors voted against the motion.*


GHD
CLIENTS|PEOPLE|PERFORMANCE
HUON VALLEY
LAND USE AND DEVELOPMENT STRATEGY
EXECUTIVE SUMMARY

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FOREWORD & AKNOWLEDGEMENTS

The Huon Valley Land Use and Development Strategy (the Strategy) was adopted by the Huon Valley Council on the 2 October 2007 as the basis for the preparation of a single integrated planning scheme for the whole municipal area.

On the 8 November 2007 GHD Pty Ltd and Huon Valley Council also received an Award for Excellence in the Rural & Regional Planning Category from the Planning Institute of Australia Tasmania Division. The Strategy also received the Jury Chairperson's Award for the overall winnner of the 2007 PIA Awards for Excellence

The citations for these awards are:

Rural & Regional Planning Category

The project synthesised old and new research, spanning more than a decade, to create an integrated policy framework and development strategy for the whole municipality. Innovative features include the use of Google Earth mapping and a guide to the assessment of the potential for 'fettering' of agricultural land by residential development. The strategy provides a sound basis for the preparation of a new planning scheme, implementation of State Policies, local settlement policies, extension of urban infrastructure and responses to climate change.

Jury Chairperson's Award

The Land Use and Development Strategy sets a new benchmark, demonstrating that it is necessary for a Council to formulate planning policies, prepare statutory plans and support sustainable development. It provides a clear, well documented examplar of best practice for other planning authorities in Tasmania.

The Strategy is the result of collaboration between GHD Pty Ltd (GHD) and the Huon Valley Council, its elected members and officers. GHD would specifically like to acknowledge the efforts of Tony Ferrier in providing a wealth of information and background documentation. We also acknowledge the efforts of Bob Karaszkewych and Leigh Stevens in providing valuable feedback and direction when required as well as Holly Hansen and Aletta McDonald.

Outside of the Huon Valley Council, this document has involved input from a number of people and various organisations including Peter Fischer, Brian Risby & John Hayes from the Land Use Planning Branch, Department of Justice and Kerry Boden from the Resource Development & Planning Commission. Input has also been provided by the Department of Police and Emergency Management, Department of Economic Development and the Department of Tourism, Arts and the Environment.

Of special note is Department of Primary Industries and water for their assistance with mapping and GIS information.

Finally, GHD would like to thank the community of the Huon Valley for their valuable feedback. GHD recognises that the community offer valuable insights into the values of the Huon Valley and future directions. These insights are important to ensure that this document ultimately achieves its aim:

> *To provide policy direction for future land use and development of the Huon Valley that ensures sustainable economic development in the long term and the protection of the Huon Valley's values at the same time as providing for the needs of the community today.*

BACKGROUND

The Huon Valley municipal area was formed during the Local Government amalgamations of the early 1990s. Prior to this, Huon Valley was comprised of three municipalities: Esperance, Huon and Cygnet. Current strategic land use directions and planning regulations within the municipal area have been carried over from those former municipalities. The Planning Schemes relating to those former municipalities still remain the primary mechanism for control over land use and development throughout the Huon Valley.

The development of a new planning scheme to cover the whole Huon Valley municipal area is seen as an imperative to ensure that current environmental, economic and social context is responded to. A new planning scheme consist of a Land Use and Development Strategy to set the strategic directions for future land use, an ordinance document to set use and development controls needed to achieve those strategic directions and a set of land use zone maps covering the whole Huon Valley to support the operation of the ordinance document.[1]

GHD Pty Ltd on behalf of the Huon Valley Council has been commissioned to prepare a Land Use and Development Strategy (the 'Strategy') for the Huon Valley as the first step towards a new Planning Scheme. This document provides a summarised version of the Strategy. Each section provides an overview of the relevant considerations discussed in greater detail throughout the full document. The strategic directions and guiding principles identified have also been provided over the following key land use and development considerations:

- Regional Context;
- The Huon Valley Community;
- Natural Resource Management;
- Natural Hazards;
- Heritage;
- Transport;
- Infrastructure;
- The Economy;
- Sustainable Tourism;
- Providing for Housing Needs; and
- Major & Minor Settlements.

1 The ordinance document component of a planning scheme is traditionally known in Tasmania as 'the planning scheme' and that terminology is retained in this document.

INTRODUCTION

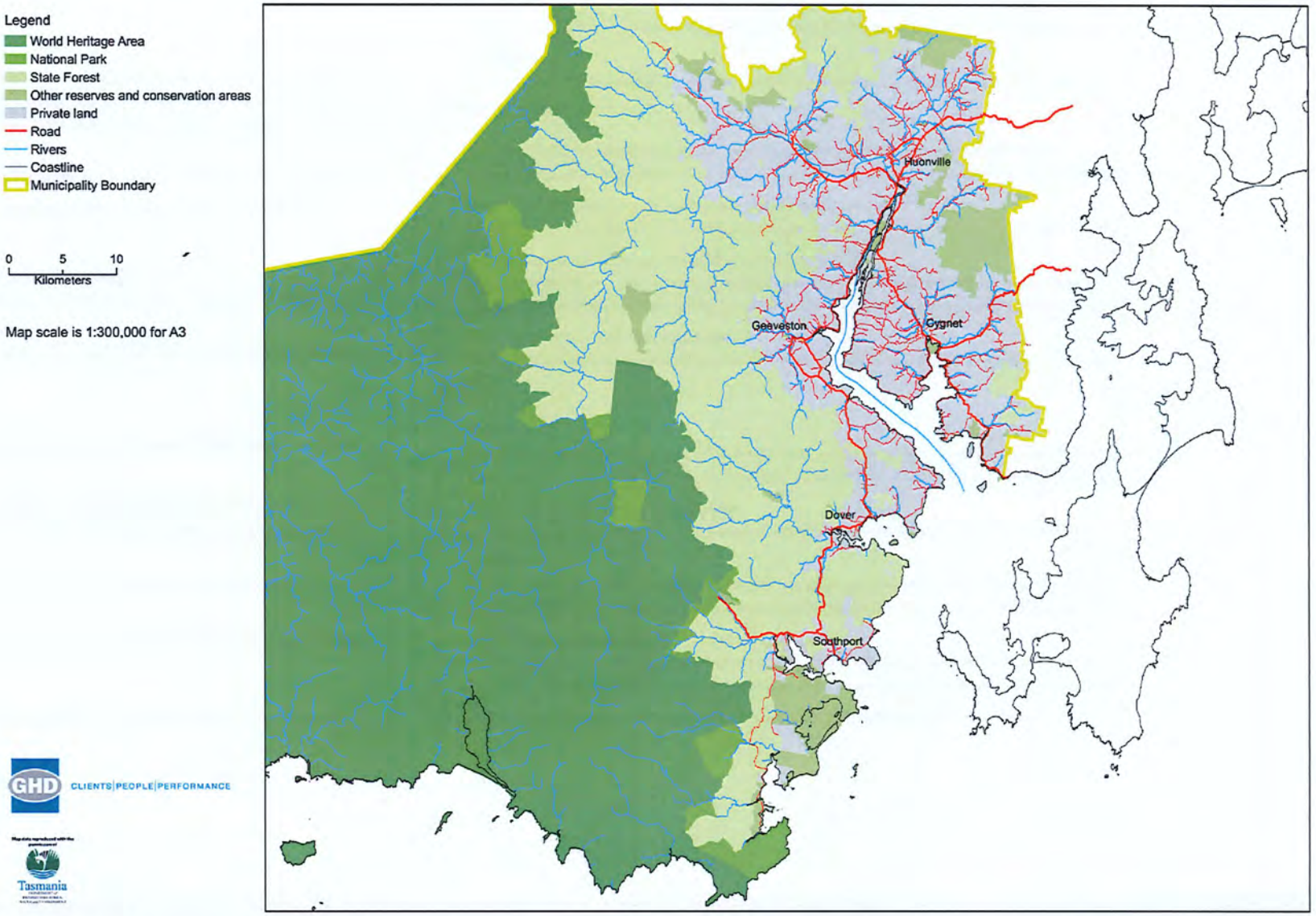
The Huon Valley area (municipal area) is second only to the West Coast Council in terms of its land coverage with a total area of 545,973 hectares. Extending from Mount Wellington Park in the northeast the municipal area comprises the southern part of Tasmania, encompassing large tracts of reserved areas. The municipal area is one of the few gateways into one of Tasmania's most significant natural and recreational resources: The South-West National Park and World Heritage Area.

Private land and development is concentrated along its eastern coast with road connections to the remainder of Tasmania through the Kingborough municipal area which shares its eastern boundary. A strong social, environmental and economic relationship is maintained with the Kingborough municipal area.

To the north and west of the municipal area are the Derwent Valley and West Coast municipalities. However, given the extent of reserved areas the social and economic relationship withthese municipalities are physically constrained.

Reserved land comprises the largest land are within the municipal area with 346,126 hectares contained declared as National Parks, State or Conservation Reserves. A further 122,512 hectares is nominated as State Forest with only 77,335 (or 14%) of the municipal area within private ownership.

LAND TENURE



GHD CLIENTS|PEOPLE|PERFORMANCE

Tasmania

KEY STRATEGIES

The following key strategies from this Land Use & Development Strategy will be transferred to the new planning scheme:

Community and Services

- Encourage the development of community facilities and services in highly accessible locations and in areas of highest need;
- Encourage the establishment of additional aged care facilities in appropriate areas close to existingphysical and community services;
- Ensure new development considers linkages between services and activities via alternative transport modes;
- Require developers, where appropriate, to contribute to the provision of community services and infrastructure;
- Encourage the development of affordable housing in locations with high accessibility to town centres, community facilities and services.

Recreation and Open Space

- Protect and maintain recreational amenity by ensuring surrounding development does not jeopardise the primary recreational purpose of any area;
- Identify suitable locations for the expansion of open space and recreational facilities and ensure new subdivisions promote connectivity where needed and provide usable land for recreation.

Natural Resource Management

- The highest priority must be given to the protection of the natural resource base of the municipal area;
- Development and use of the resource base should focus on achieving environmentally sustainable outcomes;
- All resource based use or development is to protect the quality and biodiversity of the resource base, prevent degradation of the resource and surrounding areas, maintain and improve water quality, protect significant agricultural land, retain significant stands of vegetation and protect prospective mineral and construction materials deposits.

Environmental Protection

- Development and use of land and resources is to be carried out so as to minimize impacts on the natural environment;
- Land designated as National Park, Conservation Reserve, Wilderness Reserve, Nature Reserve or State Reserve is not to be developed or used unless it can be demonstrated that the use or development can be achieved in a manner that is consistent with the conservation of the area's values and any approved management plan;
- Vegetation clearance is to be controlled and managed to prevent erosion, land instability, loss of water quality and loss of scenic and visual amenity;
- Environmental flows are to be maintained in the municipal area's major waterways;
- Beaches, dunes, sand ridges, dune swales, coastal wetlands and estuaries' cliffs subject to mass movement are not to be used or developed in a manner that would interfere with the natural coastal processes of erosion deposition, littoral drift and inshore current flows;
- Buildings, structures, and works in coastal areas are not to interfere with natural processes, lead to the need for remedial works or coastal protection measures, nor result in the removal of vegetation from potentially mobile landforms;
- Development and use in coastal areas is to be in accordance with design and siting codes designed to protect the environmental values of the coast;
- The protected environmental values which have been identified for the municipal area's waterways, estuaries and wetlands are to be maintained in accordance with the State Policy on Water Quality Management 1997;

Heritage

- Use and development is to recognise the various economic benefits associated with managing the heritage assets of the Huon Valley in an appropriate manner.
- Identify heritage places under the Planning Scheme and provide provisions to ensure that the siting, scale, form and appearance of development of heritage listed properties and areas does not detract from those characteristics of the place that contribute to its cultural significance.
- Provide an integrated approach, involving liaison between the Aboriginal community, Council and relevant government agencies to identify, respect and manage Aboriginal cultural heritage.
- Protect the visual qualities and prevent erosion and disturbance of hill faces, ridgelines, coastal bluffs, headlands and other prominent landforms, where it would result in a loss of landscape values

Transport and Access

- Include a road asset schedule with a road hierarchy to maintain the safety and efficiency of key road transport corridors.
- Ensure new subdivisions are designed to maximise connections and promote walking and cycling.
- Encourage the concentration of light industrial and commercial activities in existing towns that are accessible to the community.
- Ensure that use and development does not jeopardise future important transport corridors.

KEY STRATEGIES

Infrastructure

- Ensure new urban and industrial development incorporates water sensitive design, provides for protection of water quality and incorporates landscaping that facilitates water filtration and removal of pollutants.
- Maximise efficiency in exisitng and future infrastructure provision by concentrating development within the primary settlements and recognising that development outside of the areas is not entitled to serviced land.
- New development is to contribute to the cost of upgrading existing infrastructure in accordance with Council policy to ensure that the cost is not solely borne by the community.
- Existing unserviced developments should not be allowed to be more intensively occupied until such time that it can be shown that such development will not further add to existing and emerging environmental problems or create a demand for public infrastructure.
- New development in unserviced areas should be required to demonstrate that it can meet all of its own infrastructure requirements and that it can occur without loss of environmental quality, in particular water quality, vegetation cover, exposure to hazard risks and landform degradation.
- Encourage the innovative and sustainable forms of water use (including its reuse) for residential development where it does not impact upon amenity.

The Economy

- Ensure ongoing viability of primary industries by preventing incompatible development within identified rural areas.
- Small scale non-residential activities that can occur without affecting the character or amenity of urban residential areas should be allowed within those areas.
- Resource extraction and processing activities should not be overly restricted in their form and location. The critical outcome to be achieved in the development of processing facilities is that they meet designated environmental standards, protect visual and scenic amenity and that they are developed and constructed to high standards of siting and design.
- Provide for the minising of external impacts while still providing for ongoing sustainable forest industry within the municipal area.
- Minimise the distance between rural industry and its associated resource base.

Sustainable Tourism

- Protect and enhance the Huon Trail visual landscape as an asset of the Huon Valley.
- Encourage development that builds on the Huon Trail brand.
- Design and siting controls should be used to reduce environmental and visual impact of new tourist facilities.

Rural Areas

- Residential uses not associated with agricultural activities should occur within town boundaries.
- The protection of agricultural uses from fettering by any other non-agricultural use is to be given precedence over all other relevant planning matters.

Housing Needs and Settlements

- Focus residential growth within the serviced settlements of Huonville, Cygnet, Geeveston, Dover and to a lesser extent Franklin and promote infill residential development to maximise the utilisation and efficiency of existing infrastructure and community services.
- Identify areas for low-density residential or rural living development with regard to agricultural viability, existing development patterns, environmental considerations and proximity to community services.
- Ensure that new residential development conforms to a high standard of residential design in relation to privacy, solar access and streetscape qualities.
- Regional facilities should generally be located within Huonville unless the broader needs of the community are best served by an alternate location within the Huon Valley.
- The minor coastal settlements such as Southport, Verona Sands, Randalls Bay, Eggs and Bacon Bay, Garden Island Sands, Charlotte Cove, Abels Bay, Little Roaring Beach, Roaring Beach, Rocky Bay and Surveyors Bay will not be allowed to expand until issues of infrastructure provision and environmental management have been resolved.
- The smaller settlements of Cygnet, Franklin, Geeveston and Dover should be able to accommodate a range of uses and forms of development provided that the physical character and amenity of these places is not adversely affected.

REGIONAL CONTEXT
Summary

Traditionally, the Huon Valley has provided agricultural land used for the production of food, as well as timber based industries to support Southern Tasmania. Today, due to economic factors, agricultural activity has diversified away from its near monoculture of fruit diversifying into niche markets, viticulture and aquaculture.

On a regional level, maintenance of rural lands for agriculture is seen as critically important, particularly in light of climate change. The natural conditions and climatic regime of the municipal area offer opportunities for agricultural activities for non-traditional farming enterprises that are otherwise constrained in many other agricultural areas of Southern Tasmania.

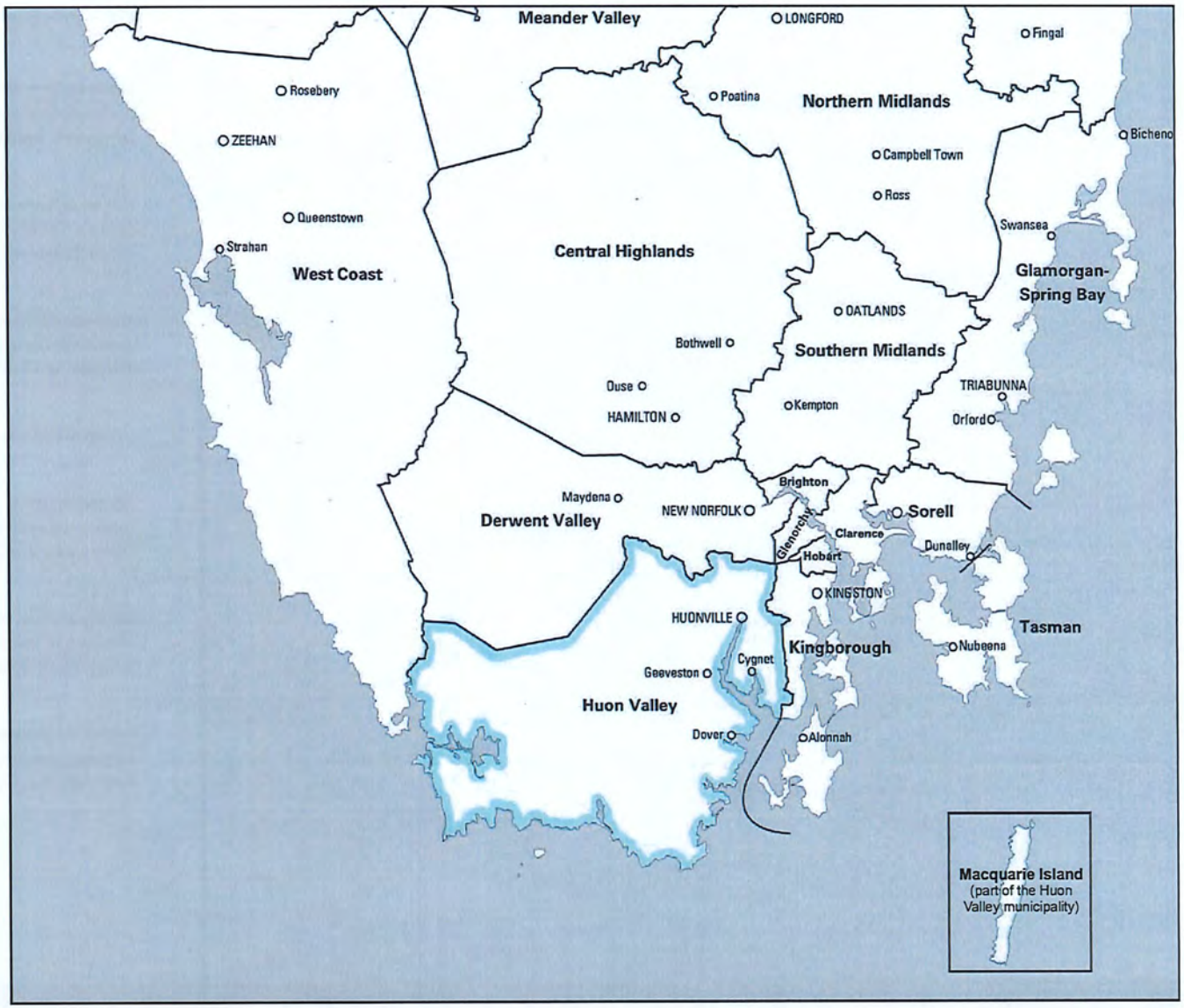
The Huon Valley also plays an integral role in the tourism industry throughout Southern Tasmania. Its important agricultural history (The Huon Valley gave Tasmania its name 'The Apple Isle') has been a major component in the marketing of the area as an historical destination for tourists, but its increasing appeal as a gateway to the south-west as well a food and wine district has also provided considerable attraction for tourism dollars.

Consideration of the relationship between Huon Valley Council and Kingborough Council is also important in developing a successful strategic direction for Huon Valley. These two municipalities not only have a shared boundary, but Huon Valley municipal area relies upon connections to Greater Hobart through Kingborough. Economic development is closely linked and as evident in more recent years, the changes to the Kingborough Planning Scheme have resulted in increasing pressure within the municipal area to meet the demand for rural residential lots.

With Huonville located only 39 kilometres and 30 minutes drive by major highway from the Hobart CBD it is inevitable much recent development has been fuelled by people attracted by the rural lifestyle, its scenic beauty, affordable housing and relatively cheap land. Decisions have also been influenced by the range of facilities available within the Huon Valley's major settlements, and its proximity to regional shopping facilities at Kingston.

Many of these new residents also bring new skills and capital to the area and this has fuelled a number of new business enterprises particularly in the retailing, tourism and agricultural sectors. However, growth needs to be managed to be within Council's capacity to provide or fund infrastructure, and to ensure protection of the municipal area's natural and cultural values.

REGIONAL CONTEXT
Location of the Huon Valley



THE HUON VALLEY COMMUNITY
Summary

The Huon Valley has a population of just over 14,000 people with a small but steady growth rate of 0.5-1.0%. Huon Valley has also followed the Tasmanian trend of an increase in median age. Research for the period of 2004-2021 indicates that there will be a high increase in people in older age groups while there will be a decrease in younger age groups.

The Huon Valley community is characterised by diversity. A number of small different communities are present across the municipal area. This can be partially contributed to the settlement pattern and the distribution of population across towns with very different historical evolutions. There are also large numbers of residents from families with multi-generational ties to their communities.

The nature of the communities can also manifest itself in the built characteristics of a town. Cygnet's and Franklin's visual characteristics are consistent with a more 'arts and cultural' image while Geeveston and Dover communities have focused on traditional forestry and fishing industries. The growing areas of rural residential development is also a physical manifestation of increasing commuter population.

Understanding the social and community profiles of the population within Huon Valley is important so that Council can plan to create and maintain liveable and healthy communities.

The increasing number of older people within the Huon Valley community will place greater pressure for additional development of aged care facilities and for housing models that are more suited to less mobile members of community in close proximity to services and facilities. It will also be important that the Strategy encourages alternative accommodation options for older persons.

Retaining young people within the Huon Valley is also essential for sustainable economic and social development as well as assisting in the social diversity of communities. Community needs for young people focus around the need for informal recreational spaces and flexibility in housing, particularly in regards to the current demands for low cost housing.

Another consideration for the community is safety. The role of the built environment in crime prevention is a relatively new concept. The Strategy recognises the 'Crime Prevention through Environment Design' principles (CPTED) and encourages the implementation of these through new development. By doing so, this creates a more attractive and liveable built environment which in turn facilitate increased economic activity.

Key social and community factors in this land use and development strategy are focussed around development strategies for the:

- Needs of differing and diverse individual communities;
- Planning for a diversity of age in terms of accommodation and service provision;
- Addressing the affordable housing requirements of the community;
- Providing for community facilities that are accessible for all; and
- Providing for recreational and open space opportunities for people with all differing levels of mobility.

THE HUON VALLEY COMMUNITY
Strategic Directions and Guiding Principles

NEED OF INDIVIDUAL COMMUNITIES

Strategic Directions	Guiding Principles
Cater for differing community values, to foster a stronger sense of identity within the Huon Valley as a whole.	*Involve members of different communities in planning for the Huon Valley in the development of the planning scheme.* *Ensure the strategy and planning scheme recognises and responds to the needs and interests of the different communities within the Huon Valley.*

PLANNING FOR DIVERSITY OF AGE

Strategic Directions	Guiding Principles
Respond to the ageing population, while also taking into consideration the needs of young people.	*Encourage the establishment of additional aged care facilities in appropriate areas.* *Allow ancillary dwellings in residential areas where there is a demonstrated need.* *Ensure new developments consider linkages between services and activities via alternative transport modes.* *Encourage new services and activities to be located in areas that are accessible to people within all social groups and mobility levels.*

AFFORDABLE HOUSING

Strategic Directions	Guiding Principles
Respond to Housing Tasmania initiatives and policies, which will assist in providing affordable housing, increased accessibility and promotes socio-economic well-being in the Huon Valley.	*Provide flexibility to allow the establishment of low cost and temporary crisis accommodation.* *Provide flexibility for communal housing within the key settlements, and generally promote choice in housing alternatives.*

COMMUNITY FACILITIES

Strategic Directions	Guiding Principles
Acknowledge the requirements of different service providers and allow flexibility to provide services that are responsive to the changing community profile. *Identify preferred locations for education, community and health facilities.*	*Provide flexibility in the planning scheme for the location of community facilities within the major settlements.* *Encourage the development of facilities in highly accessible locations and in areas of highest need.* *Regional facilities should generally be located within Huonville unless the broader needs of the community are best served by an alternative location within the Huon Valley.* *Provide mechanisms for implementation of a contribution system towards community infrastructure.*

RECREATION AND OPEN SPACE

Strategic Directions	Guiding Principles
Develop a comprehensive strategy that identifies a way forward for the improvement and upgrade of recreational and open space facilities within the municipal area. *Prepare a capital works program to implement an Open Space & Recreation Strategy.* *Provide opportunities for the development of new facilities within existing areas.*	*Protect existing open space and recreational areas.* *Protect recreational amenity by ensuring surrounding development does not jeopardise the primary recreational purpose of any area.* *Ensure new subdivisions promote accessibility and where needed, provide usable land for recreational purposes. Alternatively, cash in lieu payments to contribute towards the improvement of open spaces.* *Ensure that public open space contributions are distributed across the municipal area in accordance with an Open Space & Recreation Strategy*

CRIME PREVENTION

Strategic Directions	Guiding principles
The design of new built environments should consider measures to reduce crime.	*Ensure new developments are deisgned with consdieration of CPTED principles.* *Provide for a variety of uses within non-residential areas to facilitate passive surveillance.* *Discourage development that would result in reduction of passive surveillance of public areas.*

NATURAL RESOURCE MANAGEMENT
Summary

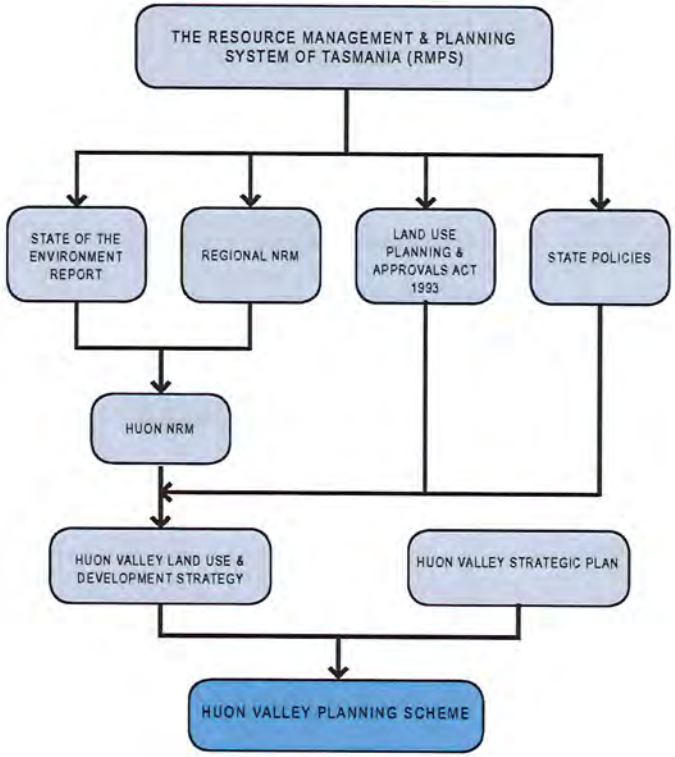
The municipal area is a region of immense cultural and natural diversity. Along the eastern and northeastern areas, settlements are nestled among the rolling hills of the eastern valleys and the spectacular coastline and waterways of the Huon Estuary and D'Entrecasteaux Channel. These in turn are set against a backdrop of extensive native forest areas and striking mountain ranges, beyond which lies the Tasmanian Wilderness World Heritage Area (WHA), tantalising and mysterious in its relative inaccessibility.

These natural resources not only have inherent value but are important community assets that warrant protection. Maintaining the quality of the municipal area's natural resources is an essential requirement if the social, cultural and economic welfare of the population is to be maintained over the longer term.

The significant natural features within the Huon Valley include:

- A maritime climate, with temperature and rainfall gradients across the region from west to east. Zonal westerly winds produce predominantly changeable, cool temperate conditions.
- Geodiversity of local, national and international significance.
- A relatively pristine water catchment originating deep in the WHA.
- In contrast a highly utilised wetland, waterway and groundwater resource within the settled areas of the Huon Valley, creating water quality issues.
- A coastal environment upon which settlement and development has been focused creating a risk to human settlement from climate change. The coastline environment also has a high concentration of sites of cultural, Aboriginal and natural significance.
- An extensive array of natural flora and fauna resources that are significant at a regional, State and in some instances national level. While many of these flora and fauna values are protected within the reserved areas (National Parks/WHA) the interface between the urban/agricultural areas provides significant concern.

The planning scheme will represent the culmination of an appropriate mix of local, regional and State-based strategic directions. It will be the working document that can put into effect the objectives developed within these various approved strategies and policies. Within the municipal area, there is Council's Strategic Plan and the Draft Natural Resource Management Strategy. The latter strategy interprets the current environmental, social and economic situation in order to appropriately inform the proposed new planning scheme. At a State level, the RMPS provides the overall framework, within which sit such various initiatives as State of the Environment reports, Natural Resource Management, environment and planning legislation, and State Policies. The table on the next page highlights the various inter-relationships



NATURAL RESOURCE MANAGEMENT
Strategic Directions and Guiding Principles

PROMOTION OF NATURAL RESOURCE MANAGEMENT	
Strategic Directions	**Guiding Principles**
Integrate principles of Natural Resource Management with land use and development controls. *Recognise the importance of maintaining natural values through natural resource management.*	*Ensure the planning scheme promotes an integration of management methods within State and regional NRM frameworks.* *Ensure the planning scheme incorporates Council adopted natural resource management strategies.* *Ensure the planning scheme is consistent with NRM related legislation and policies.* *Ensure the planning scheme allows for community NRM initiatives.*

LAND SYSTEMS	
Strategic Directions	**Guiding Principles**
Recognise the importance of land systems in the Huon Valley and provide appropriate mechanism for their protection	*Utilise relevant land system information and mapping to determine further development requirements for investigating and assessing the management of soil-related hazards.* *Ensure that the planning scheme protects areas with recognised geoheritage value.*

PROTECTION OF WATERWAYS AND WETLANDS	
Strategic Directions	**Guiding Principles**
Recognise the importance of the protection of wetlands and waterways within the Huon Valley. *Require development to maintain the identified Protected Environmental Values (PEV's), as documented in the State Policy on Water Quality Management (1997). This will ensure that diffuse source and point source pollution does not prejudice the achievements of Water Quality Objectives, and that pollutants discharged into waterways are reduced as far as possible by the use of best practice environmental management.*	*Maintain environment flows in all major waterways to protect natural ecological processes and water quality.* *Maintain and enhance the quality of riparian and fringe vegetation alongside waterways.* *Water extraction development (water storages, access to groundwater and riparian users) is to be assessed for potential environmental impacts and appropriately mananged.* *Encourage restricted stock access to prevent stream bank erosion.* *Minimise in-stream works and activities.* *Prevent development within wetlands unless unavoidable in achieving a wider environmental and social community benefit.* *New development should comply with the recognised management manuals and guidelines including the Waterways and Wetlands Manual, FPA riparian requirements and stormwater management guidelines.* *Use and development should avoid:* ◗ *Visual and ecological disturbance.* ◗ *Conflict with recreational & tourism values on the foreshore.* ◗ *Changes to the natural movement of river flows.* ◗ *The spread of weeds, pests and diseases.* ◗ *In stream barriers to fish passage.*

NATURAL RESOURCE MANAGEMENT
Strategic Directions and Guiding Principles

PROTECTION OF COASTAL AND ESTUARINE VALUES

Strategic Directions	Guiding Principles
Recognises the importance of the protection of coastal and estuarine quality and values. *Recognises that the beaches, dunes, sand ridges, dune swales, coastal wetlands and estuaries, and cliffs subject to mass movement are critical to the operation of the natural processes of erosion, deposition, littoral drift and inshore current flows.* *Identify a coastal area that has regard to:* ◗ *Animal and plant habitat;* ◗ *Landforms, such as coastal plain, beaches, wetlands and dune systems;* ◗ *Coastal processes, such as erosion/sedimentation, climate change impact and flooding;* ◗ *Geology; and* ◗ *Scenic landscapes and features.*	*Ensure that use and development:* ◗ *Has minimal potential navigation hazard for local recreational and commercial boats;* ◗ *Avoids visual and ecological disturbance by ensuring foreshore structures are in keeping with the coastal setting;* ◗ *Minimise changes to the natural movement of coastal and marine sediments;* ◗ *Protects the special wind, wave and soil conditions of coastal environments;* ◗ *Minimise the spread of weeds, pests and diseases;* ◗ *Minimise instream barriers to fish passage;* ◗ *Protect or enhance estuarine and marine water quality;* ◗ *Protects Aboriginal and cultural heritage associated with coastal areas;* ◗ *Takes into account the potential impacts of sea level rise and increased storm surges as a result of climatic change;* ◗ *Focus on established nodes to protect relatively pristine coastal areas;* ◗ *Provide for public access along the foreshore that will not be impeded by structures in a way that does not damage or degrade the coastal values;* ◗ *Ensure that it will not be dependent upon shore protection measures;* ◗ *Set back structures from the coast to minimise erosion threats;* ◗ *Protect the coastal environmental as important habitat for sea-based fauna species.*

PROTECTION OF BIODIVERSITY VALUES

Strategic Directions	Guiding Principles
Acknowledge the importance of the municipal area's biodiversity, by ensuring that the abundance, health and distribution of species is maintained. *Ensure that the impact of any development on the municipal area's biodiversity is considered as an integral part of decision making process.* *Integrate management of important wildlife corridors with the management of use and development*	*Council will incorporate provisions that outline biodiversity conservation management measures for consideration with land use and development proposals, including the following:* ◗ *Consideration of any rare, threatened or endangered species that are listed under the EPBCA or the TSPA (including consideration of significant cave species);* ◗ *Consideration of any functional wildlife corridors and biodiversity linkages;* ◗ *Assessment of existing or potential weed issues (in accordance with the Weed Management Act 1999 and through consultation with the weed division of DPIW);* ◗ *Assessment of clearance of native vegetation (in accordance with the Forest Practices Act 1985 for significant species);* ◗ *Consideration of areas of conservation areas (in accordance with the Nature Conservation Act 2002 and National Parks and Wildlife Services Act 1970);* ◗ *Consideration of native riparian and coastal vegetation condition; and* ◗ *Assessment of coastal processes.* *Furthermore, land use and development proposals must include protection of high priority vegetation or poorly conserved species.* *For Reserved Land, ensure the following:* ◗ *Compliance with the National Parks and Wildlife Act 1970 and Crown Lands Act 1976;* ◗ *Preparation and implementation of management plans, including the management of fire and weed control; and* ◗ *Management of recreational and tourism facilities and opportunities.*

NATURAL RESOURCE MANAGEMENT
Land Capability

Legend
- Class 3 land
- Class 4 land
- Class 5 land
- Class 6 and 7 land
- Municipality Boundary
- Coastline
- Rivers

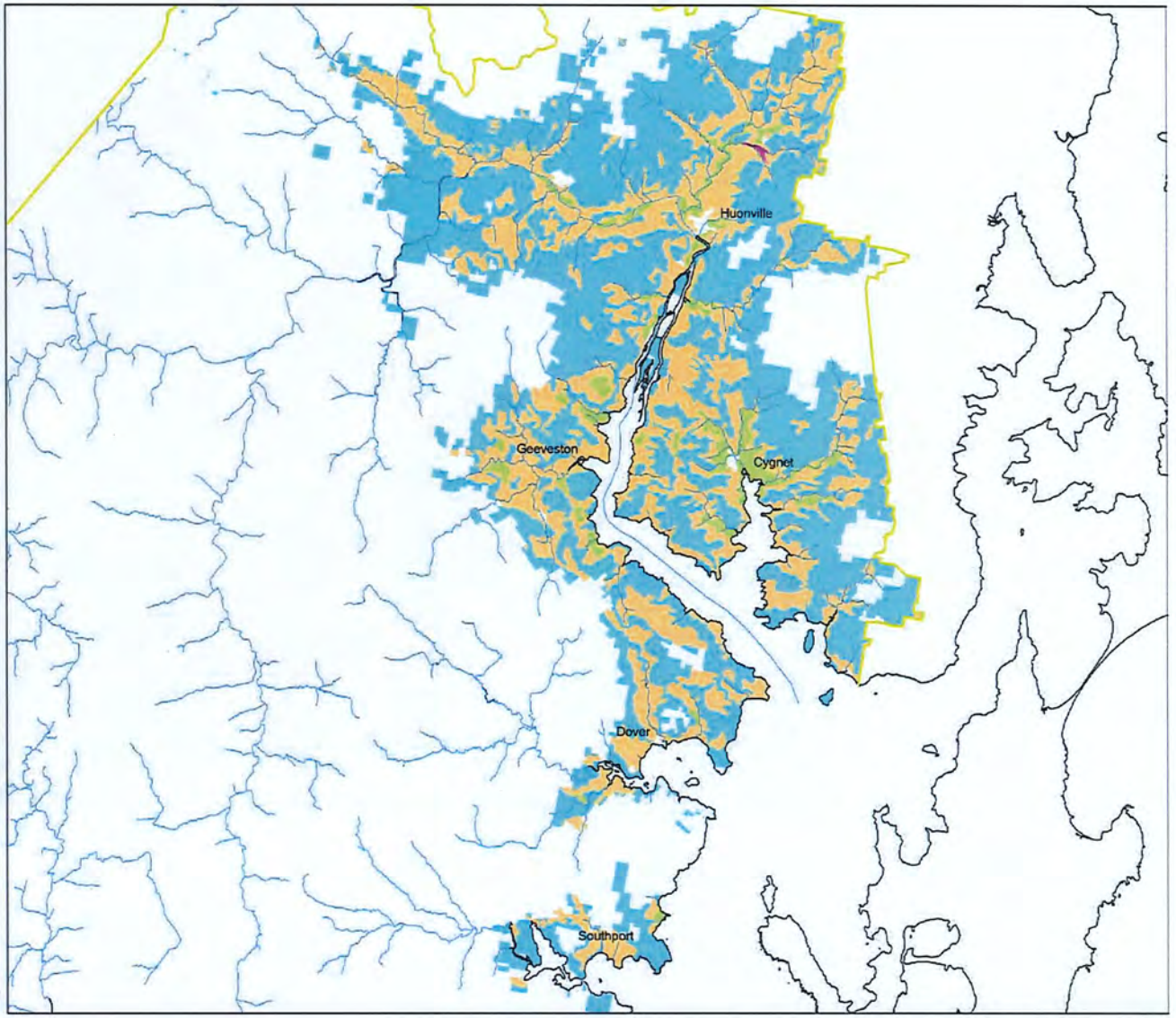
Notes

Land capability based on DPIW's land capability surveys and mapping.

Land capability only asssed on private land.

Map scale is 1:220,000 for A3.

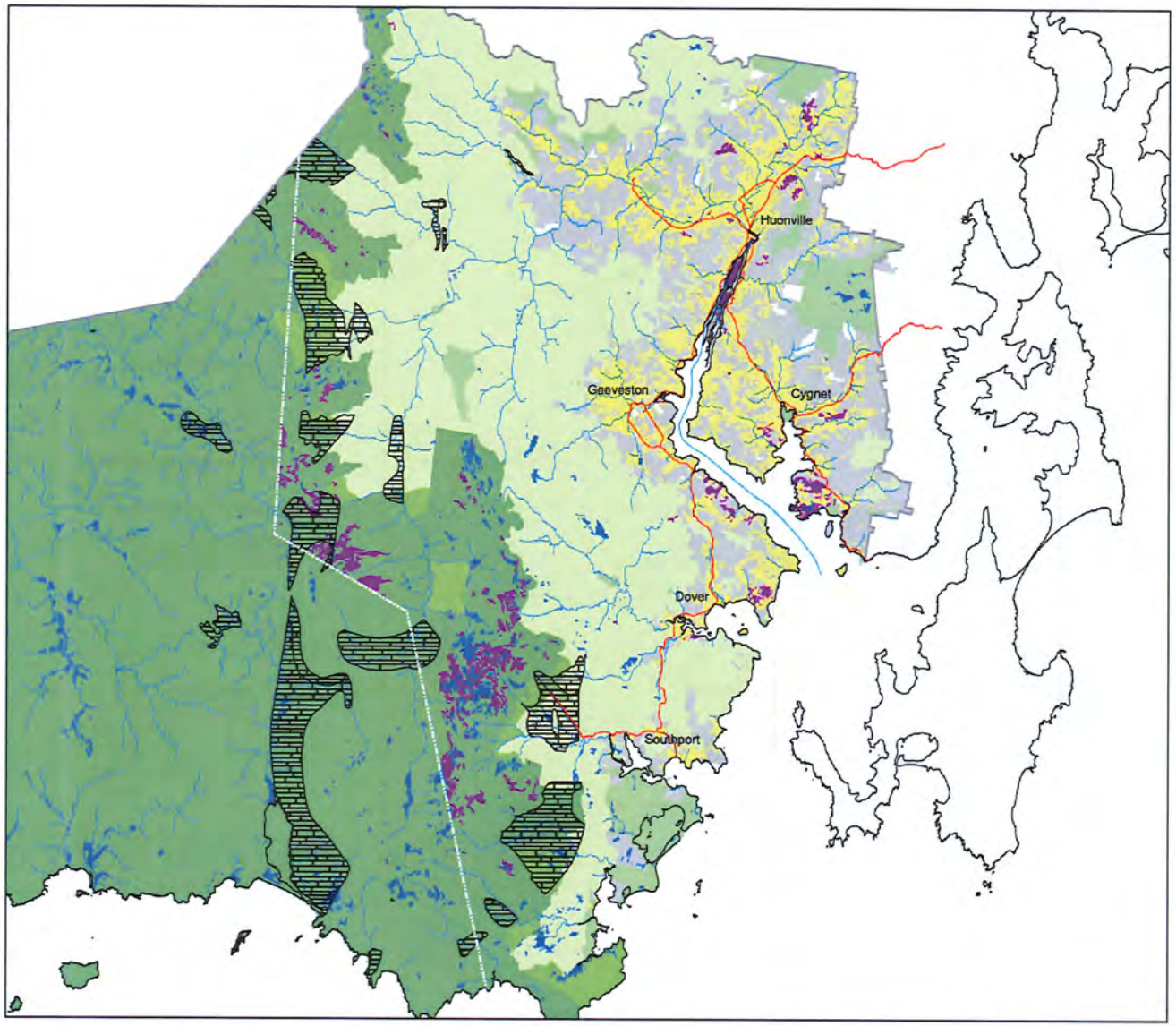
0 5 10
Kilometers



GHD CLIENTS|PEOPLE|PERFORMANCE

Tasmania

NATURAL RESOURCE MANAGEMENT
Special Values



Legend
- Threatened native veg. communities
- Wetlands
- Karst Systems
- Private land with native veg.
- Private land with negligable native veg.
- World Heritage Area
- National Park
- State Forest
- Other reserves and conservation areas
- Municipality Boundary
- Coastline
- Rivers

Notes

Extent of cleared land based on the TASVEG v1.0 (2006) database.

TASVEG communities west of the dotted white line were (shown within the WHA) not included in this map. This area was not deemed to be integral to the Strategy document.

Map scale is 1:300,000 for A3.

0 5 10
Kilometers

GHD CLIENTS | PEOPLE | PERFORMANCE

Tasmania

NATURAL HAZARDS
Summary

Natural hazards pose varying degrees of risk to human safety and property throughout the municipal area, with bushfire events posing a particular risk to human life. The use of non-urban land for residential development has significantly increased the level of risk from natural hazards. The large number of small vacant lots in areas prone to natural hazard, combined with the ongoing demand for rural residential opportunities suggest that the degree of risk from natural hazards has the potential to increase over time.

The main soil-related hazards include landslip and tunnel erosion. The municipal area has extensive areas of steeply sloping land that is potentially susceptible to landslip. Factors that may promote landslip occurrence including vegetation clearance, alteration of drainage conditions, excavation and excessive loading from structures. Tunnel erosion on the other hand is a more insidious form of risk, resulting in considerable damage even before surface manifestations are evident. The cost of tunnel erosion not only relates to loss of soils, but can affect the structural integrity of buildings.

Bushfire hazard generally has high public awareness. The physical and environmental setting of the municipal area makes it particularly susceptible. The bushfire risk has increased even further in recent years with the influx of new residents into rural areas. Often located within or adjacent to standing vegetation, many lots have little bushfire protection, are difficult to access and have insufficient water supply. In recent years both the Tasmania Fire Service (TFS) and local governments in Tasmania have been committed to minimising bushfire hazard risk through the implementation of the TFS guidelines for development in bushfire prone areas. It will be essential that these guidelines are integrated into the planning scheme and that new development is firstly required to establish the underlying bushfire hazard potential of the area.

Another major hazard within the municipal area is that arising from water inundation, arising not only from flood events but storm surge and sea-level rise associated with climate change. The municipal area has an extensive history of flood events and while the severity of such flood events has lessened with the damming of the Huon River (Lake Pedder), there are still certain areas subject to regular inundation. Storm surge and sea level rise associated with climate change are planning issues that are becoming more apparent across all of Tasmania, given the high occurrence of development within our coastal areas. The likely increase in risk associated with storm surge and sea level rise and the ultimate economic costs of this risk means the Strategy needs to appropriately control the risk.

Ultimately, the availability of appropriate technical information is critical to the assessment of potential natural hazards and this will need to be an ongoing priority for the Huon Valley Council. Information, in many cases, is not available and planning decisions will need to adopt a precautionary approach. This precautionary approach should ensure that the hazard risk be mitigated through structural or siting methods to avoid property loss or damage, lives being placed at risk or public health concerns being generated. Ultimately, though it will be necessary to restrict use and development in vulnerable areas.

NATURAL HAZARDS

Strategic Directions and Guiding Principles

LANDSLIP AND TUNNEL EROSION HAZARD

Strategic Directions	Guiding Principles
Minimise loss of property and life and avoid economic impacts by ensuring use and development avoids or manages the risks associated with landslip or soil erosion hazard.	*Factor inherent landslip and tunnel erosion risk in determination of land use zones.* *Ensure appropriate assessments (in accordance with AS1726-1993) are made before the approval of any use and development in areas that may be at risk of landslip or tunnel erosion.* *Identify appropriate prescriptive controls (using recognised stndards AS/NZS 4360:1990 & Australian Geomechanics Society Guidelines for Development on Hillsides) to manage use and development within areas potentially at risk.* *Ensure planning assessments appropriately consider landslip and tunnel erosion as a relevant matter under the Planning Scheme.* *Utilise mapping data that indicates typical environments where hazards are more likely to occur as a tool for planning assessment*.* *Ensure use and development complies with the standards for site investigations (AS1726-1993), risk management (AS/NZS 4360:1999), and Australian Geomechanics Society guidelines for development on hillsides (AGS 2000).* *Assess the potential for off-site impacts resulting from a development; for example, potential impacts of a proposed development to create or exacerbate an erosion risk outside the area of the DA.* *Identify the options and methods for treating a hazard risk. The relative costs and benefits of the options needs to be considered so that the most cost effective solutions, consistent with the overall needs of the client, owner and regulator, can be identified.* *Ensure community facilities and critical infrastructure is not located in areas of high risk.*

*DPIW has advised that errors in interpretation will occur if the information is used at a scale less than 1:100 000. However, for the purpose of identifying the approximate extent of each hazard in the Huon Valley, the data was considered to provide a useful generalisations at a scale of 1:10 000.

BUSHFIRE HAZARD

Strategic Directions	Guiding Principles
Recognise the management of bushfire hazard as an important land use considerations in order to protect lives, property and natural values of the Huon Valley as well as avoid unnecessary cost to the community.	*Ensure land use zones consider the extent of bushfire risk of land and the necessary measures to control that risk (i.e. clearance of large tracts of vegetation).* *Identify appropriate prescriptive controls within the Planning Scheme (using TFS recognised standards) to manage the location and design of use and development within bushfire prone areas .* *Ensure an adequate and protected water supply is always available to defend habitable buildings from fire.* *Ensure community facilities and critical infrastructure is not located in areas of high risk.*

FLOODING HAZARD

Strategic Directions	Guiding Principles
Ensure that flood risk is a key land use consideration and the use and development is located and designed with due regard to hazard associated with flooding.	*Consider inherent flood risk of land in determination of land use zones by avoiding residential zones within 1:100 flood risk areas.* *Ensure that habitable buildings are not located within areas at risk of 1:100 year floods.* *Require that development within flood prone areas have floor level designed in response to the flood risk.* *Ensure community facilities and critical infrastructure is not located in areas of high risk.*

NATURAL HAZARDS
Strategic Directions and Guiding Principles (cont)

STORM SURGE AND SEA LEVEL RISE	
Strategic Directions	**Guiding Principles**
Ensure that use and development is located and designed with due regard to hazards associated with sea level rise and storm surge.	*Only allow appropriate development within areas identified to be susceptible to sea level rise and storm surge.* *Protect actively mobile landforms such as beach and sand dune systems and unstable cliffs from vegetation removal.* *Prevent the construction of habitable buildings within areas at risk from storm surge and sea level rise.* *Ensure community facilities and critical infrastructure is not located in areas of high risk.*

POOR AIR QUALITY HAZARD	
Strategic Directions	**Guiding Principles**
Potential sources of particulate emissions appropriately manage and minimise particulate emissions.	*Use and development with potential for particulate emission will be required to meet the accepted standards under the Environmental Management Policy (Air Quality) 2004 or any approved substituted policy.*

NATURAL HAZARDS
Soil-Related

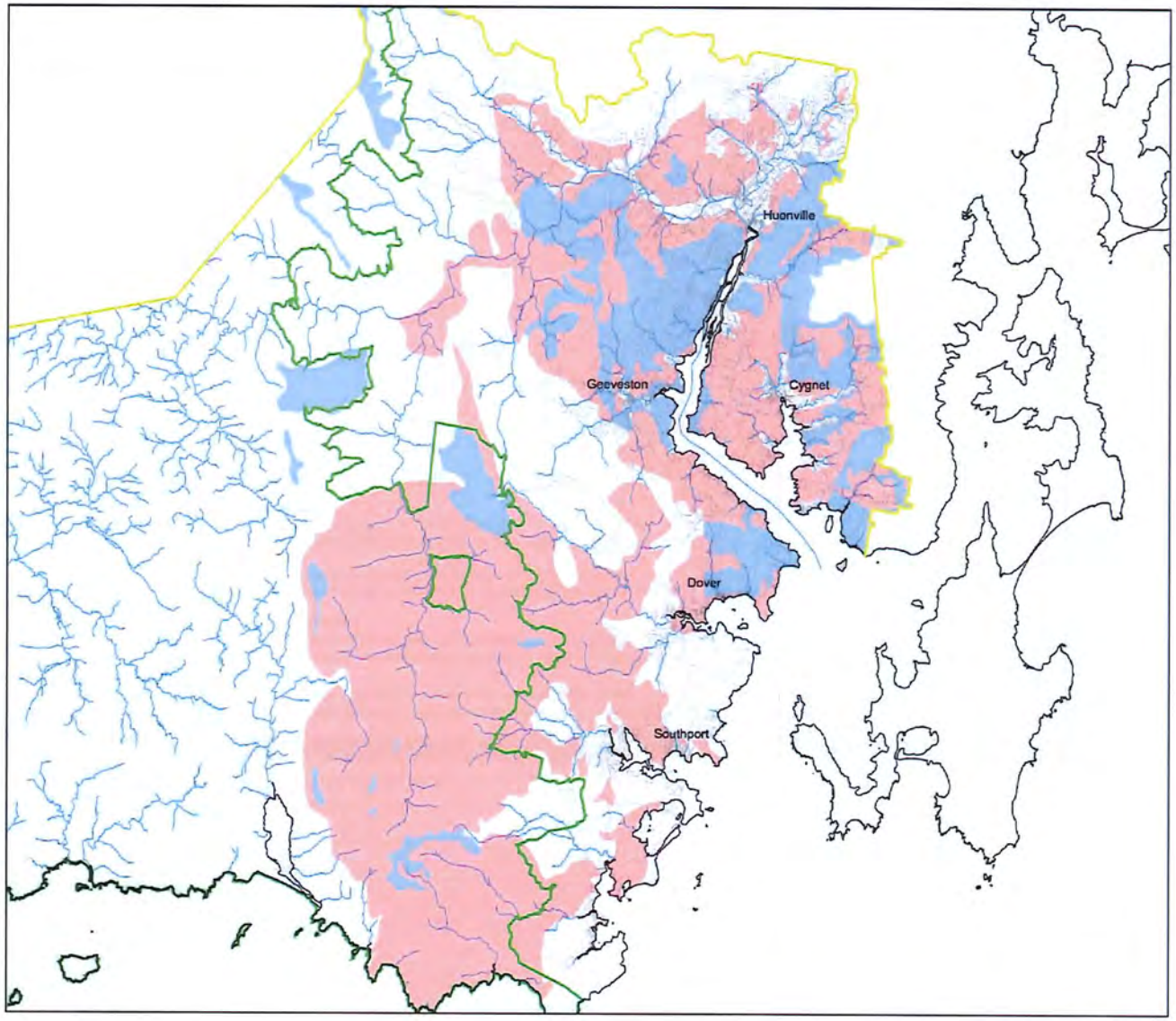
Legend
- Landslip Hazard
- Tunnel Erosion Hazard
- Municipality Boundary
- World Heritage Area
- Cadastre
- Coastline
- Rivers

Notes

Hazard zones based on land system data and contour gradients.

Map scale is 1:300,000 for A3.

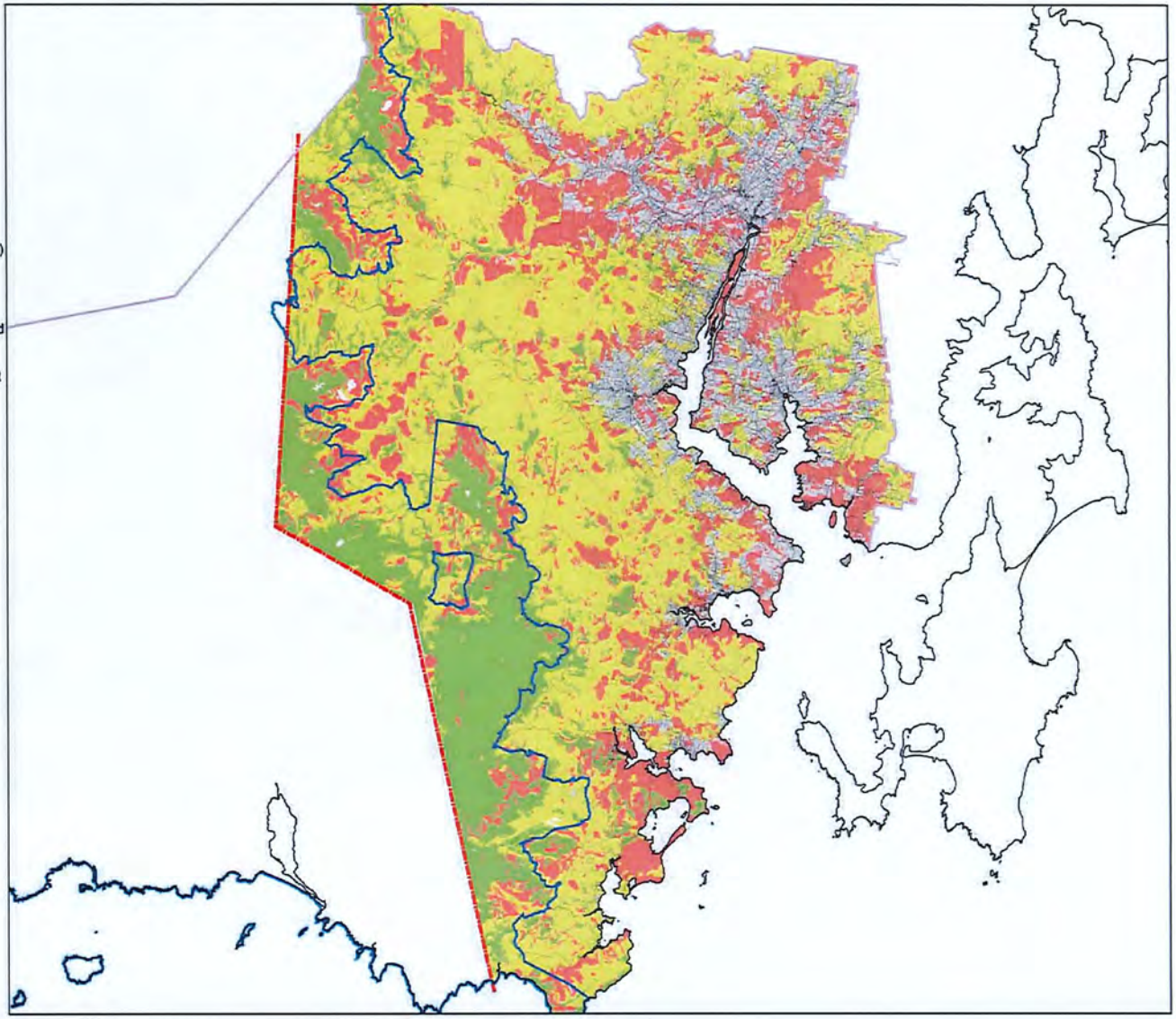
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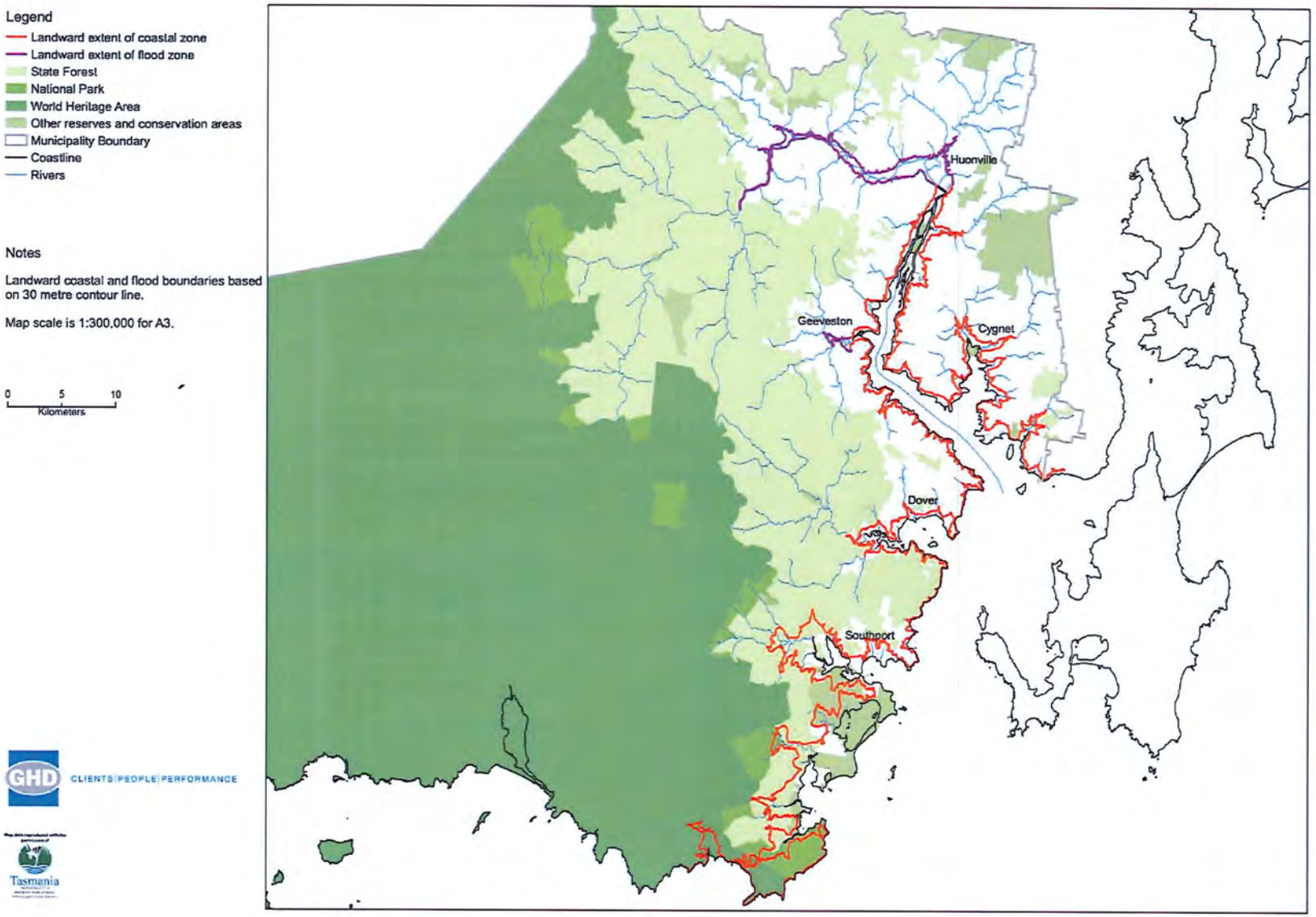
GHD CLIENTS | PEOPLE | PERFORMANCE

Tasmania

NATURAL HAZARDS
Bushfire



NATURAL HAZARDS
Flood and Coastal Zones



GHD CLIENTS | PEOPLE | PERFORMANCE

Tasmania

HERITAGE
Summary

There are a range of heritage values that are important considerations in this strategy. They can be divided into four categories: Aboriginal; European Heritage; cultural and natural Landscapes.

The municipal area is rich in Aboriginal heritage values. At present there are some 73 recorded sites within the greater Huon Valley area and there are most likely a plethora of unknown sites. The known areas comprise of Quarry sites, Isolated Artefacts, Artefact Scatters, Occupation Shelters and Midden sites. Considering the sensitivity of Aboriginal heritage sites, it is necessary to take a precautionary approach to new developments, particular those around coastal areas. Such an approach is provided for within the *Aboriginal Relics Act 1975.*

European heritage considers both cultural and built heritage. European cultural values in the municipal area are largely based on the forest, agricultural and maritime industries, all which featured heavily in the historical evolution of the area since European settlement. Heritage significance is also more than just individual structures and it will therefore be important that the protection of heritage areas are considered with new use and development.

European settlement throughout the Huon Valley has also contributed heavily to cultural landscapes. From a visual perspective Huon Valley is recognised for its unique cultural landscapes, which are often central to a community's sense of place.

Also important to the community and the tourism economy are the natural landscapes throughout the Huon Valley. High quality natural landscapes throughout the municipal area include Adamsons Peak, Sleeping Beauty, Hartz Mountains, Port Esperance, the Huon River and its Estuary and the Tasmanian Wilderness World Heritage Area.

This Strategy, although providing a listing of all current identified cultural heritage places, does not attempt to provide a detailed study of heritage values across the municipal area. This requires additional time and resources, which is not essential to the preparation of a new Planning Scheme. A more detailed study should be a priority for Council over the coming years as a basis for a future planning scheme amendment.

A list of places of heritage significance is provided as appendices to the main document. This list, however only provides for existing identified heritage listed places under the existing Planning Schemes and the Tasmanian Heritage Register. As there has been no recent systematic review of cultural heritage items in the Huon Valley, particularly those with local significance, the Council should consider commissioning a full Heritage Study for the Huon Valley area for input into the first review of the new Planning Scheme.

HERITAGE
Strategic Directions and Guiding Principles

ABORIGINAL HERITAGE

Strategic Directions	Guiding Principles
Ensure that sites and artefacts of Aboriginal Heritage Significance are managed appropriately into the future through an integrated approach to management.	*Council, relevant state agencies and the Aboriginal community work together to identify areas of sensitivity.* *Incorporate provisions into the planning scheme to allow Council to request Aboriginal heritage surveys for any proposals involving substantial subdivision of land, coastal development, or significant disturbance of land outside settlement boundaries, or as considered generally appropriate.* *Adopt an integrated approach to management with State Government and the Aboriginal community to ensure that important sites and artefacts are managed appropriately into the future.*

EUROPEAN AND BUILT HERITAGE

Strategic Directions	Guiding Principles
Recognises the various economic benefits associated with managing the cultural heritage assets of the Huon Valley in an appropriate manner. *The social benefits of appropriate cultural heritage management are also recognised. Being integral to people's sense of place and pride, the community should be involved in the management processes.* *Sites of heritage significance need to be protected against inappropriate development – this also includes sites of geo-conservation significance, historic value and those with unique environmental features.* *Provide a framework for the establishment of statutory regulation over additional heritage areas of listed sites as they are identified through appropriate studies.*	*Allow appropriate reuse of heritage buildings.* *Ensure that the siting, scale, form and appearance of development of heritage listed properties and within heritage areas does not detract from those characteristics of the place that contribute to its cultural significance.* *Ensure that important built fabric is protected through the redevelopment of any heritage listed properties.* *Provide for the protection of historic streetscapes.*

CULTURAL LANDSCAPE AND NATURAL HERITAGE

Strategic Directions	Guiding Principles
The Huon Valley landscapes are important in attracting residents and visitors and providing for a sense of place. Landscape values will therefore be protected as far as practicable. *Cultural landscape and natural heritage values provide important tourism opportunities that can be facilitated through the development approval process. The primary objective is to protect the inherent value of the landscape.* *The Huon Valley's geological assets need appropriate management to ensure the preservation of their value.*	*Ensure development is appropriately controlled in relation to the landscape setting, scenic corridors and visual amenity.* *Development (including vegetation clearance) should not occur where it is visually intrusive and out of place within the surrounding landscape.* *Development on hill faces, ridgelines, coastal bluffs, headlands and other prominent landforms should protect the visual qualities of such areas and to prevent erosion or excessive disturbance.* *Protect geological sites of significance from inappropriate development.*

WORLD HERITAGE AREA CONSIDERATIONS

Strategic Directions	Guiding Principles
The World Heritage Area is an important attracting feature and a coordinated response to management within the World Heritage Area is required between the relevant authorities. *The natural values on adjacent land needs to be maintained so as to complement the important heritage values and avoid any diverse impact on the World Heritage Area.*	*Ensure a coordinated approach to planning for land within and adjacent to the World Heritage Area to protect natural and cultural values.*

TRANSPORT
Summary

The provision, location, condition and capacity of physical infrastructure by Council and State Government, has a major influence on use and development of land, levels of accessibility, amenity and ability to minimise environmental impacts. This strategy has examined transport and road infrastructure separately to other forms of infrastructure (i.e. water, sewerage etc). The strategy does however recognise that access to a safe and efficient transport system, an adequate supply of reticulated water and disposal of effluent and stormwater are prerequisites for sustainable economic and social development.

The transport system has had a major influence on the pattern of land use and economic development within the municipal area and will continue to do so. The arterial road network and its maintenance will have a major impact on providing long-term sustainable economic and social development in the Huon Valley, particular for the resource based industries and tourism.

The road network is well developed, not affected by congestion and is subject to continuous upgrading to meet increased demands and improved safety. There is potential for conflict along the arterial road network between commuter/tourist use and freight transportation. This has been evident with the concern over heavy vehicle movements, particularly through settled areas (i.e. Huonville). This particular conflict will be partially resolved through alternative links (Plenty Link Road) and the potential development of Southwood.

To strategically plan for long-term investment and protection of the road network, a road hierarchy, which incorporates State Government arterial roads, Council maintained arterial roads and Council maintained general roads, will be developed. This hierarchy will be translated into a new planning scheme. In doing so the Strategy recognises potential impacts, adjacent development and new accesses can have on the viability of these roads. This particularly applies to new residential development which should be encouraged in areas an appropriate distance away from major arterial road corridors.

The strategy also recognises that the transport system and the pattern of land development can affect quality of life, economic development and the environment in real and direct ways by influencing:

- The amount of time we spend travelling;
- Disposal income for essential items;
- Access to employment, education, essential services and social activities;
- Personal mobility and interaction with family, friends and the community;
- Amenity and quality of the environment;
- The amount of greenhouse emissions; and
- Cost of goods and services.

As a consequence an important element within this Strategy is the integration of land use and transport planning. In order to achieve these principles as well as the major objectives under the RMPS of sustainable development, the new planning scheme will include provisions to:

- Reduce the growth in the distance and the number of journeys using motorised transport;
- Promote increased accessibility and amenity;
- Maximise the use of existing infrastructure;
- Protect high-speed road corridors;
- Encourage and promote alternative means of travel including walking, cycling and the use of buses; and
- Reduce reliance on travel by motor vehicle.

TRANSPORT
Strategic Directions and Guiding Principles

HUON VALLEY ROAD NETWORK	
Strategic Directions	**Guiding Principles**
Maintain and protect the safety and efficiency of the transport system.	*Use or development is not to unreasonable impede the safety and efficiency of the road transport system.* *Require developer contributions towards necessary road improvements arising from new development.* *Use and development is to provide adequate parking on, or in the vicinity of the site and for all vehicles to enter and leave the site in a forward motion.*

INTEGRATING LAND USE AND TRANSPORT PLANNING	
Strategic Directions	**Guiding Principles**
Recognise the consolidation of development in existing towns will promote sustainable development by increasing accessibility, reducing the reliance on motor vehicles and promote alternative modes of transport including walking and cycling. *The provision of transport infrastructure is a substantial investment with a lifecycle between 50 and 100 years. With limited funding available for new infrastructure and services it is vital that the high speed arterial roads are protected from direct access from a high traffic generating land use activity outside the major towns which could have a detrimental impact on the safety and the efficiency of movement.*	*Future residential and commercial development will be based on the consolidation of existing towns. Ribbon development will be discouraged.* *Low density residential living will be encouraged in specific areas in relative close proximity to towns.* *Encourage the concentration of light industrial and commercial activities in existing towns, which are highly accessible to the community and where services are available.* *New residential development will be encouraged in areas that are an appropriate distance away from major arterial road corridors to avoid noise and emissions.* *New residential subdivisions shall be designed to maximise connections and promote walking and cycling by developing residential neighbourhoods with connecting roads and pedestrian and cycling linkages.* *Plan for a potential link road within the Huonville town centre.* *Restrict direct access of high vehicle generating land use activities onto high-speed arterial roads.* *Require bicycle parking within town centres.*

INFRASTRUCTURE
Summary

To provide economic and environmentally sustainable outcomes, future residential and commercial development in the municipal area will predominantly occur in towns with the capacity to provide reticulated water, sewerage reticulation and treatment and stormwater collection disposal.

At present a major environmental problem is associated with leachate from septic tanks where development has occurred outside of serviced towns. To address the environmental problem, Council has pursued a policy of extending sewerage services to settlements where this is a significant problem, however this cost is not often sustainable.

The quality and supply of water, sewerage treatment and disposal of stormwater varies considerably across the municipal area. Like other small Councils in Tasmania, the Council is faced with a high demand for new infrastructure, upgrading and maintenance of existing utilities and limited funding from a relatively small rate base. It is the intent of this Strategy, to focus on maximising the use of existing infrastructure and encouraging development where there is excess capacity of reticulated water and sewerage.

Reticulated sewerage is available at major towns of Huonville/Ranelagh, Cygnet, Franklin, Port Huon, Geeveston and Dover, while all other settlements rely on disposal through septic tanks or domestic sized package treatment plants. In terms of capacity, most of the sewerage treatments plants (located at Ranelagh, Cygnet, Geeveston, Dover & Southport) suffer from excessive stormwater infiltration. Measures need to be taken to address this issue. Ultimately however, future development requiring extensions to existing reticulated sewerage schemes will be dependent upon the capacity of the treatment plant, the financial capacity of the scheme itself and the environmental benefits accruing from such an extension. A key strategy within the Strategy is the application of headwork charges for developments that impose extra long-terms costs to Council.

The availability of water supply is more extensive than reticulated sewerage. There are 11 water schemes in place across the municipal area that service all the major settlements as well as some parts of Glen Huon, Grove, Judbury and Mountain River. Verona Sands and Southport are not supplied with reticulated water. Given the considerable investment in the provision of water infrastructure by Council, it will be important to maximise the effectiveness and cost efficiency of this investment by utilising existing infrastructure to its capacity and encouraging future development within existing settlements (where there is the least amount of cost involved in upgrading or extending water supply).

There are also numerous issues in regards to the long term provision of water in the municipal area. These include:

- The water reticulation system in some areas is sub-standard and therefore not capable of handling further land use development without upgrading.
- Council applies water restrictions on an annual basis across all water schemes. This is generally due to reticulation problems where consumption in the lower levels drastically reduces available water to the more elevated sections of the schemes.
- Water conservation measures will be necessary to optimise the efficiency of the existing infrastructure. This might include water metering, domestic water tanks, improved plumbing systems and public education.

Stormwater reticulation is poor across the whole municipal area. While major towns are provided with kerb and channelling and some drains, there is no full reticulation system and no sediment or litter removal from urban stormwater. There has been no strategic analysis of stormwater to ascertain impacts on the quality of receiving waters. The only declared stormwater district in the municipal area is Huonville, but the stormwater reticulation within Huonville requires upgrading and consideration of flooding potential.

As a matter of importance, the Strategy therefore encourages water sensitive urban design that provide a range of alternatives to traditional approaches to stormwater management.

Waste management is a major environmental challenge for the municipal area not only in minimising residential waste and encouraging reuse and recycling, but the pollution impacts from leachate at landfill sites. Council has adopted a broad waste management strategy in 2001, which includes upgrading of waste transfer stations, rehabilitation of former landfill sites containing leachate and introducing a kerbside waste collection.

There is therefore need to ensure that future residential development is design to be capable of kerbside collection. It will also be important to ensure attenuation distances are applied for waste transfer/disposal sites and treatment sites to protect sensitive uses from detrimental impacts.

Existing Council mapping of reticulated services is limited and is not reliable. Council therefore relies heavily upon site inspections. The upgrade of mapping of infrastructure and its capacity should be a priority for Council.

INFRASTRUCTURE

Strategic Directions and Guiding Principles

SEWERAGE AND WATER

Strategic Directions	Guiding Principles
Give preference to developments that will maximise the efficiency of existing infrastructure in the major towns that have existing capacity. *Future development requiring an extension of existing reticulated sewerage schemes will be dependent upon the capacity of the treatment plant, the financial capacity of the scheme itself and the environmental benefits accruing from such an extension.* *All new development will be required to be provide an adequate level of infrastructure and services and not have a detrimental impact on the quality of town drinking water supplies.* *Encourage development that embraces sustainable water reuse.*	*Future residential and commercial development will be based on the consolidation of existing towns. Ribbon development and an expansion of areas where infrastructure is inadequate will not be supported. Infill development will be encouraged.* *Headwork charges on developers will apply if a development will impose extra long term costs, over and above the income that Council would expect to receive in ongoing water and sewerage charges.* *New urban residential and commercial development must be provided with:* ◗ *Reticulated water.* ◗ *Reticulated Sewerage or an adequate package treatment system.* ◗ *Stormwater drainage with satisfactory capacity and environmental performance.* ◗ *Sealed roads with kerb and gutter and safe access.* *Land in the towns will not be zoned residential if it cannot be serviced by Council infrastructure (existing or planned).* *Water supplies will be protected from activities with the potential to create nutrient and or sediment loads.* *Where development outside of established reticulated areas cannot be avoided, sustainable water supply and use mechanism must be implemented.*

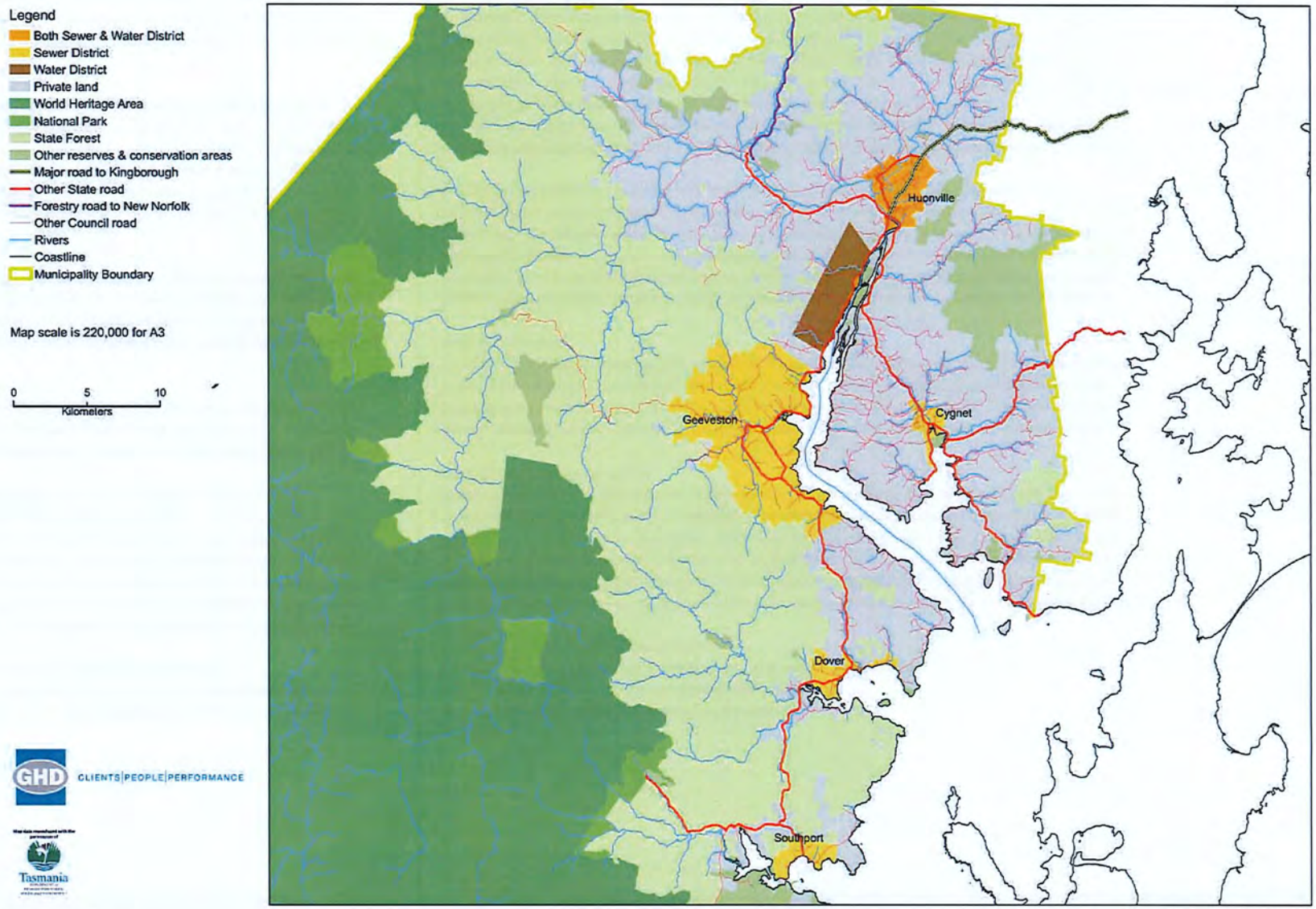
STORMWATER MANAGEMENT

Strategic Directions	Guiding Principles
Recognises that contamination of stormwater is a threat to the quality of receiving waters. *Encourage the use of innovative and alternative infrastructure for stormwater management and treatment.* *Plan for the retrofitting of existing urban areas with stormwater infrastructure*	*Stormwater infrastructure is to be incorporated into new land developments (such as subdivisions and multiple housing) utilising contemporary water sensitive techniques.* *New industrial development is to incorporate water sensitive design and provide for protection of water quality, reducing peak flows and incorporate landscaping that facilitates water filtration and removal of pollutants.* *Opportunities for contamination of stormwater are to be minimised at the source or alternatively, treatment of contaminated stormwater is to be undertaken before discharge.*

WASTE MANAGEMENT

Strategic Directions	Guiding Principles
Extend the kerbside refuse collection program and minimise the potential for conflict between refuse storage and sensitive land uses.	*Future residential development will need to be designed so that it is capable of being serviced by kerbside refuse collection vehicles.* *Appropriate attenuation distances will be provided between waste transfer stations/ disposal sites and use or development which would be sensitive to noise, odour and dust emissions.*

INFRASTRUCTURE
Water and Sewer Districts



GHD CLIENTS|PEOPLE|PERFORMANCE

Tasmania

THE ECONOMY
Summary

Economic development within the municipal area has been closely related to the natural resource base. Agricultural, forestry and fishing industries in the area have developed as a result of favourable climatic conditions, large areas of productive land and coastline, reliable water supplies and abundant fish and other marine line.

The natural resource base continues (in various guises) to provide the economic lifeblood of the municipal area as well as contributing to the economic well being of the State overall. Although agriculture, forestry and fishing have seen a slight decline in more recent years, this sector continues to be the largest employer, accounting for 17.3% of the workforce (this include the aquaculture industry which accounts for 5.1%). The tourism sector and related development has also increasingly become important for the economy of the region. The latest 2006 Census data figures however do indicate an increasing percentage of the population employed in industries outside of the municipal area and this may be reflective of the increasing desirability of the Huon Valley for commuters.

The main economic sectors that will be affected by, or impacted upon, by future use and development are forestry, agriculture, aquaculture, tourism and light industrial. Many of these sectors are dependent upon the sustainable management of natural resources. A major challenge for Council is the strategic development of all industries in the municipal area, while maintaining and enhancing these values.

Agricultural development was one of its earliest industries, developing in the mid 1880s following clearance of land from the early forestry industry. Agricultural industries based on apple, berry fruits, stone fruits and hops were soon established. The first orchards were planted in the later 1830s near Garden Island Creek, growing steadily until the late 1930s when apple and pear orchards stretched almost continuously from Grove to Geeveston and from Huonville to Cygnet.

The opening of the world economy in the 1970s and international policy changes saw a significant adverse impact upon the apple industry in the municipal area. The following 30 years has seen a decline in the industry which has only been partially arrested through the development of new markets, new varieties and a move towards larger orchards. Apple production however remain a significant contributor to the value of agriculture in Tasmania with the production of over 45,000 tonnes of apples in Tasmania for 2004-2005 (ABS 2005 Agriculture Census). Latest figures by the Apple and Pear Association Industry (2004) show that the Huon Valley still accounts for 90% of the Tasmanian crop.

It is therefore important that there is a continuing diversification of agricultural enterprises within the municipal area. Traditional orcharding and grazing activities are gradually being replaced with non-traditional farming enterprises such as viticulture, cherries, hazelnut and olives, many of which are undertaken using organic farming practices. These non-traditional and niche markets also feed into the tourism sector.

Given that the agricultural sector is the major economic driver and employer for municipal area and is important in the overall context of the State, the protection of agricultural land is an integral element of a new planning scheme. Specific issues that will need to be addressed include:

- Maintaining the economic viability of landholdings;
- Maintaining Class 3, 4 & 5 land for agricultural purposes;
- Maintaining flexibility for industry to respond to market demands; and
- Encouraging downstream processing.

The forestry sector has been a significant element in the economic development of the municipal area. Today, the majority of forestry activity is undertaken by Forestry Tasmania within the Huon Forest District. State Forests account for 22.5% of land in the municipal area; 37% of State Forests are managed primarily for protection and the remainder utilised for production. Traditionally forestry activity was based around old growth and regenerated native forests, however an increase in plantations has arisen, particularly on private land (Private Timber Reserves), although it still only account for 0.8% of the municipal area and 3.1% of the total private plantation production in Tasmania.

Forestry activities are generally outside the scope of planning controls, although forestry activities on private land that is not declared as a Private Timber Reserve prior to a planning scheme coming into effect are subject to local planning controls. Key planning issues to be addressed will include: conflict of different land uses, traffic on public roads, conditions and extent of biodiversity, landscape values, water quality, fire risk management and weed management.

Aquaculture, unlike the agriculture and forestry sectors is a more recent industry, with salmon farms established in the Huon River in the 1980s. Over the past 20 years, this sector has seen considerable growth and the Huon Valley/D'Entrecasteaux Channel is now a significant part of the Tasmanian marine farming industry. While marine farms themselves are not subject to local planning controls, land based associated activities (including processing) are. This Strategy therefore encourages, marine farms and associated land based development to be undertaken together at a strategic level, to reduce conflicts in environmentally/visually sensitive areas.

Manufacturing or light industrial activity is the other major employer in the municipal area (approximately 9% of the workforce). While there is a general feeling that heavy or noxious industry should be discouraged in order to maintain the clean green image of the area, it is important that there is sufficient land for other industrial type activities to ensure a broader and stronger economic and employment base. There is clearly insufficient industrial land in Huonville where the demand is greatest and it will be important for these types of activities to be located in areas where there is sufficient servicing and distance from sensitive uses. There will also be an increasing demand for rural industry. The location of rural processing type of industrial uses should be in proximity to its resource base.

Overall the Strategy identifies a clear direction for economic development in all sectors and at all scales throughout the municipal area to provide for surety in economic investment, protection of natural values and the maintenance of amenity for residents.

THE ECONOMY
Strategic Directions and Guiding Principles

AGRICULTURAL DEVELOPMENT

Strategic Directions	Guiding Principles
Recognises the importance of maintaining productive and viable agricultural areas and ensure that the State Protection of Agricultural Land Policy (PAL) is implemented. *To do this, Council will ensure that* ◗ *Subdivision of agricultural land will not result in the loss of land to agricultural production.* ◗ *Agricultural land is protected from encroachment by residential use and development.* ◗ *A precautionary approach is adopted.* *The planning scheme will identify land allocated to 'Rural Living' and 'Low Density Residential' zones, such that subdivision should not be necessary in the Rural Resource Zone.*	*Council will prevent further incompatible development within identified rural resource zones.* *Maintain or increase the productive capacity of agricultural land and allow farmers to undertake agricultural activities without being unreasonably constrained by conflicts with adjoining non-agricultural land users.* *Minimise scope for conflict by developing a defined boundary and buffer area between agricultural and residential areas.* *Buffer areas are to be maintained where residential areas adjoin the rural resource zone.* *Buffer areas are to be suitably designed, maintained and protected and that natural features on residential edges are retained.* *Provided agricultural activities are best practice, ensure that new adjacent uses do not have an expectation of modification to these practices to an extent which threatens efficient agricultural operations.*

FORESTRY PRACTICES ON PRIVATE LAND NOT WITHIN APTR

Strategic Directions	Guiding Principles
Provide for the minimising of external impacts while still providing for ongoing sustainable forest industry within the Huon Valley.	*Minimise impact on agricultural and residential areas.* *Minimise any negative visual impact.* *Minimise impact on public roads.* *Maintain biodiversity of remnant native vegetation on private land. This is particularly relevant to those areas containing communities of conservation significance.* *Maintain water quality.* *Minimise the risk of bushfires.*

AQUACULTURE

Strategic Directions	Guiding Principles
Maintain or increase the productive capacity of aquaculture industries, while protecting freshwater, estuarine and marine water quality values as a requirement of a development application. *Provide for the minimisation of external impacts while still providing for ongoing sustainable aquaculture industry within the Huon Valley.*	*Integration of marine farm planning and land based development should be promoted at a strategic level. This can help reduce conflicts between marine farms and the demands for associated land based facilities in environmentally/visually sensitive areas.* *Any redevelopment of existing shore based facilities should be able to demonstrate a high level of environmental performance in respect of scenic values, water quality, coastal processes and heritage.*

THE ECONOMY
Strategic Directions and Guiding Principles (cont.)

DOWNSTREAM PROCESSING	
Strategic Directions	**Guiding Principles**
Provide for the development of industries that add value to the key export sectors of forest and food industry and flexibility for development close to raw materials in rural areas, subject to acceptable environmental and amenity impacts.	*Ensure that there is flexibility to provide for farm diversification including manufacturing, processing and sale of primary produce within the rural resource zone subject to satisfactory traffic safety and amenity standards.*

LIGHT INDUSTRIAL DEVELOPMENT	
Strategic Directions	**Guiding Principles**
Identify a particular site for a light industrial 'estate' that would be available for future demands and which would be suitable for the larger industrial enterprises within the Huonville area. *Identify areas for industrial uses in proximity to the other major towns.* *Minimise the distance between rural industry and its associated resource base.*	*Identify land suitable for a light industrial estate close to Huonville that can connect to reticulated services.* *Identify land appropriate for light industrial zoning where visual, landscape and natural values have already been compromised.* *Ensure flexibility for consideration of rural industry uses within the rural resource zone.*

SMALL BUSINESS	
Strategic Directions	**Guiding Principles**
Encourage and support small business in appropriate locations.	*Provide flexibility for home occupations and small businesses across the planning area subject to assessment of the impact on the amenity of the area, the transport network and the environment.*

REUSE OF BUILDINGS	
Strategic Directions	**Guiding Principles**
Recognise and encourage the need for adaptive reuse of buildings in the Huon Valley.	*Consider the reuse of redundant buildings for employment generating uses, subject to consideration of the effects on the amenity of the area, traffic generation, impact on any heritage values and the capacity of the conversion to meet building regulations.*

THE ECONOMY
Spatial Analysis

Legend

- ! Cultural centre
- ! Industrial area
- ! Forestry centre
- Assessed land, potential constraint
- Assessed land, negligible constraint
- Unassessed land, potentially constrained
- Unassessed land, unlikely to be constrained
- Marine farming
- World Heritage Area
- National Park
- State Forest
- Other reserves and conservation areas
- Municipality Boundary
- Road
- Rivers
- Coastline

Notes:

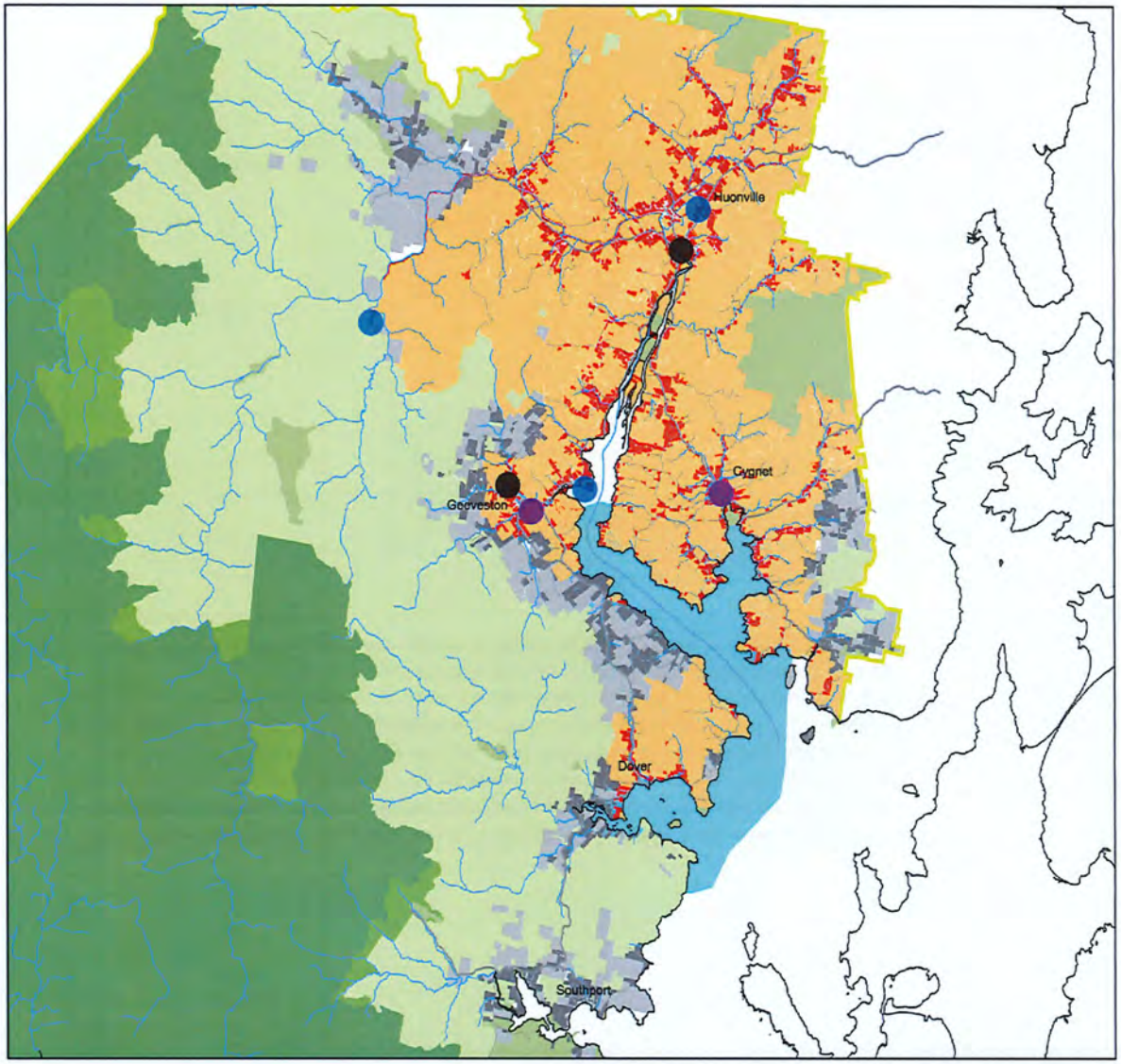
Constraints on agriculture based on the proximity of dwellings to agricultural land. Note that land assessed as having a significant level of constraint can maintain agricultural potential.

Assessments were based on aerial and satellite images. No assessment was possible for areas without such images.

For unassessed areas, titles greater than 20 ha were deemed very unlikely to be constrained by surrounding development. Titles less than 20 hectares in the unassessed areas may be constrained, depending on the proximity of neighbouring dwellings.

Map scale is 1:220,000 for A3.

0 5 10
Kilometers



GHD CLIENTS | PEOPLE | PERFORMANCE

Tasmania

SUSTAINABLE TOURISM
Summary

The Huon Valley has a very strong tourism product that forms an important component of the region's economy. It will continue to be a major long-term economic driver for the area. Given its integral role in the attractiveness of the region for visitors this strategy recognises the importance of maintaining and enhancing the natural, scenic, heritage value and amenity of the municipal area.

The Huon Valley is an identified destination within Tasmania's tourism strategy as a themed tourist trail and is branded as the Huon Trail. The Huon Trail connects Hobart with Huon Valley and Kingborough areas and provides a co-ordinated approach to marketing tourist products and experiences in the region. The touring route also includes the far south area, which in more recent tourism strategies, is identified as a key future development area.

Huon Valley both benefits and suffers from the fact that it is so close to the Hobart region. The area is seen as a day destination and consequently has the lowest overnight stay record in Tasmania. This results in many smaller tourism operators not achieving their potential, as visitors tend to concentrate on the larger and better-promoted operations. The identification of the far south area as a key future tourism area, is partially driven by the need the encourage visitors to extend their stay. The far south area is the furthest part of Huon Valley, geographically from Hobart and creates a greater need for overnight accommodation.

An increase in overnight visitors results in stimulating more expenditure than day visitors and will create more jobs in the valley. A number of specific development opportunities are restricted under current planning controls (i.e. farm stay type accommodation). Therefore the Strategy encourages good, innovative developments that add to the overall tourism experience, without detriment to other key industries. Rural based and eco-tourism developments will be encouraged, particularly outside of existing towns. Indeed, new tourism developments outside of settlements must be environmentally sustainable to protect the brand values.

Overall there is a clear need for a range of tourist accommodation of various standards and ratings through the municipal area to meet the varying needs of visitors.

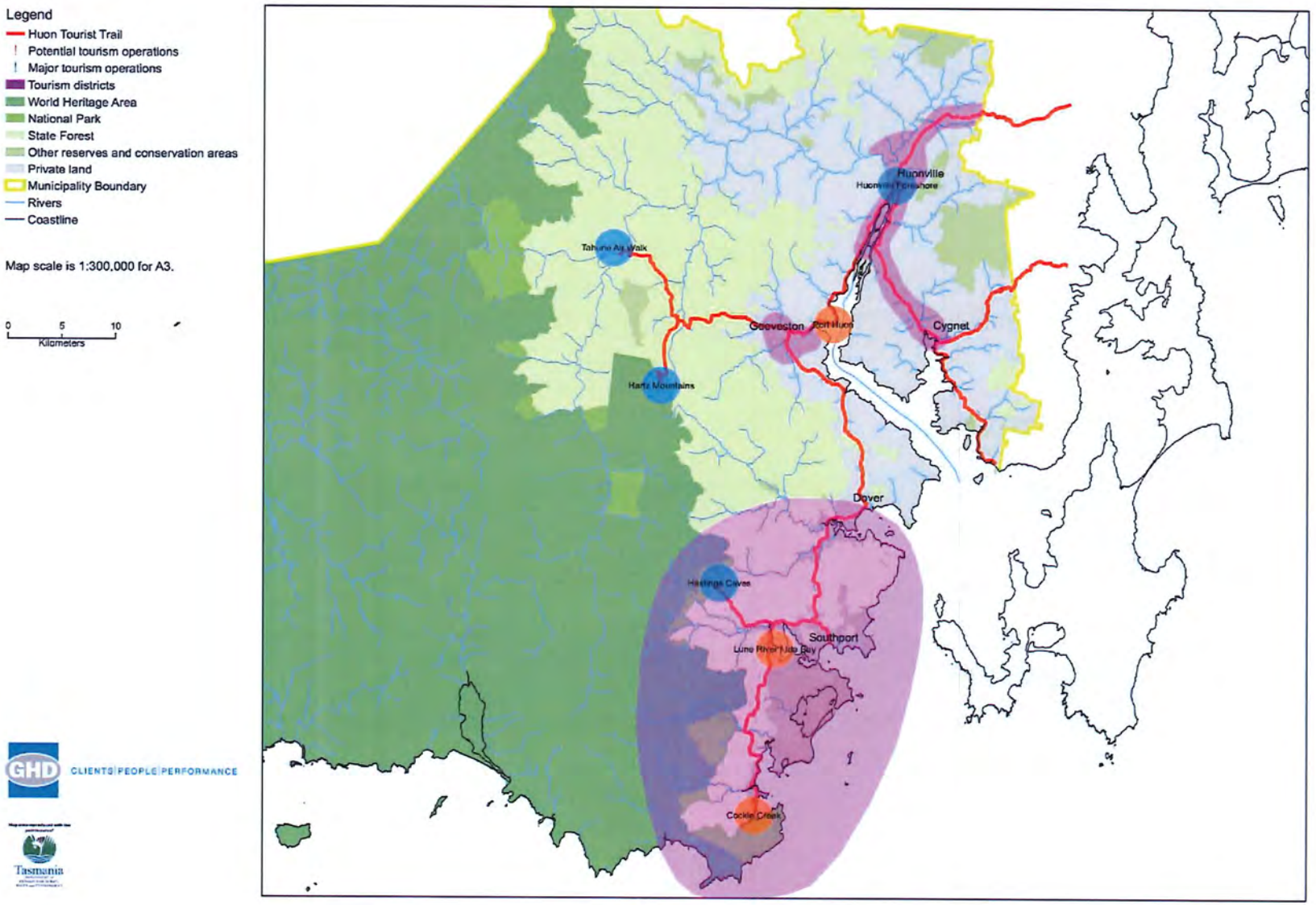
Providing and maintaining the integrity of tourism attractions is strategically important. Attractions provide a reason why visitors go to an area and are central to the tourism experience. The municipal area currently has a number of tourism attractions, including Tahune Air Walk and Hastings Cave. Council will support new attractions that build on the Huon Trail brand and that recognise and enhance natural and cultural values of the region.

Through the planning approval process Council can make sure that new development in the municipal area has a positive influence and protects important landscapes and streetscapes. Poorly designed buildings and inappropriately located development can have an adverse impact on scenic qualities, heritage, amenity of communities and the tourism industry. A key example is the unnecessary and unsightly signage spread across the municipal area, particularly on the main tourist routes. The Council will promote development that is designed to complement the qualities of natural and cultural heritage values of municipal area and protect scenic road touring corridors. Development, which would adversely affect the landscape character and amenity of the area will generally not be supported as would proposals which lead to the loss of trees or forests of high nature conservation or landscape value.

SUSTAINABLE TOURISM
Strategic Directions and Guiding Principles

TOURISM DEVELOPMENT	
Strategic Directions	**Guiding Principles**
Protect and enhance the Huon Trail visual landscape as an asset of the Huon Valley. *Encourage development that builds on the Huon Trail brand.* *Strengthen the key centres of Huonville, Cygnet, Franklin, Geeveston and Dover by encouraging tourism development to locate within them.* *Provide a consistent and coordinated approach to roadside information.* *Only consider larger scale tourism development at appropriate locations outside key centres through a planning scheme amendment process.*	*Ensure tourist attractions in rural or coastal areas or adjacent to waterways rely on that location for the actual attraction.* *Encourage the development of new tourist accommodation and caravan parks within key settlements where reticulated water and sewerage can be provided.* *Outisde of the major settlements allow small-scale overnight accommodation, small-scale agricultural based boutique operatios and home industries based on arts and crafts, subject to individual site assessment.* *Medium to large-scale development outside of servied areas must enhance and protect any adjoining rural uses, natural value of the Huon Valley and transport network.* *Ensure the provision of access and interpretation facilities for waterways, coastal areas, state forests, national parks and World Heritage Areas are subject to appropriate design standards.* *Ensure signs are located so they do not cause visual clutter and detract from the natural beauty of important landscapes and undermine the scenic qualities of road corridors.* *Tourism developments are not to detract from the environmental, landscape or agricultural production values of the Huon Valley.*

SUSTAINABLE TOURISM
Spatial Analysis



PROVIDING FOR HOUSING NEEDS
Summary

The municipal area is not only experiencing demographic and household changes which affect the demand for residential development, but is also experiencing a small amount of growth. The municipal area has been rejuvenated in the past few years with improved economic circumstances and there are new residents coming to live in the Huon Valley.

Demand for residential sites in rural areas with water or mountain views has grown. This demand has been assisted by improvements in road networks for commuters and the changing nature of planning regulation in the Kingborough municipal area. The dominant form of residential development over the past decade has been associated with small lot rural living and low density residential, particularly around Grove, Mountain River, Ranelagh, Glen Huon, Cradoc and Cygnet. Consequently the number of properties in these areas used for agricultural purposes has decreased.

At present there are over 3000 vacant lots in the municipal area that are capable under the current planning controls of having a house built upon them. Approximately 2/3 of these lots are below 10 hectares. There has been a clear tendency to over subdivide in rural areas and even taking into account possible physical constraints on building on these lots, there is ample supply of land within the municipal area without having to encourage further subdivision of rural land.

Many former shack/holiday settlements are also being redeveloped and occupied on an increasingly permanent basis. The conversion of shack leases to freehold title under the Crown Land Shacks Categorisation Program has assisted this trend.

The increasing fragmentation of land through Huon Valley for residential purposes is the most significant issue for for this Strategy to address. Not only does the spread of residential development from towns to rural living dilute the spirit of both the town and country it can compromise the economic development of the municipal area and its natural values. It is acknowledged that many subdivisions have occurred as a result of economic impacts upon traditional agricultural activities (i.e. orcharding), however there are many non-traditional and/or alternative agricultural activities that can occur on lots that are too small for more traditional agricultural activities.

Specifically subdivision of rural land for residential purposes has produced a number of issues that will need to be addressed by the new planning scheme. These include:

- Loss of better quality agricultural land.
- Land management issues.
- Land use conflict with legitimate rural operations.
- Inappropriate subdivision design of low-density developments.
- The clearance of coastal vegetation results in the loss of native habitat and ecological values, erosion and visual amenity.
- Increased levels of rural-residential development places increased and more inefficient demands on Council/public infrastructure.
- There is the potential for increased risk from hazards such as bushfire, flooding and landslip.

It is recognised that the demand for rural living is likely to continue due to the desire of new residents to seek an alternative lifestyle in attractive environmental settings. The best approach is therefore to manage the demand to ensure that there are minimal impacts.

However, it is recognised that in contemporary society, living options outside of settlements have and continue to remain desirable, for many reasons. Indeed in recent years the municipal area has offered a rural residential lifestyle for commuters to Greater Hobart as well as for 'tree' and 'sea' changers. Moreover there are already areas within the municipal area that have either be fettered or fragmented to an extent where agricultural potential is severely constrained.

This demand for rural living is likely to continue at least in the medium term, given the desire of new residents seeking an alternative lifestyle in an attractive environmental setting. It is therefore considered that the best approach is to manage the demand in a way that addresses as far as practicable the detrimental impacts upon the Huon Valley values and long term economic potential, i.e. land that is clearly good un-fettered land should not be used for rural living purposes.

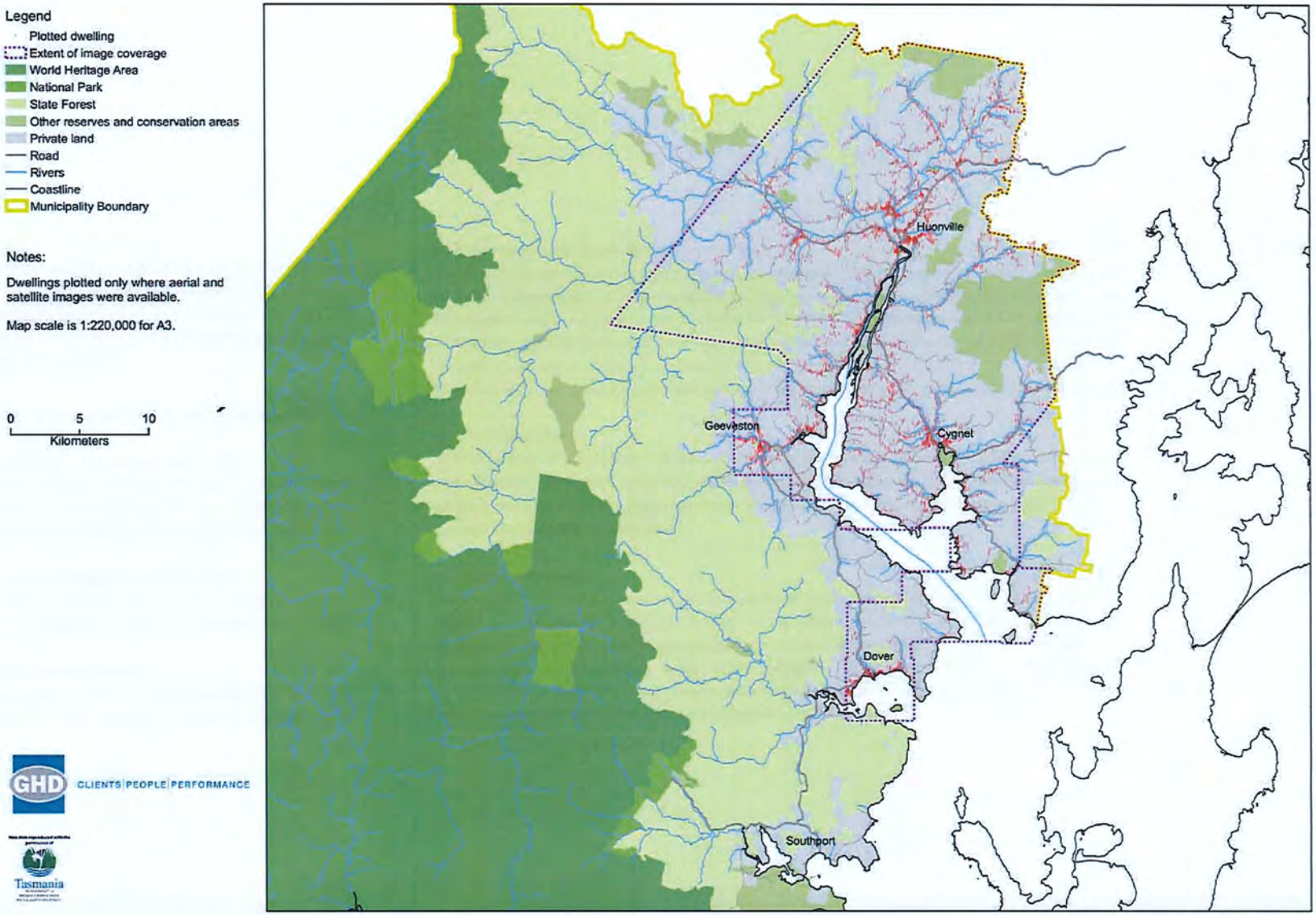
PROVIDING FOR HOUSING NEEDS
Strategic Directions and Guiding Principles

PROVIDING FOR HOUSING NEEDS	
Strategic Directions	**Guiding Principles**
Maximise the utilisation and efficiency of existing infrastructure and community services; and promote infill development in preference to settlement expansion. *Promote high quality residential design and residential amenity.* *Ensure that housing developments are provided for that are consistent with the strategic directions and guiding principles related to Agricultural Land and Living in the Rural Area.*	*Focus housing growth within the serviced settlements of Huonville, Cygnet, Geeveston, Dover and lesser extent Franklin.* *Promote opportunities for the provision of housing diversity within the identified serviced settlements.* *Consolidate existing un-serviced settlements subject to environmental constraints and community considerations.* *Ensure that new development is responsive to existing development and successfully integrates into settlements.* *Ensure that new development conforms to a high standard of residential design in relation to privacy, solar access, streetscape, car parking and access provision.*

LIVING IN THE RURAL AREA	
Strategic Directions	**Guiding Principles**
Encourage the use of rural areas predominantly for primary production and to protect these areas from undue encroachment from non-agricultural uses	*Identify specific areas for low-density residenital or rural living development with regard to agricultural viability, exisitng development patterns and environmental considerations within convenient proximity to community services.* *Non agricultural related residential development will only be approved in the Rural Zone where it either:* ◗ *Relates to an extension to an existing dwelling proceeding the Planning Scheme;* ◗ *Where the dwelling is required to facilitate a rural resource use;* ◗ *Where it is demonstrated that it will not result in the fettering of existing or future agricultural activities through the achievement of recognised buffer distances; or* ◗ *Where the site is identified by an overlay as suitable for limited residential development subject to achievement of satisfactory buffer distances.*

PROVIDING FOR HOUSING NEEDS

Existing Settlement Pattern



GHD CLIENTS | PEOPLE | PERFORMANCE

Tasmania

SETTLEMENTS
Summary

This strategy identifies clear land use policies and directions for individual settlements within municipal area. These policies and directions have primarily been formed upon the analysis of other key considerations in this strategy as well as the previous Town Structure Plans study prepared by TBA Planner Pty Ltd.

Major settlements have been considered through the TBA Planners study and through township development plans largely generated from within the local community. These plans emphasise the individuality and special features of the respective towns and their findings are included under the consideration of each town below.

Most minor settlements are purely residential in nature without even the most basic community services. Infrastructure is principally limited to roads, power and telecommunications. Water supply is generally via domestic tanks with effluent disposed through use of septic tanks – often poorly constructed and maintained. Effluent disposal heads a list of environmental management problems being experienced in many of the minor settlements.

The preferred settlement strategy for the ongoing development within the Huon Valley can be summarised as follows:

Major Settlements – Huonville, Cygnet, Franklin, Geeveston and Dover
Development is to be encouraged within existing serviced areas or where extensions to infrastructure is planned. Urban growth boundaries have been identified, and land identified for future commercial, industrial, community and residential uses. A range of other development opportunities, including streetscape projects have been identified in 'structure plans' for these towns and will provide guidance to Council and the wider community to the desired future pattern and character of development.

Minor Settlements – Port Huon, Glen Huon/Judbury, Southport, Grove
Development within these minor settlements is constrained by limited servicing and consequential environmental impacts of development reliant on on-site disposal of effluent. Whilst there is potential for an upgrade of infrastructure in the Port Huon settlement, there are no plans for services being provided to the remaining settlements. Development in all cases is strictly on the basis of in-fill opportunities, and in the absence of infrastructure, within the environmental constraints imposed by proximity to the coast, high water tables, soil characteristics and the like.

Hamlets and Other Small Settlements
Verona Sands, Garden Island, Randalls Bay, Eggs and Bacon Bay, Abels Bay, Charlotte Cove, Rocky Bay, Deep Bay, Surveyors Bay, Roaring Beach and Little Roaring Beach No further subdivision is to be permitted, and development is only on the basis of existing vacant lots within developed areas, and subject to meeting strict environmental criteria.

In support of the settlement strategy articulated above, the Strategy for residential development outside these identified settlements is outlined in the previous section (Providing for Housing Needs). In summary this is to be controlled by the identification of areas within which low density or rural residential use and development will be permitted. Further the identification of specific growth boundaries for all settlements will be integral to the successful implementation of guiding principles identified for each settlement. Outside these areas residential development will only be permitted where it supports agricultural uses or is otherwise required to support an existing approved use, for example a tourist operation.

MAJOR SETTLEMENTS
Strategic Directions and Guiding Principles

HUONVILLE AND RANELAGH

Strategic Directions	Guiding Principles
Huonville is recognised as the primary commercial centre and focus for the Huon Valley. *Enhance the Huon River foreshore area and provide for better connections to the town.* *Protect the safety and efficiency of the existing road infrastructure and have the capacity for upgrading and expansion to meet future development needs.* *There is capacity for in-fill development to occur and there are potential development sites on the fringe of the town's commercial area.* *Main street improvements are necessary to ensure pedestrian safety and to mitigate against the adverse impacts of heavy vehicle traffic.* *The visual amenity of the Huon River, hills and bushland surrounding the town should be afforded protection from use and development incompatible with the protection of these values.* *Emphasis should be placed on upgrading Huonville's existing infrastructure, rather than investing in extensions to new areas.*	*Provide opportunities for a wide range of residential, commercial and civic development opportunities that respond to the needs of the broader Huon Valley community.* *Allow for infill development within an urban growth boundary that has been identified with regard to existing infrastructure capacity and coverage.* *Provide for commercial, recreational and community uses along the foreshore, having regard to flooding and landscape qualities.* *Discourage new vehicle accesses to the main road where an alternate access can be achieved to a road that is lower in the road hierarchy.* *New development along the main road is to have particular regard to streetscape through its form, scale, siting and landscaping.* *Hillside areas of high scenic quality, which are visible from Huonville, are only to be developed with regard to siting, clearing and design measures that will minimise the visual impact on this landscape setting.* *Provide adequate industrial zoned land in proximity to the junction of Glen Road and North Glen Road that has connection to infrastructure and will not cause loss of amenity to existing or future residential areas.* *New industries located adjacent to the Huon Highway 'scenic corridor' to have a high standard landscaping and design to protect the visual and environmental amenity* *Ensure improved local services and facilities within Ranelagh*

CYGNET

Strategic Directions	Guiding Principles
A variety of uses within Cygnet should be encouraged to facilitate the town's resilience and capacity to serve the needs of its residents. *Encourage improvements to the streetscape within Cygnet.* *Infill development to occur within the township, subject to infrastructure capacity.*	*Encourage a high standard of urban design and protect buildings of architectural or heritage significance.* *Land that is subject to inundation from Agnes Creek is to only be used fo recreation or remediation works.* *Future development to be located in locations that can be serviced and provided a high level of residential amenity within an urban growth boundary based on the capacity and coverage of existing and planned infrastructure.*

FRANKLIN

Strategic Directions	Guiding Principles
Protect and capitalise on the heritage character of the town. *Development adjacent to the river should be only undertaken in a manner that protects and enhances the river environment and the inherent values of the foreshore reserve.* *Council acknowledges there are limited opportunities for further residential development within the town.* *Opportunities for a wide range of commercial and residential redevelopment should be provided throughout the town area.* *Improve the streetscape of the town.*	*Identify heritage areas and require new development to have regard to existing heritage values and existing built form.* *Development should be consistent with the main conclusions of the Franklin Township Plan.* *Future development proposals will be required to complement the existing heritage values and promote streetscape improvement.* *Encourage innovative reuse of existing buildings to stimulate economic development.* *Provide flexibility for commercial and residential development within the town.* *Ensure foreshore development has regard to hazards, environmental values, townscape qualities and public access.* *Hillside development is to have regard to siting, clearing and design measures that will minimise the visual impact on the landscape setting.* *There are opportunities for environmental improvements within the town and on fringing lands, particularly in regard to weed removal (eg crack willow), stormwater control, revegetation and foreshore works.* *Provision is made to ensure public access to the Huon River is maintained*

MAJOR SETTLEMENTS

Strategic Directions and Guiding Principles (cont.)

GEEVESTON

Strategic Directions	Guiding Principles
There are opportunities for greater tourism activity based on the promotion of the towns forestry heritage to make Geeveston an integral part of the tourist experience in the Huon Valley.	*Allow a variety of uses in the central township area subject to appropriate controls over streetscape and protection of local resident amenity.*
Development of prominent hillsides and skylines should be managed to protect the visual amenity and environmental quality of the area.	*Develop a management plan for Heritage Park having particular regard to connections to the existing commercial areas of the town and other townscape and landscape qualities.*
Residential development within Geeveston should focus around infill opportunities rather than the expansion of the town footprint.	*Provide a urban growth boundary based on the capacity and coverage of existing infrastructure.*
Activities contributing to the pollution of Kermandie River such as residences using septic tanks and the grazing of livestock close to the river will be managed to minimise inputs of contaminants	*Encourage infill development consistent with the maintenance of residential amenity within the urban growth boundary. Any development outside the serviced area will be required to provide its own infrastructure.*
	Reinforce the commercial core of the town around the existing commercial area and Heritage Park area by preventing the spread of commercial uses beyond this core.
	Allow for uses that support and foster the forestry and tourism related aspects of the town to attract visitors into the town.

DOVER

Strategic Directions	Guiding Principles
Dover should utilise the advantages of its natural setting and role as the entrance to the 'far south'.	*New development along the main road is to have particular regard to streetscape through its form and promote streetscape improvements in the town.*
Consolidate the commercial core and allow a variety of uses in the central township area.	*Provide an urban growth boundary based on the capacity and coverage of existing infrastructure and where infrastructure is needed to resolve leachate problems from septic tanks.*
	Opportunities for the innovative reuse of buildings should be provided to stimulate economic and tourism development in the town.
	Allow increased density of development in the existing low density residential area near Knobbys Point subject to provision of adequate infrastructure.
	Provide land for industrial use and development with the provision of adequate infrastructure that will avoid or allow for management of any conflicts with residential use.
	Manage the visual impact of the development on prominent hillsides and coastal areas to ensure protection of the visual and coastal values.
	Provide for improved facility for fishing vessels as an all-weather and refueling port.

MINOR SETTLEMENTS
Strategic Directions and Guiding Principles

PORT HUON	
Strategic Directions	**Guiding Principles**
The Port Huon wharf is a key asset that has the potential to be redeveloped for a variety of tourism, commercial and maritime purposes. *Future use of the Whale Point industrial area will be restricted by the lack of connection to reticulated sewerage and water systems.* *The precinct containing the hotel, motel, marina, sports centre and parking areas is an important tourist and visitor hub and should be enhanced through landscaping and further appropriate development.*	*Promote commercial and tourist uses at Port Huon Wharf.* *Provide protection of the Port Huon wharf from use or development on surrounding sites that could limit the site's potential for commercial redevelopment and provide flexibility for a variety of uses on the site.* *Encourage marine related commercial activities and industries on and close to the existing port infrastructure subject to provision of adequate infrastructure.* *Consolidate commercial and tourist use and development around the existing hotel, motel and sports centre.* *Provide for some limited residential expansion in accordance with existing available or planned services.* *Allow for aquaculture related industry and other uses that are not necessarily dependant upon Council's sewer and water infrastructure at Whale Point within an identified zone subject to environmental protection measures and the maintenance of vegetation buffers to screen the area from remote views across the bay.*

GLEN HUON/JUDBURY	
Strategic Directions	**Guiding Principles**
Retain the rural character of the district by discouraging inappropriate use or development that would detract from the character of the district or result in conflicts with established use or development.	*Allow for some infill development within existing settlement boundaries subject to adequate methods of effluent disposal and environmental protection measures.* *Identify designated rural living areas where existing rural residential development has occurred to such an extent that it dominates local land use and where environmental values will not be compromised,* *Require use of Aerated Wastewater Treatment Systems only where on site treatment is proposed.*

MAJOR SETTLEMENTS
Strategic Directions and Guiding Principles (cont.)

GROVE	
Strategic Directions	**Guiding Principles**
Identify areas that have some residential development potential without further impacting upon land used and required for agricultural purposes. *While there is limited growth potential, that it is not intended to provide for full infrastructure services to these sites and that it is an isolated settlement.*	*Allow for some infill development within existing settlement boundaries subject to adequate methods of effluent disposal and environmental protection measures.* *Identify designated rural living areas in nearby locations where existing rural residential development has occurred to such an extent that it dominates local land use and where environmental values will not be compromised and there are not further impacts upon water quantity and quality within waterways,* *Ensure that further residential development does not further constrain surrounding agricultural activities.* *Require use of Aerated Wastewater Treatment Systems only where on site treatment is proposed.*

SOUTHPORT	
Strategic Directions	**Statutory Implications**
Recognises that effluent disposal from existing development, particularly at Kingfish Beach, is inadequate and causing some localised water pollution *Address the risk of storm damage to the shacks on the Kingfish Beach foreshore.* *Encourage the coastal rehabilitation of beach and dune areas by promoting and encouraging the use of existing communal or public accesses.*	*Consolidate the existing settlement by allowing infill residential development at Kingfish Beach at a medium density, after due consideration of storm surge, flooding or erosion damage, effluent disposal, residential character and amenity and environmental protection issues.* *Prohibit alteration or extension of foreshore Crown shack sites subject to inundation at Kingfish Beach.* *Allow infill development of the remaining settled areas of Southport at a Rural Living density.* *Limit the extention or redevelopment of residences based upon consideration of servicing capacity, infrastructure, landscape values and agricultural potential.* *Prohibit residential development on mobile landforms and discourage private pedestrian access to the foreshore.* *Require all new residential development to demonstrate that on-site treatment (where proposed) will not contribute to cumulative water pollution problems.* *Require use of Aerated Wastewater Treatment Systems only where on site treatment is proposed.*

HAMLETS & SHACK SETTLEMENTS
Strategic Directions and Guiding Principles

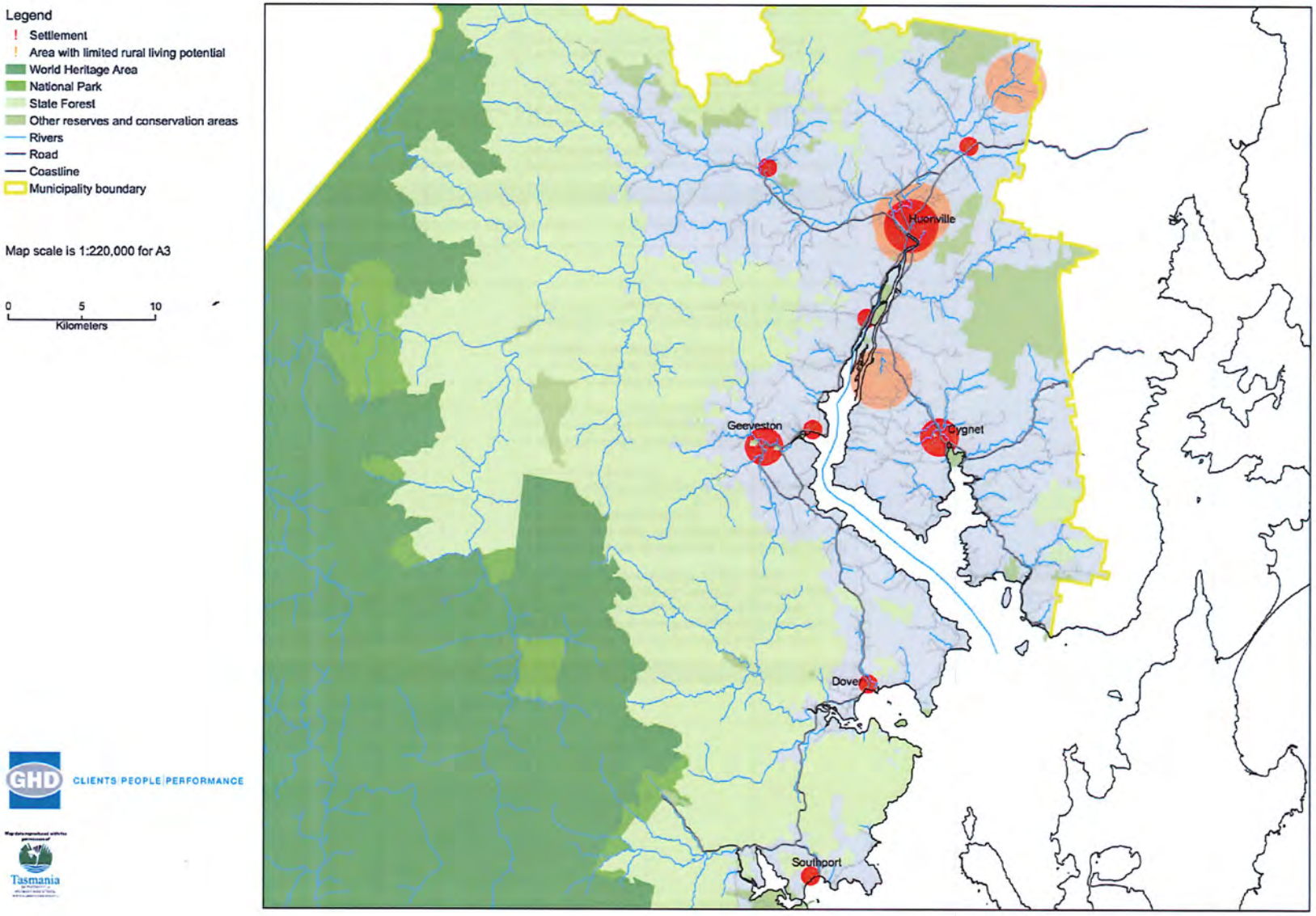
VERONA SANDS	
Strategic Directions	**Guiding Principles**
Ensure that leachates entering the lagoon are reduced. *Minimise erosion on the dune systems by controlling pedestrian traffic, vegetation clearance and siting of structures.*	*Consolidate the existing settlement and only allow infill use and development on existing lots after due consideration of storm surge, flooding or erosion damage, effluent disposal, residential character and amenity and environmental protection issues.* *Prevent residential development on vacant lots fronting the lagoon and allow only minimal extension and alteration of existing buildings.* *Allow for innovative solutions for effective wastewater disposal and treatment.* *Prohibit residential development on mobile landforms and only allow private pedestrian access to the beach via a few specific access ways.* *Require all new residential development to demonstrate that on-site treatment will not contribute to cumulative water pollution problems.* *Require use of Aerated Wastewater Treatment Systems only where on site treatment is proposed.*

SURVEYORS BAY, ROARING BEACH AND LITTLE ROARING BEACH	
Strategic Directions	**Guiding Principles**
Ensure wastewater disposal does not contribute to localised water pollution problems. *Encourage the coastal rehabilitation of beach, dune, lagoon and bushland areas by promoting and encouraging the use of existing communal or public access.* *Public access to the coast should be enhanced.*	*Allow for installation of reticulated wastewater disposal and treatment facilities if on site solutions are not practical.* *Consolidate existing settlements by allowing only infill use and development after due consideration of storm surge, flooding or erosion damage, effluent disposal, residential character and amenity and environmental protection issues.* *Prohibit residential development on mobile landforms and discourage private pedestrian access to the foreshore.* *Prohibit residential development on low-lying land subject to inundation.* *Limit the extension or redevelopment of residences based upon consideration of environmental and visual values.* *Require all new residential development to demonstrate that on-site treatment will not contribute to cumulative water pollution problems.* *Require use of Aerated Wastewater Treatment Systems only where on site treatment is proposed.*

GARDEN ISLAND SANDS, RANDALLS BAY, EGGS AND BACON BAY, ABELS BAY, CHARLOTTE COVE, ROCKY BAY, DEEP BAY	
Strategic Directions	**Guiding Principles**
Ensure wastewater disposal does not contribute to localised water pollution problems. *Maintain remaining native vegetation and other environmental resources that contribute to local amenity within the settlements.*	*Allow for installation of reticulated wastewater disposal and treatment facilities if on site solutions are not practical.* *Consolidate the existing settlements by allowing only infill development of existing lots after due consideration of storm surge, flooding or erosion damage, effluent disposal, residential character and amenity and environmental protection issues.* *Prohibit residential development on mobile landforms and discourage private pedestrian access to the foreshore and instead* *Prohibit residential development on low lying land including parts of existing vacant subdivided lots at Eggs and Bacon Bay that are subject to inundation.* *Limit the extension or redevelopment of shacks at Eggs and Bacon Bay based upon consideration of environmental and visual values.* *Protect vegetation at Randalls Bay, which has been identified as having CAR values under the Regional Forest Agreement.* *Protect the environmental and landscape values of Echo Sugarloaf and other prominent hills and foreshores by preventing land clearance.* *Any significant development of Garden Island is only to be approved after matters of wastewater disposal, visual impact, on-shore parking and transport needs are adequately addressed.* *Require all new residential development to demonstrate that on-site treatment will not contribute to cumulative water pollution problems.* *Require use of Aerated Wastewater Treatment Systems only where on site treatment is proposed.*

MAJOR SETTLEMENTS

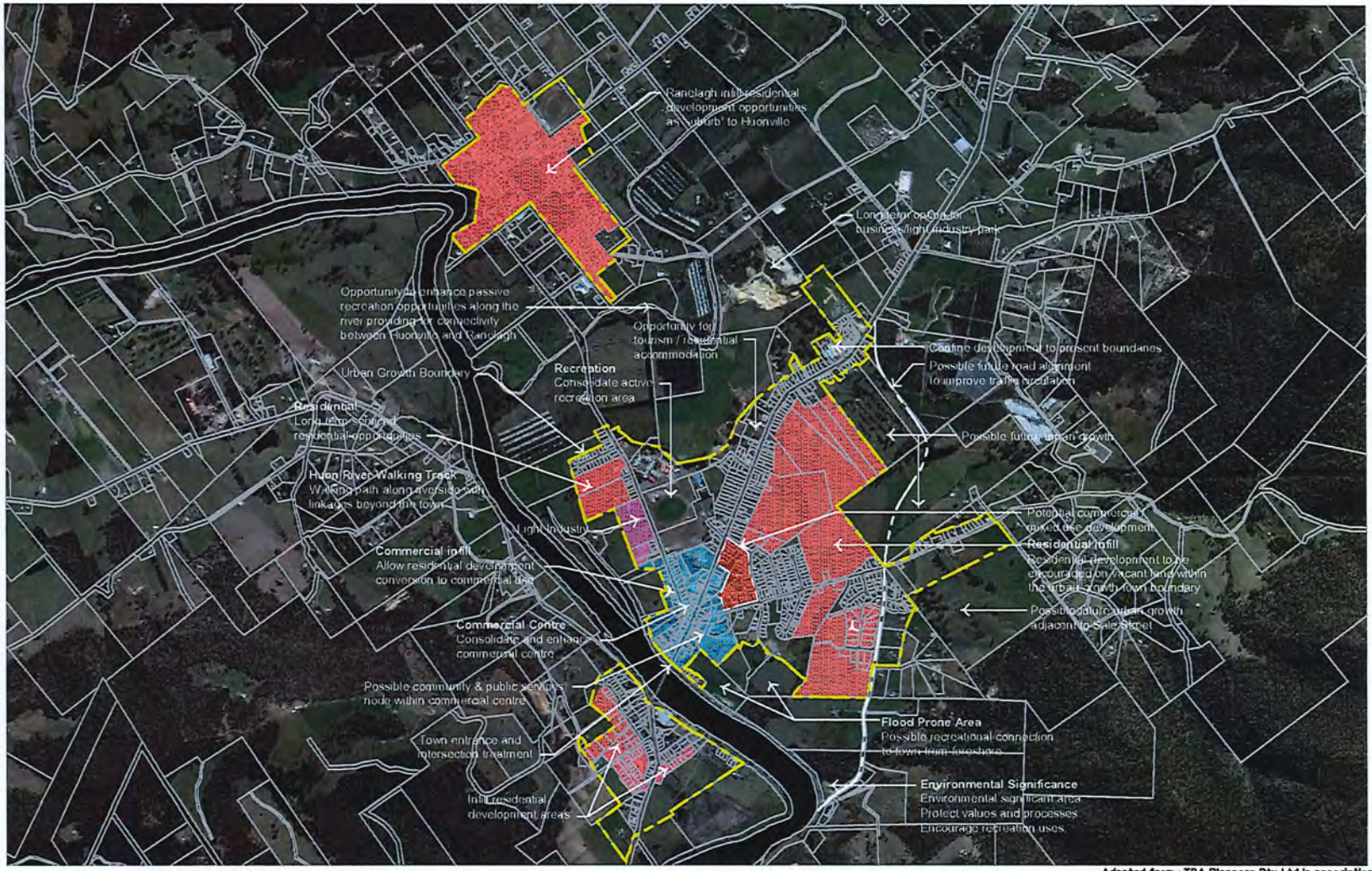
Settlement Strategy Map



CLIENTS PEOPLE PERFORMANCE

OUTLINE DEVELOPMENT PLAN

Huonville and Ranelagh



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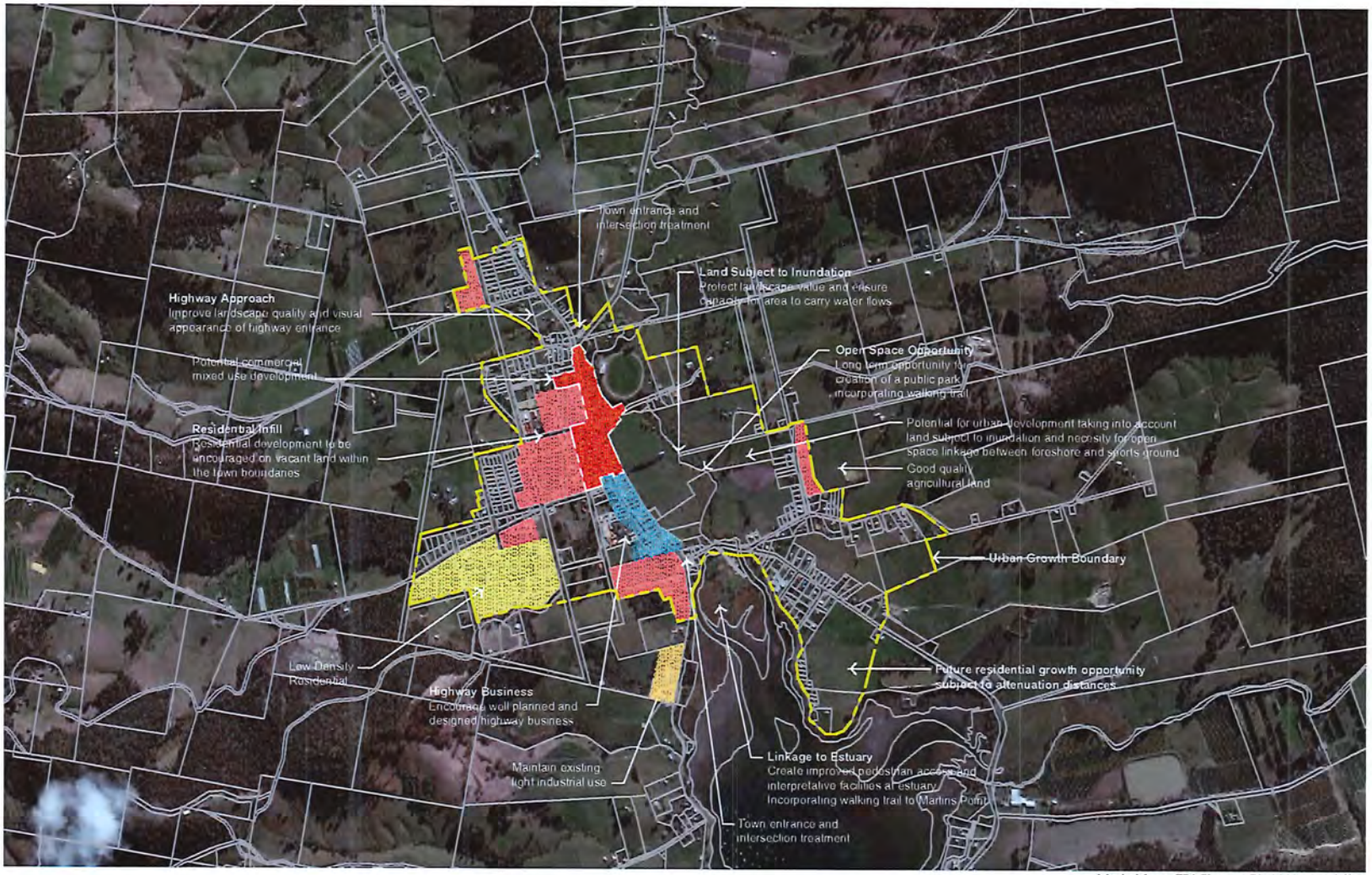
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*THESE OUTLINE DEVELOPMENT PLANS ARE NOT INTENDED TO BE ZONING MAPS BUT ARE INDICATIVE OF LAND USE OPTIONS ONLY.

Huon Valley Land Use & Development Strategy
Huonville & Ranelagh Strategy

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SCALE 1:25000 AT ORIGINAL SIZE

OUTLINE DEVELOPMENT PLAN
Cygnet



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Huon Valley Land Use & Development Strategy
Cygnet Strategy

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OUTLINE DEVELOPMENT PLAN
Franklin



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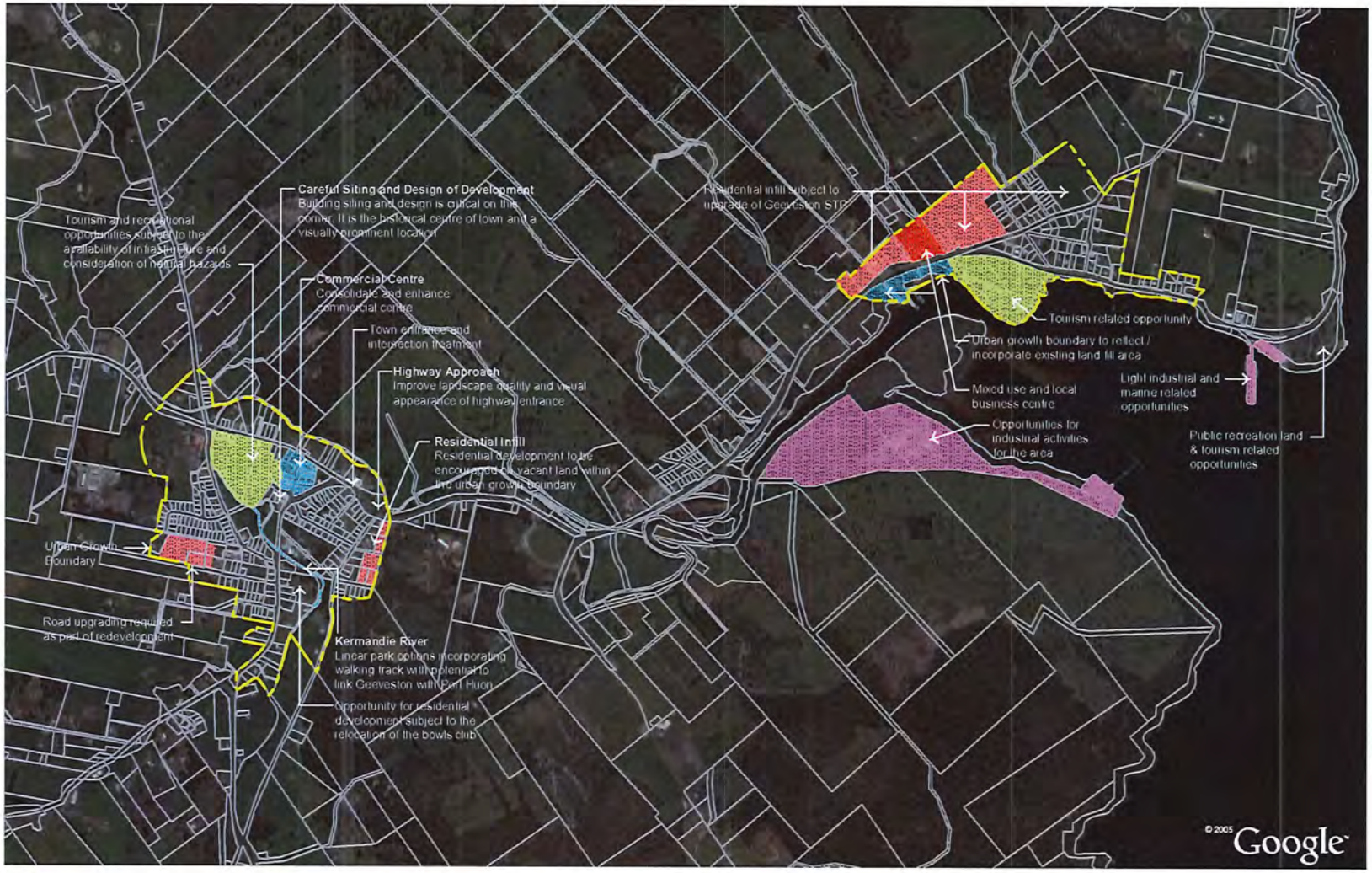
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Huon Valley Land Use & Development Strategy
Franklin Strategy

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OUTLINE DEVELOPMENT PLAN
Geeveston and Port Huon



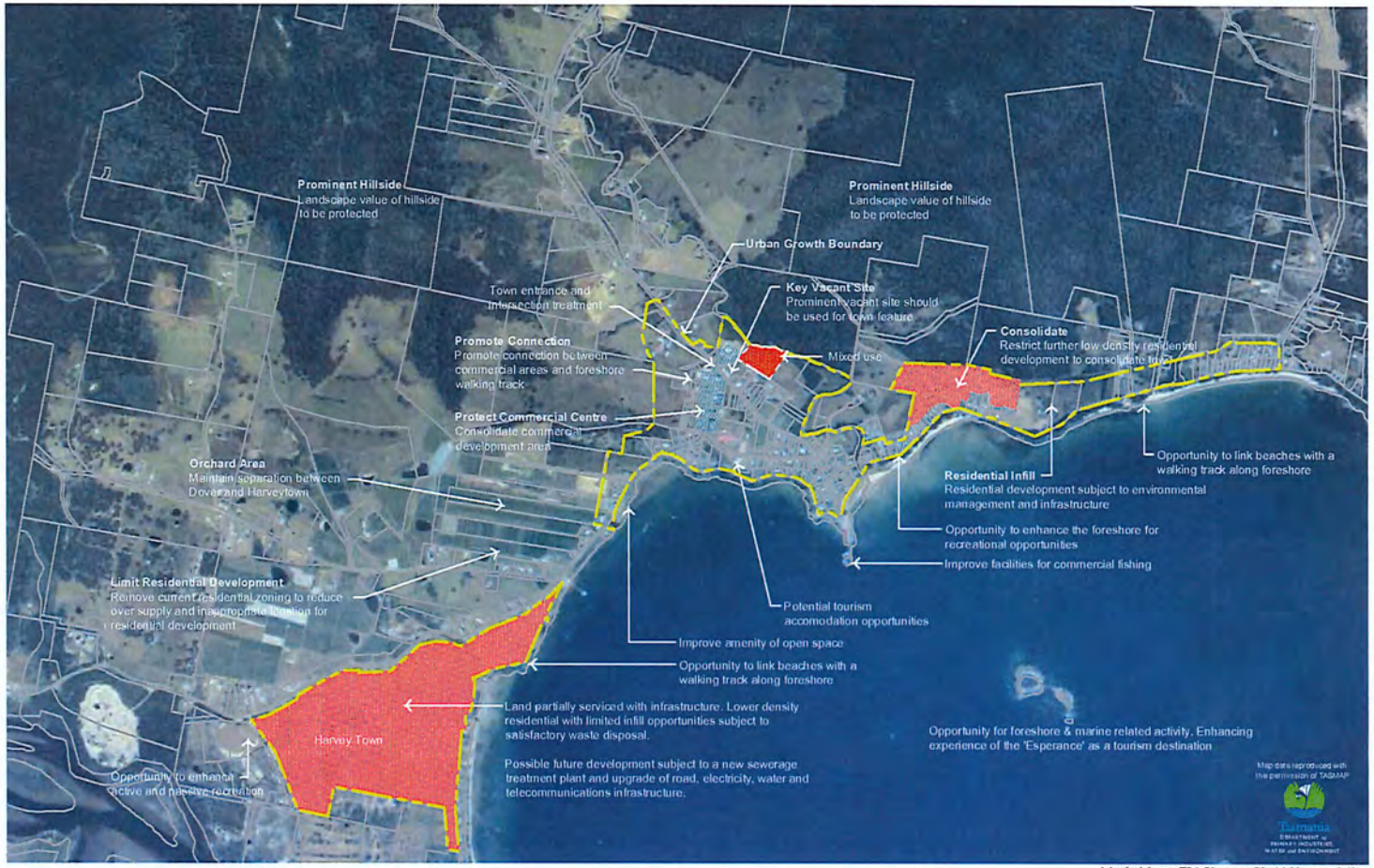
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Huon Valley Land Use & Development Strategy
Geeveston & Port Huon Strategy

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SCALE 1:20000 AT ORIGINAL SIZE

OUTLINE DEVELOPMENT PLAN
Dover



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Huon Valley Land Use & Development Strategy
Dover Strategy

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SCALE 1:20000 AT ORIGINAL SIZE

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ENDORSED	E. RILEY	A. BROWNLIE	ABB*	F. READ	FER*	31.10.2007

*signature on file

Tasmanian

Acid Sulfate Soil

Management Guidelines



CARING FOR OUR COUNTRY

Cradle Coast NRM

NRM North
Natural Resource Management in Northern Tasmania

NRM SOUTH
NATURAL RESOURCE MANAGEMENT

Sustainable Land Use
Department of Primary Industries, Parks, Water and the Environment

Tasmania
Explore the possibilities

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The Tasmanian Acid Sulfate Soils Information Project (TASSI) was undertaken with funding from the Australian Government through its Caring for our Country (formerly Natural Heritage Trust) program.

The *Tasmanian Acid Sulfate Soil Management Guidelines* are a principal output of the TASSI project and draw heavily from and build upon the *Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines* and the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland*. Additional material has been drawn from the NSW Acid Sulfate Soil Manual. Permission to use material from these publications is gratefully acknowledged.

The development of these Guidelines was supported by a Steering Committee comprising:

Sue Botting – Cradle Coast NRM

Ian Ferris – Environmental Service and Design Pty Ltd

Christine Materia – Local Government Association of Tasmania

Belinda Colson – Cradle Coast NRM

Don Thompson – Sustainable Farm Practices Facilitator, Australian Government, Land and Coasts

Nicole Middleton – Australian Government, Land and Coasts

Declan McDonald – Department of Primary Industries, Parks, Water and Environment

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The Project was coordinated by Declan McDonald, Sustainable Land Use Section, Land Conservation Branch, DPIPWE.

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DISCLAIMER

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PURPOSE OF THE GUIDELINES

The purpose of these guidelines is to provide technical and procedural advice to avoid environmental harm from acid sulfate soils (ASS) and to assist in achieving ***best practice environmental management*** through the use of six management principles. The guidelines have also been designed to assist decision-making and provide greater certainty to the construction and agricultural industries, state and local governments and the community in carrying out planning for activities that may disturb ASS. It is anticipated that the guidelines will be used by consultants, earthmoving contractors, developers, agricultural and aquaculture producers, sand and gravel extraction operators, community groups and administering authorities from state and local government. While the guidelines focus on developments below 20m AHD the requirement for a management plan should apply wherever significant disturbance of ASS occurs in the State.

SECTION 1 provides an introduction to ASS and why we should be concerned about them, where they occur in Tasmania and the Tasmanian legislation that is relevant to them.

SECTION 2 steps through the process of assessing projects which may involve disturbance to ASS, with the aim of determining whether a management plan is necessary for the project.

SECTION 3 outlines the management principles used to guide the development of a management plan.

SECTION 4 gives details of management strategies, including avoidance, minimisation and neutralisation.

Within the various appendices the Guidelines go on to provide further detail regarding the legislation likely to impact on ASS management, soil sampling procedures, analytical methods for identifying ASS and potential acid generation and treatment options, liming rates and considerations for treatment pad design.

While management options are available for minimising environmental damage from ASS the first option should always be to avoid disturbing these sediments. Only if this option is unavailable should other options be considered.

1. INTRODUCTION

1.1 WHAT ARE ACID SULFATE SOILS?

Acid Sulfate Soils underlie large areas of Australia's coastline. They are natural soils that contain sulfides (mostly iron sulfides), usually in microscopic form. Most of these sulfides were formed by bacterial activity underwater long ago. Sea water provides a ready source of sulfur for conversion to sulphides and thus the higher risk areas tend to be low-lying coastal margins that were once covered by sea water. As the seas receded, the sulfur-rich sediments remained and today can be found in areas such as coastal plains, wetlands and estuaries.

In an undisturbed and waterlogged state these soils are harmless, but when disturbed and exposed to oxygen through drainage or excavation, a process of oxidation can produce sulfuric acid in large quantities. In the undisturbed state the soils are called Potential Acid Sulfate Soils (PASS). Once they are disturbed and start oxidising, they are called Actual Acid Sulfate Soils (AASS). They are collectively referred to as Acid Sulfate Soils (ASS).

After rain and particularly following prolonged dry periods, the sulfuric acid in these soils is released into the surrounding environment. As the acid moves through the soil profile it may cause the release of heavy metals and other toxins, which eventually flow into surrounding waterways. Toxic "slugs" of concentrated acid runoff can move downstream and flow into estuaries, reducing oxygen levels in the water, significantly decreasing water quality, killing fish and damaging sensitive ecosystems. For example, this process caused extensive environmental damage in NSW 1987 when flooding mobilised aluminium and acid from disturbed ASS into the Tweed River.

ASS runoff has significant environmental, economic and social impacts on coastal communities. Besides the obvious impacts on the environment such as fish kills, death of other aquatic organisms and decline of riparian and aquatic vegetation, acid runoff has been attributed to the decline or failure of agriculture, fishery and aquaculture industries. The ecological damage can also affect valuable tourist resources including fishing grounds, swimming areas and other water sports areas. Acid discharges can damage infrastructure services and structures such as pipes, foundations, drains, bridges and flood controls. High levels of iron and manganese may precipitate in receiving waters, causing aesthetic issues, staining infrastructure, coating aquatic vegetation and preventing photosynthesis or blocking the gills of aquatic fauna. High levels of some elements such as aluminium and arsenic may also have human health implications.

Acid sulfate soils may also underlie inland areas such as peat bogs, salt lakes and wetlands. If acid sulfate conditions underlie such natural features, disturbance will have a similar effect on the surrounding area as in coastal regions with release of sulfuric acid and reduced oxygen levels in the water. Risks are increased where inland water bodies receive irrigation return water, groundwater or recycled water, as they typically contain elevated sulfate concentrations.

1.2 TASMANIAN CONTEXT

ASS have been identified in Tasmania. Some predictive modelling and mapping, based on geological history and height above sea-level, was undertaken by Mineral Resources Tasmania in 1995. This modelling was refined and extrapolated by the Australian Soil Resources Information System (ASRIS) which included other parameters (such as coastal vegetation and estuaries data) in their model to predict where ASS are likely to occur. In 2008-09, the Land Conservation Branch of DPIPWE undertook extensive investigation of ASS in Tasmania and the results are shown in Figure 1.

It can be seen from this map that most of the non-tidal (coastal) ASS occur along the north coast of Tasmania. In Southern Tasmania, extensive areas of ASS occur only in estuaries. There are an estimated 214,500 ha of coastal land in Tasmania that may contain some soils affected by ASS, with a further 51,239 ha of tidal and sub-tidal sediments. In addition, there are 369,538 ha of inland areas with some probability of ASS occurring.

Any activity which may disturb soils in areas which have ASS may result in the production of sulfuric acid and toxic / nuisance metal and nutrient concentrations. Thus agricultural activities involving deep drainage, infrastructure developments such as the construction of roads and / or installation of pipes, and coastal developments of any scale (private dwellings to resorts), may all result in disturbance of ASS. Further, if spoil from dredging materials contain ASS, release of sulfuric acid and heavy metals may result if not stored or disposed of with care.

Due to the nature of ASS, a large number of authorities, organisations, industries and individuals can cause disturbance of ASS and/or can be impacted by the results of this disturbance. Despite the extent of occurrence of ASS in Tasmania, the level of development in most of these areas has been relatively low, so there have been relatively few documented problems caused as a result of disturbance of ASS. However, with rapidly increasing pressure on some coastal areas of Tasmania, as well as intensification of agriculture in some northern regions, the potential for problems to arise is increasing.

1.3 LEGISLATION

TASMANIAN

There is no legislation directly relevant to ASS in Tasmania. However, ASS impacts may come under the "general environmental duty" section of the Environmental Management and Pollution Control Act 1994, such that: "A person must take such steps as are practicable or reasonable to prevent or minimise environmental harm or environmental nuisance caused, or likely to be caused, by an activity conducted by that person."

The recently released State Coastal Policy 2006 also may cover ASS. It aims to facilitate:

- The conservation of intrinsic assets, values and processes of the coastal area; and
- The sustainable use or development of the coastal area.

There is no explicit mention of ASS in the policy, but it does appear in supporting documents:

1) State Coastal Policy 2006 – Implementation Guidelines. This document lists ASS as one of the hazards that should be considered in planning schemes.
2) State Coastal Policy 2006 – Model Standards. This document mentions ASS in the model standards for water quality and coastal management

COMMONWEALTH

(1) The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the centrepiece of the Commonwealth's environmental regulatory regime. The following objectives of the EPBC Act are relevant to ASS:

- to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance;
- to promote: ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; the conservation of biodiversity; and a co-operative approach to the protection and management of the environment involving governments, the community, landholders and indigenous peoples; and
- to assist in the co-operative implementation of Australia's international environmental responsibilities.

(2) The *Environment Protection (Sea Dumping Act) 1981* regulates the deliberate loading and dumping of wastes and other matter at sea. This Act potentially relates to the dumping of ASS material including dredge spoil into the sea.

More details of these Acts and Policies can be found in Appendix A.

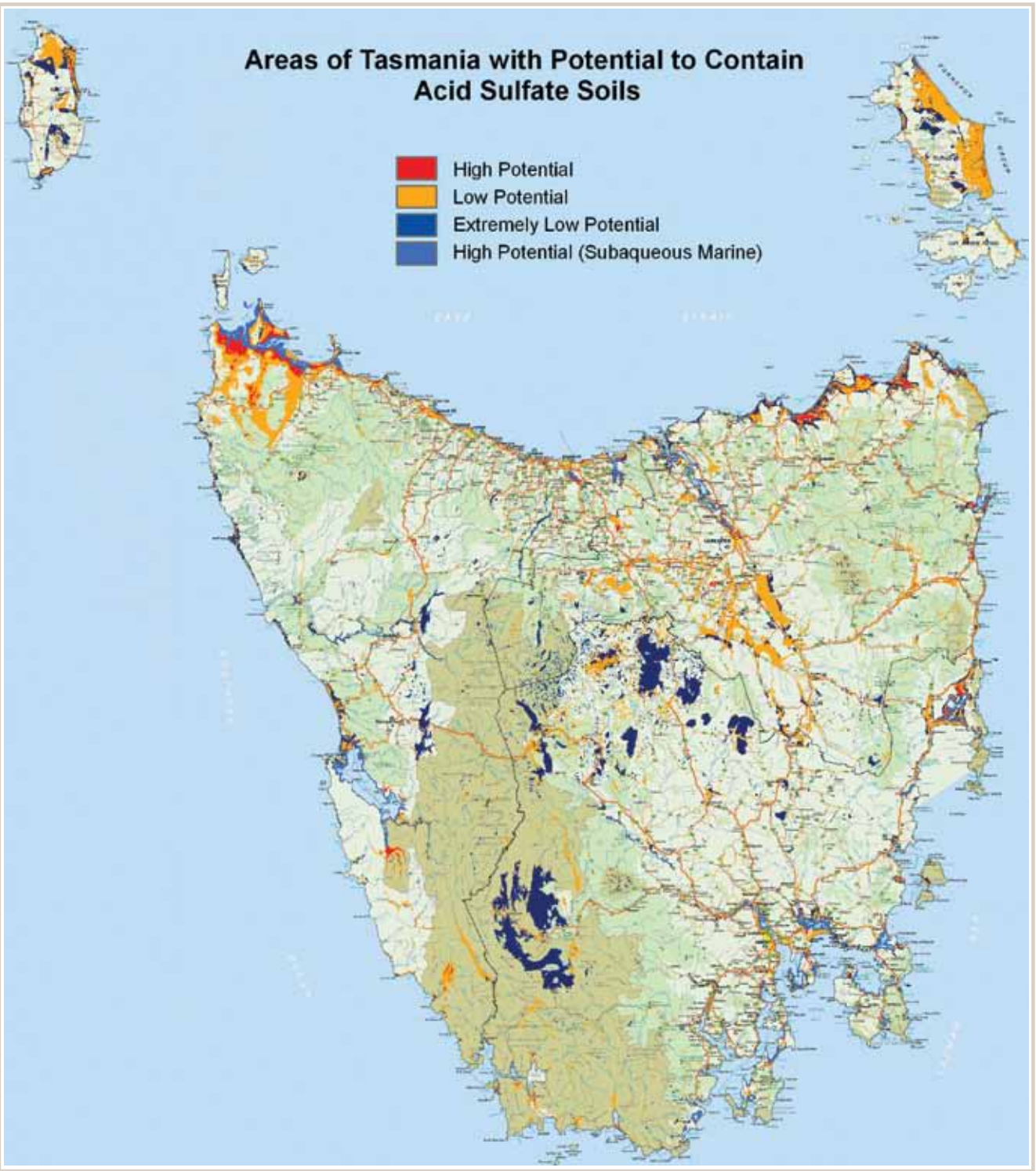


Figure 1. Predicted distribution of Acid Sulfate Soils in Tasmania

2. ASSESSMENT OF PROJECTS WHICH MAY AFFECT ASS

Any project in a coastal area which may affect soils or sediments below 20 metres Australian Height Data (AHD)[1], including direct disturbance of these soils and any disturbances to nearby groundwater hydrology and drainage which might influence these soils, should consider the likelihood of encountering ASS. This section details the steps necessary in assessing such a project, and includes a flowchart summary at the end (Figure 3).

STEP 1.

If the proposed project is in the coastal zone and is at or below 20 metres AHD, or will disturb soil or nearby groundwater hydrology at or below 20m AHD, proceed to Step 2 (if not, no further consideration of ASS is required). If the proposal is in an inland area but within or adjacent to a deflation basin (topographic depression scoured by wind), wetland area or an area of known acid mine discharge, or if indicators of acid conditions are identified, proceed to Step 2.

STEP 2.

If the project will excavate 100m^3 of soil or sediment, or will involve the dumping or filling of land with more than 500m^3 of soil to a depth of greater than 0.5m then proceed to step 3, otherwise no further consideration of ASS is required.

1. In 1971 the mean sea level for 1966-1968 was assigned the value of zero on the Australian Height Datum at thirty tide gauges around the coast of the Australian continent. The resulting datum surface, with minor modifications in two metropolitan areas, has been termed the Australian Height Datum (AHD) and was adopted by the National Mapping Council as the datum to which all vertical control for mapping is to be referred. (http://www.bom.gov.au/lam/glossary/apagegl.shtml)

STEP 3.

Existing mapping information should be checked. Maps identifying the predicted distribution of coastal areas affected by ASS are available at www.thelist.tas.gov.au. and on the ASRIS website (http://www.asris.csiro.au/index_ie.html). If the project falls within an area identified as being at risk proceed to step 4, if not no further action is required.

Although the map is based on best available information, it is important to be aware of possible limitations of this dataset. The local scale variation in Tasmanian landscapes can result in small pockets of ASS outside the zones indicated on the map. Similarly, within the zones indicated, ASS may not be uniformly distributed. It is intended that proper application of these Guidelines will improve the capacity of soil scientists, environmental scientists, planners, engineers and landholders to carry out an initial risk assessment for ASS if suggested by indicators or local topography and determine the need for further testing.

STEP 4.

Conduct a desktop risk assessment. All disturbances to the groundwater hydrology or surface drainage patterns in coastal areas below 20 metres AHD should be investigated, designed and managed to avoid potential adverse effects on the natural and built environment (including infrastructure) and human health from ASS. This recommendation also applies to the investigation of subsoil or sediments below 20 metres AHD where the natural ground level of the land exceeds 20 metres AHD (figure 2). In some situations, ASS may also occur at elevations greater than 20 metres AHD (i.e. inland areas), and these guidelines also apply to the management of those soils where they are identified.

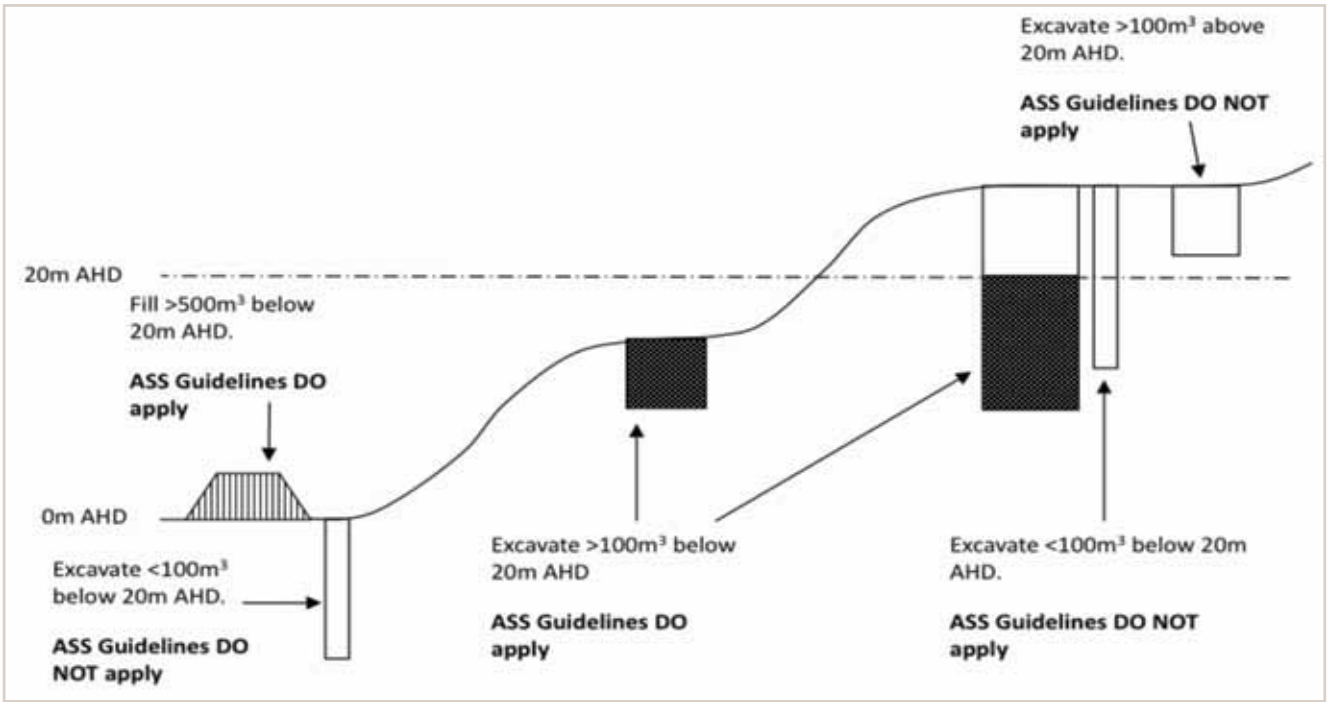


Figure 2. Areas and developments which may require an ASS investigation and management plan.

STEP 5.

Develop a soil profile. If it is determined, from mapping or site assessment, that the probability of ASS occurrence is likely, on site investigations will be required to determine where, and at what depth and concentration, the ASS may occur. The first step in this process is to develop a soil profile of the site, with detailed information on elevations, soil types and depths. Only some soil types are likely to contain ASS, and it will only be necessary to conduct further sampling if the proposed project is likely to disturb significant amounts of ASS (as per step 2). If disturbance is likely consideration should be given to redesigning the project so that the ASS materials can be avoided. If this is not possible, a management plan should be developed to minimise environmental harm from the project and justification provided as to why the ASS cannot be avoided. If disturbance is unavoidable proceed to step 6.

STEP 6.

Conduct field tests and laboratory analyses. Sampling and testing of the soil types likely to contain ASS should be done by a qualified and experienced soils professional in accordance with the Guidelines (see Appendix B). Once the location, depth and concentration of any ASS present on the site have been determined, options to manage the risk can be considered (step 7).

STEP 7.

Develop an ASS Management Plan. The remainder of these Guidelines outlines the principles and management strategies to be used in developing a management plan to minimise and/or neutralise any impacts from the disturbance of ASS.

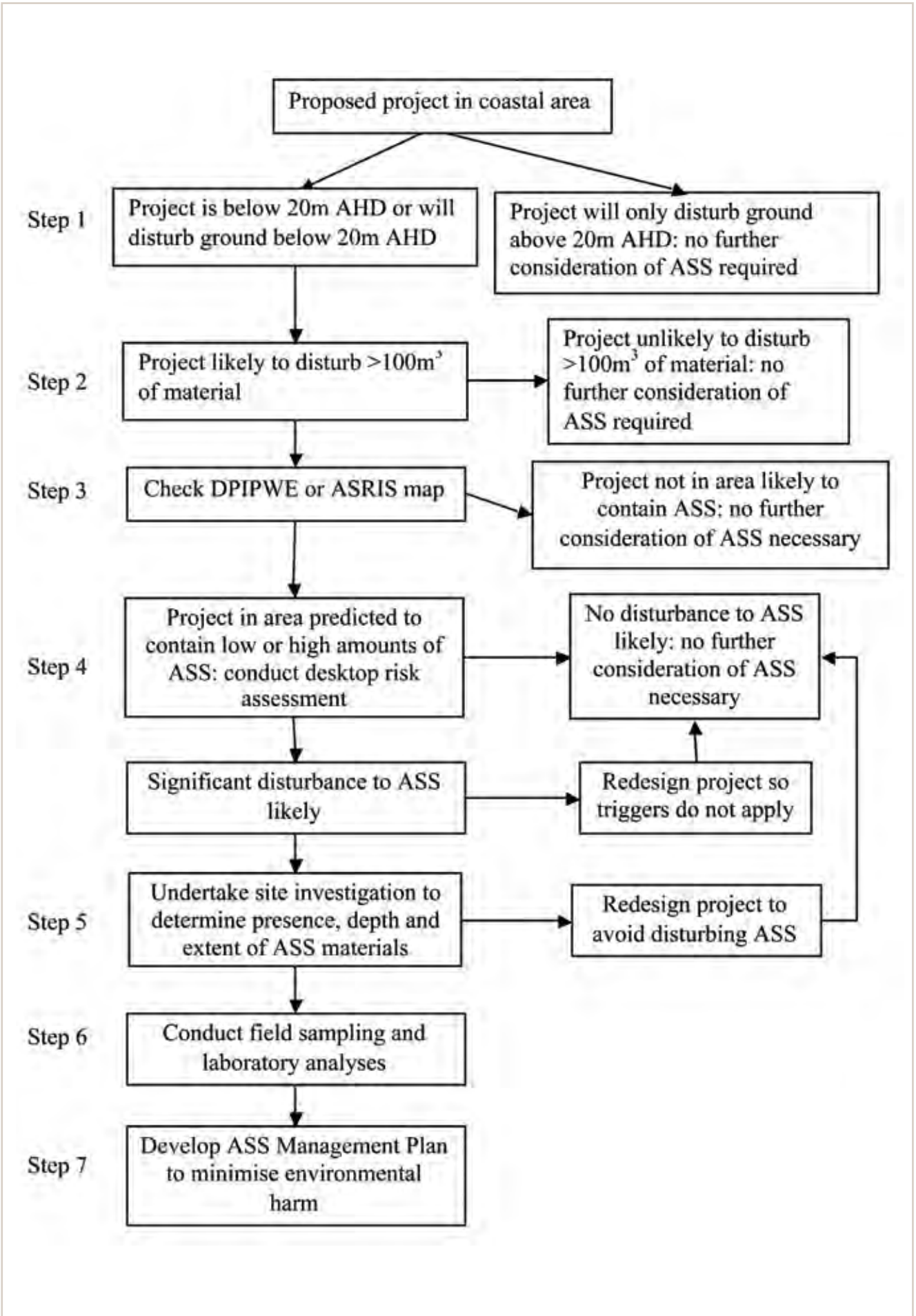


Figure 3 Summary of steps in the assessment of a project in a coastal area

3. MANAGEMENT PRINCIPLES

The Tasmanian Acid Sulfate Soil Management Guidelines should be applied in accordance with the following management principles.

1) The disturbance of ASS should be avoided wherever possible. This is by far the best option, both economically and environmentally.
2) Where disturbance of ASS is unavoidable, preferred management strategies are:
   - minimisation of disturbance;
   - neutralisation;
   - strategic reburial.

   Other management measures may be considered. All strategies must be subject to detailed technical assessment and must not pose unacceptably high risks to human health, the environment or infrastructure.
3) Where disturbance of acid sulfate soils is likely, a management plan is required for any works which may disturb the soil or groundwater. This plan should detail the technical feasibility of measures proposed to manage risks (ref. Principle 2.)
4) Receiving waters (marine, estuarine, or fresh) shall not be used as a primary means of diluting and/or neutralising ASS or associated contaminated waters.
5) Stockpiling of untreated ASS with or without containment is not an acceptable long-term management strategy. Soils that are to be stockpiled, placed as temporary or permanent cover on land or in waterways, sold or exported off the treatment site or used in earth bunds must be treated / managed to eliminate the short- and long-term risks of pollution.
6) The following issues should be considered when formulating ASS environmental management strategies:
   - the sensitivity and environmental values of the receiving environment. This includes the conservation, protected or other relevant status of the receiving environment;
   - whether groundwaters and/or surface waters are likely to be directly or indirectly affected through overland flow or infiltration;
   - the heterogeneity, geochemical and textural properties of soils on-site; and
   - the management and planning strategies of Local and/or State Government, including Catchment Management Plans/Strategies and Coastal Management Plans.

4. MANAGEMENT STRATEGIES

As outlined in the Management Principles above, the preferred strategy to deal with ASS is avoidance (see section 4.1). Avoiding the disturbance of ASS should be the primary consideration. This may require a review of the construction design or layout. There will be situations where disturbance is unavoidable. For these situations, the following risk-based management strategies are preferred:

» minimisation of disturbance (section 4.2);

» neutralisation of acid sulfate soils (section 4.3);

» strategic reburial of potential acid sulfate soils (section 4.4).

Within the preferred management strategies, avoidance and minimisation of disturbance are the most preferred. It should be noted that even though neutralisation and strategic reburial are options, there are still environmental risks associated with these techniques. In addition, the strategy may not be suitable for every site. All projects should be subject to a risk assessment to determine the degree to which risks can be managed without environmental harm.

Management strategies other than those listed as preferred may be considered but will need to be supported by technically sound assessments that demonstrate the feasibility of the strategy to avoid environmental harm. Higher risk management strategies include stockpiling ASS, strategic reburial of soils with existing acidity (AASS), large-scale dewatering or drainage, and vertical mixing. Strategies regarded as generally unacceptable include above-ground capping, hastened oxidation, seawater neutralisation and offshore disposal of ASS.

A variety of management strategies may be utilised to ensure the most appropriate management for the specific soil type or situation. For example, larger developments (e.g. >5000 tonnes of soil disturbance) should be staged to ensure that the disturbance is manageable; hydraulic separation may be appropriate for light soils; neutralisation may be appropriate for fine textured soils with low levels of sulfides; and hard-to-treat clays could be strategically reburied. Other strategies will also need to be developed to manage the impacts from smaller disturbances (such as infrastructure trenching).

In managing risk and selecting preferred management strategies it is the responsibility of the developer/operator to ensure that the work can be conducted in a way that will not result in environmental harm.

4.1 AVOIDANCE

Avoiding the disturbance of ASS is always the preferred option; it carries the least environmental risk as PASS remain inert as long as they are kept in an anaerobic (reducing) environment. It is also usually the cheapest option, as the risks from disturbance of ASS to human health, the natural environment, the built environment (e.g. infrastructure) and associated remediation / regulatory costs, may outweigh the benefits.

The ASS Management Plan should provide evidence of considerations made to avoid disturbance of ASS and sound rationale for choosing to disturb ASS.

PLANNING TO AVOID ASS

Local Government planning strategies should recognise the elevated risks associated with particular developments in areas that have a high probability of containing ASS. Land uses such as extractive industries, golf courses, marinas, canal estates, agricultural uses requiring drainage and land uses with below-ground car parking all carry higher risk of disturbing / exposing ASS and should be avoided. Consideration should be given to re-location of such developments to low risk sites. However, if the ASS occur at a significant depth, the above land uses may be appropriate if they are unlikely to result in the disturbance of ASS layers. A technical assessment of the specific risks and management responses must be detailed in the ASS Management Plan.

COVER IN SITU SOILS WITH CLEAN FILL

If earthworks will not affect groundwater levels, undisturbed *in situ* PASS may be covered with clean fill. This strategy can be used to provide adequate depth for building foundations, infrastructure trenches or other incidental excavations such as swimming pools if the sulfides are located close to the soil surface (Ahern *et al.* 1998b). A minimum depth of fill cannot be specified. It will be related to the depth to ASS, concentrations of sulfides, flood levels, proposed land use and depths of any future disturbance. It is always preferable to use clean non-ASS fill rather than using treated ASS on site from a risk minimisation point of view.

However, caution is required as in some cases, filling activities may disturb in situ ASS by:

- bringing groundwater into contact with the AASS (and thus potentially mobilising and transporting existing acidity out of the AASS into the groundwater);
- displacing or extruding previously saturated PASS above the watertable and aerating these soils or sediments (e.g. aeration may occur at the margins of the filling area if the weight of fill exceeds the failure limit of the underlying soil or sediment); and/or
- displacing acidic groundwater into waterways (figures 4 & 5).

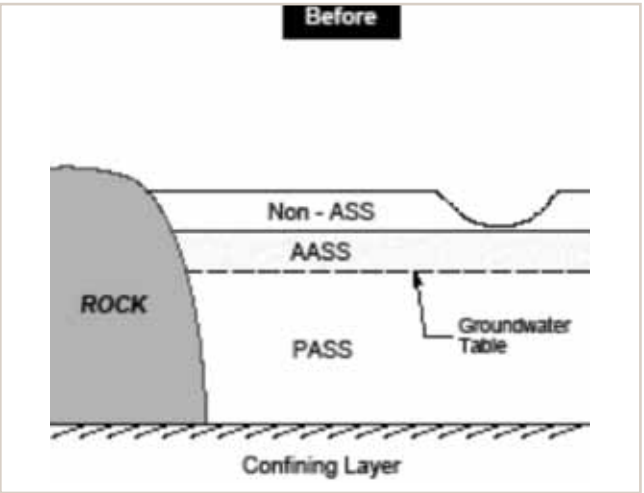


Figure 4. Schematic cross-section of an ASS prior to filling. AASS is above the water table and PASS is below.

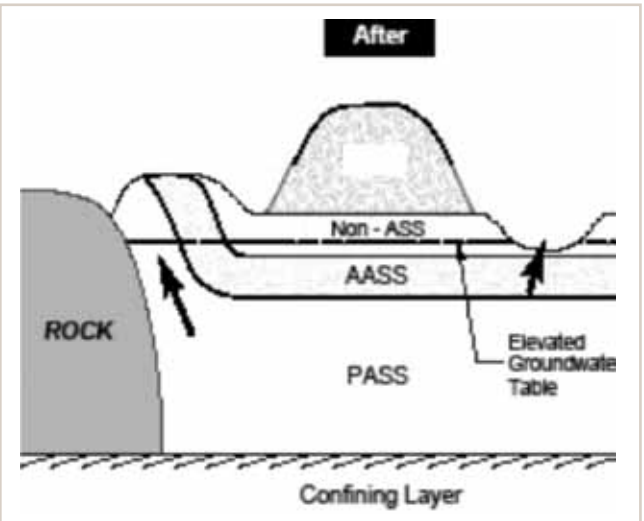


Figure 5. Schematic cross-section of an ASS after filling. The water table is raised, the groundwater is brought into contact with the AASS, and PASS and AASS are displaced above the water table.

Loading fill on clayey ASS can be problematic because some clayey soils have a high water content (up to 70 to 80% on a volume basis), and low hydraulic conductivities. Under load, such clayey soils may flow like gels resulting in subsidence at the load point. Some of the displaced soils may be pushed upwards outside the load areas into oxidising environments. In extreme situations, the fill materials may sink into the mud. This is of particular concern in areas where houses, rail, roads or other heavy infrastructure is constructed on such material. This can also be an issue in poorly-managed dredging sites where dredge fines are placed above the watertable and buried under clean sands. Historic dredging sites should be investigated for the presence of such materials prior to making changes to land use that may cause such subsidence.

Both geotechnical and hydrological investigations may be necessary to assist in devising management strategies including any pre-loading and management of potential impacts on groundwater levels and acidity. See the Queensland *Water Treatment and Management Guidelines* with respect to hydrological investigations.

Untreated ASS should not be used as pre-load material.

4.2 MINIMISATION OF DISTURBANCE

The minimisation of disturbance is a preferred management option where disturbance of ASS is unavoidable. Completion of a detailed ASS investigation is essential for minimisation of disturbance to be effective. This includes an assessment of the concentration and spatial distribution of potential and existing acidity, and groundwater characteristics. Refer to the *Sampling Guidelines* (Appendix B). Once the site has been adequately characterised, strategies that minimise the disturbance can be investigated and may include:

REDESIGN EARTHWORKS LAYOUT

Individual sites may contain areas of low, medium or high sulfides. An effective minimisation strategy may entail the redesign of an earthworks plan or agricultural enterprise to avoid the ASS with high sulfide levels, and focus disturbance into the areas with low or negligible levels. Alternative uses such as 'open space' or wildlife corridors may be allocated to the areas of high sulfide concentration. This approach is likely to be suitable for large construction sites or farms containing variable soil types. Agricultural drainage works require detailed evaluation of soil type and sulfide levels in view of the potential for drains to intersect areas where sulfides are located close to the surface. In situations where avoidance of all ASS is not possible and the project is to proceed, then the earthworks should be designed so areas with the highest levels of sulfide are not or minimally disturbed, and overall ASS disturbance is minimised (Ahern *et al.* 1998b).

Effective earthworks redesign requires planning for future management of the site and detailed ASS investigations including soil type investigations, stratigraphic mapping of the sediments and an understanding of groundwater hydrology and oxidation.

SOIL TEXTURE

Soil texture has a significant influence on risk minimisation strategies. Sandy areas might be considered lower risk for excavation / extraction as the sandy material could be removed using a floating dredge allowing the watertable to be maintained, and the soils might then be treated by hydraulic separation techniques (ref. Ahern *et al.* 1998 for details of this method).

Excavation of large areas of clay material that are difficult to work would require dewatering or drainage of large areas to permit dry excavation. Dewatering/drainage poses a higher risk to drainage of adjacent in situ PASS, which may then require remediation. In such circumstances higher risk and even more intensive management would be involved. Clays may be difficult to break up to allow effective treatment by neutralisation or hydraulic separation.

SHALLOW DISTURBANCES

The extent of earthworks on site can be altered to ensure that only shallow disturbances are undertaken and the ASS remains undisturbed. This is particularly important for the installation of 'hump and hollow' drainage for dairy / beef production in the North West of Tasmania. However, this strategy relies on an in-depth understanding of the spatial distribution of ASS, and is only viable in situations where sulfidic soils are located in the deeper horizons within a soil profile.

REDESIGN EXISTING DRAINS

Existing drains may need to be redesigned so that they are shallower and wider and do not penetrate the sulfide layers. Shallow and wide drains can increase the efficiency of surface water drainage, while reducing the drain density (number and spacing of drains) and drain depth. Hydrological studies may be required to ensure the drains are effective at removing stormwater or floodwater from the site. In undertaking 'hump and hollow' drainage works, care is required to avoid scalded areas, the base of existing drains, and areas where sulfides are less than 0.5 m below soil surface. If sulfides are greater than 0.5 m from the soil surface, the vertical distance between the lower level of cut and the sulfides should be at least 0.5 m (Tulau 2000). In situations where the sulfides cannot be avoided, these areas should be neutralised before earth works associated with 'hump and hollow' drainage commence.

The relevant local government should always be consulted and appropriate permits obtained prior to undertaking any works that may change floodwater hydrology.

MINIMISE GROUNDWATER FLUCTUATIONS

Activities that result in fluctuations of groundwater and in particular permanent lowering of the groundwater table should be avoided, as these may lead to exposure of in situ PASS to oxygen. Acidic groundwater can be brought to the surface as a result of groundwater rise through capillary rise or as a result of fill emplacement. The possible health implications of ASS impacts on groundwater, particularly arsenic contamination, should be noted. In areas with known ASS potential, it is preferable to maintain the groundwater levels in a steady state and works to be avoided include:

- construction of deep drains and canals which can considerably lower the water table;
- operation of drains which do not have gates or 'drop boards' to maintain groundwater levels;
- significant water level fluctuations during dry periods caused by the operation of drains;
- installation of new groundwater extraction bores in ASS areas, and use of existing groundwater extraction bores if they will expose ASS to oxidising conditions;
- dewatering or drainage of construction sites, mines, or sand and gravel extraction pits;
- changes in vegetation type from pastures to trees (lowers groundwater level), or replacement of native vegetation with crops (increases groundwater level); and
- construction of on-farm water storages or sediment/ nutrient ponds in acid sulfate soils.

4.3 NEUTRALISATION

A technique commonly used in ASS management is neutralisation where alkaline materials are physically incorporated into the soil. Sufficient neutralising agent(s) needs to be used to ensure that there is the capacity to neutralise all existing acidity that may be present and all potential acidity that could be generated from complete oxidation of the sulfides over time. Note: if there is existing acidity, no effective natural buffering capacity remains.

4.3.1 ENVIRONMENTAL RISK

There can be significant risks to the environment if a neutralisation treatment is poorly managed. The following issues that can affect the environmental risk need to be considered when neutralisation treatment is being proposed.

SOIL TEXTURE

There are inherent risks associated with the neutralisation of coarse sandy soils as these soils may dry quickly and oxidise within hours of exposure to air. If there is a rainfall event while the soils are stockpiled the generated acid is likely to be mobilised. Large-scale neutralisation of highly-sulfidic sandy material requires careful management.

Marine clays can be difficult to work, treat and dry and may contain variable levels of sulfide within horizons that have a similar appearance. In high rainfall areas such as the north-west of Tasmania it may be particularly difficult to dry and treat these soils. A pilot trial may be appropriate to demonstrate that consistent and efficient treatment of the clay can be achieved.

Monosulfidic black oozes are highly reactive organic-rich gels that accumulate in waterways. They have extremely high moisture contents and can be difficult to work, treat and dry, and can oxidise readily once in contact with oxygen. They are commonly enriched in ultra-fine-grained reactive iron sulfides e.g. amorphous FeS, greigite ~Fe_2S_3 and mackinawite ~Fe_9S_8, which are intermediate products in the formation of pyrite. Monosulfidic black oozes may also contain pyrite. They can form as thick accumulations (e.g. greater than 1 m thick) in drains and waterways that drain ASS landscapes, and are easily mobilised or resuspended during runoff events. Monosulfidic black oozes can oxidise readily once exposed to the atmosphere or oxygenated waters, and can cause severe acidification and / or deoxygenation of floodwaters (Sullivan and Bush 2002; Bush *et al.* 2002). The management of monosulfidic black oozes warrant special attention in any environmental management strategy.

NEUTRALISING AGENTS

Gypsum and other by-products of sulfide oxidation may form coatings on the grains of the neutralising agent during neutralisation. These coatings may reduce the neutralising capacity of the agent and can affect the level of risk associated with large-scale neutralisation. Care should be taken when using more soluble neutralising agents such as hydrated lime, $Ca(OH)_2$, to avoid the possibility of 'overshooting' the required pH to levels of alkalinity that may impact on the receiving environment. Soluble neutralising agents may also be more readily flushed from the system before full oxidation of the PASS occurs. There are additional workplace health and safety issues associated with soluble neutralising agents such as hydrated lime and quicklime, CaO.

DEWATERING OR DRAINAGE

Large sites utilising neutralisation treatments are sometimes dewatered for considerable periods to allow dry excavation. Dewatering or drainage poses a high risk to adjacent in situ PASS and these will then require remediation if oxidisation occurs (ref. Dear *et al.* for more detail).

IMPACTS ON WILDLIFE

Ideally, ASS in or adjacent to the habitat of particularly sensitive protected species (e.g. acid frogs and fish) should not be disturbed due to the potential threat to the species. Provisions of state legislation including the Environment Management and Pollution Control Act 1994 and the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 must be addressed when making decisions that may impact on protected species.

Mildly acidic aquatic environments occur naturally in some coastal areas and treatment by neutralisation may impact on these areas if incorrectly administered. This can increase the inherent risks of using this technique in coastal areas. Greater detail on both these risks and managing them is provided in the Queensland Water Treatment and Management Guidelines.

4.3.2 PERFORMANCE CRITERIA AND VERIFICATION TESTING

The following performance criteria must be attained for soil that has been treated using neutralisation:

1) 1. The neutralising capacity of the treated soil must exceed the existing plus potential acidity of the soil; and
2) 2. Post-neutralisation, the soil pH is to be greater than 5.5 (see discussion below); and
3) 3. Excess neutralising agent should remain within the soil until all acid generation reactions are complete and the soil has no further capacity to generate acidity.

Samples of the treated soil should be taken and laboratory analysed to demonstrate compliance with the performance criteria (i.e. verification testing). These performance criteria equate to there being no net acidity in the soil following neutralisation. Soil that has been treated by neutralisation techniques and has not met these criteria must be retreated until the above performance criteria are met.

4.3.3 MANAGEMENT CONSIDERATIONS

When neutralisation treatment is proposed as a form of ASS management, the following issues are important to consider.

SITE CHARACTERISATION

It is essential to undertake an accurate and thorough ASS investigation (i.e. pre-excavation sampling and laboratory analysis in accordance with Appendix B). Adequate sampling prior to earthworks must be completed to provide decision-makers with sufficient information on which to confidently conclude that the soils can be managed in an ecologically sustainable manner. The level of sampling is likely to vary depending on the site and proposal. Phase 2 (i.e. sampling and laboratory analysis during excavation), and Phase 3 sampling (i.e. verification sampling and laboratory analysis of treated material after earthworks to ensure appropriate rates of neutralising agents are applied for soil neutralisation) are also a significant component of such a management strategy. Sampling options are discussed in more detail in Appendix B.

The better the characterisation of the site, the better the understanding of the stratigraphy of the soils on site, and the lower the environmental risks if a large volume of material is to be neutralised.

pH RANGE

The solubility of iron and aluminium is controlled in part by pH; the solubility of iron is also influenced by the oxidation / reduction potential. Under neutral soil conditions the solubility of iron and aluminium is low. McElnea and Ahern (2000) demonstrated that leaching of iron and aluminium can be controlled by maintaining the soil pH above 5.5 with fine aglime. Consequently the pH of soil needs to be raised above 5.5 when neutralising ASS; an upper pH limit of 8.5 should not be exceeded. The upper limit may need to be lower if revegetation with native pH-sensitive flora is proposed or if a lower pH is more appropriate to the surrounding environment.

Coastal soils in some locations may have a natural pH of 8.5 or greater. These soils should not be treated with an agent to reduce the pH below 8.5.

REDOX (OXIDATION / REDUCTION) POTENTIAL

The redox potential is a quantitative measure of the tendency of a particular system to accept or donate electrons (i.e. produce or maintain reducing or oxidising conditions). For some iron reactions, solution pH and redox potential determines the stable phase (Willett 1983).

This is a complex issue but in general, reducing conditions prevail in the absence of oxygen and the presence of organic matter and/or sulfate reducing bacteria. Oxidising conditions prevail when the material is in direct contact with air or permits the ready diffusion of oxygen into soil masses. Other oxidising or reducing agents can also occur in the soil or the soil water.

NEUTRALISING AGENTS

A variety of neutralising agents are available to increase the pH of soil to acceptable levels and neutralise potential and/or existing acidity from the oxidation of sulfides. Factors to consider when choosing a neutralising agent include solubility, pH, neutralising value, fineness/coarseness of the product, Ca:Mg balance of the soil, spreading and transport costs, and chemical composition and purity of the agent.

Fineness and Effective Neutralising Value (ENV) are particularly important in ASS management. By-products of sulfide oxidation (particularly gypsum and iron and aluminium compounds) may form insoluble coatings on the neutralising agent (particularly larger limestone or marble particles). Such coatings reduce the neutralising capacity of the agent. Neutralising agents for treating ASS should be slightly alkaline, with a low solubility, and a pH ranging from 7 to 9. Such products will not flush out with the first heavy rain event, and have minimal potential to contaminate surrounding waterways and groundwater.

The preferred agent for treating ASS is fine aglime, $CaCO^3$. However, there can be difficulties in effectively mixing fine aglime with wet, lumpy, clayey or cohesive sediments. Furthermore, wind or water erosion of stockpiles must also be prevented to minimise impacts on receiving environments. Other agents with low solubility include dolomite (Ca,Mg) CO^3, magnesite $MgCO^3$ and burnt magnesite MgO. Caution must be taken with these magnesium compounds as they can react to produce magnesium sulfate during neutralisation reactions. Magnesium sulfate is quite soluble and may impact on water quality in waterways if large quantities are mobilised. The production of calcium sulfate (gypsum) during neutralisation reactions involving fine aglime avoids such environmental problems because of its lower solubility (Ahern and Watling 2000).

More soluble neutralising materials such as hydrated lime, $Ca(OH)^2$ or sodium bicarbonate $NaHCO^3$ can be used to neutralise acidity at depth in soil profiles where excavation and mechanical mixing are not feasible. However, there may be potential risks to the environment (and workers) when such products are used. Subsequent rain events also may dissolve and wash these materials out of the treated soil before all the sulfides have oxidised, leaving the soil with long-term net acid-generating potential and effectively polluting the site. Soluble neutralising agents that generate high pH values should be added in small amounts on a more regular basis to avoid over-shooting the target pH range. *Note: ensure that soluble neutralising agents can meet performance criterion 3 (see section 4.3.2).*

Other neutralising agents such as lime amended biosolids, cement kiln dust, crushed concrete and other industrial by-products may be appropriate for some sites, subject to their associated risks being addressed. For more detailed discussion on specific neutralising agents, refer to the Queensland *Information Sheets on Neutralising Agents.*

AGLIME REQUIREMENTS

Calculations of fine aglime requirements to effectively treat soils can be obtained from Appendix C. It is important to remember that the fineness, purity of the neutralising agent and its neutralising value need to be considered when determining liming rates. For example fine aglime typically has an acid neutralising value of about 97% $CaCO3$. Accordingly a correction factor of 100/97 = 1.03 needs to be applied to reach the equivalent of pure fine aglime.

LIME USE AND SUSTAINABILITY

It should be noted that the use of lime products to treat ASS will generate carbon dioxide in production, transport, spreading and in neutralisation reactions. This may be a consideration in selecting the management strategy for large disturbances. Larger sites may also need to consider measures to reduce greenhouse gases e.g. planting and maintenance of local endemic trees.

THE SAFETY FACTOR

Soils require neutralisation with an agent at 1.5 to 2 times the theoretical acid production potential. This 'safety factor' is used because in most situations the neutralising agent is not fully mixed with the soil regardless of the method used. Furthermore, agents such as fine aglime have a low solubility and hence a low reactivity. Also, as discussed above, issues relating to the reduction of neutralising efficiency from coatings of gypsum, and iron and aluminium compounds forming on the grains of neutralising agents need to be considered. In 'high risk' situations greater safety factors may be warranted.

Ahern *et al.* (1998b) stated that an excess of neutralising agent within the soil tends to prevent a build up of extreme acidity within the soil despite some oxidation occurring as a result of the drying of the sediments. Furthermore, bacterial assisted oxidation may occur in disturbed ASS when the pH is less than 4, accelerating oxidation by a factor of 103 if oxygen is readily available. Consequently, the acid production rate will be kept low if the pH is maintained at levels greater than 5.5. This will also favour more complete neutralisation of acid by the added neutralising agent. Thus, an excess of neutralising agent in the soil is important. The table in Appendix C has incorporated a safety factor for fine aglime requirements.

It should be noted that fine aglime, $CaCO^3$ is impure in most situations. Consequently, higher quantities of fine aglime will be required to neutralise the soils than what is stated in Appendix C. The effective neutralising value of coarser aglime (>0.03 mm) is further reduced by the coarser grainsize (i.e. there is lower grain surface area available for reaction). Procedures to account for impurity and coarseness are detailed in the Queensland Information Sheets on Neutralising Agents. *Note: the safety factor does not take these into account.*

TREATMENT PAD DESIGN

For treatment of large volumes of material, neutralisation should be carried out on a treatment or liming pad. The issues to be considered in the treatment pad design are detailed in Appendix D.

DRAINAGE LINES

Neutralising agents can be incorporated into artificial drainage lines in contained treatment areas to aid the neutralisation of acidic stormwater runoff, and to neutralise acidic water from acidified groundwater inflows. Such design measures will prevent development of highly acidic waters and the transport of mobilised metals. By treating acid as close to its source as possible, the volumes of contaminated waters requiring treatment should be minimised. This reduces treatment costs and environmental risks.

Consideration should be given to the type of drain and potential flow rates in determining the particle size of the neutralising agent, and how it will be applied. In slow flow drains fine aglime can be incorporated into a sand bund, which water will infiltrate through to a drain. Alternatively, fine aglime applied directly to the drain base, in a sand mixture, or through use of coarser limestone blends may be considered. The neutralising agent will need to be replenished if it is scoured from the drain (into other treatment areas) or as it develops gypsum, iron and/or aluminium coatings that reduce its neutralising efficiency by preventing contact with water.

Because contact of acidified water with the neutralising agent will cause precipitation of metals from solution, consideration should be given to capturing and removing such metals; for example by constructing settlement ponds or silt fences across drains at intervals. These will require cleaning and maintenance from time to time. See the Queensland *Water Treatment and Management Guidelines* for more information.

It is inappropriate to apply neutralising agents into natural watercourses or water bodies unless carefully planned and approved. Refer to the Queensland Remediation Guidelines. Site containment should be designed to prevent potentially-contaminated waters from entering such areas in the first place.

This is particularly important for waters where pH-sensitive wildlife may be present such as in acidic coastal wetlands or black water (highly coloured, organic-stained water; Reeve and Fergus 1982) creek ecosystems. Refer to the Queensland Water Treatment and Management Guidelines for more information.

TREATMENT OF WATER

When significant volumes of water require pH adjustment, as opposed to cautionary applications of neutralising agent to drainage lines, then more soluble neutralising agents are more effective. Refer to the Queensland *Water Treatment and Management Guidelines.*

APPENDIX A. LEGISLATION AND POLICY RELEVANT TO ASS IN TASMANIA

ENVIRONMENTAL MANAGEMENT AND POLLUTION CONTROL ACT 1994

PART 2A - Environmental duties
23A. General environmental duty

1) A person must take such steps as are practicable or reasonable to prevent or minimise environmental harm or environmental nuisance caused, or likely to be caused, by an activity conducted by that person.
2) In determining whether a person has complied with the general environmental duty, regard must be had to all the circumstances of the conduct of the activity, including but not limited to –
   (a) the nature of the harm or nuisance or likely harm or nuisance; and
   (b) the sensitivity of the environment into which a pollutant is discharged, emitted or deposited; and
   (c) the current state of technical knowledge for the activity; and
   (d) the likelihood and degree of success in preventing or minimising the harm or nuisance of each of the measures that might be taken; and
   (e) the financial implications of taking each of those measures.
3) Failure to comply with **subsection (1)** does not itself constitute an offence or give rise to a civil right or remedy, but if a person has failed to comply with that subsection an environment protection notice may be issued to that person.
4) Where a person, in relation to an environmentally relevant activity, takes all measures specified, in a code of practice made and approved in accordance with the regulations, as meeting the requirements for compliance with the general environmental duty in respect of the activity, the person is taken to have complied with the general environmental duty in respect of the activity.

RELEVANCE TO THE ISSUE OF ACID SULFATE SOILS

This Act sets out a general duty of care to avoid environmental impacts. Such impacts could be caused by allowing acid and associated contaminant discharge into the environment through inappropriate excavation, neutralising, stockpiling or disposal activities.

COASTAL POLICY

The recently released State Coastal Policy 2006 also may cover ASS. It aims to facilitate:

- The conservation of intrinsic assets, values and processes of the coastal area; and
- The sustainable use or development of the coastal area.

There is no explicit mention of ASS in the policy, but it does appear in the attached documents:

- State Coastal Policy 2006 – Implementation Guidelines. This document lists ASS as one of the hazards that should be considered in planning schemes.
- State Coastal Policy 2006 – Model Standards. This document mentions ASS in the model standards for water quality and coastal management.

COMMONWEALTH LEGISLATION

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

INTRODUCTION

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) commenced on 16 July 2000 and is the centrepiece of the Commonwealth's environmental regulatory regime. The following objectives of the EPBC Act are relevant to ASS:

- to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance (NES);
- to promote: ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; the conservation of biodiversity; and a co-operative approach to the protection and management of the environment involving governments, the community, landholders and indigenous peoples; and
- to assist in the co-operative implementation of Australia's international environmental responsibilities.

Administering Authority: Department of Environment and Heritage.

Jurisdiction: Australia.

Availability: The EPBC Act is available on the web at www.deh.gov.au/epbc. Information regarding the act can be found at www.deh.gov.au/epbc. Hard copies are available from Comprint by phoning 1300 656 863.

RELEVANCE TO THE ISSUE OF ACID SULFATE SOILS

Under the EPBC Act, approval is required for actions which have, will have or are likely to have a significant impact on a matter protected under the Act. The matters protected which are likely to be impacted by ASS disturbance include World Heritage areas, Ramsar Wetlands, listed species and Commonwealth marine areas.

Actions that involve the disturbance of ASS and their management clearly may trigger the provisions of the EPBC Act. For example, development that may disturb ASS in proximity to a Commonwealth marine area may lead to significant impact. Such proposed actions may require referral and may require approval under the EPBC Act. Many activities that are to be carried out in ASS areas will come within the definition of 'action' and must be carefully evaluated in relation to their likely impacts. A proponent may have confidence that proposed actions involving ASS may be satisfactorily managed to minimise impacts on matters of NES. When in doubt they should still refer the proposed action to the Minister.

ENVIRONMENT PROTECTION (SEA DUMPING ACT) 1981

INTRODUCTION

The *Environment Protection (Sea Dumping Act) 1981* regulates the deliberate loading and dumping of wastes and other matter at sea. This Act potentially relates to the dumping of ASS material including dredge spoil into the sea.

Administering Authority: Department of Environment and Heritage.

Jurisdiction: All Australian waters (other than waters within the limits of a State or the Northern Territory), from the low water mark out to the limits of the Exclusive Economic Zone.

Availability: The *Sea Dumping Act* is available at www.austlii.edu.au. Hard copies are available from Comprint by phoning 1300 656 863. Further information about the *Sea Dumping Act* can be found at www.deh.gov.au.

RELEVANCE TO ASS

The dumping of dredged sulfidic/acidic materials, which may include the disposal of excess sulfidic sand from maintenance dredging in existing canals, may require a permit under the Act. The protocol requires an assessment of waste or other matter that may be considered for dumping. This includes an assessment of the chemical, physical and biological properties of the waste. The protocol also provides for the consideration of alternatives to the dumping of a waste. It is foreseeable that waste containing ASS could be regarded as a controlled material, and hence its loading and dumping would require an application for a permit.

APPENDIX B. SOIL SAMPLING AND ANALYSIS GUIDELINES

(summarised from the Queensland *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998* and adapted for Tasmanian conditions).

1. MAPPING AND SAMPLING

MAPPING

A detailed map of acid sulfate soil occurrence/absence and an assessment of sulfide/pyrite content by depth is an essential prerequisite for deciding whether a proposed development/disturbance is feasible from an environmental, engineering and economic perspective. The proposal may have to be abandoned, modified, or planned excavations redesigned, if acid sulfate soils with substantial sulfide content are encountered.

Initial assessment of the likelihood of ASS occurring can be made using existing acid sulfate risk maps, aerial photography, maps and information on geomorphology, soils, geology, height above sea level, land use, hydrology and any soil or water tests previously done in or around the area, (Smith and Ahern, 1996; Naylor *et al.*, 1995). Generally, projects that disturb soils located above 20m AHD should be relatively safe and require only some confirmatory investigation. Common exceptions to this generalisation include activities that involve deep disturbance such as sand mining and construction of deep on-farm dams above 20m AHD (Anderson *et al.*, 1996).

Soil sample intensity is dependent on the nature, depth and size of the disturbance proposed and the sensitivity of the surrounding environment. Most ASS investigations will require sufficient sampling to create three-dimensional maps and cross sectional diagrams for presentation in the ASS report.

SAMPLING INTENSITY

A typical intensity of profiles or boreholes required is shown in Table 1 below:

Table 1. Number of sampling holes

Area of site	Number of boreholes
Up to 1 ha	4 holes
1-2 ha	6 holes
2-3 ha	8 holes
3-4 ha	10 holes
> 4 ha	2 holes/ha

More detailed transect sampling (50m intervals) may be required along proposed excavations, e.g. canals, lakes, drainage channels and borrow pits. Additional samples may need to be taken in areas of more intensive disturbance or in potential 'hot spots'. In these areas, sampling may be required on a 50-75 metre grid. This sampling intensity is not expected on areas of the site where the likelihood of acid sulfate soils occurring is low, e.g. located above 20m AHD or soils on hard rock. However, justification for reduced sampling intensity and some confirmatory investigation will still be required for these areas.

Sampling of material to be **dredged** from coastal rivers, lakes, dams and wetlands should be undertaken according to the transect spacing described above. Samples should be collected to at least one metre below the maximum depth of expected material extraction, ensuring that samples from all sedimentary layers are included. Careful attention must be paid when collecting underwater sediment samples to ensure that all sediment particle sizes are collected (a vibro-suction corer is usually suitable). The fine silt and clay fraction of the dredged material may contain high concentrations of sulfide, however this material can easily drain from the sample during collection. In some wet dredging operations, acid sulfate material (usually silt and clay) can separate from the bulk material (sand) during stockpiling.

Assessment of such dredged material may require that the constituent fractions of the resource be separated and tested accordingly, as interpretation of soil analysis on the dredge material may be complicated due to the neutralising influences of shell or seawater in the sample. Conventional laboratory analysis must include the measurement of calcium, (optionally magnesium and sodium) in the SPOCAS test (Method code 21X) and/or the HCl extract of the TOS method (Method 20Bh). Acid Neutralising Capacity (ANC, e.g. Method 19B1) may assist. Where considerable difference exists between the results of the acid trail and the sulfur trail, kinetic type tests involving leaching columns and incubation may be required.

Each borehole should be sampled and details recorded as follows:

i. The **location of each borehole** using Map Grid Australia (MGA/GDA94 to 2.5 m) or Latitude and Longitude (to 0.1 of a second) **and its existing surface height** (AHD) **must be determined and recorded in the report**. This assists in identifying sulfide-bearing layers which comprise essential data in development of proposed earthworks and management plans. The expected accuracy (± x metres) of the GPS or survey equipment used must be also specified. Investigations involving only minor disturbance may derive sufficient location information and contour data from detailed orthophoto maps which are available for some areas.

ii. Field descriptions of horizons using the nomenclature of the Australian Soil and Land Survey Field Handbook (McDonald *et al.*, 1990 or NCST 2009) for each site/borehole should be submitted in the report. Soil descriptions in accordance with the Unified classification System as outlined in AS1726 are also acceptable. Field texture, colour, mottles (particularly presence of straw yellow jarosite) and field pH are essential measurements. See section 4 of this Appendix for field pH tests that must be recorded by horizon or every 0.5m depth interval. **Field pH (pHf) and peroxide pH (pH_{fox}) must be recorded at every soil texture or colour change**. Any presence of shell or carbonate material in the soil must be recorded, along with a measure or estimate of their abundance and size distribution. Suspected carbonate material can be tested in the field by a positive reaction/effervescence with 1M HCl.

iii. Starting from the present soil surface, collection of soil samples should not exceed 0.5 m intervals down the profile, **to at least one metre (1 m) below the depth of the proposed disturbance or to at least two metres (2 m) below the land surface, whichever is greater** (i.e. at least four samples would be required when sampling a profile to a depth of 2 m). Where distinct horizons occur, then sampling should be confined to within that horizon but sampling intervals should not be greater than 0.5 m apart. Where alteration of the watertable height by drainage, pumping, etc. is envisaged then sampling to at least one meter below the depth of the final estimated water table height is required. **Ensure all depths/horizons are collected** (even when field assessments indicate the absence of ASS). Ideally, soil samples should constitute at least 0.5kg each to allow sufficient sample for physical and chemical analysis. Their analysis may be requested as part of the assessment, such as an audit process, or other unforeseen uses. Quantitative laboratory tests may need to be conducted on every 0.5m depth interval, unless strong justification is provided. Laboratory analysis confirming the absence of sulfides is often just as important as determining the actual sulfide content on a positive sample.

The depth below the surface of any watertable must be recorded and where encountered, a water sample collected for analyses. Depending on flow rates and tidal influences, this may require returning to the site some hours later. The water sample should be analysed for at least pH, Electrical Conductivity (EC), chloride, sulfate, aluminium, calcium and iron. For those users with field equipment, EC and pH (and redox and DO if available) should be measured immediately.

Quantitative laboratory tests should be conducted on all soil samples. The texture action category, (coarse, medium, fine; see McDonald *et al.*, 1990) needs to be clearly indicated to laboratories for all soil samples as this affects method selection, the detection limit required and general interpretation of the result. As sampling and laboratory analyses can be an expensive process, **a staged approach to sampling is suggested.** When selecting samples for comprehensive laboratory analysis in Stage 1, a number of profiles should be analysed for each 0.5 m interval or horizon rather than selecting random samples from many profiles. The emphasis should be on those sites most likely to be affected by development and most likely to contain sulfides based on elevation, soil type and results of field tests.

Subject to assessment of Stage 1 sampling and analytical results, the sampling intensity may be adjusted or reduced. However, the onus will be on the applicant, developer or consultant to provide information demonstrating that less sampling and laboratory analysis is justified and that if sampling is reduced the potential for environmental harm will not be increased.

In addition to preliminary mapping, some operations such as **dredging or sluicing** may require sampling at the output pipe every 500 m^3 of material for analytical determination to calculate lime requirements.

SAMPLING EQUIPMENT

Various manual and mechanical sampling equipment may need to be employed. Choice of equipment will depend on soil texture, wetness and layers in the profile. Commonly used equipment are listed and commented on below:

MANUAL

- Jarret auger - usually restricted to the upper profile of dry and moist soil only and generally not suitable for sands.
- Tapered gouge auger - suitable for soft muds, but not sands.
- Push tube with tapered tip - limited sample retention as suction is created on extraction and sample loss can be a problem (adding a sealable cap before extraction improves retention). It is generally not suitable for saturated sands.
- Dormer sand auger - acceptable for many soils but saturated sands may fall out and the walls of the borehole may collapse.
- Piston sampler - good for saturated sands but limited to the length of the piston as walls collapse as it is withdrawn. Using a suitable size PVC/HDPE pipe for casing can increase the depth of excavation on saturated sands but care is needed to limit contamination or sample mixing.

MECHANICAL

- Hydraulic push tube - hard to remove sample from tube on sticky soils, wet sands fall out (adding a sealable cap before extraction improves retention).
- Spiral auger- mixes sample, **generally unsatisfactory**
- Hollow-flight screw auger incorporating an internal 'split tube' sampler - uses a hollow screw auger with an internal sampler that can be withdrawn regularly. The internal sampler is fitted with a 'split tube' and takes suitable good cores but can have trouble with compression of muds and loss of sample on sands below the watertable. A "catcher" often improves retention on sands. Some well-equipped drilling rigs can also use within the hollow auger a thin walled 50 mm diameter tube designated U50 (undisturbed, 50mm diameter) for sampling.
- Backhoe, excavator - Excellent until the watertable is reached, sampling taken at measured intervals down the face. Once below 1.5m wall collapse is a substantial problem for effective sampling and personal safety. Good for sites with lots of shell as it allows a larger sample to be collected without shattering the shell - a common problem with most other sampling techniques. **Work place safety issues** need to be addressed when digging pits. If entering a pit for sampling one needs to **consider the possibility of poisonous hydrogen sulfide gas** overcoming the person. A rope and harness should be used and one member must always remain outside the pit to pull the other person up should such an occasion arise. Do not enter a pit to assist a gas affected person without proper breathing apparatus.
- Wash bore drilling combined with a driven Standard Penetration Test (SPT) split tube sampling - a bentonite and polymer solution which is continually pumped under pressure usually holds the borehole walls intact for deep drilling on saturated sands. Contamination of sample can be a problem even when the upper part of the core is rejected and it is not possible to observe groundwater inflows or levels.
- Core sampling employing a suction and vibrating technique – is recommended and ideal on wet sands, muds and soft soils, giving accurate depths and intact cores. Compressed air is used to remove the sample from the tube. If the upper profile is hard and dry, a hydraulic push tube or auguring device may be required until soft moist material lower in the profile is encountered.

Sands below the watertable are difficult to sample, while those sites encountering gravel layers are the most challenging. At present sampling using an excavator is recommended for gravels. The further the sampling is below the watertable the more difficult it is likely to be. Gravel and sand fractions immersed in a 'pyritic soup' have been found to contain pyrite framboids in their fine pores and fractures or as mud coatings (Saffigna *et al.*, 1996). Such materials are difficult to sample representatively.

Washing down and cleaning of sampling equipment is essential to avoid sample contamination. A high-pressure washing system is essential for mechanical drilling equipment. Trace amounts of sulfidic material from previous sampling may contaminate a sample with no sulfide present, resulting in a positive test. This can lead to unnecessary and costly earthworks and liming procedures being required on soils with no acid producing potential. Therefore an ASS consultant or a trained ASS technician must be present and supervise all drilling and sampling.

Specialised sampling equipment capable of taking uncontaminated core samples from the specified depths is a vital component of any ASS investigation. ***Inappropriate equipment/sampling procedure will render the laboratory results unrepresentative and hence invalidate the ASS component of the report.***

STAGED SAMPLING

It can be cost-efficient to **stage** the approach on large projects. When the results of the initial sampling are known and presented at an informal meeting, all parties can decide on the most efficient and cost effective sampling measures (if any) that are required to complete the ASS investigation and or ASS management plan. Authorities may ultimately insist on full sampling and analyses as per these Guidelines. The onus is on the proponent to justify that sufficient sampling has been undertaken to understand and manage the site without causing environmental harm. Many proposals contain site-specific issues that cannot possibly be covered within the general guidelines. Consultation will help eliminate rejection on the grounds of a technically inadequate EIS and EMP.

2. SOIL SAMPLE CARE/PREPARATION

In the field, all **visible shell** should be removed from soil samples. It is essential that shell material be removed in the field at the time of sampling otherwise it must be sieved out (2 mm sieve) prior to sample grinding. This is usually difficult on clayey samples as they often set hard on drying making removal of shell without breakage/shattering extremely difficult. Broken or ground shell creates fresh exposure, increases the actual reactive surface area, overestimates the true neutralising capacity and hence falsely reduces the TPA result. Most drilling techniques shatter some shell and this should be considered when selecting appropriate sampling methods for a site. Additionally, shells found in ASS commonly have a coating of relatively insoluble gypsum, silica or iron compounds, rendering much of their carbonate content ineffective for neutralisation. If large quantities of coarse shell occur at a site and it is intended to use shell materials to reduce potential liming rates, then extra tests may be useful. Extra tests may include incubation of a portion of undried sample including any shells for a number of months to provide some measure of oxidation and neutralisation rates, or determining (with separate large bulk samples) the percentage of shell present in the soil and the neutralising capacity of the uncrushed shell.

Waterproof labels, capable of withstanding oven drying at 850C, are essential due to the high moisture content of most samples. These can be pre-printed with appropriate name and job description on waterproof paper using a laser printer, then labelled in the field with site and depth using a **waterproof marking pen**. Samples and the correct label should be placed without delay into **sealable polyethylene bags** (with air excluded). Sample bags must also be externally labelled and all depths from the one hole/profile placed in a larger bag to improve efficiency and limit possible mistakes on receipt at the laboratory.

Immediately place the entire profile into a **portable freezer** (or **esky containing block ice**) to quickly cool the samples and minimise sulfide oxidation (when block ice or a freezer is not available ordinary ice or freezer blocks are the next best but are less efficient, and some minor oxidation may occur). Samples must be kept cold and transported in an insulated container to a laboratory within 24 hours of sampling. If this is not possible then they must be frozen until ready for insulated transport to the laboratory for pre-analysis drying. The laboratory should be notified prior to receipt of soil samples. This will reduce the risk of samples sitting in loading bays for extended periods of time (potentially oxidising). Separate field samples may be required to determine bulk density to convert gravimetric results to a volumetric basis for field management plans (e.g. rates of lime per m^3). A sample of known volume can be sampled using equipment such as a cut off syringe. Volumetric samples are sometimes used for 'field laboratory' measurements of TPA using a time-shortened version of Dent and Bowman (1996a, 1996b). Such an approach may be useful for quick site management decisions once earth moving operations are under way, but results should be calibrated by regular dispatch of a subsample to a laboratory for complete analysis.

Oven dried samples and full laboratory analyses will be required for preparing the ASS report and site mapping.

At the time of sampling, **soil colour, soil texture, field pH** (pH_f ; method 21Af, see section 4 of this Appendix) and **field pH after oxidation with 30 % peroxide** (pH_{fox}; method 21Bf) should be determined within 0.5 m depth intervals or soil horizons in the profile and at least on all depths sampled for further laboratory analyses. These field tests together with the strength of the peroxide reaction can indicate those depths where sulfides occur. This may assist in allocating like samples to particular batches in the laboratory, optimising procedures and improving the accuracy and detection limits. The field pH can be measured on saturated soil using a combination **spear point pH probe and field pH meter**. If pH_{KCl} is substantially lower than pHf then some oxidation of the sample during transport or drying may have occurred. Typically, pH reductions of 0.2 to 1 unit have been recorded on oven drying, without any measurable oxidation of sulfides. Oxidation of black iron monosulfides (FeS) and other unstable sulfide and iron compounds commence on disturbance and specialised sampling equipment is required to prevent oxidation. Fortunately, such compounds rarely occur in significant amounts. The use of volumetric sampling and analytical methods may be more suitable when highly unstable compounds are abundant. A method for Acid Volatile Sulfur (AVS) is contained in the Queensland *Laboratory Methods Guidelines* (Ahern *et al.*, 1998a).

All soil samples collected in the field for ASS investigations should be well marked and retained for possible future call or audit purposes. Storage in an oven-dried state as described in the next section is the safest and preferred approach, although most laboratories will charge a fee for drying and storage. Where not all samples are sent to the laboratory, particularly when conducting a staged approach, a less desirable method of storage is freezing. All samples or a subsample of approximately 50 g must be retained until the end of the project unless they become an unreasonable impost then approval to discard should be negotiated with the regulatory authority. Stored samples could be important in defence of legal action. Special arrangement may need to be made with the laboratory to retain at least 50 g of sample, as most commercial laboratories would discard samples about a month after results are reported.

3. LABORATORY ANALYSES AND ACTION CRITERIA

On arrival at the laboratory, soil samples must be either immediately oven-dried or kept frozen until ready to oven-dry. Refrigeration will not prevent oxidation as jarosite can be seen forming in refrigerated samples stored for some weeks.

Wet muddy/clayey cores should be placed on **waterproof non-metallic dishes** (high density microwave cookware is usually suitable) and cut into smaller pieces as soon as partial thawing allows. Quick oven-drying in a **forced air draft, high capacity oven at 80-85 °C** (to prevent oxidation of pyrite) for at least 48 hours is required (Ahern *et al.*, 1996a). Bulkier clay samples may require several days longer to ensure complete drying. If an estimate of field moisture is required, retain a representative portion of the soil, place in a suitable non-metallic moisture container, and weigh and determine moisture content as per method 2B1 (Rayment and Higginson, 1992).

After drying, any coarse material not previously removed (especially **shell and gravel**) should be extracted or removed by preliminary sieving (2 mm). When required, the weight of the residual coarse material (>2 mm) may be measured and calculated as a percentage of the total sample weight. Samples which do not easily break up after oven drying (such as some heavy clays), should be rolled/crushed/ground to pass through a 2 mm sieve. It is recognised that grinding equipment is laboratory-specific but it is recommended that samples for ASS analyses be fine-ground (<0.5 mm or finer), to ensure greater homogeneity. This means a smaller sample weight and less volume of reagents can be used during analysis, reducing costs. The sample should be stored in a cool dry place in an air-tight plastic or inert container for subsequent laboratory use.

SAMPLES CONTAINING 'MONOSULFIDES'

Some common locations of material containing significant monosulfides are bottom sediments of quiet coastal lakes and streams and weed-infested drains where a fresh source of organic material causes the active formation of sulfides, particularly characterised by a 'smelly black ooze'.

Samples suspected of containing **metastable sulfides** ('monosulfides') should be frozen immediately after they are sampled in the field with the use of dry ice then **freeze-dried** in the laboratory. Bush and Sullivan (1997) showed that greigite ($FeS_{1.34}$ or Fe_3S_4) readily oxidises within hours at room temperature and oxidises in minutes on drying at 88°C. Special precautions to prevent oxidation at sampling and drying are costly and laborious and generally used on research samples rather than routine samples. Provided monosulfide content is low then any oxidation on drying should be detectable by a significant lowering (>1 unit) of laboratory pH compared to field pH. The change would not be easily detectable using the sulfur trail but the acid trail should show a high Total Actual Acidity (TAA) result. Dioxane replacement of moisture (Crockford and Willett, 1995) may be useful where no freeze drying facilities are available. Greigite is relatively stable once dried (Bush and Sullivan, 1997). See also Bush and Sullivan (1998) Acid Volatile Sulfur Method in *NSW ASS Manual* (Stone *et al.*, 1998).

SAFETY

As dried ASS may contain dusty, strongly-acidic substances such as jarosite, workers involved in grinding such soils should use eye protection and carry out the operation in a dust extraction cabinet or wear a suitable dust mask.

APPROVED LABORATORY METHODS

A set of standard methods has been under development for routine laboratory use on soil samples (ASSMAC, 1996; Ahern *et al.* 1996b). These earlier versions were updated at a national methods workshop in October 1996. After some minor amendments and trials by Government, University and private laboratories two methods were approved at a combined meeting in Sydney on 29 August 1997, for standard use in all future ASS environment impact assessments to be submitted to NSW and Qld Government authorities. These methods are also required for all future ASS environment impact assessments submitted to Tasmanian authorities. They have been published in Ahern *et al.* (1998a) in the *NSW ASS Manual*.

These methods now comprise AS4969 as the agreed standard for preparation and analysis of ASS. These standards now incorporate the previously approved methods POCAS Peroxide Oxidation Combined Acidity & Sulfate (Method 21) and TOS Total Oxidisable Sulfur (Method 20) and these must now be used for quantifying the acid producing effects of sulfidic material in soils.

It should be noted that the TOS method is a useful screening method for pyrite content of soils and gives **no measure** of acidity present in partially-oxidised and actual acid sulfate soils. Field pH, conducted at the time of sampling, can assist identification of soil acidity but not quantification of actual soil acidity which can be a significant environmental issue if the acid, iron or aluminium leachate drains into streams. Thus, in many situations, TOS will not provide sufficient data to fully understand the complexity of ASS.

Where clear relationships between the 'acid trail' and the 'sulfur trail' have been established in the Environmental Impact Statement (EIS) authorities may consider an individual project basis, requests to use the 'acid trail' only of POCAS during the earth works/construction stage. This would assist in reducing costs, facilitating a quicker turn around of results, allowing earlier liming calculations and management of exposed PASS material. When permission for using such an approach is granted, an agreed percentage of samples must be submitted for full laboratory assessment to monitor the calibration.

All analytical data presented in the report must have its analytical method clearly stated using the approved codes (see Appendix). The full list may be found in Ahern and Rayment (1998). If variations to the approved methods are used, the detail must be clearly documented in the report along with the reason or benefit of the variation. Providing **additional** data, using other methods or techniques, is acceptable and necessary in some situations.

ACTION LEVELS OF OXIDISABLE SULFUR

Tasmanian authorities should use indicator or action levels recently agreed to at the national workshop (and modified recently by ASSMAC Technical Committee) as a guide to call for an ASS management plan, or the appropriate treatment for small disturbances. As clay content tends to influence a soil's natural pH buffering capacity, the action levels are grouped by three broad texture categories - coarse, medium and fine, as defined in Table 2.

Table 2. Action criteria based on ASS soil analysis for three broad texture categories.

Type of Material		Action Criteria 100-1000 tonnes disturbed		Action Criteria if more than 1000 tonnes disturbed	
Texture range. McDonald et al. (1990)	*Approx. clay ontent (%<0.002 mm)*	*Sulfur trail % S oxidisable (oven-dry basis) eg S_{TOS} or S_{POS}*	*Acid trail mol H+/ tonne (oven-dry basis) eg, TPA or TSA*	*Sulfur trail % S oxidisable (oven-dry basis) eg S_{TOS} or S_{POS}*	*Acid trail mol H+/ tonne (oven-dry basis) eg, TPA or TSA*
Coarse Texture Sands to loamy sands	≤5	0.03	18	0.03	18
Medium Texture Sandy loams to light clays	5-40	0.06	36	0.03	18
Fine Texture Medium to heavy clays and silty clays	≥40	0.1	62	0.03	29

INTERPRETATION OF THE RESULTS - ACTION CRITERIA TRIGGERING THE NEED FOR A MANAGEMENT PLAN.

The *Action Criteria* in Table 2 should trigger the need to prepare a management plan based on the percentage of oxidisable sulfur (or equivalent TPA, TAA) for broad categories of soil types. Works in soils that exceed these action criteria should require preparation of a management plan and development consent. For projects that disturb ≥1000 tonnes of ASS soils with ≥0.03 % oxidisable sulfur or equivalent existing or potential acidity, a detailed management plan and development consent should be required.

Table 3 provides an indication of the treatment or risk category that disturbed acid sulfate soils would entail, based on soil analysis. This allows a quantity of lime to be estimated provided the total volume/mass of acid sulfate soils to be disturbed is known and soil analysis has been performed. The table is based on the quantity of lime required to neutralise the acid that could potentially be produced and includes the minimum industry safety factor of 1.5.

For example, if 100 tonnes of clay material with 0.4 % oxidisable sulfur is to be disturbed, the landowner/contractor should observe best practice, bund any extracted material and fully mix at least 1.9 tonnes of lime with the excavated material. This example would fall into the 'High Treatment category' on Table 3 and may require Local Government approval, a management plan and depending on sensitivity of the site possibly some monitoring.

If 1,000 tonnes of the same material is to be disturbed, a more detailed management plan will be required, along with development consent before the works can be undertaken. In these circumstances approximately 19 tonnes of lime will be required to treat the material. This latter example would be in the 'Very High treatment category' of Table 3. A Development Application should be needed with the Local Government (and depending on site sensitivity possibly an EIS).

Table 3. Treatment categories and lime required to treat a weight of disturbed acid sulfate soils – based on soil analysis.

Disturbed Soils	Soil Analysis - Oxidisable Sulfur (S %) or equivalent TPA/TAA													
(tonnes)	0.03	0.06	0.1	0.2	0.4	0.6	0.8	1	1.5	2	2.5	3	4	5
100	0.1	0.3	0.5	0.9	1.9	2.8	3.7	4.7	7.0	9.4	11.7	14.0	18.7	23.4
200	0.3	0.6	0.9	1.9	3.7	5.6	7.5	9.4	14.0	18.7	23.4	28.1	37.5	46.8
500	0.7	1.4	2.3	4.7	9.4	14.0	18.7	23.4	35.1	46.8	58.5	70.2	93.6	117.1
750	1.1	2.1	3.5	7.0	14.0	21.1	28.1	35.1	52.7	70.2	87.8	105.3	140.5	175.6
1000	1.4	2.8	4.7	9.4	18.7	28.1	37.5	46.8	70.2	93.6	117.1	140.5	187.3	234.1
2000	2.8	5.6	9.4	18.7	37.5	56.2	74.9	93.6	140.5	187.3	234.1	280.9	374.6	468.2
5000	7.0	14.0	23.4	46.8	93.6	140.5	187.3	234.1	351.2	468.2	585.3	702.3	936.4	1170.5
10000	14.0	28.1	46.8	93.6	187.3	280.9	374.6	468.2	702.3	936.4	1170.5	1404.6	1872.8	2341.0

L	**Low treatment level:** <0.1 t lime
M	**Medium treatment level:** >0.1 to 1 t lime
H	**High treatment level:** >1 to 5 t lime
VH	**Very High treatment:** >5 tonne lime

The tonnes (t) of pure fine lime required to fully treat the total weight/volume of acid sulfate soil can be read from the table at the intersection of the weight of disturbed soil (row) with the soil sulfur analysis (column). Where the exact weight or soil analysis figure does not appear in the heading of the row or column, use the next highest value (or calculate values exactly). Lime rates are for pure fine CaCO3 using a safety factor of 1.5. A factor that accounts for Effective Neutralising Value is needed for commercial grade lime. An approximate volume (cubic m) can be obtained by dividing weight (tonne) by bulk density (t/m^3).

NOTES ON ASSESSMENT OF RISKS BASED ON THE LEVEL OF OXIDISABLE SULFUR

Levels of oxidisable sulfur within a soil or sediment can indicate the level of risk to the environment if the soil is disturbed. For all soils with oxidisable sulfur values greater than the "*Action Criteria*" in Table 2, a management plan should be developed to manage the potential harm to the environment. As a general rule, the highest result (by either the "sulfur "or the "acid" trail) should be used as the action criteria. Existing acidity (TAA) needs to be included in the assessment. If it is proposed to use the lower result of the 'acid' or 'sulfur' trail, this will require justification in advance, e.g. the acid trail may be higher than the sulfur trail for organic rich surface material.

NOTES ON ASSESSMENT OF RISKS BASED ON THE TYPE OF MATERIAL TO BE DISTURBED

The potential impacts from disturbance of acid sulfate soils can vary considerably depending upon its texture and mineralogy (e.g. the fineness of the soil particles and reactivity of naturally occurring neutralising material such as shell). In addition, due to the natural buffering capacity of clay soils, the level of clay in the soil can also influence the net level of sulfuric acid likely to be produced when the soil is disturbed.

As a result, this buffering process can moderate the potential impacts from the disturbance of soil with a particular level of oxidisable sulfur. Therefore, the levels of oxidisable sulfur that warrants management action will vary with the clay content. For assessment purposes, the criteria (based on oxidisable sulfur) which should trigger management action are grouped into three broad texture categories in Table 2. Lower criteria may be necessary if large quantities are to be disturbed as in Table 3. Soil samples that meet or exceed these criteria present a risk if disturbed and require management action if earthworks are to be undertaken.

Extreme care must be taken with interpretation of results from the analysis of 'coarse material', particularly low sulfur sands as lower detection limits are required. Sands have a lower action level because they can oxidise rapidly and usually have little or no pH buffering capacity. Preferably, more than one analytical method may be needed when analysing sands with the 'SPOCAS' method the recommended approach.

The interpretation of results of samples from peaty soils, highly organic material, coffee rock (humicrete) and indurated sands can also be difficult. Sulfides commonly occur inside old root channels and sulfide formation is usually closely associated with organic matter, which if abundant, may form sulfidic peats. However, it may be possible to get a positive laboratory result on peats, by both the sulfur and acid trail testing methods where there is no identifiable mineral sulfide under the electron microscope. The positive oxidisable sulfur result in these cases may be attributed to a high organic sulfur content in the organic matter. Such organic sulfur compounds are less of an environmental risk.

Coffee rock is expected to be fully oxidised due to its pedological and geomorphological history and in many circumstances do not pose environmental risks. However, this is not the case for all coffee rock. The chromium reducible sulfur method (Method 22 B) Chapter 9 of the *ASS Laboratory Methods Guidelines* (Ahern *et al.*, 1998) may be useful in assisting to improve information on the contribution of organic sulfur to these complex situations.

ASSESSMENT OF RISKS BASED ON THE MAXIMUM LEVEL OF ACID THAT COULD BE PRODUCED

The analysis of the oxidisable sulfur in the soil samples can be used to calculate the theoretical maximum amount acid that can be generated as result of the complete oxidation of sulfides.

The assumption is that the entire oxidisable sulfur in the sample is pyrite (FeS_2) and it produces 2 mol of sulfuric acid per mol of pyrite and no soil buffering is available. A number of methods of determining oxidisable sulfur are available (e.g. S TOS and S POS) and their results are normally expressed as % S (or kg H_2SO_4 / t), (Table 4). Methods for titrating acidity (TAA, TPA) are usually expressed in mole of acidity / t and approximate conversions between the various units are shown in Table 4. This analysis can provide an indication of the quantity of lime that could be required to neutralise all the acid. The data in Table 4 includes a 1.5 safety factor.

Table 4. Acid sulfate soil conversions.
(based on 1 mol pyrite (F_eS_2) producing 2 mol sulfuric acid and corresponding liming rates)

Oxid. S (%)	*moles H^+ /kg (S % x 0.6237)*	*moles H^+ /t or moles H^+ /m^3 (S % x 623.7)*	*kg H_2SO_4 /tonne or kg H_2SO_4 /m^3 (S % x 623.7)*	*kg lime/tonne soil or kg lime/ m^3 Safety factor = 1.5*	*Approx. lime cost/tonne soil or Cost/ m^3 of soil $*	*Cost/ha/m/depth of soil @ $50/t of lime $*
0.02	0.0125	12.47	0.51	0.94	0.05	468
0.03	0.0167	18.71	0.92	1.4	0.07	702
0.06	0.0374	37.43	1.84	2.8	0.14	1,404
0.1	0.0624	62.37	3.06	4.7	0.23	2,340
0.2	0.1247	124.7	6.12	9.4	0.47	4,680
0.3	0.1871	187.1	9.18	14.0	0.70	7,020
1.0	0.6237	623.7	30.6	46.8	2.34	23,410
5.0	3.119	3119	153.0	234.0	11.70	117,000

Note:

- Assumes a bulk density of 1.0 g /cm^3 or 1 tonne/m^3 (bulk density range can be 0.7-2.0 g/cm^3 and as low as 0.2 for peats). Where bulk density is > 1 g /cm^3 or 1 tonne/m^3 then the correction factor for bulk density will increase for lime rates/m^3 soil (eg. if BD=1.6, then 1 m^3 of soil with 1.0 % S_{POS} will require 75 kg lime/m^3 instead of 47 kg).
- Correction factors for lime purity, neutralising value or effective neutralising value where some particle size > 0.03 mm are also required.

It is essential to provide adequate neutralising material to neutralise all acid that may be produced and to bring the pH of the soil to well above 5.5. In most cases, there is only limited justification for raising the soil pH to neutrality (pH 7) as a pH above 5.5 is adequate to avoid most acid sulfate problems (Dent, 1992). However the pH of leachate should be above pH of 5.5 at all times and should ideally be in the range 6.5-8.5 to remove toxic forms of aluminium and other heavy metals.

Table 4 provides an indication of the quantities of lime required and the likely financial implications and practicability of managing the disturbance of the soil. Even when an "oxidation" mitigation strategy is not proposed, the quantity of lime required provides a signal as to the likely environmental hazards from undertaking the proposed works. Using a cost of $50 per tonne for lime, (the actual cost of lime could vary from $40 to $150 per tonne depending on the location and quality), a rough understanding of the likely economic costs from disturbance of the soils (earthworks not included) can be gained.

NOTES ON THE ASSESSMENT OF RISKS BASED ON THE QUANTITY OF MATERIAL TO BE DISTURBED

The amount of lime required to neutralise a certain quantity of acid sulfate soil can be used as an approximation to determine the degree of risk associated with disturbing acid sulfate soil. Where the volume of acid sulfate soil is small and the concentration of oxidisable sulfur is low, the risks are considered to be relatively minor. Conversely, where large volumes of acid sulfate soils are to be disturbed, the potential cumulative risks are high. A treatment rating has been developed in Table 3 based on the calculated quantities of lime required per tonne of soil. This table provides a rough guide only. It is a useful tool for those proposing the project and as an aid to the regulators in deciding the acceptability of the project.

Considerable care should be taken when using Table 3 to justify activities that disturb acid sulfate soil. Table 3 may be used as a rough risk indicator between projects with contrasting levels of soil disturbance and different concentrations of oxidisable sulfur. Individual works have their own environmental characteristics and should always be assessed on all the information available for that site and proposed works.

IMPACTS ASSOCIATED WITH THE PHYSICAL CHARACTERISTICS OF ACID SULFATE SOILS

The physical characteristics of the subsoils and the potential for compaction and subsidence of unripe acid sulfate clays should be considered for projects that involve extensive landfilling, and heavy structures such as roads, bridges, dams or major buildings. Some potential acid sulfate soil clays have the consistency of a gel with up to 80% water content and hence low bearing capacity.

When these soils are loaded, considerable lateral movement or subsidence can be expected under load. For these types of projects, geotechnical data should be analysed to consider the extent of possible movement of the sulfidic material under load and appropriate management strategies developed. Preloading of the site may need to be considered. If preloading or loading of the site is to be undertaken, hydrogeological analysis should also be carried out to consider the effects of compaction on groundwater levels and clay gel material flows and the potential for discharge of acid. The material used for preloading should be non-ASS and if it is to be removed in the future, it should be separated by geotextile fabric to allow final removal without ASS contamination.

Extreme care must be taken with sampling and laboratory methodology for the 'coarse category', particularly low sulfur sands as lower detection limits are required. For confident interpretation of results, usually more than one analytical method is needed on sands and hence the 'POCAS' method is the recommended approach (using at least double the minimum sample weight). Each case needs careful consideration. Sands have a lower action level because they can oxidise rapidly, may have little or no pH buffering capacity and often occur in sensitive environments. Conversely, clean quartzose sands may have anomalously low pH_{fox} and TPA due to the acid buffering of the peroxide solution, although the results of the sulfur trail results should be accurate.

Management plans will need to demonstrate that all soils with oxidisable sulfur values greater than the action levels can be managed without harm to the environment. Further details on management are contained in the *ASS Assessment Guidelines* (Ahern *et al.*, 1998b), *ASS Management Guidelines* (Ahern *et al.* 1998c) and the *NSW ASS Manual* (Stone *et al.*, 1998).

CONSIDER THE PRECAUTIONARY PRINCIPLE

When designing a soil sampling program or undertaking soil analysis, the precautionary principle should be considered. Where there are doubts, be conservative. Always follow best practice. If there are uncertainties, analyse extra samples. When interpreting the results, err on the side of caution. There is a responsibility on those proposing to undertake the works, the consultants advising them and any approval authority involved in making a decision, to ensure that if there are uncertainties, both the short and long term implications of the worst case scenarios are considered.

OTHER LABORATORY TESTS

Additional laboratory analyses are useful for understanding the soil's potential acid generation and identifying potential environmental effects. Measurement of electrical conductivity, chloride, organic carbon, aluminium, iron and exchangeable cations all help to define and create a clearer picture.

Mass based measurements can be converted to volumetric measures for contractors (e.g. m3) by dividing by bulk density (see NSW Acid Sulfate Soil Manual for further details). Additionally, a measure of moisture content is often required for calculations by an appropriate method such as 2B1 or 2B2 (Rayment and Higginson, 1992) or AS1289 – Methods of testing soils for engineering purposes.

MOISTURE CODES

Code	Symbol & units	Analysis and description
Moisture Content methods from Rayment and Higginson (1992)		
2B1	W_{105} (%)	As received moisture 105°C
Methods to be added to Rayment and Higginson (1992)		
2B2	W_{85} (%)	As received water moisture content 85°C

CALCULATIONS

Sulfide/pyrite assays are used to calculate the maximum acid that can be theoretically generated by the complete oxidation of a sample. For the initial assessment (unless more expensive fractionating analyses are undertaken), it is assumed that all S_{POS} or S_{TOS} sulfur occurs as iron-disulfide (or pyrite) and that the oxidation of this iron-disulfide proceeds according to the complete reaction:

$$FeS_2 + 15/4\ 0_2 + 7/2\ H_2O = Fe(OH)_3 + 4H+ + 2SO_4^{2-}$$

Based on the stoichiometry of this reaction, the maximum amount of acid that could be produced by a sample containing 1 %S as pyrite would be 30.59 kg H_2SO_4/tonne or 623.7 moles H+/tonne of soil. Such a soil, if fully oxidised and unbuffered, would require 31.2 kg of pure fine lime/tonne of soil to neutralise the acidity generated if completely mixed and fully reacted. As even the best grade agricultural fine lime is not pure, a factor to compensate upwards for the neutralising value of the lime needs to be included in calculations. Further details are contained in Chapters 5 and 6 of *ASS Management Guidelines* (Ahern *et al.*, 1998c).

In management plans which involve liming, an engineering safety factor of at least 1.5 -2 times the theoretical lime requirements needs to be used, to allow for the slow reactivity of lime and non homogenous mixing in the field. (Some countries e.g. Canada, insist on a safety factor as high as 3). Table 4 gives some liming rates for soils with increasing sulfide content, and approximate costs of lime for a range of S_{POS}, S_{TOS}, TPA or TSA values.

FIELD PH TESTS

Field pH tests cannot be used as a substitute for laboratory ASS analysis in an EIS. Attempts to use them in an EIS to predict oxidisable sulfur levels and therefore reduce the numbers of laboratory analysis submitted is not acceptable. However, they are a useful additional tool.

I) FIELD PH IN WATER (PH_f)

Field pH tests should be conducted on the soil profile at regular intervals (0.25 m) using a field pH meter with a robust, spear point, double reference pH electrode. If the measured pH of the suspension or soil paste is pH < 4, oxidation of sulfides has probably occurred in the past, indicating that an actual acid sulfate soil (AASS) is present. Low range pH indicator papers or a field pH kit based on the specifications of Ruapach and Tucker (1959) are useful if a pH meter is not available. They are based on pH-dependent indicator solutions displaying a characteristic colour and **may** be subject to interference on some ASS resulting in substantial errors.

II) FIELD PEROXIDE PH TEST (PH_{fox})

Field pH tests do not account for any sulfide present that has not yet been oxidised. To test for sulfides or potential acid sulfate soils (PASS), oxidation of the soil with 30 % hydrogen peroxide (H_2O_2)(**pH adjusted 4.5 - 5.5** with a few drops of 0.1M NaOH) can be performed. Note the peroxide pH should be checked on every new container and also regularly before taking to the field. Analytical grade peroxide is the best to use but the pH may still be as low as 3. Manufacturers stabilise technical grade peroxide with acid and this can lead to pH < 2 and give false results on the field

tests. (*Caution: 30 % Hydrogen Peroxide is a strong oxidising agent and should be handled carefully with appropriate eye and skin protection. Inhalation of vapours should be avoided.* ***This test is suitable for experienced operators only***).

The field test can be done with a few mL of peroxide and a small sample of soil in either short clear test tubes (e.g. Falcon 2070 50ml conical tubes) or clear tissue culture clusters. Heating (placing test tube in hot water) or placing in the sun may be necessary to start the reaction on cool days, particularly if the peroxide is cold. When effervescence (sometimes violent) has ceased, continue to add a few mL of peroxide at a time until the reaction appears complete. If the reaction becomes violent diluting with deionised water via a wash bottle is recommended. The test may have to be repeated with a small amount of water added to the soil prior to peroxide addition. Measure the pH_{fox} of the resultant mixture. Care is needed with interpretation of the result on high organic or reactive soils, particularly if manganese is present. In general, positive tests on 'apparently well drained' surface soils should always be treated with caution and followed up with laboratory confirmation.

The above field tests can be made more consistent if a fixed volume of soil (using a small scoop) is used, a consistent volume of peroxide is added, left to react for at least an hour or preferably overnight, then the sample moistened with deionised water before reading pHf and pHfox. However, such procedures take time in the field and are more suited to a 'field shed' situation. The peroxide test is done on two sub-samples from the same depth interval at which the field pH was measured on. **A combination of three factors is considered in arriving at a 'positive field sulfide identification'** (a) a reaction with hydrogen peroxide, (b) a much lower pH_{fox} than field pH_f (▲pH) and (c) the actual value of pH_{fox}.

(a) The **strength of the reaction with peroxide** is a useful indicator but cannot be used alone. Organic matter and other soil constituents such as manganese oxides can also cause a reaction. Care must be exercised in interpreting a reaction on surface soils and high organic matter soils such as peat and some mangrove/estuarine muds and marine clays. This reaction should be rated.

(b) A **pH_{fox} value at least one unit below field pH_f** may indicate a PASS. The greater the difference between the two measurements (▲pH), the more indicative the value is of a PASS. The lower the final pHfox value is, the better the indication of a positive result.

(c) If the **pHfox < 3**, and the other two conditions apply, then it strongly indicates a PASS. The more the pH_{fox} drops below 3, the more positive the presence of sulfides.

- A **pH_{fox} 3-4** is less positive and laboratory analyses are needed to confirm if sulfides are present. (If only low pH peroxide is available, the field test is less discriminatory, particularly for sands because of their low pH buffer capacity. Low analysis sands may give confusing field test results and must be confirmed by laboratory analysis.)
- For **pHfox 4-5** the test is neither positive nor negative. Sulfides **may** be present either in small quantities and be poorly reactive under quick test field conditions or the sample may contain shell/carbonate, which neutralises some or all acid produced by oxidation. Equally the pH_{fox} value may be due to the production of organic acids and there may be no sulfides present in this situation. In such cases, the sulfur trail would be best to check for the presence of oxidisable sulfides.
- For **pH_{fox} >5** and little or no drop in pH from the field value, little net acidifying ability is indicated. (On soils with neutral to alkaline field pH and shell or white concretions present, the fizz test with 1M HCl should be used to test for carbonates). Again the sulfur trail of the POCAS method should be used to check for any oxidisable sulfides.

All pH_f and pH_{fox} results by depth should be tabulated and reported in the ASS report/EIS. Other semi-field tests such as examination under a microscope for pyrite and its reaction with peroxide on the slide may be useful tools to identify pyrite presence, but they require experience and training.

Note: field techniques are useful exploratory tools, but are indicative only and definitely not quantitative. They are not a replacement for quantitative laboratory analyses. The field peroxide test has been found to be least useful on low analyses sands, particularly dredged sands approaching the action limit (0.03 % S). It is also difficult to interpret field tests on high organic or peat soils and coffee rock.

APPENDIX C. LIMING RATES AND SELF-NEUTRALISING SOILS

(from Queensland *Acid Sulfate Soil Technical Manual: Soil Management Guidelines*).

The formula to calculate liming rates is:

$$\%S \times 30.59 \times 1.02 \times 1.5 = \text{kg } CaCO_3\text{/tonne of soil}$$

Note: 30.59 converts to H_2SO_4; 1.02 converts to $CaCO_3$; and 1.5 is the safety factor

To convert units from tonnes to cubic metres, multiply the kg CaCO3/tonne of soil by the bulk density

To change units from %S to mol H+/tonne, multiply the %S by 623.7.

ACID SULFATE SOIL CONVERSION RATES FOR CALCULATING LIMING REQUIREMENTS:

(based on 1 mol sulfides producing 2 mol sulfuric acid)

Oxid. Sulfur S%	moles H^+ /kg (S% x 0.6237)	moles H^+ /t or moles H^+ /m^3 (S% x 623.7)	kg H_2SO_4 /tonne or kg H_2SO_4 /m^3 (S% x 30.59)	kg $CaCO_3$/tonne soil or kg $CaCO_3$/ m^3 Safety factor = 1.5
0.01	0.0062	6.237	0.306	0.47
0.03	0.0167	18.71	0.92	1.4
0.05	0.0312	31.19	1.53	2.3
0.06	0.0374	37.43	1.84	2.8
0.1	0.0624	62.37	3.06	4.7
0.2	0.1247	124.7	6.12	9.4
0.3	0.1871	187.1	9.18	14.0
1.0	0.6237	623.7	30.6	46.8
2.0	1.2474	1247	61.2	93.6
3.0	1.8711	1871	91.8	140
5.0	3.119	3119	153.0	234.0

Note: Assumes the bulk density of 1.0 g/cm^3 (1 tonne/m^3); bulk density generally ranges between 0.7 to 2.0, but can be as low as 0.2 for peats. Where bulk density is >1.0 g/cm^3 (1 tonne/m^3), then the correction factor for bulk density will need to be used. This increases lime requirements (e.g. if BD=1.6, then 1 m^3 of soil with 624 moles H^4/tonnes (1.0 %S) will require 75kg lime/m^3 instead of 47kg. Correction factors for lime purity, neutralising value and effective neutralising value may also be required.

SELF-NEUTRALISING SOILS

Some ASS are partially or completely 'self-neutralising' due to an abundance of naturally occurring calcium or magnesium carbonates (e.g. crushed shells, skeletons, coral, foraminifera15). The self-neutralising potential of a soil is an environmental safeguard. In calculating the neutralising capacity of these soils, shell size needs to be taken into consideration. The finer the shell, the more reactive. Generally, the neutralising capacity of shells <2 mm is more effective, due to large unit surface area. On larger shells, there will be a smaller unit surface area and hence gypsum and insoluble coatings of iron and aluminium are more likely to retard complete reaction. Laboratory methods can be used to detect the presence of carbonates, however if fine grinding is used during sample preparation, the neutralising component will appear more reactive than it will be in the field for reasons discussed earlier. Shells greater than 2 mm need to be removed prior to analysis. This can be relatively easy for sands, but this may be more difficult for wet clays. If the shells >2 mm can be removed, techniques are available to determine the fine (<2 mm) shell content of soils.

These soils may still require the addition of neutralising agents due to the potential for incomplete reaction of shells through either fineness or formation of coatings. The need for additional neutralising agents will need to be assessed on a site-by-site basis. In addition, the once common procedure of determining Acid Neutralising Capacity (ANC) by applying excess mineral acid and back titrating unreacted acid can give an inflated ANC, depending on the method used. As well as the simple net acidity derived from ANC and maximum potential acidity (MPA) the ratio of ANC over MPA is significant. Samples with a ratio of less than 1 are highly likely to be acid-producing. Samples with a ratio of greater than 2 are unlikely to produce acid.

APPENDIX D. TREATMENT PAD DESIGN CONSIDERATIONS

(from Queensland *Acid Sulfate Soil Technical Manual: Soil Management Guidelines*).

GUARD LAYERS

A guard layer of neutralising agent should be spread onto the soil surface of the treatment pad prior to the placement of soils (see Figure 6). This will reduce risk by neutralising acidic leachate generated in the treatment pile and not neutralised during the treatment process. This is especially relevant to the first layer of ASS that is placed for treatment prior to application of the neutralising agent. The guard layer will assist in protecting groundwater quality. To further reduce risk, a layer of compacted non-ASS clayey material (0.3–0.5 m thick) might be placed on the surface of the treatment pad and below the guard layer to restrict infiltration from the material being treated. In fully contained situations a physical barrier may be used as an alternative to a guard layer of neutralising agent as a means of protecting groundwater quality and preventing infiltration of acidic water; e.g. a bunded concrete slab, paved area or layer of bitumen may be placed under a temporary treatment pad.

The guard layer is not a primary means of soil treatment for the following reasons:

- gypsum and insoluble iron and aluminium coatings can form on the neutralising agent placed in the guard layer, which reduces the neutralising capacity of the layer;
- over time, excess water that is passing though the treatment pile may channel its flows through preferred paths, whereby only a fraction of the guard layer is intercepting and neutralising potential acid flows;
- it is difficult to ensure that there has been adequate mixing of the neutralising agent with the soil; and
- the amount of neutralising agent in the guard layer will generally be insufficient to treat all the acidity from the overlying soils placed on the pad.

GUARD LAYER RATE

The rate of neutralising agent used in the guard layer (per square metre) should be based on 0.2 times the average of the potential and existing acidity for every metre depth of the soil to be treated (i.e. if 2 metres of soil are to be treated in the treatment pad, then twice 0.2 times the neutralising agent required to neutralise the acidity should be spread as a guard layer). The safety factor of 1.5 to 2 is recommended for all guard layers. The safety factor may need to be increased for sands and for treatment pads that are adjacent to environmentally sensitive areas.

For example:

- SCR = 1.9%
- TAA = 125 mol H+/tonne
- Existing + Potential Acidity = (125÷623.7) + 1.9 = 2.1%
- 0.2 times the average of the potential and existing acidity = 0.2 x 2.1% = 0.42 %S
- Depth of soil on treatment pad = 2 m
- The situation would require 39 kg $CaCO3/m^2$ of soil as the guard layer for 2m (vertical) of fill

In all cases a minimum of 5 kg fine aglime per m^2 per vertical metre of fill should be used in the guard layer. See the Queensland *Laboratory Methods Guidelines* for information about determining existing and potential acidity.

The guard layer should be employed as a precaution to neutralise acidity that has not been adequately treated during the soil neutralisation process. The rate of neutralising agent used in the guard layer will depend on the final treatment pile height, existing and potential acidity of the sediments, and the soil texture. The rate may need to be increased where the receiving environmental values warrant higher protection. The rate may also need to be increased to enable a neutralising agent to be incorporated in situations where significant delays occur in drying soils due to soil texture or climatic conditions.

Note: Reapplication of the guard layer may be necessary under temporary treatment pads, if the guard layer is disturbed or removed with the treated soil.

SOIL TREATMENT

Soils may be neutralised on a temporary treatment pad or alternatively the soils may be neutralised as they are placed permanently. Essentially, treatment of the soils is the same process whether it is performed on a temporary treatment pad, or on a treatment pad in their permanent location. Treating soils on a temporary treatment pad may promote better mixing of the neutralising agent with the soil as the soils and agent may be further mixed as they are moved. However, there is the added expense of double-handling of the soil.

DEPTH OF SOIL

If wet materials are being placed, shrinkage may be allowed for. To allow for shrinkage, layers of greater depth may be initially placed.
Ultimately it is up to the contractor to ensure that they have appropriate equipment to incorporate the neutralising agent to the depth of fill.

Acid sulfate soil material should be placed on top of the guard layer in 150 to 300 mm-thick layers on the treatment pad, to allow drying. The appropriate amount of neutralising agent, including the calculated safety factor should be spread once the ASS are sufficiently dry. The ASS may require reworking several times to achieve adequate mixing of the neutralising agent and/or drying of the soil. The treated layer will require Phase 3 sampling (i.e. verification analysis) to confirm whether appropriate amounts of the neutralising agent have been incorporated into the soil, which should be subsequently compacted before treatment of the next layer commences, or when moved to the permanent placement area if initially mixed on temporary treatment pads.

Guard layers may need to be applied between each compacted ASS layer as a precaution in environmentally sensitive areas, areas with high levels of sulfides or where soils are difficult to mix.

EARTHWORKS STRATEGY

An earthworks strategy should be formulated to ensure that sufficient space is available to accommodate the number of treatment pads required to allow adequate drying and treatment of the ASS. Expected rates of throughput in m^3, drying, mixing and compaction times along with the capacity of the treatment pads to accept the materials, need to be identified in any strategy. The earthworks strategy should also ensure that adequate time is available to obtain the results of Phase 3 testing (i.e. verification testing) before treatment of the next layer begins. Climate, seasonal conditions, and soil texture may affect drying and treatment rates and hence the size of treatment pads required.

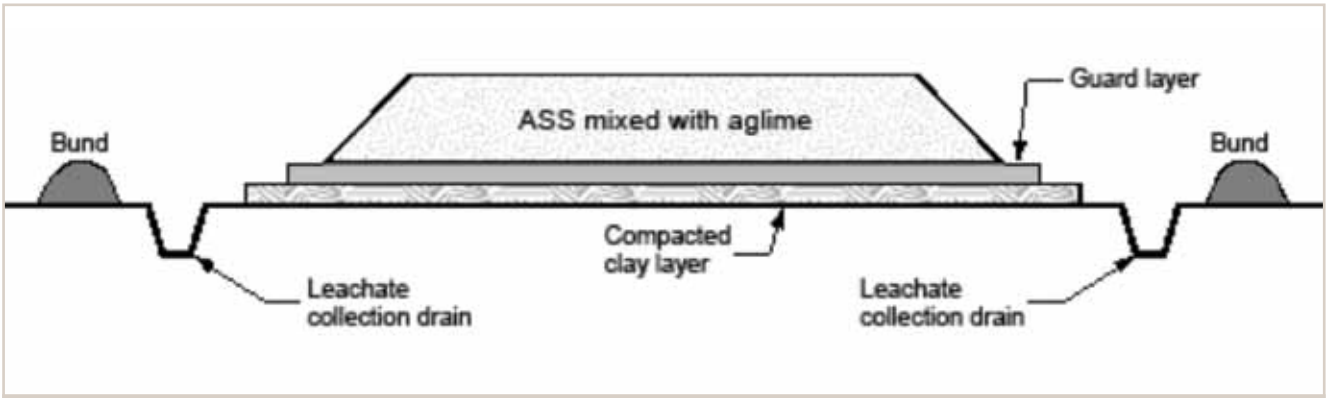


Figure 6. Schematic cross-section of a treatment pafe, including compacted clay layer, guard layer, leachate collection system and containment with bunding.

CONTAINMENT

Stormwater runoff should be contained within treatment pads by appropriate bunds and may be collected in a sump. Diversion drains should be installed to prevent stormwater run-on into the treatment pad. Surface liming of earth bunds and diversion drains can assist with neutralising any acidic stormwater. Bunds and diversion drains should not be constructed out of untreated ASS or other materials that may be a source of contaminants to the environment. The materials used should have an appropriately low permeability to avoid leakage.

SPATIAL TRACKING

The accurate spatial tracking of large volumes of ASS during the neutralisation process (e.g. survey with a hand-held Global Positioning System (GPS), differential GPS, designated lot numbers or conventional survey, depending on the level of accuracy required), is essential to ensure that initial soil testing can be correlated with prescribed treatment and any required Phase 3 sampling (i.e. verification testing). Some sites may have difficulty developing an appropriate tracking program, due to spatial constraints. In such situations, alternative management and treatment facilities should be developed.

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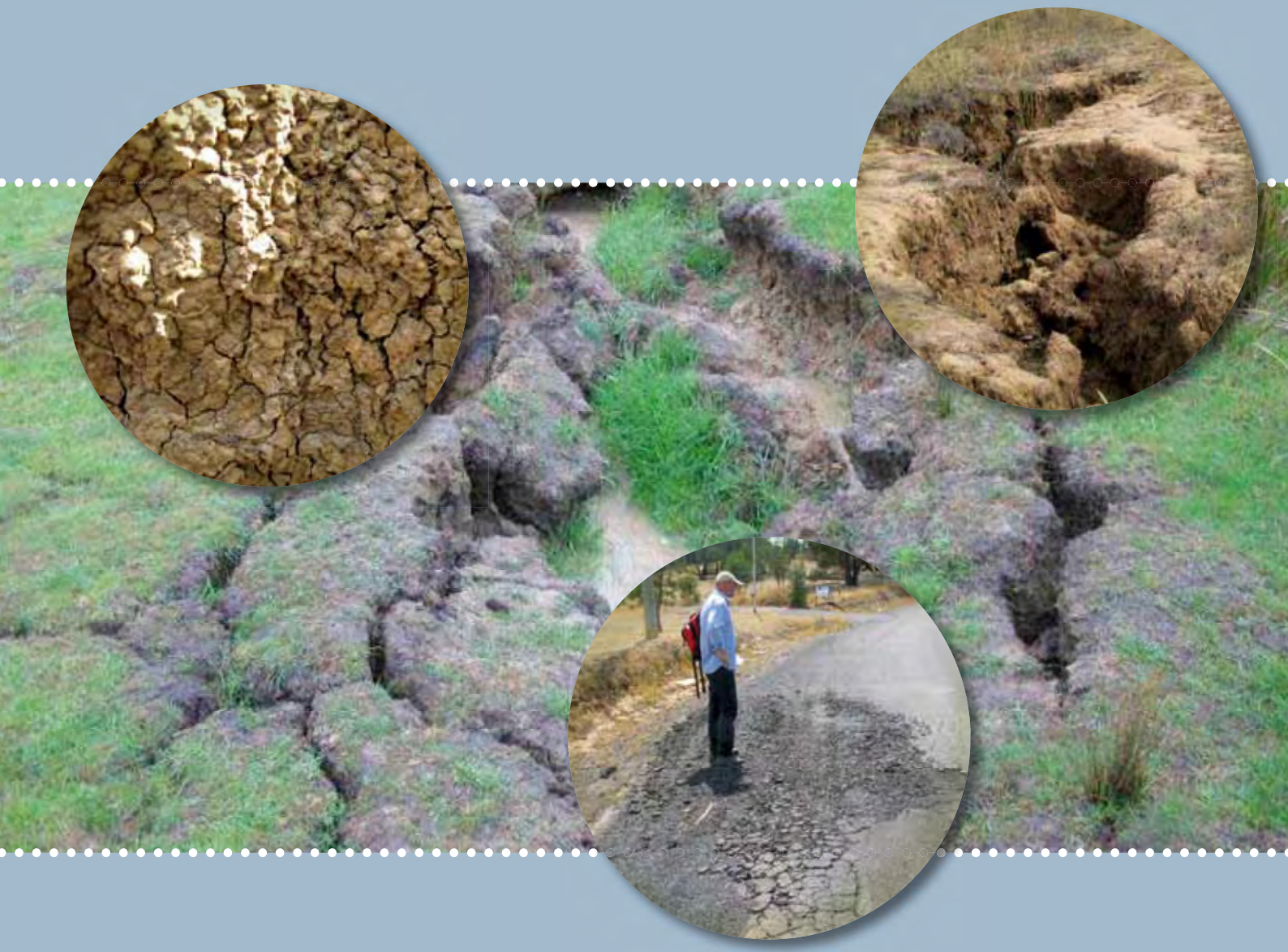
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DISPERSIVE SOILS *and their* MANAGEMENT



Technical Reference Manual

Sustainable Land Use
Department of Primary Industries and Water

Tasmania
Explore the possibilities

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PURPOSE OF THIS DOCUMENT

Currently, there is little locally relevant or available information on the management of dispersive soils in urban and peri-urban environments. Issues associated with dispersive soils and their management are not adequately addressed in planning schemes, building codes or the development approval process. This document seeks to provide a summary of the available science and experience gained with the management of dispersive soils and tunnel erosion in Tasmania. It is expected this document will have relevance for a range of stakeholders including, professionals in the building and construction industry, local government, affected landholders and natural resource managers. It is important to acknowledge that advice provided in this document results from a process of expert opinion and field observation, rather than rigorous scientific study or an established body of locally relevant literature. This document will require updating as new information becomes available.

The purpose of this document is to,

- Raise awareness of the risks associated with development and construction on dispersive soils.
- Reduce the incidence of tunnel erosion and environmental harm resulting from disturbance of dispersive soils in Tasmania.
- Indicate the types of environments in which tunnel erosion and dispersive soils occur.
- Review chemical and physical analytical techniques used for identifying dispersive soils.
- Identify risks associated with traditional construction techniques on dispersive soils.
- Outline low-risk options for construction and development on dispersive soils.
- Review methods for repairing tunnel erosion in peri-urban environments.

This document aims to reduce rather than eliminate risk associated with construction and development on dispersive soils. The advice presented in this document needs to be carefully considered together with other expert opinion in relation to specific sites on a case by case basis. Erosion processes in dispersive soils are complex and difficult to predict. No responsibility is taken for advice provided in this document.

The Crown in the right of the State of Tasmania does not accept responsibility for any loss or damage which may result to any person arising from reliance on all or any part of this information, whether or not that loss or damage has resulted from negligence or any other cause.

1.0 INTRODUCTION: WHY DISPERSIVE SOILS AND TUNNEL EROSION ARE AN ISSUE

- Dispersive soils and tunnel erosion have been found in all municipalities in southern Tasmania, and several locations in northern Tasmania.
- In recent years, urban expansion has occurred in areas known to contain dispersive soils.
- Tunnel erosion in dispersive or sodic soils mostly occurs in areas with
  - Soils derived from Triassic sandstone or Permian mudstone.
  - Deep sedimentary soils.
  - North facing slopes.
  - Slopes over 10 degrees.
  - Drainage lines.
  - Areas in which vegetation, soils or local hydrology have been disturbed.
- Tunnel erosion has the potential to result in considerable damage to infrastructure (including dwellings) and the environment.
- The location or extent of dispersive soils has not been specifically mapped in Tasmania.
- Existing soil maps and tunnel erosion hazard maps are unsuitable for land use planning and infrastructure development.

Dispersive soils and tunnel erosion occur in all municipalities in southern Tasmania, as well as parts of the Northern Midlands, Tamar Valley and Break O'Day municipalities. In recent years, urban expansion on dispersive soils has increased the incidence of infrastructure damage and environmental harm resulting from tunnel erosion. Unlike other forms of erosion, tunnel erosion results from a combination of both chemical and physical processes, which makes its control and repair difficult. Management of tunnel erosion is focused on both the prevention of further tunnel erosion and improved repair and management of existing tunnel affected land.

1.1 ENVIRONMENTS IN WHICH DISPERSIVE SOILS AND TUNNEL EROSION OCCUR

Crouch (1976) identified that landscapes which were predisposed to tunnel erosion had;

- A seasonal or highly variable rainfall combined with high summer temperature.
- Cracking of surface soils due to desiccation.
- A reduction or detrimental change in vegetative cover.
- A relatively impermeable layer in the soil profile.
- Sufficient slope to create sub-surface flow.
- A dispersible soil layer.

In Tasmania, tunnel erosion is commonly associated with dispersive subsoils derived from Triassic sandstone, or Permian mudstone (Colclough 1978, Doyle and Habraken 1993). However tunnel erosion is also known to occur on dispersive soils derived from Jurassic Dolerite (Bruny Island, Dunalley and Orielton) and Lower Carboniferous – Upper Devonian granites (Elephant Pass). Tunnel erosion mostly occurs on moderately steep (>10°) north or north-east facing slopes in areas with less than 650 mm annual rainfall. Tunnel erosion is less common in shallow soils or soils containing a high proportion of stones (exceptions exist, Figure 1a) and areas with greater than 800mm rainfall.



Figure 1a & b. Exceptions always exist. (a) Tunnel erosion in shallow stony ground located on a side slope away from drainage lines, Brighton. (b) Tunnel erosion in a mature forest, on dispersive soils derived from Triassic Sandstone, Middleton. Tunnel erosion existed prior to felling of trees in the foreground.

The nature and extent of tunnel erosion appears to differ between soil types. In soils derived from Permian sediments, tunnel erosion is usually confined to a single narrow 'slot' often within a drainage line. In soils derived from Triassic sediments, tunnels often have multiple branches and frequently occur on hillslopes as well as drainage lines. While tunnel erosion usually results from some form of disturbance, in a few instances tunnel erosion has occurred in otherwise undisturbed environments (Figure 1b).

1.2 TUNNEL EROSION HAZARD MAPPING

The location and extent of tunnel erosion in Tasmania has not been specifically mapped or investigated, however land system mapping indicates that approximately 103,000 ha of private freehold land has a tunnel erosion hazard (Grice 1995). Figure 2, the 'Location of tunnel erosion prone dispersive soils (sodic soils or sodosols) in Southern Tasmania (DPIWE 2004)' map has been created by modifying the Soil Orders Map of Tasmania 1: 500,000, (DPIWE 2004) to reveal the location of sodosols (soils with more than 6% sodium in the subsoil) as a predictor of dispersive soils. Figure 3 the 'Map of land systems containing areas of tunnel erosion on private freehold land in Southern Tasmania' has been generated from state-wide land systems mapping in which combinations of soil, geology and climate have been inferred to reveal areas which have an elevated likelihood that tunnel erosion may occur (Grice 1995). Note: neither of these maps indicate the actual location or extent of dispersive soils or tunnel erosion.

Tunnel erosion hazard maps in Figures 2 and 3 (pages 9-10) cannot be used for land use planning or making decisions on soil suitability for sub-division. Note that some areas indicated to have a dispersive soil or tunnel erosion hazard differ between the two maps. These discrepancies are expected, and result from differences in how the two maps were produced. Landuse planning, sub-division works and site development require field inspections and large scale soil mapping at 1:5,000 – 1:10,000 scale.

A local example of larger scale land suitability mapping for residential development was conducted in the Brighton municipality to identify soils which were unsuitable for urban development (Figure 4) (Cumming 2003). Similar landuse and erosion surveys have been used to quantify risk associated with urban development on erosion prone loess soils in the Port Hills, Christchurch, New Zealand (Trangmar 2003).

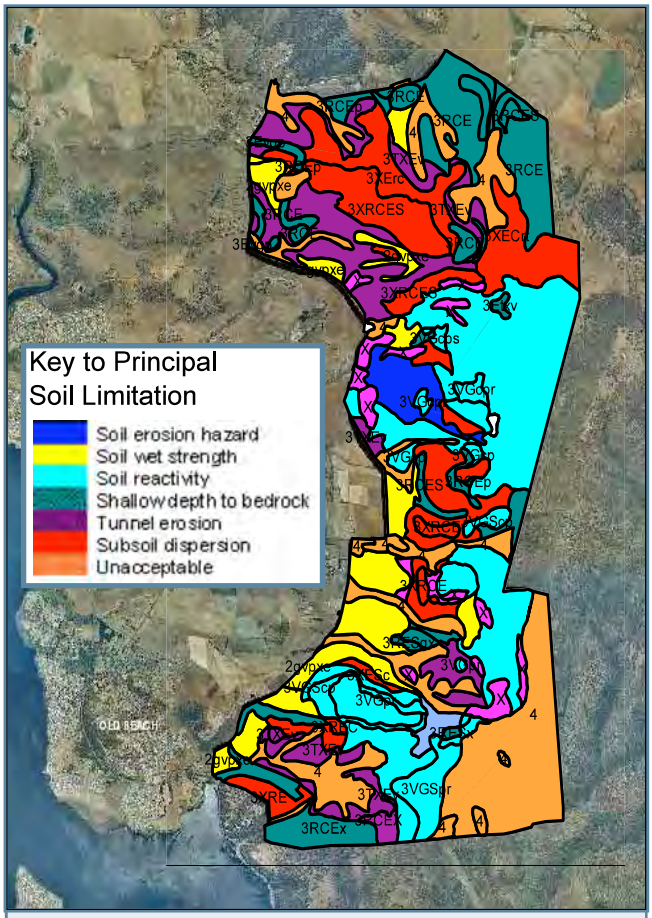


Figure 4. 1:10,000 Brighton Land Use Suitability Map (Cumming 2003).

Cumming (2003) notes '*The map is reliable only at the scale published, and must not be enlarged…..*'

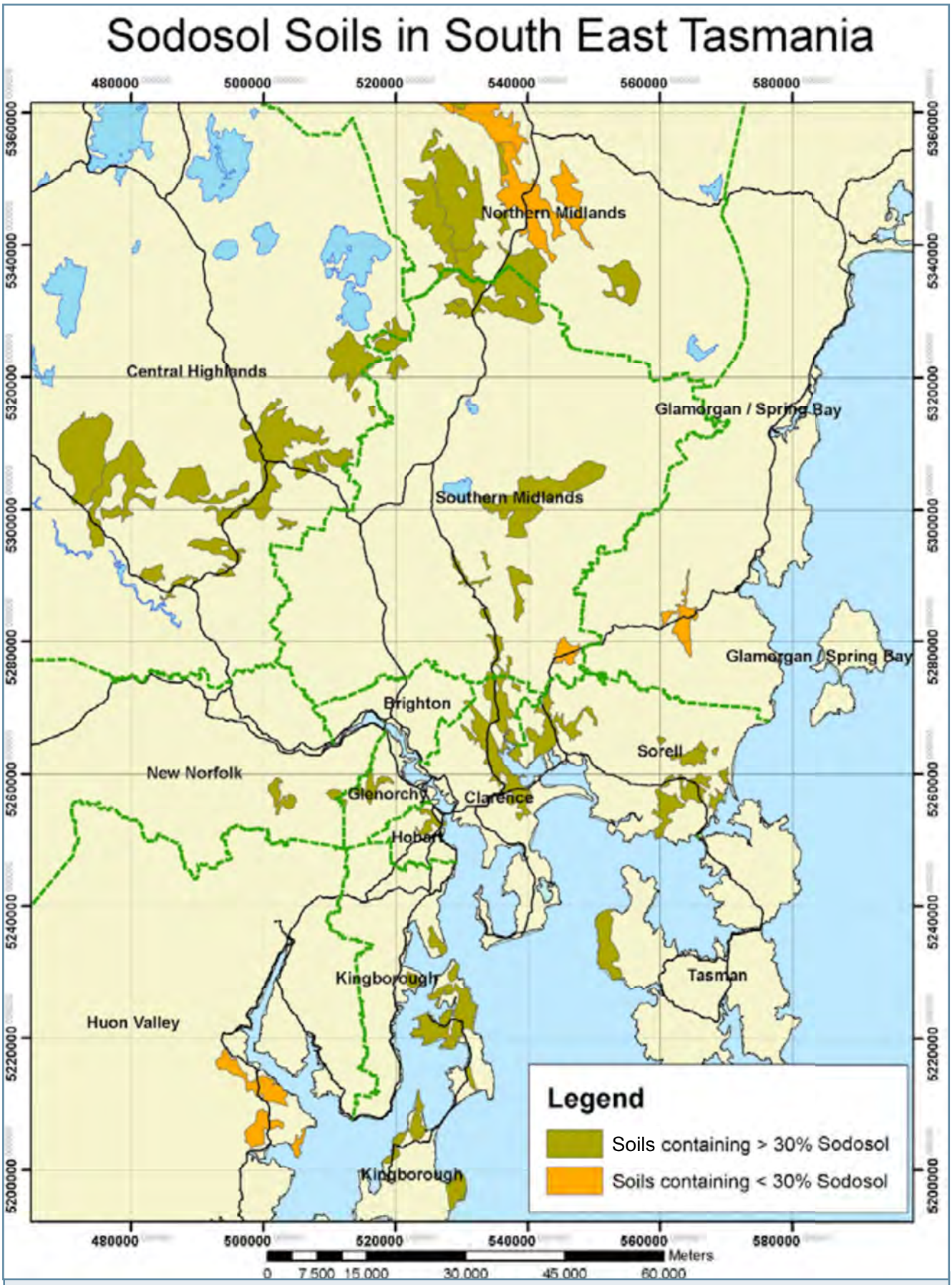


Figure 2. Location of tunnel erosion prone dispersive soils (sodic soils or sodosols) in Southern Tasmania (DPIWE 2004).

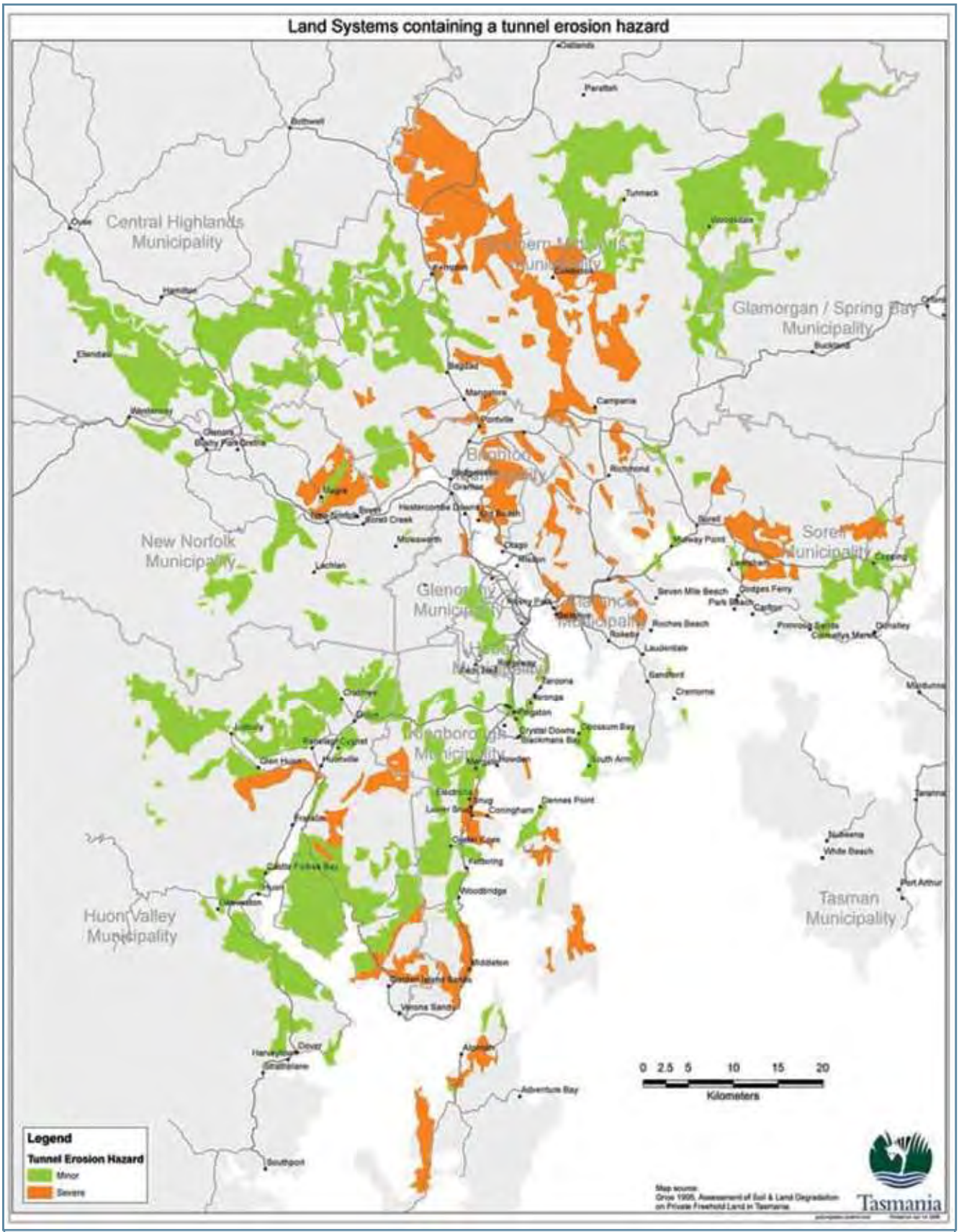


Figure 3. Map of land systems containing areas of tunnel erosion on private freehold land in Southern Tasmania (based on Grice 1995).

2.0 UNDERSTANDING DISPERSION AND THE EROSION PROCESS

SODIC SOILS AND DISPERSION

- Dispersion results from the presence exchangeable sodium between clay platelets.
- Dispersion results in the swelling of clay platelets and collapse of clay aggregates.
- Dispersion is often seen as 'muddy' or 'milky' water in dams and surface water.
- Dispersion only occurs in non-saline water or rainwater.

TUNNEL EROSION RESULTS FROM

- Both chemical and physical processes.
- Dispersion of clay subsoils.
- Sodic or dispersive subsoils coming into contact with fresh water (rain, runoff etc).
- Soil cracks and pores which enable runoff and dispersed clays to flow through the soil.
- Intense rainfall events on dry cracked soil, usually at the end of summer.
- Loss of topsoil through erosion or excavation which exposes dispersive soils to rainfall.
- Hydraulic disturbance such as vegetation removal or creation of runoff.

2.1 SODICITY AND DISPERSION

Tunnel erosion mostly occurs in dispersive soils (Vacher *et al.* 2004) which typically contain greater than 6.0 % exchangeable sodium (ESP). These soils are known as sodic soils or Sodosols (Isbell 2002), or in the past may have been referred to as Solodic, Solonetz or Solodized – solonetz (Doyle and Habraken 1993). Other soils such as Vertosols, Kurosols and Kandosols may also contain sodic or dispersive soil layers.

When a sodic soil comes into contact with non-saline water, water molecules are drawn in-between the clay platelets causing the clay to swell to such an extent that individual clay platelets are separated from the aggregate, this process is known as dispersion (Figure 5, van de Graaff & Patterson 2001, Nelson 2000). When small aggregates are placed in a dish of distilled water they appear to 'dissolve' into a milky ring or halo. This milky ring is the ejected clay platelets floating away from the clay aggregate. Dispersed platelets are often so small that they remain forever in suspension, which explains why dams constructed from dispersive clays never settle and always appear 'muddy' or 'milky'.

While sodic soils are generally dispersive, it is important to acknowledge that not all sodic soils disperse, and that not all dispersive soils are sodic (Sumner 1993). Factors such as silt and high magnesium content may induce non-sodic soils (ESP <6%) to disperse, while organic matter, clay mineralogy, acidity, and high iron content may prevent sodic soils (ESP >6%) from dispersing (Raine and Loch 2003, Rengasamy 2002). In southern Tasmania degraded Kurosols are known to be dispersive despite having less than 6.0 % ESP (Doyle pers. comm.). In addition, soils which are both saline and sodic do not disperse or behave like sodic soils until the salt is leached from the soil profile, usually following subsurface drainage (Rengasamy and Olsson 1991).

In slightly saline water, or water with a moderate electrolyte (salt) concentration, sodic soils swell, but generally don't disperse. The clay platelets remain intact. The presence of salts within the soil water reduces the osmotic gradient between the outside and inside of the clay platelets preventing the ultimate stage of swelling leading to dispersion (Nelson 2000). Maintenance of salts within the soil water is one of the most important mechanisms by which sodic soils are protected from dispersion and development of tunnel erosion.

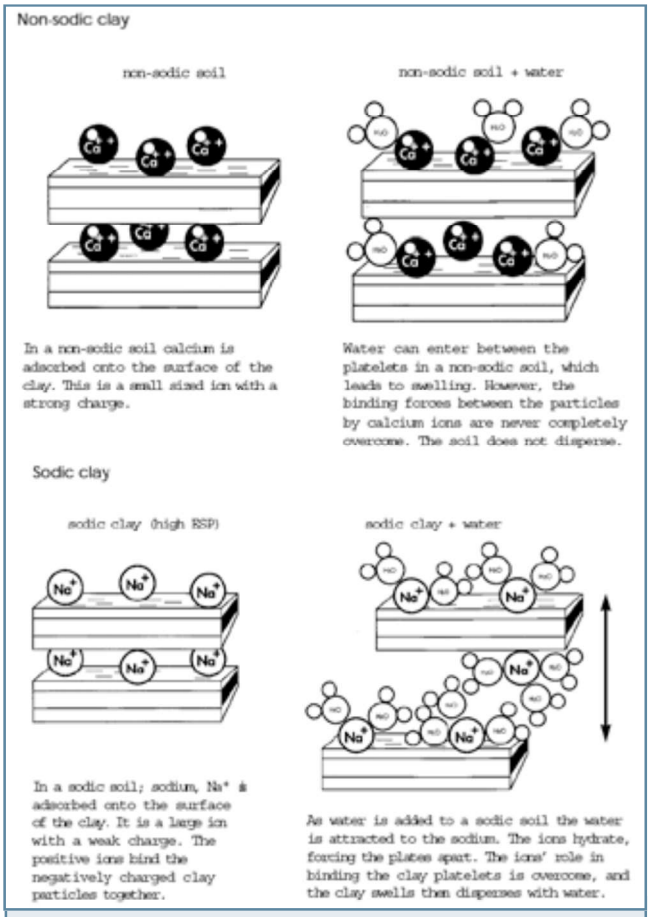


Figure 5. Behaviour of non sodic and sodic soils in water. (Anon 1999a).

2.2 TUNNEL EROSION

Tunnel erosion results from a complex interaction of chemical and physical processes associated with clay dispersion, mechanical scouring, entrainment and mass wasting. Observation indicates that in Tasmania, tunnel erosion usually starts as a result of rainfall coming into contact with dispersive subsoil following,

- Loss of topsoil ie excavation or erosion.
- Surface soil cracking due to desiccation (drying).
- A change in hydrology or generation of runoff.
- And occasionally formation of rabbit burrows or old root holes.

Once subsoil clays have dispersed the development of tunnel erosion depends on whether the soil matrix has sufficient permeability to enable dispersed soil material to move downslope through soil cracks and pores. This movement of dispersed clays leaves behind a small cavity. Further rainfall events, entrain more dispersed soil material, resulting in both the headward and tailward expansion of the cavity (Zhu 2003, Vacher *et al.* 2004, Laffan and Cutler 1977). Eventually cavities link-up to form a continuous tunnel system in which water flowing at the tunnel base, further scours the sidewalls resulting in slumping and tunnel enlargement (Figure 6) (Laffan and Cutler 1977, Zhu 2003). Eventually undermining reaches an extent where complete roof collapse occurs and either gully erosion forms (Figure 24) (Laffan and Cutler 1977), or the topsoil collapses back over the tunnel to form a stable depression (Figure 8).



Figure 6. Sidewall collapse due to mechanical scouring and undercutting sidewalls. Dolerite derived soils, Dunalley.

Tunnel erosion tends to be a sporadic phenomenon (Pickard 1999). Tunnel eroded areas may appear to be stable for periods up to a decade or more before a single runoff event re-initiates the erosion process (Zhu 2003). There may also be a significant time-lag between disturbance and the first observation of tunnelling. At one site in Kingborough, tunnel development only became apparent 10-15 years after the site was disturbed presumably as a result of dwelling construction. At a property on Bruny Island, a single summer storm in 2003 increased the section of a hillslope affected by tunnel erosion by around 30%. Observation indicates that tunnel initiation tends to occur late in summer when vegetation has died off and soils are desiccated and cracked (Floyd 1974, Vacher *et al.* 2004). Sudden downpours generate large amounts of surface runoff which enter the subsoil directly through soil cracks (Figure 7), dispersing sodic soil horizons and initiating the tunnel erosion process. Although greater rainfall generally falls over winter, tunnel initiation is uncommon during the winter months as clays tend to have swelled, sealing surface cracks and reducing the presence of void spaces within the soil (Floyd 1974).



Figure 7. Surface water entering an existing tunnel system, increasing the mechanical erosion and scoring.



Figure 8. Collapse of tunnel roof, following loss of dispersive soil horizon leading to formation of a stable depression, Cygnet.

3.0 IDENTIFYING DISPERSIVE SOILS

IDENTIFICATION OF DISPERSIVE SOILS

- Dispersive soils can be identified by dribble patterns and pitting.
- Early stages of tunnel erosion can be identified by the development of spew holes.
- Simple field tests can be used to identify the presence of dispersive soils.
- For engineering works or infrastructure development, a combination of analytical and physical tests should be used. Consult an appropriately qualified and experienced soil specialist or civil engineer.

3.1 FIELD TECHNIQUES

Dispersive soils may be readily identified by distinctive dribble patterns that form following exposure to rain or low electrolyte runoff. The presence of the distinctive 'dribble' patterns or 'worm channels' is considered to be a reliable indicator of moderately to highly dispersive soils (Figure 9) and is nearly always observed on the sidewalls of tunnel erosion cavities. Where topsoil has been removed by erosion or excavation, pitting and pocketing can occur in subsoils exposed to rainfall (Figure 10).



Figure 9. (a) Example of dribble pattern on an exposed subsoil, the photograph was taken from within an actively eroding tunnel system. (b) Dribble patterns on sodic soil ped.



Figure 10. 'Pitting & pocketing', resulting from topsoil removal, surface water has dissolved through the soil surface. Soils derived from Triassic Sandstone.



Figure 11. 'Sediment fans or 'spew holes' are often the first sign of tunnel erosion (a) Honeywood, (b). Woodbridge (c) Campania (d) Dunalley.

Early signs of tunnel erosion include the presence of sediment fans or 'spew holes' which result from the ejection of fine sediments and dispersed clays from the downslope end of a tunnel erosion system (Figure 11). It is however important to note that by the time a spew hole has developed, considerable sub-surface erosion may have already occurred.

3.2 SIMPLE FIELD TEST FOR IDENTIFYING DISPERSIVE SOILS

Field testing for dispersive soils can be conducted by observing the behaviour of air dried aggregates in distilled water or rainwater. This analysis is a simplification of the Emerson crumb test (Emerson 2002).

1) Collect soil aggregates (1-2 cm diameter) from each layer in the soil profile.
2) If moist, dry the aggregates in the sun for a few hours until air-dried.
3) Place the aggregates in a shallow glass jar or dish of distilled water or rain water. It may help to place the jar on black card or a dark surface (distilled water can be purchased at most supermarkets).
4) Leave the aggregates in water without shaking or disturbing them for 2 hours.
5) Observe and record if you can see a milky ring around the aggregates. Don't worry if the soil collapses or bubbles (Figure 12).

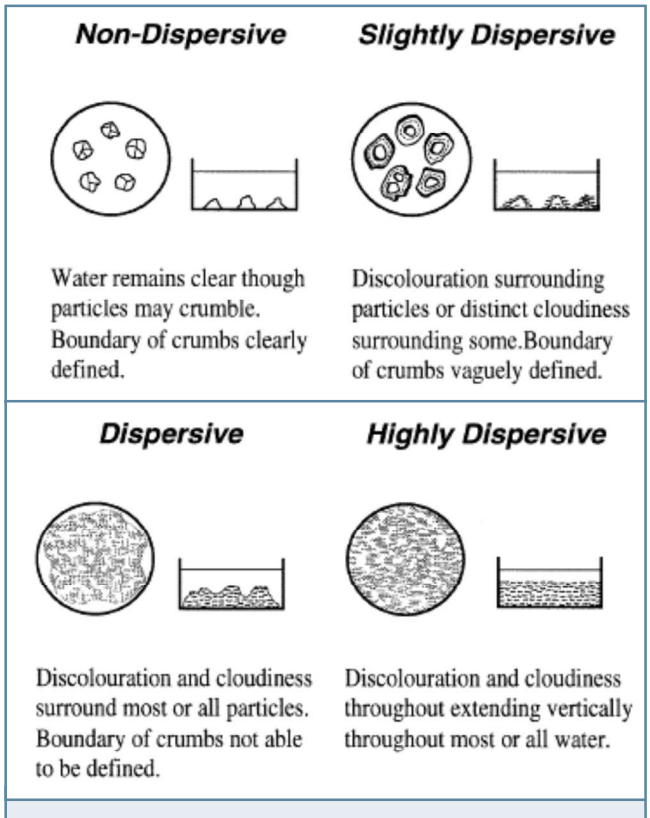


Figure 12. Field test for aggregate dispersion (Sorensen 1995).

Caution: Aggregates may not disperse when they should if they haven't been sufficiently dried. While the presence of a milky halo indicates the presence of dispersion, the absence of a milky halo does not necessarily mean that soil will not disperse. Some soils only disperse after they have been disturbed or remoulded. Further testing using an approved Australian Standard technique may be required.

3.3 LABORATORY TECHNIQUES FOR IDENTIFYING DISPERSIVE SOILS

Although a number of tests have been used to identify dispersive soils, no single test has been developed that can reliably identify all dispersive soils under all conditions (Bell and Maud 1994, Bell and Walker 2000). For civil engineering works or infrastructure development, it's suggested that a range of chemical and physical tests be employed rather than relying on interpretation of a single analysis (McDonald *et al.* 1981, Bell and Maud 1994, Bell and Walker 2000). McDonald *et al.* (1981) note that "there is urgent need for an agreed standard test or tests to identify dispersive soil. In the meanwhile, engineers should use a large number of inexpensive tests for screening, and confirm these as needed by more elaborate tests, adopting the most conservative evaluation." A review of analytical procedures for identifying dispersive behaviour in soils is presented by Bell and Maud (1994) and Bell and Walker (2000). It should also be noted that identification of soil dispersion does not necessarily imply that tunnel erosion will occur, as other factors such as water chemistry, site hydrology and soil porosity also influence the development of tunnel erosion.

CHEMICAL TESTS.

Chemical analyses such as ESP and SAR attempt to relate the relative abundance of exchangeable cations to aggregate stability and dispersion. Relationships between soil dispersion and chemical properties such as Exchangeable Sodium Percent (ESP), Cation Exchange Capacity (CEC), Sodium Absorption Ratio (SAR), and Electrical Conductivity (EC) have been developed for a limited range of soils (Elgers, 1985, Sherard *et al.* 1976, Gerber and Harmse 1987, Rengasamy *et al.* 1984). Use of chemical techniques for the prediction of soil dispersion have not been established for most Tasmanian soils. It should be noted that threshold levels for dispersion are arbitrarily defined (Sumner 1993) and that dispersion can occur in soils with ESP below 6 or SAR below 3 (further details and discussion of test procedures are provided in Appendix 1).

PHYSICAL TESTS

The physical tests of soil dispersion such as the pinhole test and the Emerson crumb test rely on observation and ranking of soil dispersion in distilled water and / or dispersant. The performance of a range of analytical procedures for the prediction of soil dispersion has been conducted by a number of authors including; Bell and Maud (1994), Bell and Walker (2000), Sherard *et al.* (1976), Moore *et al.* (1985) and Elges (1985). Review of these studies generally indicate that the Emerson crumb test (Emerson 2002) and the pinhole test to be the most reliable tests for predicting dispersive behaviour of soils, while the pinhole test (AS 1289.3.8.3 – 1997) was rated the most reliable single test for identification of soil dispersion associated with earth works such as dams or embankments, (further details and discussion of test procedures is provided in Appendix I).

4.0 APPROACHES FOR MINIMISING EROSION RISK IN DISPERSIVE SOILS

MINIMISE RISK OF TUNNEL EROSION BY;

- Identifying and avoiding disturbance to areas with dispersive subsoils.
- Minimising excavation of dispersive soils.
- Not allowing water to pond on the soil surface, or exposed subsoils.
- Keeping sodic sub-soils buried under topsoil.
- Maintaining vegetation cover.

UNDERSTAND THAT;

- The presence and severity of dispersive soils may vary enormously over short distances.
- Past efforts to control field tunnel erosion have often failed.

STRATEGIES FOR REDUCING THE RISK OF TUNNEL DEVELOPMENT IN PERI-URBAN AREAS INCLUDE;

- Soil testing and avoidance.
- Precise compaction.
- Chemical amelioration.
- Sand filters and sand blocks.
- Topsoiling and revegetation.

4.1 MANAGEMENT OPTIONS FOR TUNNEL EROSION

Past efforts to repair tunnel erosion in agricultural landscapes have relied on mechanical destruction of the tunnel system by deep ripping, contour furrowing, and contour ripping. Unfortunately many of these techniques either failed or resulted in tunnel re-emergence in an adjacent areas (Floyd 1974, Boucher 1995). The use of these 'agricultural' techniques is inappropriate in peri-urban areas where tunnel repair requires a low incidence of re-failure due to the potential for damage to infrastructure. Experience with the construction of earth dams using dispersive clays, demonstrates that repair and prevention of tunnel erosion in urban and peri-urban environments is best achieved using a combination of,

- Identification and avoidance of dispersive soils.
- Precise re-compaction.
- Chemical amelioration.
- Sand blocks and barriers.
- Topsoil, burial and revegetation.

4.2 IDENTIFICATION AND AVOIDANCE OF DISPERSIVE SOILS

The risk of tunnel erosion resulting from construction activities on dispersive soils can often be reduced or eliminated by identifying and avoiding areas containing dispersive soils. The presence and severity of dispersive soils can vary enormously over short distances (Figure 13). In many instances, large scale (ie 10 x 10 or 20 x 20 meter grid) soil survey and screening of soils for dispersion, (using the Emerson crumb test - section 3, Appendix 1) can be used to site dwellings and infrastructure away from dispersive soils. Advice should be sought from a suitably qualified and experienced engineer or soil professional.

4.3 COMPACTION

Ritchie (1965) demonstrated that the degree of compaction within the dam wall was the single most important factor in reducing dam failure from piping (tunnel erosion). A high degree of compaction reduces soil permeability, restricting the movement of water and dispersed clay through the soil matrix, which decreases the severity of dispersion and restricts tunnel development (Vacher *et al.* 2004). However, dispersive soils can be difficult to compact as they lose strength rapidly at or above optimum moisture content, and thus may require greater compactive force than other soils (McDonald *et al.* 1981). Bell & Bryun (1997) and Bell and Maud (1994) suggest that dispersive clays must be compacted at a moisture content 1.5 -2% above the optimum moisture content in order to achieve suficent density to prevent piping (Elges 1985).

Construction of structures such as earth dams and footings for buildings with dispersive soils require geotechnical assessment and advice from a qualified and experienced engineer, in order to determine compaction measures such as the optimal moisture content, number of passes, and maximum thickness of compacted layers.

Normal earth moving machinery including bull-dozers, excavators and graders do not provide sufficient compactive force to reduce void spaces or achieve adequate compaction in dispersive soils. A sheepsfoot roller of appropriate weight is usually required to compact dispersive soils. By comparison a D6 dozer applies only 0.6 kg/cm^2 pressure compared to 9.3 kg/cm^2 for a sheepsfoot roller (Sorensen 1995).



Figure 13. The severity (or sodium content) and depth of dispersive subsoils can vary considerably over short distances. (a). At this site highly dispersive subsoils exist meters away from (b) non-dispersive soils.

4.4 CHEMICAL AMELIORATION

Initiation of tunnel erosion is predominantly a chemical process, so it makes sense to use chemical amelioration strategies when attempting to prevent or repair tunnel erosion in dispersive soils. Despite the widespread use of gypsum and lime to treat sodic soils in agriculture, the use of gypsum and lime to treat tunnel affected areas has been relatively rare (Boucher 1990).

Hydrated lime (calcium hydroxide) has been widely used to prevent piping in earth dams. Rates of application have varied depending on soils and degree of compaction used in construction. Laboratory testing usually indicates that only around 0.5 –1.0% hydrated lime is required to prevent dispersion, however difficulties with application and mixing necessitate higher rates of application (Moore *et al.* 1985). Moore *et al.* (1985) cite examples of the use of hydrated lime to control piping in earth dams at rates between 0.35% (N.S.W. Australia) and 4% (New Mexico). Elgers (1985), and McElroy (1987) recommend no less than 2% hydrated lime (by weight of the total soil material) to prevent dispersion within dam embankments, while Bell and Maud (1994) suggest that 3% - 4% by mass of hydrated lime should be added to a depth of 0.3m on the upper face of embankments. In alkaline (pH >7.0) soils (most sodic subsoils in Tasmania are neutral or alkaline) the effectiveness of hydrated lime is reduced by the formation of insoluble calcium carbonate (Moore *et al.* 1985), such that gypsum is preferred to hydrated lime. It is important to note that agricultural lime (calcium carbonate) is not a suitable substitute for hydrated lime due to its low solubility (McElroy 1987). Also note that excessive applications of lime may raise soil pH above levels required to sustain vigorous plant growth.

Gypsum (calcium sulphate) is more effective than lime for the treatment of dispersive soils as it increases the electrolyte concentration in the soil solution as well as displacing sodium with calcium within the clay structure (Raine and Loch 2003). Gypsum is less commonly used than hydrated lime in dam construction and other works due to its lower solubility, and higher cost. Elges (1985) recommends that in construction, a minimum of 2% by mass of gypsum be used. Bell and Maud (1994) present a means of calculating the amount of gypsum required to displace excess sodium and bring ESP values within desired limits (normally < 5). Be aware that application of excessive amounts of gypsum may cause soil salinity to temporarily rise beyond the desired level for plant growth.

NOTE:

- Use of gypsum in Tasmania is covered under the Fertiliser Act 1993, which has established the allowable limit for cadmium and lead at 10 mg/kg and 5 mg/kg for mercury.
- Gypsum is usually imported into Tasmania from Victoria or South Australia, which have different standards for allowable heavy metal content.
- Purchasers of gypsum should check with suppliers to ensure that gypsum imported into Tasmania is compliant with current regulations.

Alum (aluminium sulphate) has been effectively used to prevent dam failure and protect embankments from erosion. Application rates are not well established. Limited data suggests mixtures of 0.6 –1.0% (25% solution of aluminium sulphate) (Bell and Bruyn 1997, McElroy 1987) to 1.5% (Ouhadi, and Goodarzi 2006) of the total dry weight of soil may be appropriate. Alum is however highly acidic (pH 4-5), and thus alum treated soils will need to be capped with topsoil in order to establish vegetation (Ryker 1987). Soil testing is required to establish appropriate application rates for Tasmanian soils.

Long chain polyacrylamides have been shown to increase aggregate stability, reduce dispersion and maintain infiltration rates in dispersive soils (Levy *et al.* 1992, Raine and Loch 2003). However the effect is highly variable between various polyacrylamide products and the chemical and physical properties of the soil. The benefit of polyacrylamides is generally short due to their rapid degradation (Raine and Loch 2003). Further advice and laboratory testing should be conducted before using polyacrylamides to protect earth dams from piping failure.

Note that appropriate application rates for gypsum, hydrated lime, alum and polyacrylamides have not been established for dispersive soils in Tasmania. Extensive laboratory assessment of materials used for the construction of dams or embankments is required before locally relevant 'rules of thumb' can be established for the use of these products.

4.5 SAND BLOCKS AND SAND BARRIERS

Sand filters were first developed to prevent piping in earth dams. Sand filters prevent dam failure by trapping entrained sand and silt, blocking the exit of the tunnel and preventing further tunnel development (Sherard *et al.* 1977). Following the work of Sherard *et al.* (1977), Richley (1992 and 2000) developed the use of sand blocks to prevent tunnel erosion during installation of an optical fibre cable in highly dispersive soils near Campania, Tasmania. The sand blocks work slightly differently to the sand filters in that they allow the free water to rise to the surface through the sand. The use of sand blocks has recently been modified by Hardie *et al.*, (2007) to prevent re-initiation of tunnel erosion along an optical fibre cable near Dunalley. Modifications to the original technique developed by Richley (1992 and 2000) include (Figure 14 &15);

- Upslope curved extremities to prevent the structure from being by-passed.
- Geotextile on the downslope wall to prevent collapse or removal of sand following settlement or erosion.
- Application of gypsum (around 5% by weight) to ensure infiltrating water contains sufficiently electrolyte to prevent further dispersion.
- Earth mound upslope of the structure to prevent run-on entering the sand blocks.



Figure 15. (a) Installation of sandblock perpendicular to a service trench. Note securing of geotextile to the optical fibre cable to prevent water flowing past the sand block. (b) Sandblock before final topsoiling.

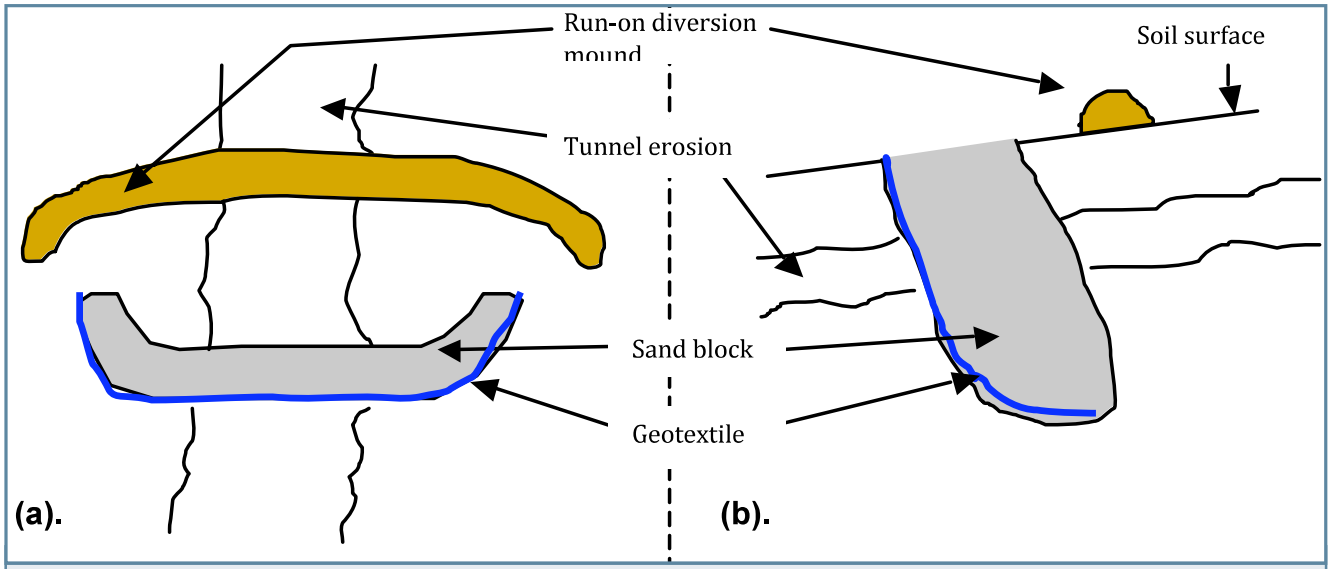


Figure 14. Modified sand block design. (a) plan view, (b) cross section view. The depth of the sand block is determined by the depth of dispersive soils or tunnel erosion. The span length of the structure is determined by the width of the tunnelling.

4.6 USE OF TOPSOIL / BURIAL AND REVEGETATION

Topsoil or burial of exposed dispersive soils reduces the likelihood of subsoil dispersion and initiation of tunnel erosion by;

- Providing a source of salt to increase the electrolyte content of infiltration water.
- Preventing desiccation and subsoil cracking.
- Promoting even infiltration.
- Providing a protective cover from raindrop impact.
- Providing a suitable medium for revegetation.

Topsoil minimises the interaction between water and dispersive clays by providing both a physical and chemical barrier. Topsoil also reduces soil desiccation and development of surface cracks (Sorensen 1995). It is suggested that exposed dispersive subsoils be covered with at least 150mm of non dispersive topsoil and sown with an appropriate mix of grass species. In some cases it will be necessary to protect the topsoil from erosion with 'jute' cloth or similar product.

The suitability of planting trees in tunnel affected areas is influenced by the amount of annual rainfall and frequency of soil cracking resulting from desiccation. Boucher (1995) recommends the preferred option for revegetation of reclaimed tunnel erosion is a widely spaced tree cover in association with a combination of perennial and annual pastures, rather than a dense stand of trees or pasture alone. Experience in Tasmania suggests that in low rainfall areas, or areas in which existing trees or shrubs cause soil drying and cracking, the preferred option for revegetating tunnel affected land is a dense healthy pasture. In high rainfall areas, dense plantings of trees have been successfully used to repair or stabilise tunnel erosion for example Colclough (1973) successfully used Pinus radiata to stabilise tunnel-gully affected land in a moderate rainfall area near Tea Tree, Tasmania.

5.0 ACTIVITIES THAT INCREASE THE RISK OF EROSION ON DISPERSIVE SOILS

ACTIVITIES THAT INCREASE RISK OF INITIATING TUNNEL EROSION, INCLUDE;

- Removal of topsoil.
- Soil excavation or expose of subsoils to rainfall.
- Supply of services via trenches.
- Construction of roads and culverts in dispersive subsoils.
- Installation of sewage and grey water disposal systems in dispersive subsoils.
- Dam construction from dispersive soils.

OPTIONS FOR REDUCING THE RISK OF TUNNEL EROSION DURING CONSTRUCTION AND DEVELOPMENT WORKS ON DISPERSIVE SOILS INCLUDE,

- Where possible do not remove or disturb topsoil or vegetation.
- Ensure that dispersive subsoils are covered with an adequate layer of topsoil.
- Avoid construction techniques that result in exposure of dispersive subsoils.
- Use alternatives to 'cut and fill' construction such as pier and post foundations.
- Where possible avoid the use of trenches for the supply of services ie water & power.
- If trenches must be used, ensure that repacked spoil is properly compacted, treated with gypsum and topsoiled.
- Consider alternative trenching techniques that do not expose dispersive subsoils.
- Ensure runoff from hard areas is not discharged into areas with dispersive soils.
- If necessary create safe areas for discharge of runoff.
- If possible do not excavate culverts and drains in dispersive soils.
- Consider carting non-sodic soil to create appropriate road surfaces and drains without the need for excavation.
- Ensure that culverts and drains excavated into dispersive subsoils are capped with non-dispersive clays mixed with gypsum, topsoiled and vegetated.
- Avoid use of septic trench waste disposal systems; consult your local council about the use of alternative above ground treatment systems.
- Where possible do not construct dams with dispersive soils, or in areas containing dispersive soils.
- If dams are to be constructed from dispersive clays, ensure you consult an experienced, qualified civil engineer to conduct soil tests before commencing construction.
- Construction of dams from dispersive soils is usually possible, using one or a combination of: precise compaction, chemical amelioration, capping with non-dispersive clays, sand filters and adequate topsoiling.

With all forms of construction on dispersive soils, ensure you obtain advice and support from a suitably experienced and qualified engineer or soil professional before commencing work.

5.1 ACTIVITIES THAT PROMOTE TUNNEL EROSION

In almost all cases tunnel erosion results from some form of disturbance resulting in rainwater or water with very low salt content coming into contact with dispersible subsoil. Changes to hydrology, such as concentration of flow in culverts, runoff from hardened areas and ponding of rainfall all increase risks of tunnel erosion. Typical activities that increase the risk of exposing dispersive subsoils to rainfall include;

- Removal of topsoil.
- Soil excavations.
- Trenches and supply of services.
- Roads and culverts.
- Sewage and grey water disposal.
- Dam construction.

5.2 REMOVAL OF TOPSOIL.

Topsoil provides both a physical and chemical barrier to infiltrating water (see section 4.6). Removal or stockpiling of topsoil for even relatively short periods can result in the initiation of tunnel erosion (Figure 16). If dispersive subsoils are exposed during construction, ensure they are covered with topsoil or dusted with gypsum and that rainfall does not have the opportunity to collect and pond.



Figure 16. Initiation of tunnel erosion caused by scalping or removing topsoil. Note that even a very thin layer of topsoil was able to prevent widespread tunnel erosion

5.3 CUT AND FILL

The use of 'cut and fill' excavation techniques (road cuttings, housing pads etc.) should be avoided in areas containing dispersive soils. Excavation can lead to the development of 'outlet initiated' tunnel erosion resulting from the removal of overburden (Figures 17 and 28) (Crouch *et al.* 1986, Vacher *et al.* 2004). While this form of tunnel erosion is rarely as extensive or deep as other forms of tunnelling, outlet initiated tunnelling can be difficult to repair and results in the deposition of sand and 'spewey' clays around the back of dwellings or in culverts.



Figure 17. Extensive 'outlet initiated' tunnel and rill erosion caused by excavating a cut and fill pad for a large building in a dispersive soil. Triassic sandstone parent material.

Although less commonly observed than the outlet initiated tunnelling, development of tunnel erosion in footings constructed from dispersive soils can occur as a result of rainfall ponding on dispersive fill. Note that in Figure 18 tunnelling has developed on a flat area without the need for a slope to generate water movement.



Figure 18. (Same site as Figure 17) Tunnel erosion in footings intended for a large building. Erosion resulted from ponding of rainwater on highly dispersive fill. The fill contains a number of narrow slots (up to 1.2 meters deep) caused by surface water 'dissolving' through the footing.

Seek experienced and qualified geotechnical advice from a suitably qualified civil engineer or appropriate soil specialist if a structural fill or footing is to be constructed from or into dispersive soils.

In areas with dispersive soils, pier or post style construction (Figure 19) is a low risk option for the construction of footings. Footings will need be excavated beneath any sodic layers and / or pinned to the basement rock. Post holes should be completely filled and capped with concrete above the soil surface, rather than backfilled with spoil. Runoff and surface water must be safely directed away from the building, or prevented from flowing near the foundations.



Figure 19. Pier or post style construction has considerably lower risk of initiating tunnel erosion than cut and fill techniques.

5.4 TRENCHES AND SUPPLY OF SERVICES

Services such as electricity, telecommunications and water are usually supplied to dwellings via trenches from mains outside the property. In areas with dispersive subsoils, supply of services by trenches increases the risk of initiating tunnel erosion (Figure 21b) (Richley 1995 & 2000, Hardie *et al.* 2007). Unfortunately most service providers are unfamiliar with the issues associated with dispersive soils, and may need assistance to understand why alternative supply options may need to be considered. Electricity and telecommunications can be supplied by private power poles resulting in minimal soil disturbance, provided that the poles are installed using augurs rather than excavated trenches (Figure 21a) and that the hole is completely filled with concrete above the soil surface or repacked with a mixture of gypsum and soil, with a high level of compaction. Spoil should be removed from the site.

EMERGING TECHNIQUE: HYDROLOGICAL BARRIER

This technique for diverting surface and subsurface water away from footings has been proposed as an alternative, or an addition to pier or post foundations. The hydrological barrier technique involves construction of a sand and gypsum filled trench to the depth of the foundations around the upslope area of the dwelling (Figure 20). The sand – gypsum mixture acts to trap the dispersed silts pugging up the developing tunnel while allowing the water to come into contact with the gypsum and rise through the sand and away from the footings. An earth mound immediately above the sand filled trench acts to prevent surface runoff entering the trench. The hydrological barrier can be installed either during construction or fitted to existing dwellings after construction. While the hydrological barrier technique has only been trialled once in Tasmania (Ducket pers. comm.) the design principles result from successful use of sand blocks (Figures 14 & 15) for the prevention of tunnel erosion resulting from the installation of optical fibre cables in dispersive soils (Richley 1995 & 2000, Hardie *et al.*, 2007).

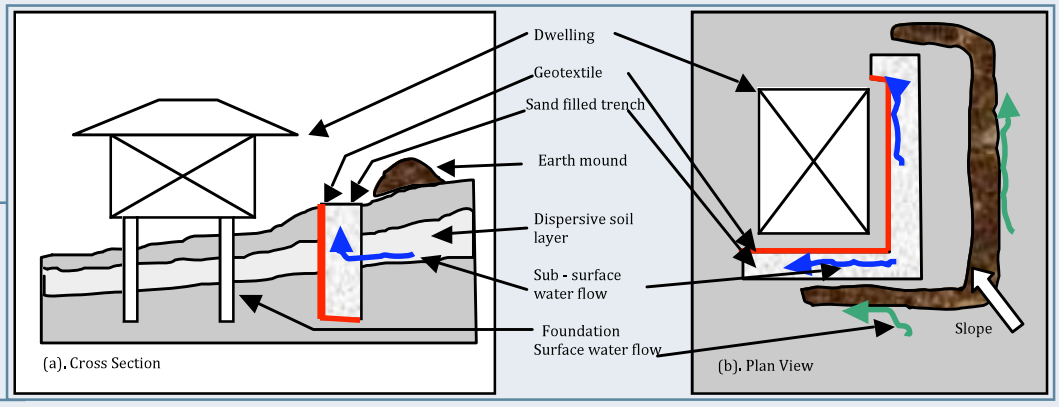


Figure 20. Hydrological barrier to isolate foundations from surface and groundwater (Duckett pers. comm.), (a) cross section view, (b) plan view.



Figure 21 (a) Tunnel erosion initiated by installation of an optical fibre cable into a dispersive soil. (b) Subsidence and early stages of tunnelling resulting from inappropriate installation of power pole in a backfilled trench.

Alternatives to the use of trenches for the supply of potable water and other services will need to be approved by your local council. Examples include laying cable or pipe in the thin topsoil then carting more topsoil to the site to ensure adequate burial depth (Figure 22c). Alternatively the cable may need to be laid in hard conduit on the soil surface and buried with non-dispersive soil (Figure 22a). Any earthworks on the site must ensure that rainwater is not able to collect and pond on the soil surface, such that additional soil may be required to ensue that any buried cable or pipe is level with the land surface (Figure 22b). The remaining mound can be landscaped into the surrounding garden provided that trees and large shrubs are not planted in such a way as to prevent future access to the pipe.

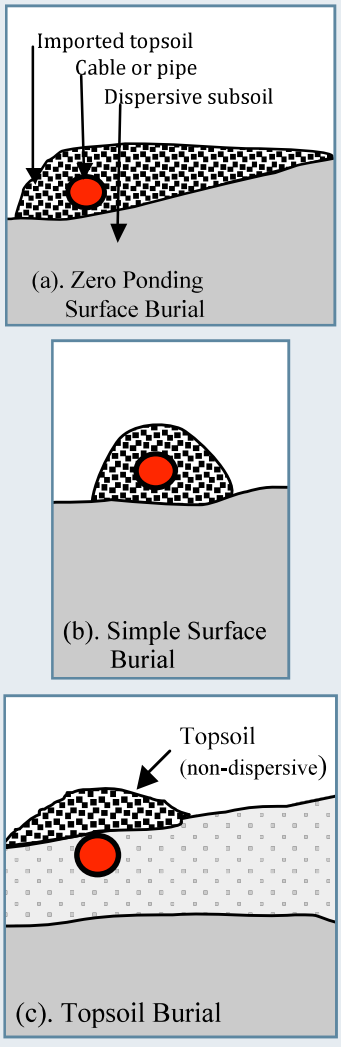


Figure 22. Cable and pipe installation techniques. (a) Good technique, surface burial of pipe or cable ensuring that ponding cannot collect on or behind the mound. (b) Average technique, simple surface burial, however ponding can occur behind the mound. (c) Good technique, where topsoil depth allows partial burial.

Trenches may be used to supply services such as water and electricity, however in dispersive soils, the increased porosity of repacked spoil within the trench can lead to tunnel erosion and damage to pipes and cables (Figures 6 & 21b). If a trench must be used, then use of chemical amelioration, sand blocks and precise compaction can lower the risk of tunnel formation. Richley (1992) used sand blocks to prevent development of tunnel erosion along an optical fibre cable installed in highly dispersive soil near Campania, and Hardie *et al.* (2007) used a combination of chemical amelioration, compaction and sand blocks to prevent re-initiation of tunnel erosion following repair of a 380m long tunnel erosion system near Dunalley.

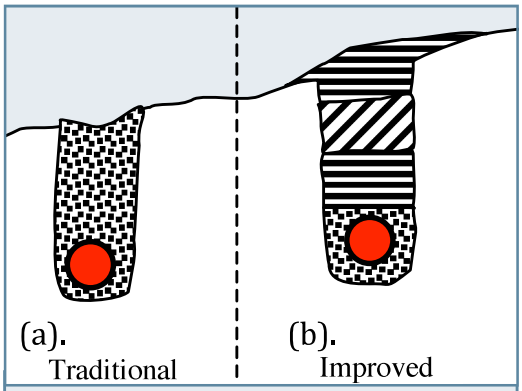


Figure 23. Improved trench design. (a). Traditional Trench. Note surface sinks allowing water to pond above trench. (b) Improved trench with individually compacted clay layers. The surface is finished above the ground surface to prevent ponding on top of the trench.

5.5 STORM WATER AND RUNOFF

Storm water and runoff from hard surfaces such as driveways and courtyards, need to be managed to prevent initiation of tunnel erosion (Trangmar 2003, Vacher *et al.* 2004). Stormwater and runoff should not be allowed to collect or pond on dispersive soils. Runoff should be directed away from susceptible areas (exposed dispersive soils) through the use of pipes or diversion mounds created from imported non-dispersive clays rather than trenches or culverts which risk excavation and exposure of dispersive subsoils (Figure 24). Captured runoff should be dissipated and spread over as wide an area as possible, not concentrated in drainage lines. Where possible dispose of captured water in 'safe' areas such as;

- Garden beds mixed with gypsum.
- Existing well vegetated areas with ample topsoil.
- Stony elevated areas (Trangmar 2003).

If no other options exist, then a garden bed with ample topsoil and gypsum (around 2 -5 % of total soil volume) may need to be created away from dwellings or infrastructure. Wherever possible use rainwater tanks to capture runoff from roofs and buildings, but note that overflows will also need to be piped to 'safe' areas.



Figure 24. Tunnel erosion resulting from construction of a stormwater culvert in dispersive clay derived from Triassic sandstone, Brighton.

5.6 ROADS AND CULVERTS

Construction of roads or driveways on dispersive soils is difficult due to their low bearing capacity when wet (Figure 25). Concentrating water in roadside culverts and drains which have been excavated into dispersive soils often leads to erosion and collapse of the road batter adjacent embankments (Figures 26-28). Soil surveys may assist landholders / councils to locate roads in areas containing non-dispersive soils, however in most cases managing runoff without excavating culverts is the best means of reducing the erosion risk.



Figure 25. Road surface breaking up due to construction on dispersive clays. This section of road is repaired 2-3 times a year.



Figure 26. Undercutting and collapse of roadside batter due to construction of a table drain in dispersive clay. Note the failure of the blue rock rap to prevent further erosion.



Figure 27. Table drain constructed in dispersive subsoil. The concentration of runoff in the culvert is greatly adding to the erosion problem, resulting in slumping and undercutting of the road and the adjacent batter slope. This photo was taken 18 months after the driveway was constructed.



Figure 28. Rill and tunnel erosion caused by excavation of sodic soils for road construction. Dunalley.

Table drains should not be constructed in dispersive soils (Figure 26 & 27). If topsoil depth is insufficient to allow table drains to be constructed without exposing dispersive soils, then alternative forms of road construction and drainage need to be considered. Road design needs to ensure runoff is spread out and dissipated over wide, well vegetated areas. On steep slopes, minor roads are best constructed straight up and down the slope with speed hump like barriers across the road surface to shed water to the sides (Figure 29 - Duckett *pers. comm.*). Consideration should be given to spreading topsoil, applying gypsum and re-vegetating either side of the roadway to ensure runoff doesn't initiate further tunnelling.

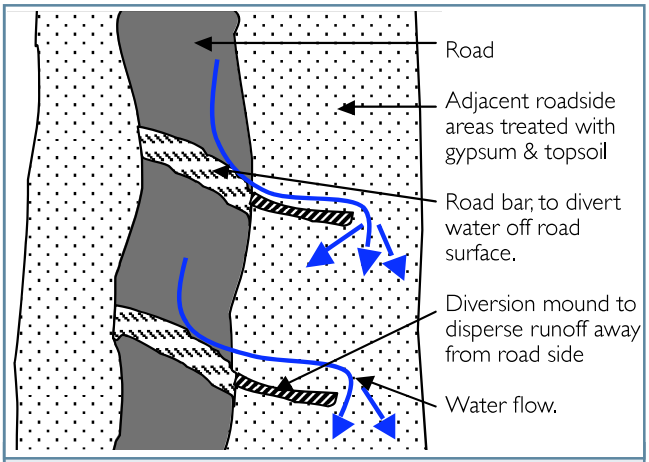


Figure 29. Alternative road design using road bars and diversion mounds to shed water into stable areas.

Where it is necessary to excavate drains and culverts in dispersive soils, it is suggested that the exposed subsoil is treated with gypsum or hydrated lime then capped with a thick layer (i.e. 200-300mm) of non-dispersive clay (test for dispersion using procedure in section 3) preferably also mixed with either gypsum or hydrated lime. The clay capping should be covered with topsoil and revegetated if appropriate. Alternatives to the use of clay capping include the use of bitumen spraying and hydro-mulching, however few details of these techniques are available.

5.7 SEWAGE AND GREY WATER

Experience from the Brighton municipality has demonstrated that septic tank systems do not perform adequately in dispersive soils. Installation of septic systems in dispersive soils have resulted in the initiation of tunnel erosion resulting in health risks associated with uncontrolled discharge of effluent (Parkinson pers. comm.).

Brighton council have tested five different domestic wastewater treatment and disposal systems for use in dispersive or shallow soils (Parkinson & Palmer unpublished). Three systems were found to be viable: Recirculating Sand Filter (RSF), Pulse Dosed Aerobic Sand Filter (PDASF) and Effluent Landscape Mound (ELM), table 1).

Of the three systems, the Pulse Dosed Aerobic Sand Filter (PDASF) produced the highest level of treatment however at the time of the study the Effluent Landscape Mound (ELM) was the only system to be accredited by Australian Standards (AS1547, 2000). Other systems with similar or better performance have been developed since the original study. Check with your local council or a suitably qualified and experienced consultant to determine which operating systems meet current standards and would be best suited to your soils and level of occupancy.



Figure 30. Ozzi Kleen single tank (Aerated Wastewater Treatment System) for treatment and disposal of sewage and grey water. Raised – mulched area in foreground is being used for effluent disposal from the house in background.

Table 1: Alternative sewage and grey water treatment systems for dispersive or shallow soils. *(Parkinson & Palmer unpublished).*

	Sand Bed Size (meters)	Tank Requirement	Suitability for Above Ground Spray	Final Quality (cfu / 100mL)	Australian Standard
Recirculating Sand Filter	2 x 6 x1	2.4 meter diameter, and filter & effluent pump wells.	Yes	0-10	No
Pulse Dosed Aerobic Sand Filter	10 x 4 x1 and rock filter 12 x 1.5 m x 0.4	2 x 3000L and filter & effluent pump wells	Yes	0-10	No
Effluent Landscape Mound	18 x 6.5 x 1	4500L, Dosing And effluent pump wells.	Required additional disinfection or subsoil application.	<50	Yes AS 1547, 2000

Alternatively composting toilets provide a no-water, zero tunnelling risk option for the treatment of sewage in areas with dispersive soils (Figure 31). Composting toilets offer a practical low risk and environmentally sustainable alternative to standard flushing toilets.



Figure 31. Example of a composting toilet system. (Source www.nature-loo.com.au)

5.8 DAM CONSTRUCTION

Dispersive soils are inherently unsuited to dam construction. A survey by Foster *et al.* (2000) found that 48% of dam failures resulted from piping (internal tunnelling) and that 42% of these failures occurred on first filling. Dams constructed from dispersive clays are always 'muddy' and are rarely suitable for swimming. Small farm and amenity dams are particularly prone to tunnel failure as they are frequently built without regulation, soil testing, or engineering advice. Serious consideration should be given to whether constructing a dam is necessary, and the potential consequences of dam failure before building a dam in an area containing dispersive soils.

Tunnel erosion or piping in dam walls results from fresh water dispersing sodic clays within the embankment. The dispersed clays flow into void spaces created by insufficient compaction during construction. Movement of dispersed clays creates increasingly larger cavities until a continuous tunnel or pipe is formed between the inner and outer wall, at which point dam failure occurs (Figures 33-35). The likelihood of failure of dams built with dispersive soils depends on a number of factors (Vacher *et al.* 2004) including,

- The rate of first filling.
- The degree of compaction during construction.
- The dispersibility of materials used to construct the dam.
- The electrolyte content of the soil solution.
- The electrolyte concentration of the stored water.



Figure 32. The dam in the foreground has been constructed from dispersive clays. Note the rill erosion and cloudy brown colour of water in foreground, compared to the blue colour of the dam constructed from non-dispersive soils in the background.



Figure 33. Typical small dam failure. Note piping through the side wall of the dam. This dam was constructed using dispersive clays derived from Triassic sandstone.



Figure 34. Piping failure of a dam constructed from soils derived from Permian mudstone, Penna area. This dam is known to have failed on first filling. The image was taken from the dam floor, looking at the inside of the dam wall.



Figure 35. Failure of Blackman Creek dam (source: Davies Brothers). In 2005 the Blackman creek dam failed, resulting in the evacuation of Tunbridge. Doyle and Cumming (unpublished 2005) indicate the cause of the failure to be variability in the compaction of a slightly to a moderately dispersive soil layer, combined with rapid filling of the dam with low electrolyte water.

The risk of tunnel or piping failure in small earth dams can be minimised by a combination of control measures including;

- **i)** Adequate compaction
- **ii)** Chemical ameliorants e.g. gypsum, hydrated lime etc.
- **iii)** Sand filters.
- **iv)** Construction with non-dispersive clay.
- **v)** Topsoiling.

Construction of earth dams with dispersive soils is usually possible if adequate compaction can be achieved (Bell and Maud 1994). Ritchie (1965) demonstrated that the degree of compaction within the dam wall is the single most important factor in reducing dam failure. The importance of other factors such as batter angle, rate of filling or moisture content during construction were all secondary to that of compaction. Dispersive soils can be difficult to compact as they lose strength rapidly at or above optimum moisture content, and thus may require greater compactive force if moisture contents are just dry of optimum (McDonald *et al.* 1981). A sheeps foot roller is required to adequately compact dispersive soils as normal earth moving machinery cannot provide enough compactive force. (Refer section 4.3).

Chemical ameliorants such as hydrated lime (calcium hydroxide), gypsum (calcium sulphate), alum (aluminium sulphate) and long chain polyacrylamides have been used to prevent dispersion and piping in earth dams. Hydrated lime is the most commonly applied product with the rate varying between 0.5 to 4.0 % by weight, depending on soil chemistry and level of dispersion (Moore *et al.* 1985, McElroy 1987, Elgers 1985, Bell and Maud (1994). Gypsum may also be used but its lower solubility and higher cost may limit its use. Gypsum is more effective than lime due to its higher electrolyte content which prevents dispersion as well as improves clay structure. Gypsum may also be added to the dam water to artificially increase the electrolyte (salt) concentration of the dam water, to minimise the risk of failure upon first filling (McDonald *et al.* 1981). (Refer section 4.4).

CASE STUDY: BEN BOYD DAM, NSW.

The Ben Boyd dam in New South Wales was protected from tunnel erosion or piping failure through a combination of chemical amelioration, precise compaction and increasing the electrolyte content of the inflowing waters.

The earth dam was successfully constructed with dispersive clays with ESP values as high as 20.7, (average 7.5) in an area known to contain very low electrolyte stream flow. Gypsum was applied to the dam structure at a rate of 1% by weight or 27 tonnes per hectare over the storage area. The gypsum was cultivated into the inner wall of the dam to a depth of 150cm and then compacted with a vibrating sheepsfoot roller. The infilling water was dosed with gypsum and alum to raise the electrolyte concentration from around 70 mg/l to 300-600 mg/l (McDonald *et al.* 1981).

Sand filters can effectively seal and safely control leaks in dispersive clays. While sand filters are unable to 'trap' dispersed clays, the sands and silts are effectively 'trapped' sealing the exit of the tunnel and preventing further tunnel development (Sherard *et al.* 1977). (Refer section 4.5).

Dams constructed with low to moderately dispersive clays can often be protected from piping by capping the upper dam wall with a thick layer of compacted non dispersive clay, usually mixed with either hydrated lime or gypsum. Topsoiling and re-establishment of vegetation minimises the interaction between water and dispersive clays by providing both physical and chemical barrier to infiltrating water. Topsoil also reduces soil desiccation and development of surface cracks. (Refer section 4.6).

6.0 REPAIR AND REHABILITATION OF TUNNEL EROSION

While the techniques outlined in this document represent the best available knowledge at the time of writing, it should be recognised that repair and rehabilitation works are prone to re-failure and that the techniques outlined below (and in the wider literature) have not been validated by replicated field trials or adequate long term monitoring. Differences between field sites, erosion processes and long term landuse of the reclaimed area may affect the success of repair works.

- Repair of tunnel erosion is expensive, difficult and prone to re-failure.
- Existing literature is focused on repair of field tunnel erosion in agricultural landscapes rather than urban or peri-urban areas.
- A combination of chemical, physical and vegetative measures are required to repair tunnel erosion.
- Repair of tunnel erosion in peri-urban areas should consider use of controlled compaction, chemical amelioration, sandblocks, and topsoiling.
- Revegetate repaired areas with fast growing locally appropriate pasture species and trees in higher rainfall areas.
- Seek professional assistance.

Repairing tunnel erosion is expensive, difficult and prone to re-failure. Every effort must be made to prevent the formation of tunnel erosion before intervention is required. Literature on the repair and rehabilitation of tunnel erosion is scarce and focused on agricultural landscapes rather than protection of infrastructure in urban environments. The history of tunnel erosion control and repair has been reviewed by Boucher (1990), and Ford *et al.* (1993). Boucher (1990) identified the need for a combination of mechanical, vegetative and chemical measures to control and repair tunnel erosion, however Boucher (1990) and Boucher (1995) also note that many past attempts to repair tunnel erosion have failed or been responsible for initiating further tunnelling.

In Tasmania, Colclough (1965, 1967, 1971, 1973 and 1978) pioneered early techniques for controlling tunnel erosion and Richley (1992 and 2000) demonstrated the use of sand blocks to prevent the development of tunnel erosion following installation of an optical fibre cable. Hardie *et al.*, (2007) detailed advances in repair and rehabilitation techniques resulting from experience gained with the rehabilitation of a 380 meter long tunnel erosion system in Dunalley, Tasmania.

It is strongly recommended that a suitably qualified soil professional, with first hand experience in dispersive soil management be consulted before embarking on any repair or rehabilitation works. The approach outlined below has been developed following, extensive review of literature, expert opinion from erosion consultants and first hand experience of repairing tunnel erosion.

GENERAL RECOMMENDATIONS FOR REPAIR OF TUNNEL EROSION IN PERI-URBAN AREAS.

1) Where possible cut off or divert surface water away from the tunnel system using diversion mounds rather than drains. Earthworks must be conducted without exposing dispersive subsoils. Experience has sown that identification of 'safe' areas is rare and usually dependant on there being a change in soil type or geology. If there is any doubt that a disposal area is 'safe' then works to divert flow from the head of the tunnel system should be abandoned.

2) Identify the true head of the tunnel system to determine the scale of intervention work required. This usually requires chasing tunnels with an excavator and use of coloured dye to trace water movement.

3) If tunnels are shallow and reappearance of tunnel erosion is not likely to impact on critical infrastructure, then deep ripping and cultivation techniques may be used to destroy the tunnel system (see Floyd 1974, Colclough 1965 & 1971).

4) If tunnels extend below the maximum depth of deep ripping, or if critical infrastructure is at risk from tunnel reappearance, then control and repair options will require a higher level of intervention to lower the risk of re-failure.

5) Tunnel systems will need to be dug out along their entire path using an excavator.

6) If soils have a low to moderate risk of dispersion (ESP 6 - 15), or if the consequences of tunnel reappearance is low, then the dispersive soils excavated from the trench can be treated with gypsum and repacked back into the excavated area.

7) If soils are highly dispersive (ESP> 15) or the risk of tunnel reappearance may cause damage to infrastructure, then non- dispersive clays will need to be carted to the site and repacked in the trench. Repacked soils should also be mixed with gypsum as an additional measure against future dispersion.

8) All material repacked into the trench needs to be compacted to at least 95% of proctor maximum. Compaction is best achieved using a sheepsfoot roller. Track rolling with an excavator or back hoe is not adequate. Alternative compaction techniques may be available.

9) The surface of the repacked material should be finished with a convex shape to ensure runoff is not able to pond on top of the reclaimed area. The upper surface of the repaired work should be treated with gypsum to act as an electrolyte source for water infiltrating into the repacked spoil.

10) Treated areas and exposed subsoils should be covered with topsoil and revegetated with fast growing, locally appropriate species such as cocksfoot, ryegrass, and clovers. Fertiliser may also need to be applied to ensure adequate establishment.

11) Bare areas above the tunnel head may need to be treated to minimise runoff through use of scarifying, topsoil, fertiliser and sowing locally appropriate pasture species.

12) Consideration should be given to applying gypsum over the whole area at a rate of approximately 1.0 - 2.5 t/ha every 3 to 5 years.

13) Fence off all reclaimed areas, and allow only minimal grazing over time.

14) Control rabbits and maintain vegetative ground cover.



Figure 36. Examples of tunnel erosion control (a) Poor technique. Rock rap is usually an inappropriate erosion control technique for dispersive soils. Normally rock barriers work well to trap sediment and reduce erosion. However in dispersive soils, hard surfaces such as rock are quickly bypassed i.e. upper corner of the rock structure (b) Excellent technique. Note the entire repaired area is fenced, and the whole length of the repaired tunnel is covered with topsoil and jute cloth. Sand barriers have been constructed every 20 meters down the slope.



Figure 37. Good technique. Topsoil mounding, reclaimed tunnel erosion, Brighton. Note the width of earthworks required to fix a 50cm wide tunnel, and the raised profile to shed surface water. Jute cloth would prevent surface erosion until vegetation has established.

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8.0 APPENDIX I: ANALYSIS AND CLASSIFICATION OF DISPERSIVE SOILS

(I). EXCHANGEABLE SODIUM PERCENT (ESP)

The Exchangeable Sodium Percent (ESP) is the most common analytical technique used to identify sodic or potentially dispersive soils. The ESP is determined from the ratio of exchangeable cations and is measured as method 15N1 (Rayment and Higginson 1992),

$$ESP = \frac{Na+}{Na^{+} + Mg^{2+} + K^{+} + Ca^{2+}} \times 100$$

In Australia, soils with an ESP greater than 6 are classed sodic (Isbell 2002) due to their likelihood to undergo dispersion in fresh water. Highly sodic soils are classed as having an ESP greater than 15. Most North American literature however classifies soils as being sodic when the ESP exceeds 15 (Rengasamy & Churchman 1999).

(II). SODIUM ABSORPTION RATIO (SAR)

Sodium absorption ratio (SAR) is commonly used as a measure of soil sodicity in North America. In Australia it is more commonly used as a measure of sodicity in water, however its use for soil on either a saturated paste or 1:5 basis is considered useful, especially in acid soils, in which the presence of exchangeable Al+3 effects measurement of CEC (Rengasamy & Churchman 1999). Rengasamy and Olsson (1991) found that SAR of a 1:5 extract is better at predicting soil dispersion than ESP. Dispersion thresholds based on SAR1:5 are not as well established as those for ESP however if SAR1:5 is greater than 3, soils are considered sodic (Rengasamy and Olsson 1991).

$$SAR = \frac{Na+}{((Mg^{2+} + Ca^{2+})/2)^{1/2}}$$

(III). EMERSON SOIL CRUMB TEST (AS 1289.3.8.1-1997)

The Emerson soil crumb test (AS 1289.3.8.1-1997) is an Australian Standard for the prediction of dispersive behaviour of clay soils. The Emerson test is quick and simple and can be used to assist in the rapid identification of dispersive soils. The test has three levels,

(i) Spontaneous dispersion of an air dried aggregate in deionised water,

(ii) Remoulding at near maximum field capacity and re-immersion in deionised water,

(iii) Remoulded soil is shaken in deionised water.

A number of modifications and variations to the Emerson test have sought to add subclasses to either Class 2 and Class 3 aggregates (Craze *et al.* 2003). The history and interpretation of the Emerson crumb test is discussed in Emerson (2002).

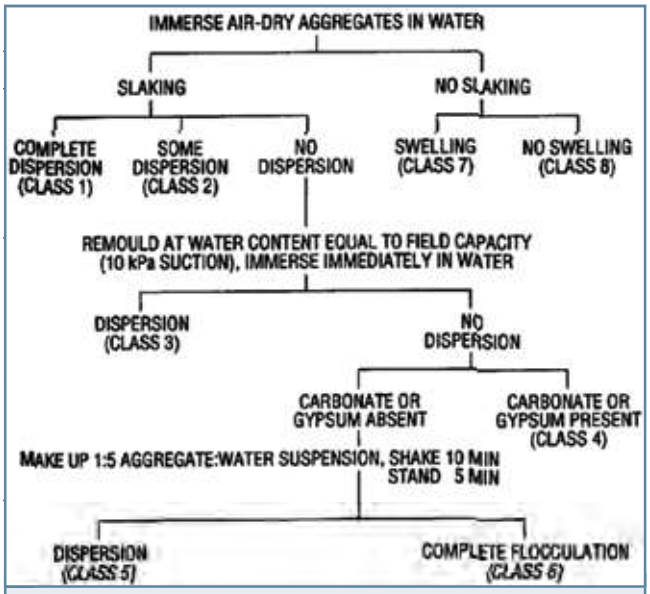


Figure 38. Emerson dispersion test procedure (AS 1289.3.8.1-1997) (Raine and Loch 2003). Soils with an Emerson ration of 1 or 2 are highly susceptible to tunnel erosion (Vacher et al. 2004).

pinhole is measured and the shape of the pinhole inspected for erosion.

(V). DISPERSION INDEX OR DOUBLE HYDROMETER TEST

The Dispersion Index has been widely used in Australia to identify soils at risk of tunnelling. Soil is shaken end over end in two separate operations, firstly in distilled water and secondly in dispersant to ensure complete dispersion. The difference between the amount of dispersion (measured as the % particles <2 microns) between the two tests is used to infer dispersion risk (Raine & Loch 2003). The dispersion index is very similar to the Double Hydrometer test (ASTM D 4211-83, 1986) routinely used in America for predicting dispersive behaviour of soils.



Figure 39. Pinhole test for compacted soils & fill. (Photo, Raine & Loch 2003).

(VI) MEASUREMENT OF CLAY DISPERSION (514.01) (RENGASAMY 2002).

The clay dispersion technique is based on the threshold electrolyte concept which takes into account the electro – osmotic pressures between clay platelets and at the soil solution. The percent of dispersed clay is determined by pipette extraction and weighing following 16 hours spontaneous dispersion and after 16 hours mechanical dispersion. The soil solution is also measured for SAR, EC and pH and the results reported as the percentage dispersed clay and the predicted dispersion class based on EC and SAR.

(VII) MEASUREMENT OF DISPERSIVE POTENTIAL (514.03) (RENGASAMY 2002).

The mechanical dispersive potential is calculated as the difference in osmotic pressure between the threshold electrolyte concentration required to flocculate clays and the ambient solution concentration. The electrolyte concentration required to flocculate the clays is determined by sequentially lowering the SAR of the solution until no clay dispersion occurs.

$$\text{Dispersive if } \frac{\%\ \text{Particles} < 2\ \mu\text{m in dispersant \& water}}{\%\ \text{Particles} < 2\ \mu\text{m in distilled water}} = \leq 3.0$$

9.0 APPENDIX II: AMENDMENT TO EXISTING CODES OF PRACTICE & GUIDELINES

9.1 SOIL AND WATER MANAGEMENT CODE OF PRACTICE FOR HOBART REGIONAL COUNCILS (1999B).

The Soil and Water Management Code of Practice for Hobart Regional Councils (Anon 1999b) and Guidelines for Soil and Water Management (Anon 1999c) were written without an awareness of the specific issues associated with dispersive soils. Amendments (in italics) are proposed to the Water Management Code of Practice for Hobart Regional Councils (Anon 1999b) and Guidelines for Soil and Water Management (Anon 1999c).

Soil and Water Management Code of Practice for Hobart Regional Councils (Anon 1999b).

1.0 BUILDING SITES AND SMALL SUBDIVISIONS.

1.1.1 Soil and water management plans (SWMPs) are required for all developments where 250 square meters or more of ground will be disturbed. Council may vary this requirement where there is:

(iii) High likelihood that dispersive soils will be exposed or disturbed, in which case it may require a SWMP even though less than 250 square meters of ground will be disturbed.

1.1.4 Where development consent is not required, earthworks should only be undertaken without an SWMP if:

(ii) The land on which this work is undertaken is not:

» Geotechnically unstable; if soils are dispersive; and

(iv) Work will not disturb or expose dispersive soils.

1.2.1 On all sites, identify;

» Location of areas with dispersive soils or subsoils.

1.3.8 Table drains and culverts should not be constructed in locations or ways which expose dispersive soils

1.5.6 Exposed or disturbed dispersive soils will immediately be capped with 150mm topsoil.

1.5.7 Alternatives to the use of trenches for the supply of services should be considered in areas containing dispersive soils.

1.6.2 Stormwater should not be conveyed in trenches which expose dispersive soils.

1.6.3 Stormwater should not be disposed in areas which contain dispersive soils.

2.0 SUB-DIVISION CONSTRUCTION ACTIVITIES.

2.1.1 Soil and water management plans (SWMPs) are required for all developments where 250 square meters or more of ground will be disturbed. Council may vary this requirement where there is:

(iii) High likelihood that dispersive soils will be exposed or disturbed, in which case it may require a SWMP even though less than 250 square meters of ground will be disturbed.

2.1.4 Where development consent is not required, earthworks should only be undertaken without an SWMP if:

(ii) The land on which this work is undertaken is not:

» Geotechnically unstable; if soils are dispersive; and

(iv) Work will not disturb or expose dispersive soils.

2.2.3 On the map/plan identify;

» Location of areas with dispersive soils or subsoils.

2.3.4 Table drains and culverts should not be constructed in locations or ways which expose dispersive soils

2.5.6 Exposed or disturbed dispersive soils will immediately be capped with 150mm topsoil.

2.6.4 Stormwater should not be conveyed in trenches which expose dispersive soils.

2.6.5 Stormwater should not be disposed in areas which contain dispersive soils.

2.8.5 Table drains and culverts should not be constructed in locations or ways which expose dispersive soils.

3.0 CIVIL INFRASTRUCTURE WORKS.

3.1.1 Soil and water management plans (SWMPs) are required for all developments where 250 square meters or more of ground will be disturbed. Council may vary this requirement where there is:

(iii) High likelihood that dispersive soils will be exposed or disturbed, in which case it may require a SWMP even though less than 250 square meters of ground will be disturbed.

3.1.6 Where development consent is not required, earthworks should only be undertaken without an SWMP if:

(iv) Work will not disturb or expose dispersive soils.

3.2.3 On the map/plan identify;

- Location of areas with dispersive soils or subsoils.

3.3.4 Table drains and culverts should not be constructed in locations or ways which expose dispersive soils

3.5.11 Exposed or disturbed dispersive soils will immediately be capped with 150mm topsoil.

3.5.12 Alternatives to the use of trenches for the supply of services should be considered in areas containing dispersive soils.

3.6.4 Stormwater should not be conveyed in trenches which expose dispersive soils.

3.6.5 Stormwater should not be disposed in areas which contain dispersive soils.

3.8.4 Table drains and culverts should not be constructed in locations or ways which expose dispersive soils.

9.2 GUIDELINES FOR SOIL AND WATER MANAGEMENT (ANON 1999C)

The following section on dispersive soils should be appended to the guidelines.

What are Dispersive Soils.

- Dispersive soils disperse or appear to 'dissolve' in water, forming a cloudy ring or halo of detached soil particles.
- Dispersive soils are usually sodic, containing greater than 6% sodium within the clay structure.
- Dispersive soils are usually derived from sedimentary rocks.
- Dispersive soils occur in all municipalities in southern Tasmania.

Issues with Dispersive Soils

- Result in tunnel erosion.
- Result in damage to infrastructure including foundations, roads and septic systems.
- Often responsible for dam collapse.
- Impact on environment including considerable turbidity in waterways.
- Usually considerable damage has occurred before tunnel erosion is detected.
- Potential liability risk.

Management of Dispersive Soils

Should Do

- Apply gypsum to potentially dispersive soils.
- Cover exposed dispersive soils with topsoil.
- Vegetate all bare areas with vigorous pasture.
- Seek profession geotechnical advice before commencing construction works including dam construction, roads and building foundations.

Should Not Do.

- Expose dispersive subsoils to rain.
- Allow water to pond on dispersive soils.
- Concentrate stormwater in drainage lines containing dispersive soils.
- Use table drains, trenches or cut and fill construction techniques in areas containing dispersive soils.
- Scalp or extract topsoil from areas with dispersive subsoils.

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DISPERSIVE SOILS *and their* MANAGEMENT







Guidelines for Landholders, Planners and Engineers

1.0 WHY MANAGEMENT OF DISPERSIVE SOILS IS IMPORTANT

In recent years, urban expansion has occurred in areas with dispersive soils. Disturbance of dispersive soils has resulted in tunnel erosion, damage to infrastructure, and environmental harm. Greater awareness of the difficulties posed by development on dispersive soils is required to prevent future damage. Tunnel erosion results in the formation of underground cavities that can collapse causing gully erosion and damage to infrastructure such as optical fibre cables, septic systems, roads, culverts and dwellings. Unlike other forms of erosion, tunnel erosion involves both chemical and physical processes associated with the dispersion of sodic clays. Given the difficulty of repairing tunnel erosion, management effort is focused on prevention of tunnel formation through increased understanding and awareness of the issues associated with construction and development on dispersive soils.



Figure 1. Tunnel and gully erosion resulting from construction of a stormwater culvert in dispersive clay.

2.0 WHERE DO DISPERSIVE SOILS OCCUR?

Dispersive soils and tunnel erosion occur in all municipalities in southern Tasmania, as well as parts of the Northern Midlands, Tamar Valley and Break O'Day municipalities. Dispersive soils are generally associated with soils derived from Triassic sandstone, or Permian mudstone. The location and extent of dispersive soils has not been specifically mapped in Tasmania, although broad scale land systems mapping indicates that approximately 103,000 ha of private freehold land in Tasmania contains a tunnel erosion hazard.

Tunnel erosion mostly occurs on;

- Dispersive, or sodic soils.
- Soils derived from Triassic sandstone and Permian mudstone.
- Deep sedimentary soils.
- North and northeast facing slopes.
- Drainage lines.
- Areas in which vegetation, soils or hydrology have been disturbed.
- Areas with less than 700 mm annual rainfall.

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3.0 IDENTIFICATION OF DISPERSIVE SOILS

- Dispersive soils can be identified by dribble patterns and pitting (Figure 2).
- Early stages of tunnel erosion can be identified by the development of 'spew holes' and fans of dispersed material ejected from tunnels (Figure 3).
- Simple field tests can be used to identify the presence of dispersive soils.
- For engineering works or infrastructure development, a combination of analytical and physical tests may be required to predict dispersive behaviour in soils.



Figure 2 (a). Example of dribble pattern on an exposed subsoil, the photograph was taken from within an actively eroding tunnel system. (b) Dribble patterns on sodic soil ped.



Figure 3. Sediment fans or 'spew holes' are often the first obvious sign of tunnel erosion

SIMPLE TEST FOR IDENTIFYING DISPERSIVE SOILS.

Field testing for dispersive soils can be conducted by observing the behaviour of air dried soil aggregates in distilled water or rainwater.

1) Collect soil aggregates (1-2 cm diameter) from each layer in the soil profile.
2) If moist, dry the aggregates in the sun for a few hours until approximately air dried.
3) Place the aggregates in a shallow glass jar or dish of distilled water or rainwater (not tap water). It may help to place the jar on black card or a dark surface. (Distilled water can be purchased at most supermarkets).
4) Leave the aggregates in water without shaking or disturbing them for 1 hour.
5) Observe and record if you can see a milky ring around the aggregates. Don't worry if the soil collapses or bubbles (figure 4).

Caution: Aggregates may not disperse when they should if they haven't been sufficiently dried. Importantly, while the presence of a milky halo indicates the presence of dispersion, the absence of a milky halo does not necessarily mean that soil will not disperse, especially after disturbance. Further testing using an approved Australian Standard technique may be required.

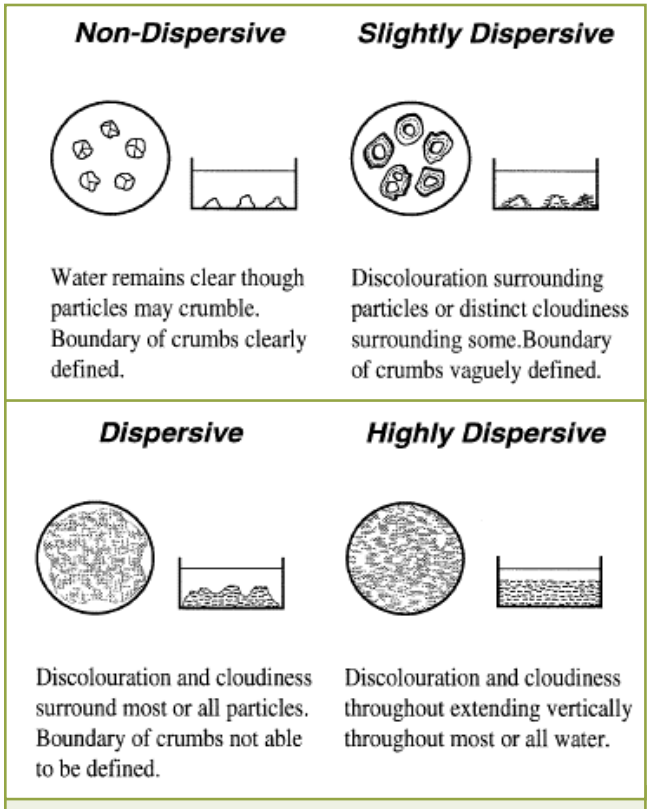


Figure 4. Field test for aggregate dispersion (Sorensen 1995).

4.0 ACTIVITIES THAT INCREASE THE RISK OF INITIATING TUNNEL EROSION

In almost all cases tunnel erosion results from some form of disturbance which allows rainwater to come into direct contact with dispersive subsoils. Activities that increase the risk of exposing dispersive subsoils to rainfall include;

- Removal of topsoil.
- Subsoil excavations (cut and fill).
- Supply of services by trenches.
- Construction of roads and culverts in dispersive soils
- Sewage and grey water disposal systems in dispersive soils
- Dam construction from dispersive clays.

Changes to hydrology, such as concentration of flow in culverts, runoff from hardened areas and ponding of rainfall may also increase the likelihood of tunnel erosion.



Figure 5. Piping failure or tunnel erosion in a dam constructed from soils derived from Permian mudstone. This dam is known to have failed on first filling. The image was taken from the dam floor.

5.0 STRATEGIES TO REDUCE RISK ASSOCIATED WITH DISTURBANCE OF DISPERSIVE SOILS

In order to prevent or repair tunnel erosion it is important to understand that unlike other forms of erosion, tunnel erosion results from chemical processes associated with dispersion of sodic subsoils. The risk of initiating tunnel erosion during construction or development of land containing dispersive soils can be minimised by;

- Identifying and avoiding disturbance to areas with dispersive subsoils.
- Minimising excavation of dispersive soils.
- Not allowing water to pond on the soil surface, or exposed subsoils.
- Keeping dispersive soils buried under topsoil.
- Maintaining vegetation cover.
- Use of gypsum or hydrated lime at appropriate rates.



Figure 6 (a). Tunnel erosion resulting from construction of a culvert in dispersive clay (b). Tunnel erosion caused by installation of optical fibre cable in dispersive soil.

RECOMMENDATIONS FOR REDUCING THE RISK OF TUNNEL EROSION IN PERI-URBAN AREAS

- Where possible do not remove or disturb topsoil or vegetation.
- Ensure that dispersive subsoils are covered with an adequate layer of topsoil.
- Avoid construction techniques that result in exposure of dispersive subsoils.
- Do not allow rainwater to pond or sit on exposed dispersive subsoils.
- Use alternatives to 'cut and fill' construction such as pier and post foundations.
- Where possible avoid the use of trenches for the supply of services i.e., water & power.
- If trenches must be used, ensure that repacked spoil is properly compacted, treated with gypsum and topsoiled.
- Consider alternative trenching techniques that do not expose dispersive subsoils.
- Ensure runoff from hard areas is not discharged into areas with exposed dispersive soils.
- If necessary create safe areas for discharge of runoff.
- If possible do not excavate culverts and drains in dispersive soils.
- Ensure that culverts and drains excavated into dispersive subsoils are capped with non-dispersive soil / spoil mixed with gypsum and vegetated.
- Avoid use of septic trench waste disposal systems. Consult your local council about the use of above ground treatment systems.
- Where possible do not construct dams from dispersive soils, or in areas containing dispersive soils.
- If dams are to be constructed from dispersive clays, ensure you consult an experienced, qualified civil engineer or soil specialist before commencing construction.

With all forms of construction on dispersive soils, ensure you obtain advice and support from a suitably experienced and qualified soil professional or civil engineer before commencing work.

6.0 FURTHER INFORMATION

Comprehensive information on the management of dispersive soils in Tasmania is available in the companion document '*Dispersive Soils and Their Management : Technical Reference Manual*'. Hardie 2008, DPIW, Tasmania

Dispersive soils - high risk of tunnel erosion. Fact Sheet 2. Soil and water management on construction sites series, Department of Tourism, Arts and the Environment (DTAE).

Seek advice from your local council, the Department of Primary Industries and Water (DPIW), a suitably qualified and experienced soil specialist, or a civil engineer.

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State Policy on the Protection of Agricultural Land 2009

Tasmania

Explore the possibilities

1. PURPOSE

To conserve and protect agricultural land so that it remains available for the sustainable development of agriculture, recognising the particular importance of prime agricultural land.

2. OBJECTIVES

To enable the sustainable development of agriculture by minimising:

(a) conflict with or interference from other land uses; and

(b) non-agricultural use or development on agricultural land that precludes the return of that land to agricultural use.

3. PRINCIPLES

The following Principles will be implemented through planning schemes and other relevant planning instruments. No one Principle should be read in isolation from the others to imply a particular action or consequence.

1. Agricultural land is a valuable resource and its use for the sustainable development of agriculture should not be unreasonably confined or restrained by non-agricultural use or development.

2. Use or development of prime agricultural land should not result in unnecessary conversion to non-agricultural use or agricultural use not dependent on the soil as the growth medium.

3. Use or development, other than residential, of prime agricultural land that is directly associated with, and a subservient part of, an agricultural use of that land is consistent with this Policy.

4. The development of utilities, extractive industries and controlled environment agriculture on prime agricultural land may be allowed, having regard to criteria, including the following:
   (a) minimising the amount of land alienated;
   (b) minimising negative impacts on the surrounding environment; and
   (c) ensuring the particular location is reasonably required for operational efficiency.

5. Residential use of agricultural land is consistent with this Policy where it is required as part of an agricultural use or where it does not unreasonably convert agricultural land and does not confine or restrain agricultural use on or in the vicinity of that land.

6. Proposals of significant benefit to a region that may cause prime agricultural land to be converted to non-agricultural use or agricultural use not dependent on the soil as a growth medium, and which are not covered by Principles 3, 4 or 5, will need to demonstrate significant benefits to the region based on an assessment of the social, environmental and economic costs and benefits.

7. The protection of non-prime agricultural land from conversion to non-agricultural use will be determined through consideration of the local and regional significance of that land for agricultural use.

8. Provision must be made for the appropriate protection of agricultural land within irrigation districts proclaimed under Part 9 of the *Water Management Act 1999* and may be made for the protection of other areas that may benefit from broad-scale irrigation development.

9. Planning schemes must not prohibit or require a discretionary permit for an agricultural use on land zoned for rural purposes where that use depends on the soil as the growth medium, except as prescribed in Principles 10 and 11.

10. New plantation forestry must not be established on prime agricultural land unless a planning scheme reviewed in accordance with this Policy provides otherwise. Planning scheme provisions must take into account the operational practicalities of plantation management, the size of the areas of prime agricultural land, their location in relation to areas of non-prime agricultural land and existing plantation forestry, and any comprehensive management plans for the land.

11. Planning schemes may require a discretionary permit for plantation forestry where it is necessary to protect, maintain and develop existing agricultural uses that are the recognised fundamental and critical components of the economy of the entire municipal area, and are essential to maintaining the sustainability of that economy.

4. GUIDELINES

The Resource Planning and Development Commission may, with the approval of the Minister, issue guidelines consistent with the terms of this Policy and confined to assisting planning authorities in dealing with the implementation of the Policy.

5. AUTHORITY

This State Policy is prepared pursuant to the *State Policies and Projects Act 1993*.

6. APPLICATION

This Policy applies to all agricultural land in Tasmania.

A decision made in accordance with the provisions of a planning scheme;

(a) approved under the *Land Use Planning and Approvals Act 1993*, as being in accordance with this Policy, or

(b) amended in accordance with section 13 of the *State Policies and Projects Act 1993*,

is taken to have been made in accordance with the Policy.

7. DEFINITIONS

In this Policy, unless the contrary intention appears:

Agricultural land

"Agricultural land" means all land that is in agricultural use or has the potential for agricultural use, that has not been zoned or developed for another use or would not be unduly restricted for agricultural use by its size, shape and proximity to adjoining non-agricultural uses.

Agricultural use

"Agricultural use" means use of the land for propagating, cultivating or harvesting plants or for keeping and breeding of animals, excluding domestic animals and pets. It includes the handling, packing or storing of produce for dispatch to processors. It includes controlled environment agriculture and plantation forestry.

Controlled environment agriculture

"Controlled environment agriculture" means an agricultural use carried out within some form of built structure, whether temporary or permanent, which mitigates the effect of the natural environment and climate. These include production techniques that may or may not use imported growth mediums. Examples of controlled environment agriculture structures include greenhouses, polythene covered structures, and hydroponic facilities.

Extractive industry

"Extractive industry" means use of land for extracting and removing material from the ground for commercial use, construction, roadwork or manufacturing works. Included is the treatment or processing of these resources by crushing, grinding, milling or screening on, or adjoining the land from which it is extracted. Examples are, mining, quarrying, sand mining and turf extraction.

Land

"Land" means land as defined in the *Land Use Planning and Approvals Act 1993*.

Planning scheme

"Planning scheme" means any planning scheme in force under section 29 of the *Land Use Planning and Approvals Act 1993*.

Plantation forestry

"Plantation forestry" means the use of land for planting, management and harvesting of trees predominantly for commercial wood production, including the preparation of land for planting but does not include the milling or processing of timber, or the planting or management of areas of land for shelter belts, woodlots, erosion or salinity control or other environmental management purposes, or other activity directly associated with and subservient to another form of agricultural use.

Prime agricultural land

"Prime agricultural land" means agricultural land classified as Class 1, 2 or 3 land based on the class definitions and methodology from the Land Capability Handbook, Second Edition, C J Grose, 1999, Department of Primary Industries, Water and Environment, Tasmania.

Utilities

"Utilities" means use of land for:

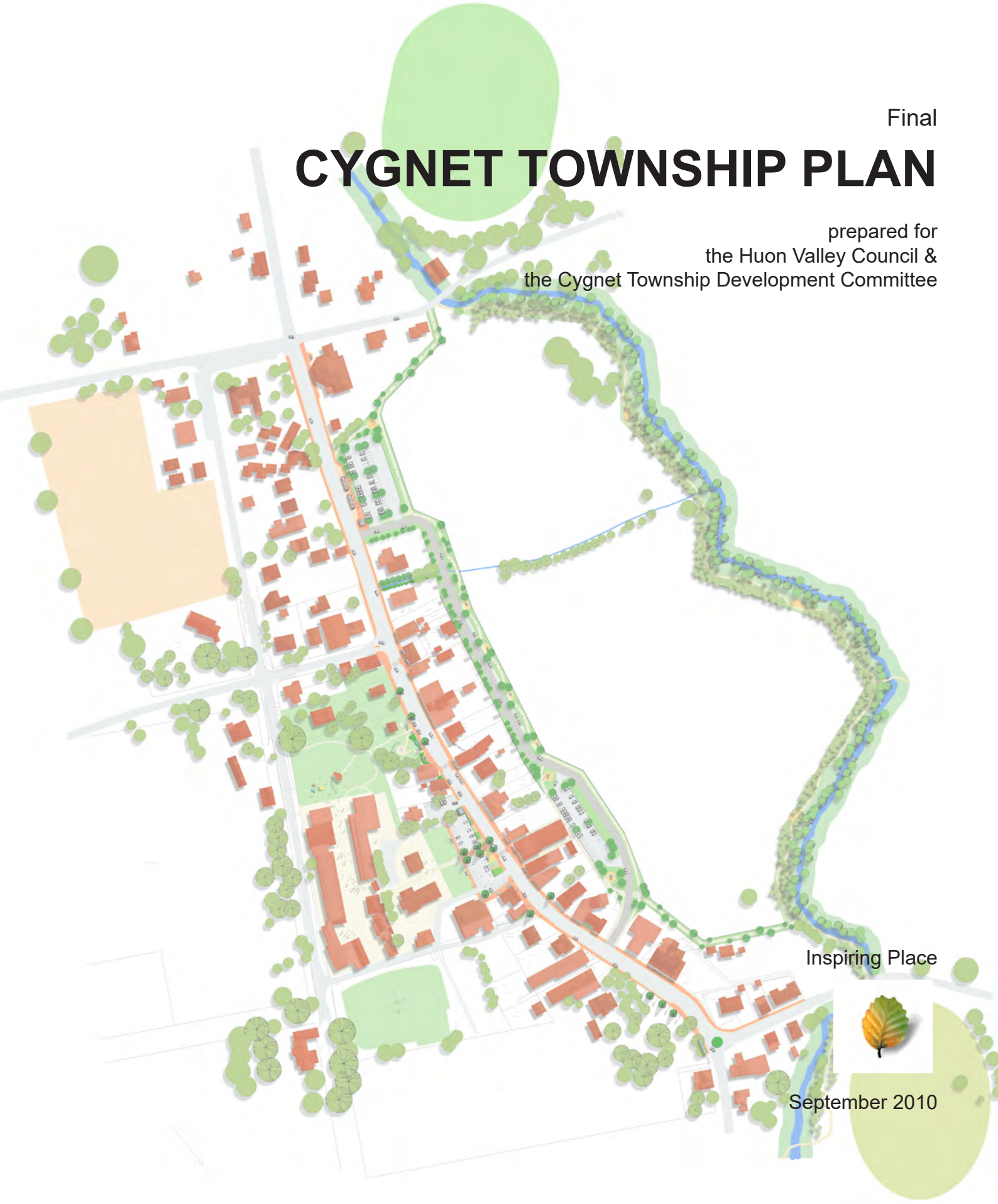
(a) telecommunications; or
(b) transmitting or distributing gas, petroleum products, or electricity; or
(c) transport networks; or
(d) collecting, treating, transmitting, storing or distributing water; or
(e) collecting, treating, or disposing of storm or floodwater, sewage, or sullage

Examples are a gas, water or sewerage main; electrical substation; power line; pumping station; retarding basin; road; railway line; sewage treatment plant; water storage dam; storm or flood water drain and weir.

Final

CYGNET TOWNSHIP PLAN

prepared for
the Huon Valley Council &
the Cygnet Township Development Committee



Inspiring Place

September 2010

Final Plan

CYGNET TOWNSHIP PLAN

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CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

The Mellukerdee people were perhaps the most maritime of the Aboriginal peoples of Tasmania, and utilised the coast and immediate hinterland throughout the year[1]. This original intimacy with, and importance of, the estuarine and coastal environmental is repeated throughout more recent times. In 1793 Bruni D'Entrecasteaux imparted the name Port des Cygnet after the many swans seen in the estuarine port, implicitly acknowledging the natural values of the district[2].

Subsequently established as a probation station in 1845 Port Cygnet, the district attracted farmers, orchardists, timber workers, boat builders and their families, and was later proclaimed as the township of Lovett in 1862[3]. In the early 1900's the town was renamed Cygnet, relating the town to its increasingly important estuarine port. Located 50 km south of Hobart, the Port of Cygnet provided a major transport hub for the Huon and D'Entrecasteaux districts.

During the late 19th century over 1500 people lived in the town, while the number of residents has decreased, the 1990s saw a resurgence in residents to be just over 850 people in 1996[4]. While the town no longer serves a major port, its role as a regional centre supporting agricultural and cottage art and craft industries, along with a regular commuter population, has ensured diverse lifestyles allowing Cygnet to weather the social and economic decline witnessed by many regional towns.

Today, Cygnet can build upon its broad cultural assets generated by new and established residents and a strong indigenous community. Taking advantage of its location just over 50km south of Hobart (see Figure 1.1), Cygnet can draw upon an increasing visitor base, further broadening the Town's inherent diversity in order to return social and economic benefits for all community members.

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[1] Ryan, L., 1996. **The Aboriginal Tasmanians** Allen & Unwin, S Leonards. pp.39-41.
[2] Cockerill, J. in **Port Cygnet Guide and Directory 2003/04** Port Cygnet Promotions, Cygnet. p.4.
[3] Cockerill, J. Op. cit. pp.3-4.
[4] Huon Valley Council, 2001. 'Draft Huon Valley Planning Study – March 2001' unpublished report for the Huon Valley Council. p.47.



Figure 1.1 Location of Cygnet in southern Tasmania[5].

[5] Adapted from Department of Environment and Land Management, 1998. **Tasmanian Towns Street Atlas** Department of Environment and Land Management, Hobart. p.35.

1.2 THE 2004 TOWN PLAN

In July 2003, the Huon Valley Council and the Cygnet Streetscape Reference Group (hereafter, the Reference Group) prepared a project brief inviting consultants to provide plan management, advice and oversight of the consultation process in the preparation of a concept township plan for Cygnet.

Recognising the strong participatory approach submitted, Council and the Reference Group engaged Inspiring Place P/L to develop with the Cygnet community a long-term concept plan for the township's future.

This report documents the development of the *Cygnet Township Plan* (hereafter, the *Plan*), providing issue analysis, design rationale and supporting commentary. The proceeding report includes:

- the background to, and approach taken in preparing the *Plan* (this Chapter);
- a discussion of the background situation, critical issues, opportunities and recommended actions associated with township planning in the wider geographic context surrounding the Cygnet town centre (Chapter 2);
- a discussion of the background situation, critical issues, opportunities and recommended actions associated with planning and development of Cygnet's centre (Chapter 3); and
- an implementation strategy detailing the recommended actions and a proposed priority for implementation (Chapter 4).

Included at the end of this report was an A3 plan illustrating many of the recommendations contained with the proceeding report. The broad stages involved in the preparation, conduct and documentation of the *Plan* are outlined below.

STAGE 1 INITIAL BRIEFING

An initial meeting with the Cygnet Streetscape Reference Group was held on the 28th October 2003 in the Cygnet Town Hall. This meeting confirmed the work program and established targets for the completion of tasks. The meeting also provided an initial forum for the Reference Group to discuss the scope, extent and methodology of the project.

Stage 2 Organisation

The second stage of the project was a preparatory stage for organising base maps, undertaking initial research and arranging the consultation and concept planning stages to follow. The planning intensive that followed was promoted through media releases provided to the Huon News and Cygnet Classifieds newspapers, A4 posters displayed in local businesses within Cygnet, and telephone calls to community groups and organisations.

Stage 3 Consultation and Township Plan

Stage 3 revolved around an 'intensive' planning program conducted in Cygnet on Sunday 23rd, Tuesday 25th and Wednesday 26th November 2003. The 'intensive' included:

a 'walk and talk' on a Sunday afternoon involving the broad community and key stakeholders in an assessment of the opportunities, constraints, issues and options associated with the township that attracted approximately 50 community members;

on-site meetings with the Huon Valley Council officers and the Department of Infrastructure, Energy and Resources (DIER), Transport Division;

a 'door knock' of the businesses and organisations in the main street, meetings with representatives of key organisations wishing to have input into the *Plan* (informally on the Tuesday and Wednesday);

preparation of a preliminary concept to address the identified issues and opportunities for the *Plan*; and

presentation of a preliminary concept to the Reference Group on Thursday 12th December for an initial response to the ideas and directions being taken prior to the preparation of a *draft Plan*.

Stage 4 Draft Documentation, Community Review and Final Documentation

The outcomes of the 'intensive' process, and the preparation of a more detailed *Plan* comprise Stage 4 of the project. The *Plan* includes:

plans, sections and elevations illustrating the key recommendations; and

a brief accompanying report which describes:

the approach to the project;

the context for the plan (e.g. site conditions, existing activities, historic character and opportunities and constraints);

the strategic framework (cultural tourism context, business and recreational needs, etc.), matters of detailed design (e.g. traffic management, walking links, other amenities) and suggested materials and design treatments; and

an implementation strategy with recommended priorities.

A preliminary concept was presented to the Huon Valley Council management executive (MANEX) on Thursday 5th February 2004, to gain an initial response. Detailing within the concept was then amended to align the plan with Council's strategic direction.

The *draft Plan* and accompanying report were displayed for four weeks at the Cygnet Laundromat, Cygnet Library, Red Velvet Lounge and Huon Council Chambers. Community input and response was invited via a number of comment books provided with the large format plan and each copy of the planning report.

A meeting with the Cygnet Streetscape Reference Group was held on the 05th May 2004 to discuss any proposed amendments in response to the community comment, and develop the priorities for the various recommended actions following the public review period.

Where necessary, the *Plan* was altered to better reflect the comments and concerns raised during the public review, prior to final submission of the finalised *Plan* to Council.

1.3 Review of the 2004 Plan

In September 2009 the Council engaged Inspiring Place Pty Ltd to revise the 2004 *Plan* given that a number of the listed projects were now completed within the town, there were new projects in planning (e.g. relocation of the bus shelter) and the need for further investigation into road access to future car parking areas on the eastern side of the town centre.

The review process involved:

- briefing with Council staff and site visit;
- review of background information, completed and planned works;
- further site investigations to identify best options;
- undertaking a walk and presentation with the Cygnet Township Development Committee;
- presentation of the revised town plan concept to the Cygnet town forum in November 2009;
- revision of the town plan report ready for public review and comment; and
- review of the public comment received and the final preparation of the revised town plan.

1.4 ACKNOWLEDGEMENTS

Inspiring Place would like to thank the Council, Cygnet Township Development Committee, local businesses and community members who contributed ideas to the original and revised plan.

CHAPTER 2
EXTENDED TOWNSHIP PLANNING

This Chapter provides a discussion of issues and opportunities evident within the complete study area, and their connections to the Cygnet town centre. The issues include:

- land use planning and development (Section 2.1);
- landscape values and amenity (Section 2.2); and
- open space and trail networks (Section 2.3).

For each of the above groupings, the following sections provide:

- a background discussion summarising the existing condition, previous works and opportunities;
- a succinct summary of the critical issues; and
- the recommended actions to achieve the desired outcome.

Many of the recommendations are illustrated in the *Plan* that is included at the end of this report.

2.1 LAND USE PLANNING & DEVELOPMENT

2.1.1 Background

The *Port Cygnet Planning Scheme 1988* (hereafter, the *Planning Scheme)* is the primary land use planning and development control document for Cygnet. Important controls under the Planning Scheme include:

- the Reserved Business/Open Space zoning of the land to the east of Mary Street;
- considerable Closed Residential zonings, that have not as yet been developed both within Cygnet and located to the east of Agnes Rivulet;
- the zoning of the eastern side of Mary Street primarily as Business; and

mixed zonings along the western side of Mary Street – including Community Services, Closed Residential, Business and Open Space.

Council is currently developing a new planning scheme for the Huon Valley, including Cygnet. The proposed scheme will depart from the current traditional or prescriptive planning approach, utilising a more performance-based approach to planning and development control. Such an approach suggests land use development assessments be based more on their furtherance of sustainable development rather than prescriptive zonings and planning controls. While not being a purely performance based scheme, the proposed scheme aims to introduce greater flexibility in land use development[6].

While the planning scheme may impact upon the implementation of the *Plan*, the time frames for the implementation of a new planning scheme and that for the preparation of the *Plan* were not compatible. Ideally, the community desires and concerns reflected in the *Plan* will inform future land use planning in Cygnet.

2.1.2 Critical Issues

The important observations regarding the current land use zonings in and around Cygnet include:

a sufficient amount of residential and industrial zonings both within and to the east of the town;

commercial development along Mary Street believed (by some operators) to be constrained by the parking provisions within the *Planning Scheme*;

the residential zoning of the northern portion of the Mary Street may limit commercial development within this area; and

the zoning of the land to the east of Mary Street as Reserved Business/Open Space provides limited development and/or use opportunities.

[6] Ferrier, T., Huon Valley Council, *pers comm.*, 26.11.03.

2.1.3 Recommended Actions

The recommended actions for improvements in township planning for Cygnet through land use planning include:

the finalisation and subsequent introduction of a more performance-based planning scheme for the Huon Valley may provide greater flexibility to support the use and development of Mary Street as the business precinct of Cygnet, and the retention of the rural character of Cygnet[7];

the continued preference for infill development of Mary Street for general business development - business development should be consolidated between the Mary Street and Lymington Road intersection in the south, and the Mary Street and Frederick Street intersection in the north, rather than encouraging commercial development to spread beyond Mary Street in any direction;

mechanisms for the use of the land to the east of Mary Street should be pursued for;

the opportunity to establish a rear access to the commercial properties along the eastern side of Mary Street; and

alternative vehicle circulation if pursued in the future (see Section 2.1);

the Council land bounded by Louisa, Frederick and George Streets and Golden Valley Road should be developed as a health centre; and

alternative uses of the existing caravan park site may be pursued in the future *if* a new development is undertaken that replaces its current role.

2.2 Landscape Values & Amenity

2.2.1 Background

Cygnet is set amongst a diverse landscape, the township is surrounded by rural farmlands and rural-residential developments, these in turn are framed by the forested hillsides of Grey Mountain, Galleries Hill and Balfes Hill. While the riverside setting of Cygnet is not evident from the town centre, this setting and proximity of the Town's surrounding hills are important elements of Cygnet's landscape character

[7] Ibid. *pers. comm*. 26.11.03.

that should inform land use planning and development. Similarly, the larger a lot size of the surround rural-residential housing development contributes to the rural character of the Town.

2.2.2 Critical Issues

The important observations regarding the landscape and amenity values in and around Cygnet include:

- loss of rural backdrop to the town centre through inappropriately sited rural residential subdivision and clearing of bushland for such development; and
- the replacement of areas of diverse farm and wooded landscape with larger commercial timber plantations.

2.2.3 Recommended Actions

The recommended actions to protect and enhance landscape values and amenity in and around Cygnet include:

- the completion of a landscape character and scenic assessment for the Huon Valley as strategic support for the new planning scheme; and
- liaison with the Forest Practices Board and forestry companies to ensure that local landscape values are adequately managed.

2.3 COMMUNITY OPEN SPACES

2.3.1 Background

Within Cygnet there are several community open spaces that have been improved through considerable community efforts. The major open spaces in Cygnet include:

Burtons Reserve – approximately 7.5 ha of land adjoining the Port Cygnet Wildlife Sanctuary, facilities include play equipment, toilets, walking tracks, barbeque facilities and ball courts;

Cygnet Recreation Ground – formal sporting ground catering for cricket, football, training nets, clubrooms and change rooms;

Loongana Park – informal community park with paths, public toilets, cycle racks, seating and picnic tables; and

Sports Ground – grassed sporting area for cricket and football, regularly used by the Cygnet Primary School to compliment their school grounds.

The *Huon Valley Sport and Recreation Plan 1996* (hereafter the *Recreation Plan 1996)* suggested the key issues needing to be addressed regarding open space in Cygnet at the time were[8]:

the need to develop an overall direction for the siting of sports and recreation facilities within the town in the future;

the future of the existing skateboard ramp;

the lack of local parks; and

lack of recreation trails within the town.

Regarding the above issues, the *Recreation Plan 1996* made several observations that have again been raised during the course of the current project. These observations particularly relate to the planning, design and location of a skateboard facility, the lack of good quality local parks (now partially addressed through the recent development of Burtons Reserve and Loongana Park), and the absence of recreational trails[9].

[8] Hepper Marriott Tasmania P/L & Hepper Marriott and Associates P/L, 1996. 'Huon Valley Sport and Recreation Plan 1996' unpublished report to the Huon Valley Council. pp.80-81.
[9] Ibid. p.79.

The recommended strategies within the *Recreation Plan 1996*, regarding open space included[10]:

> 'retain and continue to upgrade the Cygnet Recreation Ground as one of the principal sports grounds for the Huon Valley;
>
> priority for the development of the old Burtons Factory site as a major community park with a focus on passive and informal recreational activities, heritage and conservation values;
>
> the construction of new netball courts in the future near the proposed indoor sports centre at the Cygnet Recreation Ground, and the use of the old netball courts at the old Burtons Factory site for youth basketball and other informal sports;
>
> the redevelopment of the existing skateboard facility and relocation to the park area behind the public toilets on Main Road [Mary Street];
>
> the development of new playgrounds at the proposed childcare centre site and the old Burtons Factory site, with Council pursuing other opportunities for local parks within the town in the future; and
>
> the development of bikeway/walkways with priority for safe access along Main Road for the length of the town'.

The current project provides in principle support for many of these strategies, although the location of some facilities (i.e. skateboard facility, safe route for pedestrians and walkers through the town) has been altered in light of the broader context.

The need for a path and trail network remains pertinent in light of the importance of recreational walking as continues to be the most popular recreational activity within Southern Tasmania, with over 50% of participants in southern Tasmania participating in recreational walking[11]. This predominance of recreational walking is similarly reflected in national recreational statistics[12].

It is now widely recognised that people who participate regularly in recreation and sporting activities enjoy the benefits that an active lifestyle has on their health and sense of well-being. Many Tasmanians spend the proportion of their time either in

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[10] Ibid. pp.80-81.

[11] Office of Sport and Recreation, 2002. **Participation in sport and recreation activities in the south of Tasmania** Office of Sport and Recreation, Department of State Development, Hobart. p.17.

[12] Australian Sports Commission, 2001. **(Extract From) Participation in Exercise, Recreation and Sport** Australian Sports Commission, Canberra. Available: http://www.activeaustralia.org/facts/index.htm 15.03.04.

education or workplaces and it is important to consider the environments and time schedules of people when attempting to increase physical activity. It is also important for local governments to provide opportunities for residents of all ages to participate in a range of recreation activities through the provision of sporting facilities, trails, tracks and other open spaces.

These recreation opportunities are similarly reflected in the needs of visitors to Tasmania. Such facilities need not solely cater for the resident population of the Cygnet area, if done well, such recreation facilities may provide an important attractor for the regional population and visitors to Tasmania generally. Such an additional visitor attraction within Cygnet would again extend the visitors stay within the area and benefit the local community.

Development Plans for Burtons Reserve and Loongana Park have been developed with considerable community participation. It has been requested that the purpose of the current project be not to extensively revise these community driven plans. Rather, the *Plan* recognises opportunities that have been identified during the current project and may be investigated by the respective management groups for these two open space sites. A 10 buffer on the eastern side of Agnes Rivulet has been fenced from stock and revegetation works initiated by the landholder and the Port Cygnet Land and Water Care group[13].

2.3.2 Critical Issues

The important issues regarding open space usage in Cygnet include:

- the existing Council operated Caravan Park is constrained in size and of relatively poor standard;
- a continuing need for recreation facilities catering for *informal* sport (i.e. casual basket ball, BMX/MTB jumps and a skate facility);
- a limited need for an area that acts as an informal focal point for younger residents; and
- continuing need for further upgrading and development of Burtons Reserve and Loongana park as per existing plans.

[13] Gordon, J., Community Liaison Officer, Huon Valley Council, *pers. comm.* 17.05.04.

2.3.4 Recommended Actions

In addition to the above parks, it is recommended that Council proceed to plan for improved access to the rear of the properties on the eastern side of Mary Street, and by doing so provide the opportunity for improved car parking, local open space, landscaping and trails.

As suggested above, the *Plan* identified several opportunities for further developments within Burtons Reserve and Loongana Park. Recognising the efforts devoted to existing community plans for these two sites, the *Plan* seeks only to articulate opportunities that were identified by community members, rather than prescribe their development. Therefore, possible opportunities that may be considered within existing management of Burtons Reserve may include:

a connection to the proposed Cultural Recreation Area (see discussion above) via the multiple use path network;

the provision of improved visitor facilities – including seating, interpretation and picnic facilities within the Reserve;

provision of mature landscaping and tree plantings to provide shade and shelter from the wind; and

the retention and upgrading of at least one netball/basketball court at Burtons Reserve for informal sport – ideally such casual sports facilities (would be integrated with the proposed Cultural Recreation Area discussed below), thus allowing Burtons Reserve to develop more as a passive recreation area based around natural values, and the Sports Centre and Recreation Ground to continue as the formal sporting venues.

Possible opportunities that may be considered within existing management of Loongana Park include:

relocation of the two Telstra phone booths to an area adjacent the public toilet;

paving of a new formal entrance and access paths through the site and to the toilets; and

enlarged soil embankment to create more of an amphitheatre around the central performance space.

CHAPTER 3
MAIN STREET PLANNING

This Chapter provides a discussion of issues and opportunities evident within the Cygnet town centre. For each issue, the following Sections provide:

- a background discussion summarising the planning context, previous studies and works;
- a succinct summary of the critical issues;
- articulation of the aims and a discussion of the options (where appropriate) for addressing the critical issues; and
- the recommended actions to achieve the desired outcome.

Many of the recommendations are illustrated in the *Plan* that is included at the end of this report.

3.1 VEHICLE CIRCULATION AND PARKING

3.1.1 Background

During the initial stages of the project, there was considerable debate regarding the establishment of by-pass road that would direct traffic around Cygnet. While this project does not purport to be a comprehensive evaluation of the pros and cons of a vehicular by-pass around Cygnet, summary observations can be articulated as these underpin the current project.

The arguments for such a by-pass include:

- a reduction in the amount of traffic, particularly heavy vehicles, traveling through Cygnet, contributing to;
  - improved pedestrian and cyclist safety within the town;
  - improved opportunity for streetscape plantings;
  - reduced traffic noise; and
  - improved vehicle circulation; and
- the option of closing Mary Street to traffic for civic events (i.e. Huon Folk Festival, Taste of the Huon and the Christmas pageant).

While there was considerable support for the by-pass from some residents and businesses contacted, there are constraints upon the practicality of the by-pass, many of which were also expressed strongly by other residents and businesses, including:

- the high cost of such a by-pass road and the alternative uses to which such resources could be put;
- the absence of a strong attractor to draw visitors into the town rather than choosing to by-pass Cygnet;
- lower traffic volumes (particularly heavy vehicles) through the town relative to other regional towns that have had by-pass proposals evaluated[14];
- a lack of consensus among residents (including business operators, senior citizens, students and other residents) as to whether there are *widespread* pedestrian safety and traffic circulation problems in Cygnet – although there was general agreement that there are some *site specific* problems (i.e. pedestrian crossing of Mary Street and Golden Valley Road); and
- uncertainty as to whether other traffic management mechanisms cannot achieve the same outcome for less cost with equal or better improvements in main street amenity.

Some of the potential benefits and/or impacts of a by-pass road cannot be designated as either positive or negative upon Cygnet. By way of example, some visitors may choose an extended stay in Cygnet due to improved pedestrian amenity, this may in turn have positive benefits for the local community. Conversely, a by-pass may encourage visitors and residents alike not to stop in Cygnet, this may in turn have a negative impact upon the local community.

Therefore, a substantive approach (one that integrates social, environment and ecological benefits and costs) must be used to evaluate the by-pass proposal if it were to be pursued in the future.

The current project does not recommend a whole of town by-pass road given:

- only limited issues identified through the community consultation regarding pedestrian safety along Mary Street – apart from several key locations, there was no widespread consensus that pedestrian safety was a critical issue within Cygnet;

[14] R. Bauer, Department of Infrastructure, Energy & Resources, *pers. comm*. 03.12.04.

limited Council support for the acquisition of additional land required; and

the costs of the by-pass works far out weigh the proposed gains, particularly as similar improvements in traffic circulation may be achieved through a combination of alternative mechanisms.

So as to improve traffic circulation and pedestrian safety, this project assumes that visitors and residents alike will be required to travel a slightly increased distance between vehicle parking and shopping areas. The need to walk between vehicle parking and shopping has long been accepted in urban centres, yet the traditional ease of parking in regional towns has established a 'privilege' of being able to park directly outside the destination, often at the expense of pedestrian and streetscape amenity. While this increased travel cost may be resisted, it is substantially off-set by other recommendations within this plan, and is therefore accepted within the current study.

3.1.2 Critical Issues

The pertinent observations regarding traffic circulation within Cygnet include:

the Mary Street carriageway is reasonably narrow, particularly for heavy vehicles to pass one another, this is exacerbated by road side parking provisions;

many vehicles use the intersection of Mary Street and Golden Valley Road, and the Lymington Road Channel Highway intersection as u-turn points;

the through traffic along Louisa Street constrains the use of the adjacent oval by Cygnet Primary School Students;

school bus traffic, student pick-up and drop-off in the town centre car park exacerbates traffic flow difficulties in this area;

parking near the Golden Valley Road and Mary Street intersection reduces sight lines for turning vehicles; and

the new western footpath at the Golden Valley Road and Mary Street intersection impedes the turning radius for medium rigid (and larger) vehicles turning west into Golden Valley Road.

Important observations regarding the provision of car parking within Cygnet (excluding the town centre parking area discussed in detail below at Section 3.4) include:

- the new footpath(s)[15] within the southern end of Cygnet have reportedly reduced the amount of available roadside parking, and business expressed a strong desire to retain all existing road side parking;
- many off street car parking areas and spaces are poorly defined and surfaced, reducing their efficiency and amenity;
- there is considerable (on and off Street) parking available in Cygnet, but there is considerable reluctance for shoppers to use parking that is not on-street and adjacent their intended destination; and
- there is some limited all day 'commuter' parking within the town centre car park which reduces the available parking for short term stays.

In the revision of the *Plan* the Council asked that consideration be given to the realignment of the rear access road reserve on the eastern side of Mary Street with the view to having access adjacent to the BP service station. The proposed road would allow vehicle access to Council owned land set aside for a future car park and the potential to continue the road to rejoin Mary Street. This would effectively provide the option for low vehicle speed access to the car park that is conveniently located to allow pedestrians to access the town centre shops and services. This outcome is similar to many European villages so as to help reduce traffic congestion in the main town centre.

3.1.3 Recommended Actions

The recommended actions to improve traffic circulation within Cygnet include:

- consideration of the construction of roundabouts at the Lymington Road, Mary and Charlton Street intersections;
- construction of a road on the eastern side of Mary Street businesses that would provide access to a future car parking area and convenient pedestrian access to the town centre;
- relocation of the bus stop and construction of a new shelter to be located near the BP service station;

[15] This includes both the reconstructed western footpath and the planned reconstruction of the eastern footpath early in 2004.

realignment of the Golden Valley Road and Mary Street intersection to improve safety (see below), reduce vehicle speed entry and provide improved turning radii;

construction of a pedestrian refuge (SSB – Safety Bar Island Type 1) on Golden Valley Road adjacent the Mary Street intersection; and

traffic calming and road re-alignment or closure of a portion of Louisa Street to limit through traffic between the Primary School and the Sports Ground.

The recommended actions to address vehicular parking issues within the centre of Cygnet include:

limit the length of stay along Mary Street to short term parking (i.e. half hour);

businesses are to be encouraged and/or assisted to provide and promote off street customer parking at their premises;

the development and maintenance (including adequate drainage) of an informal overflow parking area that caters for both long term customer and visitor parking to the east of Mary Street behind the Town Hall (i.e. greater than 2 hours)(see above);

relocation of the bus stop to the northern end of Mary Street which will help reduce the parking of vehicles by bus users in the main car park;

the use of road markings to define on street parking spaces; and

the redevelopment of the Town centre parking area to provide improved circulation, visitor facilities and medium stay parking (i.e. 1 to 2 hours)(see Section 3.4).

3.2 Pedestrian Circulation & Trail Network

3.2.1 Background

There are some existing pedestrian linkages within Cygnet, these include the newly constructed path along the edge of Lymington Road and within Burtons Reserve. Many community members also suggested there is an informal walking route from Thorpe Street to Garfield Avenue and/or Guys Road via the Golf Course.

Considerable engineering design of the footpaths and Mary Street carriageway in many points has now been completed.

3.2.2 Critical Issues

The critical issues regarding the existing footpaths and pedestrian circulation within Cygnet include:

- the absence of defined pedestrian crossing points across Mary Street; and
- the absence of safe and defined crossing point(s) across Golden Valley Road, Frederick Street and the Channel Highway (opposite Burtons Reserve).

The predominant issues identified in relation to path and trails networks within and around Cygnet include:

- a limited number and length of multiple use trails (that cater for walking, jogging, cycling and skating) within the town, particularly those accessible to families and younger residents and visitors, that are separated from traffic circulation;
- poor definition of the trail along Lymington Road – resulting in reduced safety and amenity for path users; and
- the absence of a safe and accessible route linking existing recreation nodes (i.e. Sports Centre, Recreation Ground and Burtons Reserve).

3.2.3 Recommended Actions

The recommended actions to improve pedestrian safety and circulation within Cygnet include:

- the definition of a pedestrian walkway through coloured carriageway paving, narrowing of the carriageway and reduced speed limits at these points; or
- the provision of new pedestrian crossings in locations as shown on the master plan.

While the authors and the many members of the Cygnet community support the re-establishment of ‘zebra’ crossings, discussions with DIER representatives suggest that the re-instatement of the zebra crossing within Cygnet is not consistent with Departmental policy, and would not be supported. In light of this policy, priority may

wish to be given to pursuit of the former option for improved pedestrian crossing of Mary Street and the Channel Highway.

The recommended actions for establishing an extended recreational path and trail network include:

- the resurfacing and landscaping of the trail along Lymington Road – so as to provide a distinction between the road verge and the trail;
- the continuation of the Lymington Road trail to the Robleys Point picnic facilities and beyond to the launching ramp and public toilets at Catos Bay;
- development of a trail from Burtons Reserve through the Coastal Reserve around the eastern foreshore of Port Cygnet;
- upgrading the pedestrian link between the Primary School (and Sports Centre) and the Child Care Centre, St James College and Mary Street – possibly integrated with an open space linkage through the Council owned residential land;
- upgrading and defining the pedestrian route between Mary Street and the Recreation Ground; and
- the development of the multiple use trail network on the eastern side of Mary Street properties aligned with the proposed new road link.

3.3 Township Amenity

3.3.1 Background

Streetscape amenity is broad range of improvement that can play an important role in activating the local town space, benefiting residents, business and visitors alike. An active streetscape can provide a range of elements that creates interest and pride in the town's fabric, contributing to both economic and social benefits for the local community.

Recognising the large amount of streetscape work previously completed for Cygnet, this Section draws together many of these elements, integrating them with opportunities identified during discussions with local residents and businesses and organisations. Existing streetscape improvements include:

- limited street furniture (i.e. seats, rubbish bins);

western Mary Street footpath upgrade;

several murals on commercial buildings in Mary Street;

limited adoption of the agreed streetscape colour scheme (see Appendix A);

provision of public toilets in Loongana Park; and

provision of banner poles at the northern and southern ends of Mary Street.

While many of the prior recommended actions (Sections 2.1 through to 3.5) can be seen as being parts of a long or medium term vision, many of the actions within this proceeding Section can be implemented immediately, or within the short term, by Council in collaboration with relevant community groups, organisations and businesses. These short term gains may provide initial motivation and enthusiasm, fueling the furtherance of the vision and benefiting residents and businesses alike.

3.3.2 Critical Issues

Within the Cygnet town centre there are several issues that reduce the amenity enjoyed by residents and visitors alike, including:

the limited adoption and implementation of prior streetscape planning, although there has been significant improvements with Council's street works;

approaches to Cygnet are in places unkempt and there are no defined entrances to Cygnet;

the lack of shade, and seating which is protected from the elements (i.e. seating that is both shaded and sheltered from rain), particularly near sites that are used for bus passenger pick-up and drop-off;

there are only limited elements of interpretation, interest or excitement within the streetscape (including interpretation of the many historic buildings);

the streetscape reflects little of the history, culture or art of the local community; and

no defined or focused town centre.

3.3.3 Recommended Actions

The recommended actions to improve the amenity of the Cygnet include:

the streetscape furniture should be sympathetic with the historic characteristics of the town;

the provision of 'pocket parks' which may include mature plantings (to provide shade), landscaping, seating and/or rubbish bins;

a Town landscape program, including;

mature tree plantings[16] within carriageway outriggers along the western edge of the Mary Street carriageway;

landscaping of the proposed roundabouts with native shrubs to DIER specifications;

mature tree plantings around the Town Centre parking area; and

improved weed control and roadside vegetation maintenance program on the approaches to Cygnet;

the inclusion of Aurora conduit in the programmed eastern footpath redevelopment to facilitate future under-grounding of electricity services;

'adopt a box' planter boxes along Mary Street where footpath width allows and individuals, businesses and organisations support their introduction (potential sites may include the Post Office, Antique store at the intersection of Frederick and Mary Street, outside the Chemist and café adjoining the town centre parking area, outside the Haberdashery at the intersection of Golden Valley Road and Mary Street, and where appropriate within the eastern redevelopment of the footpath);

refurbishment of banner poles to increase their use and promote the sense of arrival to Cygnet during community events, improvements may include;

secure footings and pole attachment means;

return of banner poles to southern entrance area on reconstructed footings;

trimming of vegetation adjacent the northern poles to improve visibility;

alignment of all banner arms offset to inbound traffic;

[16] Potential tree species may include: Golden Honey Locust (*Gleditsia triacanthos* 'Sunburst'), White gum (*Eucalyptus pulchella*), and or Crabapple (*Malus ioensis* 'Plena').

lanyard system for setting and retrieval of banners;

develop a set of banners to support entry signage, Huon Folk Festival, Christmas Pageant, Taste of the Huon etc.; and

formalised maintenance and banner setting/retrieval program (i.e. banner changing included in Council works program or resolution and articulation of liability if banners are to be maintained by community members);

increased use of interpretative and artistic elements within Mary Street, including;

footpath inserts developed in collaboration between the students, Council, businesses and community members included in forthcoming upgrade of the eastern footpath;

interpretive 'mural map' depicting Cygnet (potentially on the wall of 'Wild Thyme' cottage adjoining Loongana Park);

portrayal of building histories through thematic interpretation plaques;

small community based artistic (i.e. sculpture, painting, 'life like' murals) elements integrated with pocket parks, street furniture and/or in collaboration with business premises; and

extension of the mural program developed in collaboration between students, Council, businesses and community members (potential locations include the Newsagency, Laundromat, Wild Thyme Cottage and the Porthole);

develop a township entry at the Lymington Road and Charlton Street intersection, including;

return banner poles to southern entrance area on new footings (see above);

widening of footpath between the hardware store and the Lymington Road and Charlton Street intersection; and

design and construction of a purpose built fence or railing to formalise the display signage; and

further implementation of established streetscape colour scheme for street furniture by Council, community and business stakeholders within Mary Street, potentially including;

the Town's existing banner poles;

any outdoor seating and tables provided by businesses;

the use of established colour scheme in township entry signs (being developed by Reference Group); and

the support for the use of complimentary colours by businesses in any building refurbishments (i.e. provision and/or subsidisation of materials, collaboration with Reference Group by stakeholders planning refurbishment works to ensure compatibility).

CHAPTER 4
IMPLEMENTATION STRATEGY

This Chapter outlines the processes and opportunities for implementing the works proposed in the *Plan*, and includes a staged implementation plan identifying the priority, initiating stakeholder for recommended actions within the *Plan*.

The key features of the revised Plan are:

potential for a two-way future access road to be developed from the northern end of Mary Street (north of the BPP service station) past the rear of the Mary Street properties to connect to Council owned land (located at the rear of the hall) and then onto Mary Street – this will require negotiation with the landowner(s) to widen the existing road reserve (20m width);

potential for Council to negotiate the acquisition of the land area (north of the BP service station) to develop as a car park, new bus stop location, bus shelter and to provide an entry point to the above access road;

potential for the development of a shared trail within the road reserve and in the longer term a trail link to Agnes Rivulet and circuit along the rivulet (Council currently owns a section on the southern part of Agnes Rivulet);

enhancement of the proposed road reserve with landscaping, park furniture and public art;

use of the road reserve to construct bio-retention swales to help improve drainage;

formalizing pedestrian paths from the new car park to allow pedestrians safe and convenient access to the shops and services on Mary Street

Table 4.1 identifies the recommended action, the suggested priority for the staging of the recommended works, along with an identification of the initiating responsibility. The plan at the rear of the report provides a reduced summary of the *Plan*.

It is acknowledged that current funding availability may not cover the complete package of works recommended in the *Plan*. Therefore, the long term implementation of the plan should be staged over a number of years as funds permit.

Given the uncertainty regarding the available funding allocations and sources, a recommended time frame has not been provided by the current project, instead a priority has been assigned to each initiative in order to guide implementation.

Within Table 4.1, the following abbreviations are used:

HVC – Huon Valley Council;

DIER – Department of Infrastructure, Energy and Resources;

CTDC – Cygnet Township Development Committee; and/or

A/S – Appropriate stakeholder/business/organisation concerned with recommendation (e.g. Arts Council, Landcare, individual businesses landholders etc.).

A priority has been assigned to each recommended action. Very High priorities are those, which form a key component of the overall vision. Many other recommendations within the *Plan* are contingent on the initiation of these Very High priority recommendations.

High priority actions are defined as those which:

are required to protect significant natural and cultural values;

are required under relevant standards, legislation and orders;

meet identified needs for high priority user groups;

require immediate action to alleviate existing public liability and safety concerns;

provide benefits for a diversity of users; and/or

are important operational matters with minimal cost.

Medium priority actions are defined as those which:

improve the safety of the Town;

are required to enable staging of other works;

enhance the recreational experience and extend opportunities for visitor use; and/or

improve the amenity of the Town.

Low priority actions are defined as those which:

are ongoing measures in response to localised problems;

have high costs associated with them and can be forgone until such time as funds are available; and/or

require further planning and involvement of other agencies.

The designation of a high priority to an item does not necessarily imply an immediate time frame for its implementation. In many cases, additional planning and design development is required before a recommendation can be acted upon. While an action may have been assigned a particular priority within the*) Plan* it does not necessarily imply a fixed order of development. The availability of funding may well change the order in which components of the *Plan* are implemented.

Recommended Initiative	Initiating Stakeholder	Suggested Priority	Report Reference
Adoption of *Revised Cygnet Township Plan2009* as the basis for guiding future streetscape works and township planning in Cygnet	CTDC, HVC, A/S	Very High	n/a
Prioritisation of recommended works by the Cygnet Township Development Committee in light of available funds.	CTDC	Very High	n/a
Initiate purchase of land to the north of the BP service station for a future bus stop, bus shelter, car park and access point for a future road located to the eastern side of the Mary Street properties (Stage 1)	HVC	Very High	s3.1/s2.3
Initiate development of Council land for a car park behind the Town Hall and access link road from Mary Street to the south (Stage 2)	HVC, A/S	High	s3.1
Initiate development of an access road to link the proposed northern car park to the planned Council car park (Stage 3)	HVC, A/S	Moderate	s3.1
Establishment of an initial low cost BMX/ MTB dirt jump area in the vacant land immediately to the east of the Recreation Ground (between the access road and equestrian paddock)	HVC, A/S	High	s2.3
Realignment of the Golden Valley Road and Mary Street intersection to improve safety (see below), reduce vehicle speed entry and provide improved turning radii	DIER, HVC	High	s3.1
Construction of a SSB –Safety Bar island Type 1 on Golden Valley Road adjacent the Mary Street intersection	DIER, HVC	High	s3.1
Encourage and/or assist businesses to provide and promote customer parking at the rear of their premises	CTDC, A/S, HVC	High	s3.1
The provision of marked pedestrian ‘zebra’ crossings between the Town Hall and Town Centre car park, the Red Velvet Lounge and the Thyme Cottage, and across the Channel Highway adjacent Burtons Reserve, and/or the definition of a pedestrian walkway through coloured carriageway paving, narrowing of the carriage way and reduced speed limits	DIER, HVC	High	s3.5
Development of the Council land bounded Louisa, Frederick and George Streets and Golden Valley Road as a health centre	HVC	Moderate	s2.1
Limit the length of stay along Mary Street to short term parking (i.e. half hour)	CTDC, A/S, HVC	Moderate	s3.1
Define on-street parking spaces along Mary Street with line markings	HVC	Moderate	s3.1

Recommended Initiative	Initiating Stakeholder	Priority	Report Reference
The inclusion of Aurora conduit in the programmed eastern footpath redevelopment to facilitate future under-grounding of electricity services	HVC, Aurora	Moderate	s3.6
Construction of a roundabout at the Lymington Road, Mary and Charlton Street intersection	DIER, HVC, CSRG	Moderate	s3.1
Traffic calming and road re-alignment on Louisa Street to limit traffic through between the Primary School and adjacent oval	HVC, A/S	Moderate	s3.1
Ensure street furniture is sympathetic with the historic characteristics of the town.	HVC	Ongoing	S3.3
The upgrading and defining the pedestrian route between Mary Street and the Recreation Ground	HVC	Moderate	s3.5
The provision of 'pocket parks' which may include mature plantings (to provide shade), landscaping, seating and/or rubbish bins	CTDC, A/S, HVC	Moderate	s3.6
The increased use of interpretative and artistic elements within Mary Street, as identified with the *Plan*	CTDC, A/S, HVC	Moderate	s3.6
The development of an 'adopt a box' planter boxes along Mary Street where footpath width allows and individuals, businesses and organisations support their introduction, at the potential sites identified within the *Plan*	CTDC, A/S, HVC	Moderate-Low	s3.6
The refurbishment of banner poles to increase their use and promote the sense of arrival to Cygnet	CTDC, HVC	Moderate-Low	s3.6
The resurfacing and landscaping of the trail along Lymington Road to Robleys Point facilities	HVC	Low	s3.5
The development of a trail from Burtons Reserve through the Coastal Reserve around the eastern foreshore of Port Cygnet	HVC, A/S	Low	s3.5
The upgrading the pedestrian link between the Primary School (and Sports Centre) and the Child Care Centre, St James College and Mary Street – possibly integrated with an open space linkage through the Council owned/developed residential land	HVC	Low	s3.5
The further implementation of established streetscape colour scheme for street furniture by Council, community and business stakeholders within Mary Street, as identified with the *Plan*	CTDC, A/S, HVC	On going	s3.6
Continued preference for infill development of Mary Street as the primary commercial district in Cygnet	HVC	On going	s2.1

Table 4.1 Suggested implementation for the *Cygnet Township Plan*.

APPENDIX A
TOWNSHIP COLOUR SCHEME

Figure A.1 is reproduction of a sample colour scheme provided to Inspiring Place by the Reference Group as the agreed colour scheme for Cygnet. This sample has been utilised with the preceding report as the recommended basis for paving and street furniture within the Town, and has to date been partially implemented within the Cygnet streetscape (e.g. new footpath paving, seating, banner poles and rubbish bins).



Figure A.1 Reproduction of a sample of the agreed colour scheme for Cygnet (Note: colour detail may vary with reproduction).

APPENDIX B
REVIEW OF PUBLIC COMMENT

The *draft Cygnet Township Plan* (hereafter, the *draft Plan*) was released for public review on public display from 29th March to 23rd April 2004.

Public review of the *draft Plan* consisted of display of a plan in the Cygnet Laundromat, and copies of the accompanying report (with reduced plan included) available through the Cygnet Library, Red Velvet Lounge and the Huon Council offices. With each report a comment was provided for the record of community comment.

The public review of the *draft Plan* resulted in 22 written submissions, most of which were provided within the available comment books. Included in the review process was a meeting (5th May 2004) with the Cygnet Streetscape Reference Group to discuss the review process and results.

Table B.1 provide a summary of submissions received on the *draft Plan*. Included in the Table are the authors' responses to each of the matters raised, and how the final report (hereafter, the *Plan)* will be amended if required.

The typographic or minor errors of fact that were identified by respondents will be corrected.

Submission Ref.	Comment	Response
1	▪ Concern that service road has been degraded in *draft Plan* for the Preliminary as presented to the Reference Group	▪ The service road has not been downgraded although it was omitted from the 'Action Plan'. The strong support for the service road demonstrated through the review will be reflected in the report, and the Action Plan will be amended to include the service road.
2	▪ Concern that there is an absence of recommendations for the northern end of Mary Street ▪ Do not want bank cut away from in front of town centre parking area ▪ Support for service road ▪ Support Cultural Recreation Area ▪ Support cycle/walking paths ▪ Support for BMX track	▪ The project considers the current priority for streetscape works lies in consolidating and reinforcing the main commercial hub of Cygnet (between Charlton Street and Frederick Street). No amendment is required. ▪ The *draft Plan* did not recommend the removal of the grass bank in adjoining the town centre parking area. No amendment required. ▪ The support is appreciated and will inform revision of the Action Plan.
3	▪ Greater justification/context required for the plan, ideally wait until completion of the new *Planning Scheme* ▪ Suggestion to secure land to the east of Mary St for future use ▪ Suggest a need for a town square or market facility ▪ Suggest a need for overflow parking, possibly as open space ▪ Concern that youth recreation facilities are not enough	▪ Due to the statutory process required, the implementation of a new *Planning Scheme* may yet be some time away, while changes to the planning scheme may certainly provide greater strategic context and justification to the *draft Plan*, there is no reason why the community views expressed in the *Plan* cannot similarly inform a new *Planning Scheme*. The *Plan* will be amended to highlight this relationship. ▪ The *draft Plan* already acknowledges the long term advantage of securing land to the east of Mary Street, particularly as a benefit of the 'Council Purchase' scenario. No amendment required. ▪ The *draft Plan* already acknowledges the value of a town square and/or market facility and the this role is recommended as ephemeral use of the town centre parking area. No amendment required. ▪ The *draft Plan* already acknowledges the role of open space (such as the cultural recreation area and/or rear parking facilities) as ephemeral overflow parking. No amendment required. ▪ The determination of what youth activities are required is well beyond the scope of the current project, the current project does however recommended the use of many areas and nodes within the cultural recreation area for youth recreation. No amendment required.

Submission Ref.	Comment	Response
4	▪ Support Cultural Recreation Area ▪ Support for recommendations regarding improved amenity and layout of towns centre parking area ▪ Support recommendations of roundabouts ▪ Support for service road ▪ Support for potential caravan/camping park as designated ▪ Support for walking tracks ▪ Support for revegetation along Agnes Creek	▪ The support is appreciated and will inform revision of the Action Plan.
5	▪ Concern the buses will no longer being able to access the town centre car park ▪ Suggestion that vacant land next to BP be utilised for overflow parking ▪ Support for service road	▪ The proposed layout of the Town Centre parking area does not preclude the entry and exit of buses, subsequent design development will ensure adequate turning radii. No amendment is required. ▪ Vacant land next to the BP service station was recommended as access to the rear service road (access to parking) and cultural recreation area, rather than parking facilities. No amendment is required. ▪ The support is appreciated and will inform revision of the Action Plan.
6	▪ General support for the plan but concern that without the service road the plan has little value	▪ The support is appreciated and will inform revision of the Action Plan.
7	▪ Observation that now is an appropriate time for new caravan/camping park as current caretaker is retiring	▪ No amendment is required.
8	▪ General support for the *draft Plan*, particularly the cultural recreation area and walking tracks	▪ The support is appreciated and will inform revision of the Action Plan.
9	▪ same author/submission as 2 above,	▪ n/a

Submission Ref.	Comment	Response
10	▪ Support for the service road (with addition of speed humps) ▪ Support for roundabouts ▪ Support for pocket parks ▪ Support for street plantings ▪ Support for town centre parking area	▪ The support is appreciated and will inform revision of the Action Plan.
11	▪ General support for the plan, concern for Council's willingness to actually implement the recommendations of the Plan	▪ No amendment is required.
12	▪ General support for the plan, would like to see more music and art spaces ▪ Perhaps a skate facility	▪ The support is appreciated and will inform revision of the 'Action Plan. ▪ The *draft* Plan recommends the inclusion of a skate facility and art spaces within the cultural recreation area, also refer to response to submission 3 above. No amendment required.
13	▪ General support for the *draft Plan* ▪ Need to upgrade public toilet facilities ▪ Support for the service road ▪ Support for walking/cycle paths ▪ Concern for actual adoption of the plan in light of increasing tourism visitors	▪ The support is appreciated and will inform revision of the 'Action Plan. ▪ Facilities within Loongana were excluded from the scope of the current project due the existing and ongoing implementation of a development plan by the local community. No amendment required.
14	▪ Support for pedestrian crossings on Mary Street ▪ Support for walking/cycle tracks ▪ Suggestion of extending cycle track on to Ables Bay ▪ Concern that the *draft Plan* does not mention minimum housing lot sizes to retain country feel ▪ Support for Cultural Recreation Area	▪ The support is appreciated and will inform revision of the 'Action Plan. ▪ The *Plan* will be amended to reflect the potential value of minimum lots sizes in retaining the 'rural character' of the surrounding rural residential area.

Submission Ref.	Comment	Response
15	▪ Suggestion that funds from sale of land behind fire station be reinvested in Cygnet ▪ Suggestion the land east of Mary Street should be purchased ▪ Concern for small lot sizes and pedestrian access in new Reardon subdivision ▪ Suggestion a new vehicular bypass is required given high traffic volumes	▪ The *draft Plan* recommends the use of proceeds from the sale of land within Cygnet to contribute toward other proposals. Council policy suggests that funds from the sale of land within Cygnet are not necessarily retained for use within that town. No amendment required. ▪ The *draft Plan* acknowledges that Council purchase of the land to the east of Mary Street is a strong option, unfortunately existing Council policy requires alternatives to direct purchase be identified. The *Plan* will be amended to include the further alternative of Council being granted the 'first right of refusal' over the land, through declaration of an 'interest' in the land area. ▪ The *Plan* will be amended to reflect the potential value of minimum lots sizes in retaining the 'rural character' of the surrounding rural residential area. ▪ The *draft Plan* included a summary discussion regarding the provision of a 'bypass' around Cygnet. At the current time the idea was not supported by the authors based on discussions with DIER staff regarding traffic volumes. The future provision of a bypass will be acknowledged as a benefit of Council purchasing the land to the east of Mary Street.
16	▪ Suggestion to make Cygnet the first eco village in Australia ▪ Suggestion of liaison with 2000 Sydney Olympic Committee for ideas and evidence ▪ Suggestion to ban plastic bags from Cygnet ▪ Construction of a second level on the Town centre parking area	▪ While such initiatives are commendable, they are beyond the streetscape and township and planning scope of the current project (e.g. eco village initiatives and plastic bags), liaison with external organisations was conducted where necessary. No amendment required. ▪ The construction of a second storey above the existing town centre parking area is considered by the authors as a critical impact upon the amenity of the Town, and would not provide the same outdoor multiple use space (i.e. markets, festival) as redevelopment of the car park. No amendment required.
17	▪ Support for upgraded signage/display at Channel Highway intersection ▪ Observation that Mary St/ Golden Valley Rd is more important than other end ▪ Support for Service Road	▪ The support is appreciated and will inform revision of the Action Plan.

Submission Ref.	Comment	Response
18	▪ Concern that too many roundabouts are planned, suggestion that traffic lights at southern intersection would be better	▪ Community consultations and the public review has demonstrated very strong support for the proposed roundabouts as an effective means to control unsafe traffic movements within Cygnet. No amendment required.
19	▪ General support for *draft Plan* ▪ Support for roundabouts and traffic calming ▪ Concern that the plan does not take into account increased traffic from developments on the outskirts of town ▪ Noise created by flags on banner poles would be irritating ▪ Land for overflow parking is waterlogged ▪ Provision of a bus stop next to town centre parking area ▪ Limit parking in town centre parking area ▪ Between the roundabouts should be 50km/h ▪ Provide off street parking	▪ The support is appreciated and will inform revision of the 'Action Plan. ▪ The project scope did not allow for substantive traffic forecasts and modeling, the cumulative results of the recommendations within the plan are envisaged to cater for reasonable future traffic demands. Consultations with DIER indicated that current road configuration has the capacity to cater for traffic volumes within the short to medium term, and that the traffic management works herein could extend this time frame further. No amendment is required. ▪ The use of the banner poles was proposed for specific events (e.g. Taste of the Huon, Huon Folk Festival, etc.) rather than continual use, although this intention was not clear within the report. The *Plan* will amended to highlight this intention in light of concerns regarding noise, maintenance, cost etc. ▪ Site visits and discussions with residents suggest the area identified for the main parking area (behind the Town Hall) is not subject to regular inundation, rather the area further east toward Agnes Rivulet is more prone to inundation, further engineering plans will be required when works are implemented. The *Plan* will be amended to highlight the need for detailed engineering plans prior to implementation. ▪ Parking limits in Mary Street are discussed in the *draft Plan,* consultations suggested that commuter parking in the Town Centre Parking area was not a significant problem. The *Plan* will be amended to include a recommendation to limit the length of stay in the Town Centre Parking area. ▪ Bus stop and facilities (e.g shelter, seating and information) are provided adjacent the town centre parking area. No amendment required. ▪ The existing speed limit through Cygnet, between the locations of the proposed roundabouts is already 50km/h (Shopping Zone). No amendment required. ▪ The *draft Plan* already provides off street parking, accessed from the service road. No amendment required.

Submission Ref.	Comment	Response
20	▪ Support for Cultural Recreation Area ▪ Support for traffic calming (i.e. roundabouts, pedestrian crossings) ▪ Support for recommendations regarding the town centre car park ▪ General support for the *draft Plan*	▪ The support is appreciated and will inform revision of the Action Plan.
21	▪ Support for pedestrian crossings ▪ Greater emphasis should be placed on tree planting along Mary St and the town centre parking area ▪ Why is there an ugly iron rail in front of Loongana?	▪ The support is appreciated and will inform revision of the Action Plan. ▪ The narrow width and services within both the carriageway and footpath along Mary Street preclude extensive tree planting, the provision of pocket parks and mature tree planting within the town centre parking area, along with the street planting shown on the *draft Plan* are considered an appropriate balance. No amendment required. ▪ Facilities within Loongana were excluded from the scope of the current project due the existing and ongoing implementation of a development plan by the local community. No amendment required.
22	▪ Support for walking tracks and revegetation of Agnes Rivulet ▪ Support for roundabouts ▪ Golden Valley Rd intersection is too narrow for inclusion of a pedestrian island ▪ Support for re-establishment and use of banner poles ▪ Support for pocket parks ▪ Suggest more street tree plantings are required	▪ The support is appreciated and will inform revision of the Action Plan. ▪ The *draft Plan* includes the realignment of Golden Valley Road and Mary Street intersection to provide the pedestrian island and turning radii, further engineering plans will be required when works are implemented. No amendment required.

Table B.1 Summary of submissions received and authors' response.

CYGNET TOWNSHIP PLAN 2010

CYGNET

Boundary adjustment to allow for a 6m wide strip and future potential for construction of a 2.4m wide shared trail connection

Allow layby parking for larger vehicles, vehicles towing trailers, caravans etc

Aquire land for long term car parking. Maximum parking numbers shown, construct only as many as required while allowing for expansion. Provide disabled access to bus stop.

Hardstand and bus shelter

Storm water from car park to be treated using a bio retention swale with outlet into existing drainage line

Screen planting and fencing to service station

Revegetate existing drainage line

Purchase and rehabilitation of 10m buffer along eastern bank Agnes Rivulet if opportunity arises in the long term

Bus layby for 2 buses between existing power poles. Relocate banners

New circulation road entry / exit location

Potential health centre development.

SSB - Safety Bar Island Type 1 at Golden Valley Road intersection.

Negotiate with land owner for boundary adjustment to allow for a 20m wide strip for a 2 way circulation road, a 2.4m wide shared trail and landscape amenity

Potential for occassional parallel parking

Passive nodes with bench seating / garden bed / tree planting and or artwork

Garden bed and screen planting to rear of existing blocks

Potential for future rear access to main street shops from new circulation road

Location for potential artwork

Allow gate for land owner access

Continue development in accordance with existing community park plan.

Note: Streetscape furniture should be sympathetic to the historic nature of the Town

treatment. Drain to a bioretention swale then into existing storm water drainage lines

Formalise access lanes to main street as pedestrian paths

Create car park on council owned land. Include tree planting for amenity. Drain to bioretention swale then into existing drainage lines.

Create safe crossing location

Boundary adjustment to allow for a 6m wide strip and future potential for construction of a 2.4m wide shared trail connection

Engineering works to enable bus pick up and drop off along George Street.

New circulation road entry / exit location

Re-establish banner poles at southern entry to town.

Formalise signage wall at Lymington Road and Charlton Street intersection.

Propsed landscaped roundabout.

Purchase and rehabilitation of 10m buffer along eastern bank Agnes Rivulet if opportunity arises in the long term

Burtons Reserve

Community park including:
- Mature landscaping.
- Trail connection through coastal reserve to Crooked Tree Point (not formalised but gravel path to laneway).

Town centre parking area

Landscaped multiple use space including:
- Hard pavement.
- Landscaping.
- Shelter structure.
- Signage and street furniture.
- Consolidated entry and exit.

N

0 10 20 30 40 50 100m

AUG 2010

INSPIRING PLACE

GEEVESTON MASTERPLAN

ARVE ROAD SITE DEVELOPMENT STRATEGY



The following Masterplan proposal has considered the options identified in this report, and expanded upon the opportunities available to develop a more detailed proposal, and further explore the possibilities offered by the current settlement pattern and unique characteristics of available throughout the townscape.

While this proposal is still 'diagrammatic' in nature, the proposed insertions do go some way to suggest the possibilities on offer in enhancing the key attributes of each location.

01] BRADY STREET EXTENSION

The extension of Brady Street to meet Arve Road provides an identifiable edge to the town precinct and Heritage Park. It would also establish a link from Arve Road to Huon Highway which would assist the town's Main Street in becoming more pedestrian-friendly. Subject to future traffic engineering, it is envisaged that the Brady Street extension is two way.

02] CONSOLIDATION OF RESIDENTIAL INFILL

The expansion of the existing independent living units use within this now well-defined zone - defined by existing carparks to the north and east and the extension of Brady Street - would provide an appropriate use between the commercial town centre and Heritage Park and in close proximity to the medical centre. An additional twelve (12) independent living units represented.

03] CHURCH STREET PEDESTRIAN ZONE

The extension of Brady Street to connect Arve Road and Huon Highway would reduce the through-traffic on Church Street, thereby enhancing the pedestrian friendliness of this commercial hub.

04] NEW CHILDCARE CENTRE

The new child care centre has frontage to Brady Street and overlooks Heritage Park in a similar manner to the existing community centre.

05] EXPANSION OF 'PLATYPUS WALK'

Extending the Platypus Walk to the north-west would also provide an attractive pathway from the proposed Motel development and carparking off Arve Road. This is a safer and more attractive pedestrian route from Motel to township than along Arve Road and would retain the open area of Heritage Park for multi-purpose occasional use without the impediment of a pedestrian path.

It also provides a future opportunity to 'signpost' the Platypus Walk commencement at Arve Road in a similar manner to the existing signage on Huon Highway.

06] MOTEL DEVELOPMENT OPPORTUNITY

Locating the Motel Development and associated parking on the western edge of Heritage Park maintains the open area for occasional use and enables the Motel to engage with the river-edge natural setting.

07] HERITAGE PARK ENTRY

Raised surface pedestrican crossing of Brady Street aligned with pedestrian access from township and carpark.

Seating, signage and lighting to be incorporated at this gateway to Heritage park and open parkland. Sensitive lighting to be incorporated to new and existing walking tracks to provide safety/security without visually impacting on surrounds.

08] HERITAGE / HISTORY MUSEUM

Proposed location for new Heritage / History Museum to house displays of the Geeveston History Society and Geeveston Archives.

09] COMMUNITY HALL CAR PARK

10] RELOCATED ROTUNDA

Relocated or new Rotunda to incorporate new BBQ facilities.

11] NEW PLAYGROUND

0m 10 20 50 100

1:1000 @ A1
1:2000 @ A3

N

1 October 2010

TERROIR

Tasmanian **Coastal Works** Manual

A best practice management guide for changing coastlines

Leah Page and Veronica Thorp

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CARING FOR OUR COUNTRY

Tasmania
Explore the possibilities

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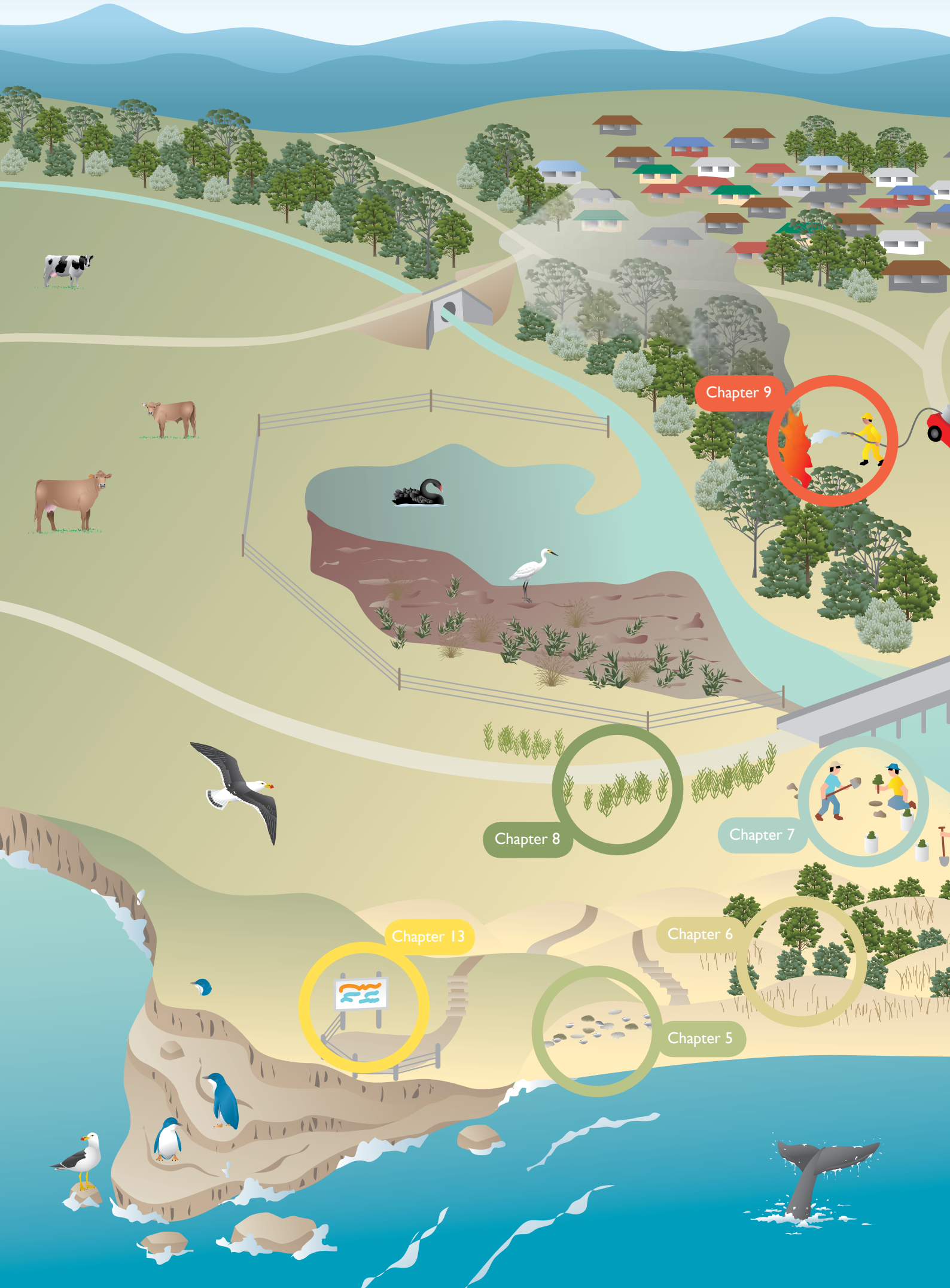
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Introduction

Tasmania's coast is a valuable and irreplaceable asset with diverse and sensitive natural and cultural values that require protection. Coastal landscapes of dunes, beaches, rocky shorelines, coastal wetlands, estuaries and saltmarshes support important vegetation communities and wildlife habitat. Tasmania's coast is also rich in Aboriginal heritage values and an important part of contemporary Aboriginal culture.

Coastal wildlife is diverse and significant, including migratory shorebirds and waders that stopover on Tasmanian wetlands, and shorebird species, hardly seen on mainland Australia, that nest on more remote beaches. The cool temperate coastal waters contain significant marine communities including vast seagrass beds, kelp forests and a very high level of endemism (species only found here).

Historically Tasmania's coastline has hosted industries and economies ranging from shipping and transport, whaling and sealing, through to mining of lime. Today coastal areas provide essential port infrastructure and are critical to transport and shipping operations. A number of heavy industries have been established on the coast, primarily to make use of the supply of water for cooling, and other industries such as fishing and aquaculture are intrinsically reliant on coastal areas.

Beautiful or iconic stretches of coastline are often the site of tourism ventures and developments such as resorts, caravan parks and golf courses. Extensive coastal areas adjacent to our cities and towns are prime real estate for coastal subdivisions whilst more remote locations often have coastal shack communities.

Tasmanians are fortunate to have such an abundance and variety of coastal areas to enjoy for recreation, and they have a long association with living and recreating on the coast.

Greater evidence of climate change and sea level rise on coastal environments in Tasmania is expected to emerge during this century. Many stretches of Tasmania's coastline already experience occasional inundation, and shoreline erosion events are becoming more frequent and widespread.

With the risks of inundation, erosion and recession already increasing, the management of natural and built assets needs to adapt to this threat. Climate change and sea level rise must now be considered

Tab photo: Friendly Beaches dunes – east coast of Tasmania. © Leah Page.

when planning and carrying out any management or development activity in the coastal zone to manage the coast sustainably.

The coast is under pressure from human use including modifications of shoreline areas for industry and development, the removal of native vegetation, introduction of weeds, and the introduction of pollutants and excess nutrients into estuaries. The vulnerability of coastal systems to climate change is exacerbated by increasing human-induced pressures in the coastal zone (DPIPWE 2010).

The intention of this manual is to help land managers to manage coastal environments for the protection of coastal values into the future, to ensure that works practices do not impact on coastal values and to encourage coastal works that are effective and of the highest environmental standard.

The Manual will also help land managers to better understand and address the possible on-ground consequences of climate change and sea level rise. Using this manual and other recommended resources, land managers will be better informed to plan the most suitable approach for the type and scale of the work being undertaken, taking into account the unique characteristics of each coastal area.

Purpose of the Manual

This manual and the accompanying guidelines provide practical information and guidance on the sustainable management of Tasmania's coast for council staff (e.g. parks and reserve managers, engineers and planners), other on-ground coastal managers, work crew leaders and contractors. This information will help avoid unnecessary damage and make rehabilitation of coastal areas more effective.

The Manual gives guidance on which environmental management issues should be considered and how to minimise the risk of causing environmental damage and impacts on coastal values. It contains information on identifying coastal values and assets and seeking assessments and approvals. It also summarises the main legal and policy obligations for protecting coastal areas and provides sources of further information.

The Manual covers both construction and ongoing maintenance for small- to medium-scale coastal management activities (including those classified as Level 1 under the *Environmental Management and Pollution Control Act 1994*).

The planning and approval process for industrial development and coastal subdivisions is beyond the scope of this manual. Land managers, however, have a responsibility to ensure that developments in the coastal zone minimise impacts on coastal values both during their construction and over their life span.

Managers of aquaculture facilities, golf courses, caravan parks and resorts can improve their environmental standards by following the best practice ideas throughout this manual such as maintaining native vegetation, removing weeds, protecting wildlife habitat and cultural heritage values, and reducing sediment and pollution run-off into waterways.

How to use the Manual

The Manual is organised into 15 chapters accompanied by a series of guidelines and checklists on specific management issues or approaches that complement each chapter. These can be found at the back of the manual.

The Manual provides information on climate change impacts as they relate to specific issues. Most chapters also have a climate change section that summarises this information, where available.

Some chapters provide design and siting guidelines (where appropriate) and others contain information on key issues to consider in order to attain best practice standards. Wherever possible, case studies illustrate successful approaches to best practice coastal management techniques.

Each chapter, except Chapter 1, has a 'Tools and resources' section at the end of chapter to direct users to documents, maps and other resources. Website addresses are provided wherever possible. All tools and resources are also collated in Appendix 5.

Complete citations of all documents referred to in the text and listed in the tools and resources sections are provided in a reference list at the end of the manual.

Guidance for minor works undertaken by community groups is available in the *Community Coastcare handbook* (Thorp 2005).

Chapter overview

Chapter 1 Working on the coast

Contributors : Kathy Noble (Coastal and Marine Branch, DPIPWE), Mike Pemberton (Biodiversity Conservation Branch, DPIPWE)

Background on understanding local coastal processes (interactions of wind, waves, tides and currents) on both hard and soft elements of the changing and dynamic coastline.

Planning and understanding coastal land management legislation and frameworks prior to starting works is important, to save time, effort and money while doing a good job. Approvals and permits are required for most works on the coast. Follow-up inspections are advisable, to find out whether the works are successful and if maintenance is required.

Chapter 2 Climate change and the coast

Contributors: Chris Rees (Coastal and Marine Branch, DPIPWE), Chris Sharples (Consultant)

An overview of the latest climate change information, predictions for Tasmania, and some of the implications of these changes for Tasmania's coastal environment

Chapter 3 Coastal hazards

Contributors: Chris Rees (Coastal and Marine Branch, DPIPWE), Jocelyn Phillips (Coastal and Marine Branch, DPIPWE)

Information about risk management and common coastal hazards such as storm damage and oil spills.

Chapter 4 Community values

Contributors: Kristy Blackburn (Southern Coastcare Association of Tasmania), Anna Wind (Cradle Coast NRM), Sally and Chris Johns (Southern Beaches Landcare & Coastcare Inc)

Working with the community, effective consultation and understanding social and recreational values of coastal areas.

Chapter 5 Cultural heritage management

Contributors: Elizabeth Tew (Aboriginal Heritage Tasmania), Ester Guerzoni (Heritage Tasmania)

Cultural heritage values, how to protect them and how to work with the Aboriginal community to manage Aboriginal heritage values.

Chapter 6 Coastal landscape management

Contributors: Chris Rees (Coastal and Marine Branch, DPIPWE), Chris Sharples (Consultant), Vishnu Prahalad (University of Tasmania), Jason Bradbury (Land Conservation Branch, DPIPWE)

An overview of the range of Tasmanian coastal landscapes and some key management practices to protect coastal landforms and the vegetation and wildlife values they support.

Chapter 7 Vegetation management

Contributors: Tim Rudman (Biodiversity Conservation Branch, DPIPWE), Anthony Reid (Biodiversity Conservation Branch, DPIPWE), Christine Corbett (Greening Australia)

Information about the conservation and management of natural coastal vegetation.

Chapter 8 Weed and disease management

Contributors: Mike Askey-Doran (Land Conservation Branch, DPIPWE), Karen Stewart (Land Conservation Branch, DPIPWE), Tim Rudman (Biodiversity Conservation Branch, DPIPWE), Sandy Leighton (Southern Tasmanian Councils Authority)

Information about preventing the spread of weeds and diseases whilst undertaking coastal land management activities.

Chapter 9 Fire management

Contributors: Sandra Whight (Parks and Wildlife Service, DPIPWE)

The role of fire in coastal ecosystems and fire hazard reduction works.

Chapter 10 Wildlife and pest management

Contributors: Rosemary Gales (Biodiversity Conservation Branch, DPIPWE), Anthony Reid (Biodiversity Conservation Branch, DPIPWE), Richard Schahinger (Biodiversity Conservation Branch, DPIPWE), Alistair Morton (Marine Farming, DPIPWE), Eric Woehler (Birds Tasmania)

Information about protecting wildlife habitat and values and threatened species and managing feral animals and marine pests.

Chapter 11 Soil management and earthworks

Contributors: John Chrispijn (Derwent Estuary Program), Rob Moreton (Land Management Branch, DPIPWE), Chris Grose (Land Management Branch, DPIPWE), Regan Parkinson (Land Management Branch, DPIPWE)

Information on best practice excavation works, soil and water management plans and protecting against acid sulfate soil contamination.

Chapter 12 Stormwater and crossings

Contributors: John Chrispijn (Derwent Estuary Program)

Information on stormwater and crossings and how to minimise impacts on coastal ecosystems and values.

Chapter 13 Access management

Contributors: Lynne Sparrow (Parks and Wildlife Service, DPIPWE), Stuart Dudgeon (Parks and Wildlife Service, DPIPWE), Richard Greenhill (Hobart City Council), Jennifer Burdon (Parks and Wildlife Service, DPIPWE)

Best practice techniques for designing and constructing and maintaining roads, tracks and access infrastructure, including signs.

Chapter 14 Structures and facilities

Contributors (Julie Woolley, Marine and Safety Tasmania)

Best practice techniques for designing, siting, constructing and maintaining coastal infrastructure such as boat ramps and public facilities.

Chapter 15 Shoreline modification

Contributors: Chris Rees (Coastal and Marine Branch, DPIPWE), Chris Sharples (Consultant), Jason Bradbury (Land Conservation Branch, DPIPWE), Ruth Eriksen (Aquatic Science)

Guidance on minimising impacts on coastal values when undertaking shoreline modification, reclamation and dredging.

Guidelines and checklists

Guidelines and, when required, checklists for specific work activities, are collated at the end of the Manual and are colour-coded to correspond with the relevant chapter.

The guidelines are designed to be used as stand-alone tools that can be issued to planners, engineers, contractors or works crew leaders to stimulate thinking about key coastal issues or best practice techniques when planning and undertaking coastal works. Dot points could be extracted for use as environmental clauses in contracts to improve environmental standards.

Several guidelines have detailed procedures and designs that are either not readily available elsewhere, or have been adapted to coastal conditions.

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Appendix 2: Organises the legislation according to work activity areas.

Appendix 3: Where to obtain information; contact details for key organisations.

Appendix 4: Lists useful community and non-government organisations.

Appendix 5: Lists useful tools and products, organised by activity area.

A glossary, list of acronyms and references can be found at the end of the Manual.

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1.2 Coastal processes

1.3 Managing conflicting uses of coastal areas

1.4 Legislation

1.5 Assessments and approvals

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1.8 Monitoring and evaluation

Tab Illustration by Brett Littleton

This manual provides best practice guidelines for many small-scale works in coastal areas. It is designed for local government, other land managers and contractors who undertake works on the coast.

The Manual explains the physical coastal processes that shape our coastline and the unique and important coastal values that require careful management. It describes key impacts of common coastal work activities and provides recommendations of what to do and what to avoid during these activities to protect coastal values.

The coastal environment is dynamic and complex and the shoreline is always changing in response to the interactions between wind, waves and tides. Coastal systems are delicately balanced to survive in these highly changeable environments. Management of these areas is further complicated by the number of authorities having land management and legislative responsibilities, some of which overlap or are not clearly defined.

Marine and coastal ecosystems are predicted to be highly vulnerable to the impacts of climate change. Coastal wetlands will be particularly vulnerable to changes in hydrology and the impacts of sea level rise. Significant areas of Tasmania's coast are at risk of erosion from exposure to sea level rise and storm surge inundation (DPIPWE 2010).

To work successfully in the coastal zone, and to avoid costly problems in the future, land managers will need an understanding of physical coastal processes, and have the wisdom to know when it is better to do nothing, by applying the precautionary principle. It is important to seek specialist advice and consulting broadly with other coastal stakeholders and the community.

1.1 Tasmania's coastline

Tasmania's coastline boasts vast and diverse coastal features such as estuaries, dunes, sandy beaches, rocky shores and headlands, sea cliffs, lagoons, tidal creeks and rivers, intertidal flats, rocky reefs, harbours and open coast. It also supports a wide range of habitats and ecosystems such as heathlands, woodlands, saltmarshes, seagrass beds, sponge gardens and kelp forests, as well as a rich variety of birds, fishery resources and marine life.

Tasmania's coast is a valuable and irreplaceable asset with diverse and sensitive natural and cultural values that require protection. Many coastal areas are highly valued for recreation, tourism, resources (such as fisheries), amenity and intrinsic values.

Tasmania has a remarkably long coastline for its size, due to a highly indented shoreline with large estuaries, harbours and embayments, and many offshore islands,

Figure 1.1 South coast track in the World Heritage Area
© Chris Rees



including those in the Furneaux Group and King, Maria, Bruny and Macquarie islands (Sharples 2006). Tasmania has a longer coastline than Victoria and NSW combined (Mount 2001).

No place in Tasmania is more than 115km from the sea and most population centres and major industries are on or near the coast. Many Tasmanians live, work and play on the coast.

1.2 Coastal processes

The coastal zone is not a stable and constant environment, but a dynamic place that can change rapidly in response to natural processes such as seasonal weather patterns.

Waves, winds, currents, tides and storms are the major forces on the coast. The results of actions and interactions of these natural forces on the shoreline and near-shore seabed are called coastal processes. These include erosion and deposition, movement of dunes, longshore drift, and the effects of storms on the coastline.

There are complex issues at the land and sea interface and an understanding of the connectivity between the catchment and the coast is essential in managing coastal issues and landscapes. Activities in the catchment can affect the water quality of our river systems and wetland areas, which in turn impacts on the health of coastal and marine environments. This can have implications for natural values such as seagrass beds, fish stocks and biodiversity.

Many coastal foreshores are still responding to the last sea level rise around 6 000 to 7 000 years ago and will continue to respond to increases in sea level associated with climate change.

The geology, alignment of coastal landforms and local geomorphology (orientation and shape of coastal landforms) can all influence how coastal processes operate. The alignment of the coast influences the way waves are bent (refracted) as they approach the shore and the way they are aligned to the coast, and therefore how sand is moved along the shoreline.

Waves

Waves are formed by winds blowing over the sea. Waves are the most important force on sandy coasts because they transport sand on- and offshore and can also move sand along the shore. In winter, beach profiles often become steeper due to stronger wave action, which removes sand from the beach and deposits it on offshore sandbars. In summer, calmer waves bring sand back to the beach (Figure 1.2).

The relative amounts of summer deposition and winter erosion can mean sand dunes gradually move either seaward or landward. Beaches backed by parallel ridges (eg. Seven and Nine Mile, Rheban and many in the north-west) demonstrate a history of accretion (sand build up) and seaward expansion. Others, like Roches Beach in the east and Ocean Beach in the west, appear to have entered a new phase of sustained erosion.

Currents

Nearshore currents are created by winds, waves, tides and river flows. These currents may transport large amounts of sand and alter the shape of offshore sandbars.

Longshore currents (longshore drift) occur when waves come in at a slight angle to the shoreline. Each wave washes sand grains diagonally up the beach, the sand moves down the beach with the backwash and is then edged a little further along the beach by the next wave.

As a result, the sand is carried in a zigzag pattern along the beach and can cause an overall movement of sand and currents in one direction, called longshore drift. The effects of longshore drift can be observed by noting where sand builds up against a solid object (e.g. a groyne) or by the way a spit forms across a river mouth.

Rip currents can also carry large amounts of sand to offshore bars during wilder weather.

Tides

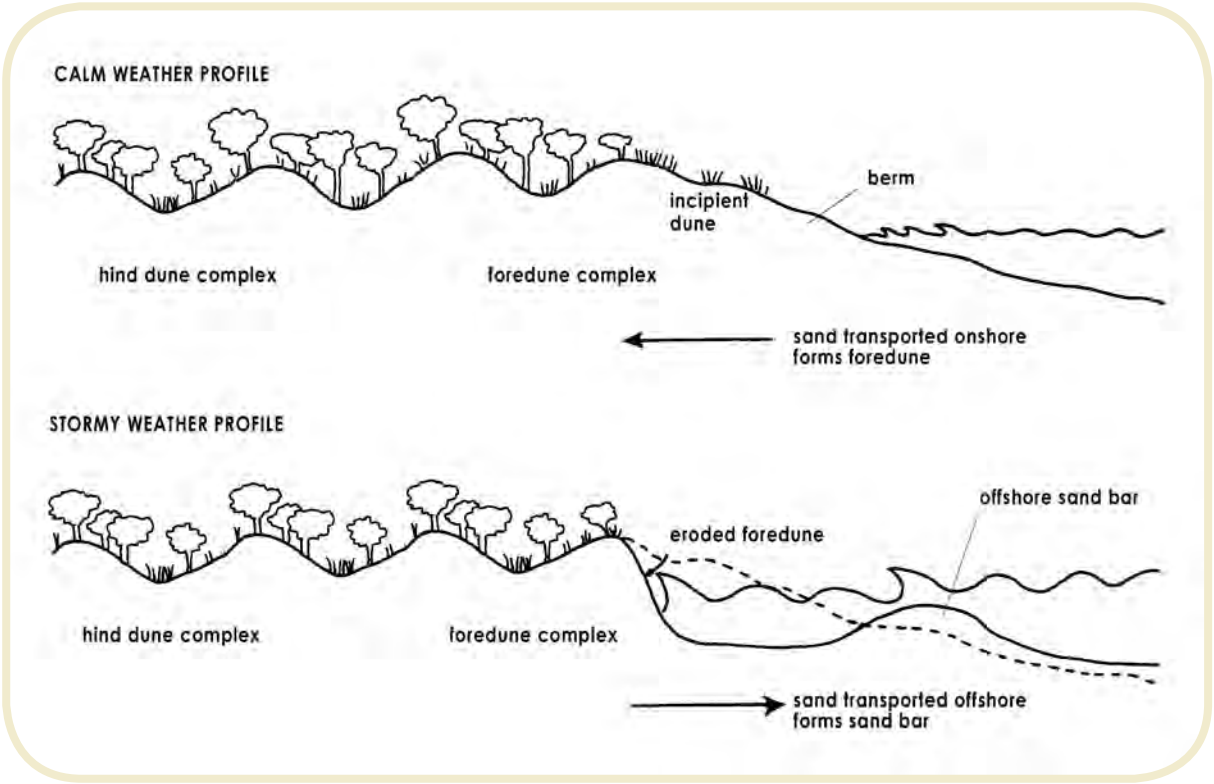
Tides play a more indirect role in transporting sand and altering the shape of sandy coastal areas. The ebb and flow of tidal waters can create tidal currents that transport sand and are mostly seen in areas where there is a narrow passage between landforms.

Tides play an important role in coastal estuaries where the regular inundation of low-lying areas often supports saltmarsh and wetland habitats which are important water filters and fish nursery areas.

In the lunar month, the highest tides occur roughly every 14 days, at the new and full moons, when the gravitational pull of the moon and the sun are in line. These are called **spring tides** (Tarbuck & Lutgens 1987).

On Australia's east coast, the highest tides occur

Figure 1.2 Beaches and foredunes undergo major cycles of change, as storm waves drag sand out to the surf zone and calmer swells bring the sand back onshore. The beach, foredune and offshore sandbar are all part of the one dynamic system. Source: Community Coastcare handbook (Thorp 2005)



during the winter months of June, July and August, and the summer months of December, January and February. The highest of each of these periods (i.e. one in winter and one in summer, totalling two per year) are known as the **king tides**.

The winter king tide usually occurs at night and may go unnoticed. Consequently the summer king tide, usually during the daytime, catches the most attention (Tarbuck & Lutgens 1987).

Wind

Wind takes over as the main dune-forming process above the high tide mark. Wind picks up sand grains deposited by waves and moves them landwards until vegetation (or other obstructions) slows the wind, and the sand grains fall. Sand grains become trapped in vegetation and form dunes. Wind is also a cause of dune erosion and blowouts, often when vegetation has been disturbed and sand becomes mobile.

Storms

Storms can dramatically change beach, dune and bar systems in a very short period. Storms produce high energy and steep waves that can erode beaches, destroy foredunes and even erode the dunes behind. It often takes years after a storm before the original dune is restored; intervention may be required if public safety is at risk.

In some locations, 90% of the amount of sand moved by the annual longshore drift can occur in just two weeks during very stormy periods. A major storm or succession of storms is likely to occur every 20 years or so.

Shoreline erosion and recession

Erosion is the wearing away of land or the removal of beach or dune sediments by wave action, tidal currents, wave currents, wind or drainage. Erosion may result in long-term losses of sediment and rocks, or merely the temporary redistribution of coastal sediments.

Recession is the result of ongoing erosion with no sediment replenishment, resulting in the landward retreat of the shoreline.

The impacts of sea level rise and climate change will result in more frequent and severe storm events and higher sea levels will increase the rate of coastal erosion and lead to coastal recession in many coastal areas.

Sediment budget

Sediment budget refers to the balance between sediment added to and removed from the coastal system by coastal processes. When more material is added than is removed, there is a surplus of sediment and the shore builds seaward. Coastal erosion occurs when coastal processes remove more material from the shore than is added.

The movement of sand and sediment in coastal areas is very important to the way humans use the coast. Sand can build up in unwanted areas (river channels) and be eroded from valued sandy landforms such as beaches. Understanding coastal processes is essential to ensuring that coastal works do not cause unwanted changes to sand movement such as increasing erosion.

Figure 1.3 Significant saltmarsh areas are associated with Duckhole Rivulet within the Pitt Water-Orielton Lagoon Ramsar site in south-east Tasmania.
© Vishnu Prahalad

1.3 Managing conflicting uses of coastal areas

Tasmania's coast is an irreplaceable asset of natural, economic, recreational, cultural and historical significance. Managing the coast and coastal resources requires a balance between these values. Sometimes the range of activities and values associated with any particular area of coastline can be in conflict.

Planning for coastal areas needs to take into account the range of coastal values, assets and land use types, to ensure that land use is appropriate for the area and not likely to create conflict in the future.

Coastal land management is further complicated because a range of legislation and a number of different authorities are responsible for managing the spectrum of coastal values.

There are no simple answers for managing conflicting uses but the best outcomes are achieved through a holistic approach that includes consideration of natural, economic and cultural values, the natural processes, community perception, the land use, threats and unique local issues. Broad consultation, expert advice and planning are essential.

Tips for managing conflicting uses

- Public safety must be paramount
- Identify all of the stakeholders in your particular area
- Identify all of the values through consultation with stakeholders and by seeking expert advice
- Identify all the natural and cultural heritage values – seek expert advice
- Identify the threats, both present and future
- Provide lots of opportunities for stakeholders to be involved in planning and decision-making, as this will reduce conflict in the long term
- Ensure that you understand the relationships between the potential coastal uses and values – some may be completely incompatible



Case Study 1.1: Pitt Water-Orielton Lagoon Ramsar site – an example of the complexity of managing coastal areas

Pitt Water-Orielton Lagoon is an extensive and diverse wetland system in south-eastern Tasmania providing habitat for migratory and resident shorebirds and is an important estuarine ecosystem for marine life. The lagoon area provides habitat for a number of threatened bird species and is one of only a few locations in the world that is home to the threatened Tasmanian live-bearing seastar (*Parvulastra vivipara*).

The wetland supports a number of threatened plant species as well as some of the most significant saltmarsh habitat in Tasmania. The area is an important nursery for the commercially valued school shark and also supports commercial oyster farming. Recreational activities include fishing, paddling, windsurfing and kite-surfing. The area is also rich in Aboriginal heritage values.

The wetland is surrounded by residential development and high-intensity agricultural land as well as some light industry and a golf course.

Pitt Water-Orielton Lagoon is one of 10 internationally recognised Ramsar sites in Tasmania. Ramsar wetlands are recognised as Wetlands of International Importance by the Ramsar Convention, an intergovernmental treaty that provides the framework for international cooperation for the conservation and wise use of wetlands.

Parts of the wetland area are also managed as a Nature Reserve under the *National Parks and Reserves Management Act 2002*. The Parks and Wildlife Service (DPIPWE) is responsible for managing the nature reserve; Crown Land Services (DPIPWE) is responsible for the management of any unallocated Crown land; the Biodiversity Conservation Branch of DPIPWE is responsible for upholding the commitment to the Ramsar Convention; the Sorell and Clarence City Councils are responsible for stormwater management and any areas of council land.

In addition, the wetland is bisected by two causeways managed by the Department of Infrastructure, Energy and Resources.

A range of other legislation also covers the heritage values, threatened species, fisheries and marine resources and weed management. The migratory shorebirds that use this area annually are protected under a number of international agreements including CAMBA*, JAMBA** and ROKAMBA^, to which Australia is a signatory.

In addition to these natural and cultural values the area receives stormwater from the surrounding residential areas, is under pressure from inappropriate access by vehicles, horse and dogs, has some significant weed incursions and is subject to agricultural run-off from the surrounding catchment.

A management plan for the area has been created by the Parks and Wildlife Service to guide its activities and a collaborative project, being implemented by a committee that represents the majority of the stakeholders, has produced some good outcomes in managing access, controlling weeds, protecting Aboriginal heritage, raising awareness and protecting bird values and habitat.

*China-Australia Migratory Bird Agreement **Japan-Australia Migratory Bird Agreement ^Republic of Korea-Australia Migratory Bird Agreement

1.4 Legislation

This section details the legislative framework of coastal management decision-making and the more common legislation that will be triggered by activities and works in coastal environments.

Coastal management in Tasmania is complex and a number of authorities are responsible for different jurisdictions. Always seek advice to ensure that planned activities meet the legislative requirements.

In addition to the information provided here, **Appendix 1** lists all of the relevant legislation for coastal management. The legislative and policy requirements for each type of activity are listed in **Appendix 2**.

1.4.1 Resource Management and Planning System

All planning decisions made in Tasmania fall under the umbrella of Tasmania's Resource Management and Planning System (RMPS). All the legislation that contributes to the RMPS has five common objectives that drive decisions about the use of land and natural resources in the state:

- promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity
- provide for the fair, orderly and sustainable use and development of air, land and water
- encourage public involvement in resource management and planning
- facilitate economic development in accordance with these objectives
- promote the sharing of responsibility for resource management and planning between the different spheres of government, the community and industry in the state.

The RMPS covers:

- local planning schemes that are prepared and administered by councils
- state policies applicable to particular issues, which must be adhered to by both local and state government
- a single appeal system involving the Resource Management Planning Appeal Tribunal (RMPAT)
- a suite of processes and instruments which gives legislative effect to the RMPS objectives above

1.4.2 Tasmanian coastal legislation

Aboriginal Relics Act 1975

The *Aboriginal Relics Act 1975* provides for the preservation of Aboriginal relics and the declaration, management and protection of Protected Sites. Under the Act, Aboriginal heritage is referred to as 'relics', and includes such things as artefacts, paintings, carvings, engravings, arrangements of stones, middens, or any objects, sites, or places that show signs of the activities of Aboriginal inhabitants.

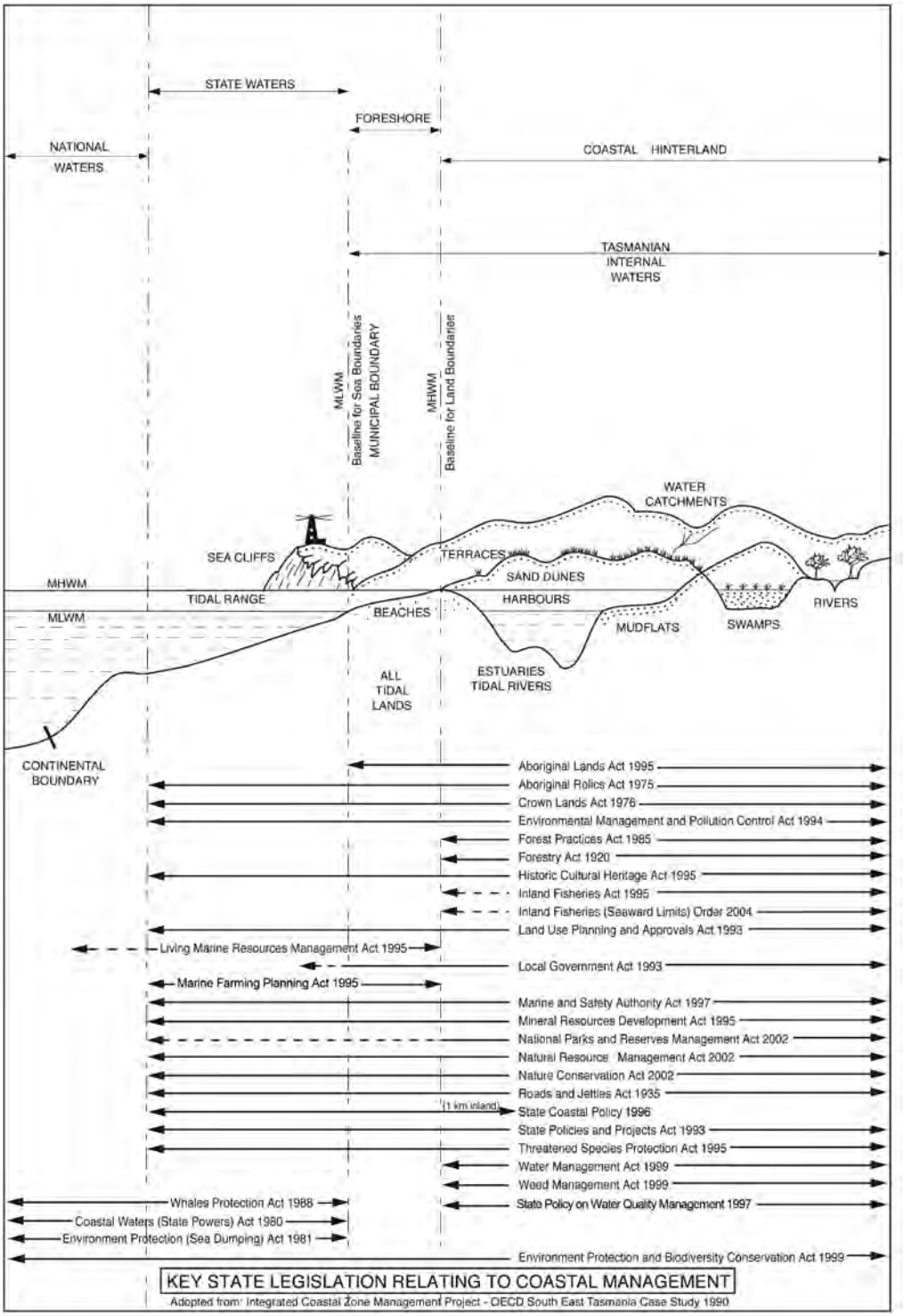
All Aboriginal heritage is protected under the *Aboriginal Relics Act 1975*. If at any time during works Aboriginal heritage is suspected, you must cease works immediately and contact Aboriginal Heritage Tasmania for appropriate management advice.

Crown Lands Act 1976

In Tasmania, the majority of coastal land is Crown land covered by the *Crown Lands Act 1976*. The Act governs the management and use of Crown land, including land that is licensed or leased from the Crown.

Crown Land Services (DPIPWE) is responsible for the assessment of all applications for the use of Crown land, including the private use of land reserved

Figure 1.4 Key state coastal legislation. Adapted from: Integrated coastal zone management project – OECD south-east Tasmania case study 1990.



under the *Crown Lands Act 1976* and land reserved under the *National Parks and Reserves Management Act 2002*. The Parks and Wildlife Service are however responsible for the day to day management of land reserved under the *National Parks and Reserves Management Act 2002*.

All land below the high water mark falls under the jurisdiction of the Crown. Developments involving Crown land may also require approval from council under the *Land Use Planning and Approvals Act 1993*.

Environmental Management and Pollution Control Act 1994

The *Environmental Management and Pollution Control Act 1994* (EMPCA) is the primary environment protection legislation in Tasmania. The role of EMPCA is to integrate local government and state planning assessment, and environmental management and approvals. Three classes of activities are identified under EMPCA (Levels 1 to 3), reflecting the range of potential environmental impacts.

Local government authorities have responsibility for the assessment, approval and environmental regulation of smaller-scale activities (Level 1) and must endeavour to prevent or control activities that might cause pollution.

The implementation of approved activities, along with any conditions, is regulated through a permit process under the *Land Use Planning and Approvals Act 1993*. Level 1 approved activities are deemed to pose the lowest level of risk to the environment.

This manual covers both construction and ongoing maintenance for small- to medium-scale coastal management activities (including those classified as Level 1 under EMPCA) undertaken by local government works crews, other government agencies, contractors, consultants and other parties.

Historic Cultural Heritage Act 1995

The *Historic Cultural Heritage Act 1995* provides protection of heritage with respect to places of archaeological, architectural, cultural, historical, scientific, social and technical significance.

Land Use Planning and Approvals Act 1993

The *Land Use Planning and Approvals Act 1993* (LUPAA) is the central Act within the RMPS. It provides the framework and key components for strategic and statutory land use planning and development. LUPAA requires that a local council planning scheme must aim to further the objectives of the RMPS, be consistent with any state policies, and have regard to the council strategic plan.

LUPAA provides for the creation, application and administration of planning schemes by planning authorities. Council planning schemes set out the requirements that apply to new land use and development. Planning controls on land use are applied in the form of zones and associated development controls.

The Tasmanian Planning Commission (formerly the Resource Planning and Development Commission, RPDC) is responsible for assessing planning schemes and planning-scheme amendments that are prepared by local planning authorities. Appeals against decisions made by local planning authorities are resolved through RMPAT.

Living Marine Resources Management Act 1995

The *Living Marine Resources Management Act 1995* promotes the sustainable management of living marine resources, provides for management plans relating to fish resources, and protects marine habitats. Living marine resources refers to all fish

species and other marine life including marine plants and vegetation such as seagrass and seaweed. It does not include whales or aquatic mammals or birds, or freshwater fish.

The Act applies to both commercial and recreational fisheries, as well as to aquaculture, marine reserves, marine pollution, release and importation of fish, diseases and pests, and other marine habitat-protection issues.

The Act and its regulations set minimum sizes of fish that can be taken; establish allowable fishing equipment and techniques, total allowable catches and bag limits for fisheries; give powers to fisheries officers, and allow for Fisheries Management Plans to be prepared.

National Parks and Reserves Management Act 2002

The *National Parks and Reserves Management Act 2002* provides for the management of national parks and other reserved lands. These include national parks, state reserves, nature reserves, game reserves, conservation areas, nature recreation areas, regional reserves, historic sites, private nature reserves and private sanctuaries. The Act sets out the values and purposes of each reserve class and how they should be managed according to management objectives for each class.

Nature Conservation Act 2002

The *Nature Conservation Act 2002* provides for the conservation and protection of the fauna, flora and geological diversity of Tasmania and for the declaration of national parks and other reserved land. The Act also provides for conservation covenants and reservation of private lands.

Schedule 1 sets out the different classes of reserved land, and outlines their values and the purpose for reservation.

Schedule 3a sets out a list of threatened native vegetation communities. In addition to individual threatened species, a number of threatened coastal vegetation communities are defined (e.g. riparian vegetation, wetlands, saltmarsh).

State Policies and Projects Act 1993

This Act deals with the making of Tasmanian Sustainable Development Policies, the integrated assessment of projects of state significance, the State of the Environment Reporting and for related purposes. The two state policies most relevant to the coastal zone are the *State Coastal Policy 1996* and the *State Policy on Water Quality Management 1997*.

State Coastal Policy 1996

The *State Coastal Policy 1996* has a central objective of sustainable development of the coastal zone. All activities, uses and developments that might impact on the coast are required to meet the objectives, principles and outcomes of the State Coastal Policy.

The policy has three main guiding principles:

- protection of natural and cultural values of the coast
- use and development of the coast in a sustainable manner
- integrated management and protection of the coastal zone is a shared responsibility.

The coastal zone is defined in the *State Coastal Policy 1996*, and revised in 2003 in accordance with the *State Coastal Policy Validation Act 2003*, as the area encompassing state waters and all land to a distance of 1km inland from the high water mark.

The main vehicles for implementing the State Coastal Policy are through land use planning controls, marine farming development plans, and local council strategic and operational plans.

Where there is a discrepancy between the State Policy and the provisions of a council planning scheme, the State Policy takes precedence.

A review of the *State Coastal Policy 1996* started in 2004, resulting in a proposed new *draft State Coastal Policy 2008*, which has yet to be formally adopted.

Until a new State Coastal Policy is gazetted, the *State Coastal Policy 1996* remains in force.

State Policy on Water Quality Management 1997

The central objective of the *State Policy on Water Quality Management 1997* is sustainable management of Tasmania's surface and groundwater resources, by protecting or enhancing their qualities while allowing for sustainable development.

Protected Environmental Values (PEVs), which describe the current uses and values of waterways, must be set for all Tasmanian surface waters, including estuarine and coastal waters. PEVs have been documented in a consultative process that involved all interested industry and community groups.

PEVs are useful in determining which key indicators should be monitored, and target levels for protecting or improving water quality for designated uses. In general, these values should be protected by implementation of best practice environmental management, and by compliance with emission limits set by the regulatory authority to minimise pollution of waterways.

Threatened Species Protection Act 1995

Threatened species are native species that are listed under state and federal legislation to receive special protection. Tasmanian species become listed under the *Threatened Species Protection Act 1995* due to restrictions in their abundance, range or habitat, or threatening processes likely to result in population reduction.

Management options to protect listed species include declaring areas of critical habitat, preparing and implementing recovery and threat-abatement plans, and instigating interim protection orders. Interim protection orders prevail over planning schemes, and can include the prohibition or regulation of any activity likely to affect the habitat adversely.

Weed Management Act 1999

The *Weed Management Act 1999* is the central legislation covering weed control and eradication in Tasmania. A core component is the legal process of declaring a weed species under the Act. Once declared, appropriate actions can then be taken against the plant species, including preparing a weed management plan. The legislation also addresses compliance requirements, and powers of inspectors appointed under the Act.

1.4.3 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

Activities that are likely to have an impact on matters of national environmental significance, for example listed threatened species and ecological communities, or listed migratory species, may also trigger an assessment under the federal Environment Protection and *Biodiversity Conservation Act 1999* (EPBC Act).

This assessment is conducted by the Australian Government, and the assessment is triggered by the referral of the matter to the Minister for the Environment.

1.5 Assessments and approvals

Before planning or undertaking works at any location, check who owns the land and what approvals and permissions are required. Works on public land, such as beaches, dunes and coastal reserves, will require the permission and approval of the land manager/owner. This would generally be Crown Land Services (CLS), Parks and Wildlife Service (PWS) or the local council. For private land, permission of the landowner will be required.

Land below high water mark is generally Crown land; works there require approval under the *Crown Lands Act 1976*. There are also some Crown reserves extending up to 30m inland from high water mark. These are shown on the Tasmanian 1:25 000 scale topographic maps.

Councils and state agencies, such as PWS and CLS, can assist in identifying ownership of the land and the responsible land management authority. They can also

Table 1.1 Approval processes for coastal management activities

Councils	State government	Australian Government
Planning approval under the local planning scheme.	Approvals under the various state Acts detailed in section 1.4, such as *Aboriginal Relics Act 1975, Crown Lands Act 1976, Environmental Management and Pollution Control Act 1994, Land Use Planning and Approvals Act 1993, Living Marine Resources Management Act 1995, National Parks and Reserves Management Act 2002, Nature Conservation Act 2002, Threatened Species Protection Act 1995, Weed Management Act 1999.*	Compliance with *Environment Protection and Biodiversity Conservation Act 1999* may require approvals.
Building approval under the Building Code of Australia.	Each agency has different processes and requirements for approvals that they administer.	
The Engineering, Works and Parks and Recreation branches of local government are also required to obtain planning and building approvals from within their local governments.		

advise on the nature of any approvals required and how to go about lodging an application for approval.

Common approval processes are summarised in Table 1.1. Each land manager may also have requirements for certain formal assessments to be carried out so that values such as natural and cultural heritage and the potential impacts of a proposed activity are systematically considered.

Reserve Activity Assessment (RAA), Parks and Wildlife Service

The RAA system applies to all reserves managed under the Tasmanian *National Parks and Reserves Management Act 2002*. Depending on the nature and size of the proposed activity, an RAA assessment may be required for works undertaken in any reserves administered by PWS. The proposed activity will be assessed in order to minimise or reduce the potential for impacts on the reserve values. In some instances this may require input from specialists.

Aboriginal Heritage Assessment, Aboriginal Heritage Tasmania

Any development or works outside an existing development footprint should involve Aboriginal Heritage Tasmania at the beginning of the planning stage. It will advise if an Aboriginal heritage investigation or mitigation measures are needed to protect Aboriginal heritage. The level of investigation required will depend on the size and complexity of the project, the potential for Aboriginal sites to be present and what sites are already known in the area.

Crown Land Services Assessments, Department of Primary Industries, Parks, Water and Environment (DPIPWE)

Any activity occurring on Crown land requires approval from Crown Land Services (CLS). Crown land may be sold, leased or made available for use under licence. It includes lands such as beaches, coastal and river reserves, public reserves, reserved roads, road verges, schools and hospitals. Coastal land or land adjoining inland waters will generally not be available for sale.

Formal application must be made to CLS to purchase the land or hold a lease or a licence over it. Application forms are found on the DPIPWE website.

A leaseholder has exclusive possession of the Crown land for a fixed term and pays rent. A licence does not provide for exclusive possession and is usually issued for access purposes or temporary short term use. Sale gives freehold title of the land upon payment of market value or an agreed price and is generally by public auction, tender or private treaty.

CLS assesses applications for land purchases and developments taking into account its merits, the management objectives for the land, and a public benefits test. Applications are considered by a Technical Advisory Group made up of government stakeholders with technical expertise across a number of areas, including environmental, European and Aboriginal heritage, and conservation. The public benefits test assesses the economic, social and environmental benefits of the proposal.

Environmental Impact Assessment (EIA), DPIPWE

The Environment Protection Authority Board's environmental impact assessment process applies to projects that are classified as Level 2 activities (under Schedule 2 of the *Environmental Management and Pollution Control Act 1994*), or other activities as determined by the Director of the Environment Protection Authority.

The scale and impact of the proposed activity determines whether an environmental impact assessment is required. Many of the activities covered in this Manual would be regarded as Level 1 activities, and therefore would not require a formal environmental impact assessment. These activities will, however, still require assessments of coastal values in order to minimise impacts on coastal environments and to abide by environmental legislation. Some of the more complex and larger activities, such as shoreline protection works, may be classified as Level 2 activities.

Threatened Species Assessment, Australian Government

The *Environment Protection and Biodiversity Conservation Act 1999* protects nationally listed threatened species by requiring activities or developments that are likely to have a significant impact upon a nationally listed threatened species to undergo a formal environmental impact assessment and approval process.

Additional assessments

If formal assessment processes are not deemed necessary it is still important to ensure that all natural and cultural values are identified before works commence.

Check with the Tasmanian Heritage Office and the heritage section of PWS for heritage values.

Search the Tasmanian Geoconservation Database at DPIPWE for geoheritage sites.

Seek expert advice on wildlife and vegetation values from the DPIPWE Biodiversity Conservation Branch and the Wildlife Management Branch.

Seek expert advice on coastal processes and coastal landforms from a coastal geomorphologist.

1.6 Working with contractors

In many circumstances contractors will be engaged to undertake works in coastal areas, such as fencing, earthmoving, vegetation management and weed control.

The qualifications and performance standards that need to be met will differ from one land manager to the next.

Contractors may not always be up to speed with latest best practice or have an understanding of the complex values and issues within the coastal environment. The guidelines throughout this manual will provide a benchmark for 'best practice' standards to expect from contractors.

Choose contractors with high environmental standards. Seek references or evidence of environmental credentials.

Provide clear environmental management targets in contract schedules. Works guidelines in this manual could be used as a basis for clauses in agreements with contractors.

A contractor who gets the job done in half the expected time might save money initially, but it could take a lot more time and money to fix problems that result from cutting corners or not following correct procedures.

1.7 Before work starts

This section deals with the importance of planning coastal management works and provides a step-by-step process for good management of work activities. Effective works on the coast require thorough planning and preparation, risk assessment and monitoring. Works must adhere to all relevant Australian and Tasmanian Acts, regulations, codes, strategies, and management plans.

Undertaking environmental management activities and construction works in coastal areas without adequate care could lead to environmental damage, which may be difficult and expensive to remediate. Works in the wrong place or completed incorrectly can soon be destroyed by natural coastal processes.

It makes sense to develop a works plan, obtain specialist advice, get the correct approvals, and notify or involve nearby residents and other interested people. It may be necessary to do cultural and natural heritage surveys before commencing works, to locate and identify values such as Aboriginal heritage, geoheritage, threatened species or vegetation of high conservation value.

Managing coastal environments is not an exact science and sometimes innovative methods may be more appropriate than traditional approaches. The guidelines in this manual do not rule out other approaches, as long as they are supported by specialist advice.

1.7.1 Things to consider

Works on unstable coastal landforms such as dunes, cliffs and beaches can increase erosion, which in extreme cases can lead to loss of structures (e.g. retaining walls) and danger to the public.

Coastal vegetation is important habitat and plays a role in stabilising foreshore areas. Some coastal vegetation communities are threatened or contain threatened species. Works should avoid impacts on threatened species, minimise damage to vegetation and implement rehabilitation where required.

Works on soft and sandy shorelines will be especially vulnerable to the increasing frequency of storm surges and rising sea level associated with global changes in climate.

Works should be appropriate for the site: soft' methods (e.g. revegetation) are preferable to 'hard' structures (e.g. seawalls) on the shoreline. Hard structures need engineering advice and require ongoing maintenance.

Acid sulfate soils in some areas can cause great damage to coastal structures and natural values if disturbed by excavation. Some areas have toxic sediments (e.g. heavy metals from mines or refineries) that may cause water pollution if disturbed.

Particular precautions are required with the use of machinery, particularly large machines such as excavators and bulldozers, on fragile and unstable coastal soils.

Machinery and equipment can transport weeds and diseases, and should be cleaned off-site before travel to the work site.

Commercial activities that rely on protecting natural ecosystems (e.g. fisheries and ecotourism) may be adversely affected by some works.

Some wildlife such as shorebirds, penguins and threatened species are extremely vulnerable to disturbance of their coastal habitat.

Works in coastal areas may disturb Aboriginal or other heritage sites and destroy cultural heritage values.

Consultation with the community is important to gain support for works and activities. Working with local organisations such as Coastcare groups is critical to ensure that proposed works will not impact on existing coastal management work being undertaken by volunteers.

1.7.2 Prepare a plan – six steps to effective coastal works

Planning is essential for all work activities to ensure works are undertaken effectively, efficiently, safely and with minimal impact on the environment. This section outlines how to plan effective coastal works.

Environmental management and construction projects require careful investigation and planning to ensure that the works:

- are effective in solving the environmental problem
- are appropriate for the specific site conditions (including impacts of sea level rise and climate change)
- are undertaken with minimal intervention at the site
- minimise damage to the environment
- maintain the integrity of ecosystems
- respect and protect Aboriginal heritage places and other heritage places
- involve the community through consultation and participation.

A works plan should be prepared before starting work, outlining the works to be done and who will do them, ensuring staff or contractors have appropriate skills and training for the job.

The plan should include a risk assessment detailing the measures that will be used to minimise the risk of causing environmental damage. It should specify the proposed methods and procedures and identify the materials, labour and costs, both for the works and for maintenance and ongoing monitoring.

Some key coastal issues to include in the plan

Identify sensitive vegetation communities and threatened species that might be affected by the works and need to be protected. A scientific survey may be needed.

Design works specifically for conditions at the site (e.g. direction of the prevailing wind/s, waves and movement of marine sediments) and interfere as little as possible with the coastal processes and ecosystems. Time activities to accommodate the tides and seasonal changes in winds, weather and storms. Consider seeking a specialist advice on whether the proposed work methods, design and placement of structures are suitable for local conditions, especially on soft or sandy coasts. Consider and seek advice on the local natural coastal processes.

Identify and avoid any potential impacts on wildlife and plan to reduce these impacts. Seek advice if working near sensitive wildlife habitat, such as shearwater rookeries or penguin colonies. Time activities to allow for seasonal breeding cycles for birds such as penguins and nesting shorebirds. Also consider providing for wildlife requirements (e.g. when revegetating an area, remember some shorebirds require bare patches to build their nest in the sand).

Protect Aboriginal and cultural heritage values. Ensure that these values are identified and any specifications for activities adhered to.

Work with the local community: in particular, it is important to collaborate with local environmental groups such as Coastcare groups.

Protect surface and ground water quality. Take steps to minimise pollution and changes to the natural drainage patterns of the shore area.

Minimise construction and excavation on the seabed or shoreline. Manage it carefully under the advice of engineers and a coastal geomorphologist. Identify potential acid sulfate soils and toxic sediments.

Avoid introducing marine and terrestrial weeds, pests and diseases (e.g. on the wheels of vehicles, in mulch products and via boats), particularly phytophthora root rot (*Phytophthora cinnamomi*) and rice grass.

Plan for sea level rise by avoiding major works in highly vulnerable locations and factoring into the design and siting of coastal infrastructure the latest sea level rise predictions by the Intergovernmental Panel on Climate Change (IPCC). Coastal storms and storm wave surges are likely to occur more frequently in the future. This will remove sand from dunes, cause flooding in coastal areas and increase the salinity of coastal groundwater and freshwater wetlands (Sharples 2006; IPCC 2001).

Occupational health and safety (OH&S) and public safety are important when installing structures or providing facilities. Adhere to Australian Standards. Ensure that public safety, use and enjoyment are maintained. Provide adequate warning signs, fencing and other barriers while undertaking works that may endanger public safety. Provide safe, well-marked alternative access routes, if necessary, during works.

Protect aesthetic values. As far as possible, structures should be concentrated at certain locations to reduce the environmental and visual impacts (from both short and long views, from both land and water) on the general area.

The works program should include rehabilitation of the site, if necessary, and provide for regular follow-up to make sure the works are effective and in good repair. Schedule revegetation works for the most appropriate time of year for the best plant-survival rates.

Step 1 - Seek specialist advice

Good specialist advice can help to prevent or solve problems caused by constructions that are not properly sited or designed for the changing conditions on the coast. Inappropriate works can cause a range of issues including erosion or deposition of sand where it is not wanted.

Coastal geomorphologists have knowledge of managing coastal sands, soils and landforms such as dunes and cliffs.

A coastal engineer has experience in designing and constructing bridges, boating facilities and other structures to take account of tides, currents, sediment movement and other local coastal processes.

Other relevant specialists include Aboriginal Heritage Officers, biologists and ecologists.

In these situations it is essential to seek specialist advice:

- a new hard engineering structure (e.g. a concrete wall) is proposed for a soft or sandy coastline
- the structure is large enough to trap sediment or change wave action (e.g. shoreline stabilisation techniques, groynes on sandy beaches, seawalls)
- an existing hard structure is creating ongoing problems (e.g. sand being trapped by a boat ramp).
- soft engineering techniques are being investigated and it is difficult to know which technique is most appropriate for the existing conditions (e.g. mesh or brush fences, and/or revegetation)
- there is a risk of disturbance to significant or threatened vegetation communities, flora or fauna, or cultural and Aboriginal heritage sites.

It is possible that minor upgrades to hard structures such as jetties and boat ramps will not require specialist advice (e.g. resurfacing, or filling in holes at the end of boat ramps caused by boat propellers). However these works should be undertaken with great care and with consideration of coastal values. If values are disturbed or impacted by the work activity, specialist advice should be sought immediately.

Step 2 - Communicate, communicate, communicate

Make a communications plan. This includes notifying all neighbours and users likely to be affected by the works. The scale and type of activity will determine the level of community consultation required.

Identify the different values of all coastline users, not just local residents and regular visitors. This is important even for small-scale projects. One stretch of coastline may be used at different times for a variety of recreational and economic pursuits. Recognising the values and interests of the various people who use the area will help to identify and minimise conflicts between them.

Community consultation is important to inform people and gain public support for coastal works and developments that might affect public use and enjoyment of coastal areas. Consultation takes time and money, but it may be cheaper than having contractors and expensive equipment standing idle while a dispute brings work to a halt. Consider also the cost to future generations of doing the wrong thing.

Consult the local Coastcare group or other interested groups before undertaking major works to make sure the works do not interfere with their activities. Many public works (e.g. management of weeds, native vegetation and wildlife) require ongoing work and maintenance and will be more successful if they are joint projects carried out in partnership with

the community. ***Refer to section 4.2 Working with community.***

Step 3 - Undertake a risk assessment

Risk can be defined as the likelihood of an event occurring and the consequence if that event occurs. Risk assessment helps answer the questions:

- what is going to happen?
- how likely is it to happen?
- how vulnerable am I to it?
- how do I manage that?

Risk assessment enables land managers to deal with uncertainty through a step-by-step process to examine the current or potential environmental impacts of work activities and to deal with them before they become a problem. Environmental risk assessments follow the same basic principles as assessing a workplace for occupational health and safety (OH&S) risk.

The main stages:

- identify any environmental hazards associated with the proposed work
- assess the likelihood and potential environmental consequences of the hazards
- identify the environmental risk
- prioritise the risks to get an idea of which measures need the most attention (sometimes the small things are very significant)
- determine the control measures needed to prevent environmental harm, or to minimise impacts if something does occur – if no measures are available to bring risk within acceptable levels, then the project may need to be redesigned, or perhaps even halted
- review, apply and monitor environmental protection measures for effectiveness and ongoing maintenance.

Simplify risk assessment processes by linking coastal and environmental risk assessments to existing OH&S risk assessments.

Step 4 - Seek approvals

Obtain permission from the land manager and/or landowner and all relevant authorisations for the works, to ensure that activities are undertaken appropriately and within the law.

Land tenure on the coast can be complex. If there is any doubt, land tenure can be identified through the Land Titles office at DPIPWE. ***Refer to section 1.5 Assessments and approvals.***

Step 5 - Supervise works

Ensure all works staff and contractors are briefed on minimising environmental impacts and provide adequate supervision to ensure best practice environmental standards are being implemented.

Step 6 - Monitor and review

Monitor the effectiveness of the works plan during the course of activities and be prepared to respond to changed circumstances.

1.8 Monitoring and evaluation

Keeping records of the results of coastal management works will help to judge success and inform future decisions. The more details are gathered, the easier it will be to understand why something worked in one location and not in another.

This information will also improve opportunities for organisations to work in partnership with each other and to access external funds for projects, by demonstrating the need for funds or proving the ability of the organisation to undertake the works.

Ongoing monitoring will pick up any problems or changes early on and reduce the cost of mitigating or managing those problems.

Monitoring

Monitoring is the regular gathering of information in a consistent manner. It is a way to keep track of the condition of an area or asset.

Monitoring may include photographic records, water quality testing, beach profile measurements, visitor use statistics, asset condition assessments and habitat or natural value assessments.

A monitoring plan should specify the sites to be monitored, the procedures to be used, the timing or frequency of sampling or assessing and the format of reporting.

Evaluation

Evaluation is the systematic review of an activity or project. It indicates whether the activity has provided the result intended. Evaluation involves collecting and analysing information, often through monitoring and generating a report.

Evaluation enables information to be used to plan for future projects, review management methods and techniques, and determine the worth of a particular activity.

Tips for photographic records

Photographic records enable before-and-after comparisons and are very useful for monitoring impacts or outcomes of activities.

- Set up photopoints – mark the exact spot from which you take your first photo; over time, take subsequent photos from the same spot.
- Try to choose an angle that includes some distinguishing features in your photo.
- Aim to take photos at the same time of day and, as far as possible, with the same camera settings.



2 Climate change and the coast

At the time of producing this manual a number of key Tasmanian government initiatives were still underway and are expected to be achieved over the course of 2011:

- Development of a new Tasmanian Framework for Action on Climate Change
- Finalisation of the state's Regional Planning Initiative
- Development of a state Framework for Mitigating the Impact of Natural Hazards through Land Use Planning
- Consideration of a new State Coastal Policy for Tasmania.

As with all topics addressed by the Manual, chapters will be regularly updated online as these initiatives are finalised and new information is released.

2.1 *Adapting to climate change*

2.2 *Predicted climate and sea level rise changes and consequences*

2.3 *Managing the coast for climate change*

2.4 *Tools and resources*

Tab photo: Existing infrastructure already underwater at high tide in south-east Tasmania. © Leah Page.

This chapter provides an overview of the implications for climate change to coastal management. It describes the coastal landforms, natural values and types of infrastructure most likely to be affected by climate change and sea level rise, and provides information for assessing inundation, erosion and recession risks for a chosen location. Predicted climate and sea level rise changes over this century and the science and the science of climate change and sea level rise are touched on only briefly because many other publications summarise the science well. There is a table summarising climate change information found in other chapters of the Manual and tools and resources for assessing and planning for climate change impacts are at the end of this chapter.

The Manual adopts a precautionary approach to climate change and sea level rise and suggests that coastal managers should plan for the upper levels of predicted changes. This approach will be in tune with growing agreement among researchers that climate change impacts are emerging more rapidly than earlier thought.

Projections based on the best scientific evidence suggest that the global climate will continue to change and sea levels to rise well beyond this century. Many stretches of Tasmania's coastline already experience occasional inundation, and shoreline erosion events are becoming more frequent and widespread.



Over the next century these changes may be very significant in some areas, and could cause major alterations to our coastline and the way we use it. Management of natural and built assets needs to adapt to this.

2.1 Adapting to climate change

This section discusses the importance of adapting to climate change and sea level rise in addition to the already complex and challenging task of managing the existing natural and human pressures on the coast.

Climate change and the rise and fall of sea levels are not new phenomena on this planet and, left alone, the coast's natural systems have great capacity to adapt and establish a new equilibrium. In undisturbed environments plant and animal communities can adjust and move with the changing shoreline, and in unpopulated and undeveloped areas these mechanisms can largely be left to proceed unaided. However, in more developed areas, existing private and public assets may not only hinder natural adaptation by causing 'coastal squeeze' (pressure on natural and cultural heritage values), but also require protection in their own right.

In this manual it is recognised that, in Australia and other countries, artificial shoreline protection is a very costly business, it will impact on the aesthetic and ecological values of coasts, and all protective structures have a limited life span. Tasmania's relatively small population is unlikely to have the economic resources to protect any but the most important built assets and shorelines from erosion and inundation. To help reduce the future cost of shoreline protection, some underlying principles are suggested for managing climate change and sea level rise.

- Work in partnership with local communities and other stakeholders.
- Base decisions on good scientific knowledge – investing in appropriate studies can help avoid very costly and damaging mistakes.
- As far as possible, do not interfere with natural processes.
- Manage the coast's vegetation and habitats to enhance their natural resilience to change.
- Avoid locating new buildings and other infrastructure where there is any chance they might interfere with natural processes, and/or require protection within their expected life span.
- Where intervention is absolutely necessary, thoroughly assess any potential consequences for adjacent shorelines.
- Choose 'soft' reversible coastal protection options in preference to more permanent 'hard' structures.
- Recognise that any intervention to protect assets will almost certainly be costly, ongoing, and continue to increase in scale as sea level continues to rise.

These principles are largely self explanatory. In essence the advice is to plan well with good information and, where engineering or other works are proposed, take every measure to keep disturbance of the area to an absolute minimum (this may involve a review of the existing works culture).

Consider whether the area or asset to be managed is defensible in the long term – in a growing number of places around the world it is being recognised that parts of the coast will have to be left to respond in their own way.



It is also important to recognise the value of no-regrets, low-regrets and win–win adaptation options when managing climate change risks:

no-regrets:

policies and decisions that will have immediate benefits under present-day climate conditions

low-regrets:

low-cost policies, decisions and measures that have potentially large benefits over time

win-wins:

policies, decisions and measures that help manage several coastal hazard or climate related risks at once, or bring other environmental and social benefits, e.g. preservation of natural character.

(Derived from: *Coastal hazards and climate change: A guidance manual for local government in New Zealand*, Ministry for the Environment 2008b)

2.2 Predicted climate and sea level rise changes and consequences

This section summarises climate change predictions and impacts on coastal areas. Information on managing some of these impacts is provided in Chapter 3 Coastal hazards.

Over the coming century scientists expect the sea level to continue to rise, at times at an accelerated rate as has been observed over the last few decades. The Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC 2007) conservatively estimated a sea level rise of up to 79cm by 2100, however this figure did not allow for polar ice-sheet melting. Measurements since 2007, and improved understanding of ice-sheet responses, show that sea level rise of over 1.0m and as high as 1.5m is possible, and sea levels will continue to rise long after 2100. It is anticipated that these higher projections will be reflected in the next IPCC report, expected in 2014.

Most state governments in Australia roughly agree on the sea level rise benchmarks to use for future planning and management decisions. For example, for planning purposes New South Wales now assumes a sea level increase of 40cm above 1990 levels by 2050 and 90cm by 2100. Victoria has recommended working to a figure of 80cm by 2100, and Queensland is recommending the same 2100 value. It is likely that these benchmarks will be revised upwards following the release of the next IPCC report. There may be small discrepancies between exact figures but there is agreement that sea levels will rise considerably, the mean high and low water mark will increase and storm surges will reach further inland.

Many of Tasmania's coastal areas will be at risk from sea level rise and more severe storm surges associated with climate change, with impacts including increased coastal erosion and recession of erodible shorelines, inundation and flooding of low-lying areas, and coastal infrastructure. Coastal infrastructure in high-risk locations is likely to incur damage or require redesign or relocation.

2.2.1 Storms and inundation

Sea conditions are rarely flat like a pond, and storms in particular can dramatically add to the water level as well as creating very high energy conditions on the shore. Storms are usually caused by low-pressure systems in the atmosphere, with high wind speeds that can generate large waves.

Low pressure, tide and effects of wind can all contribute to a storm surge, or the height of the

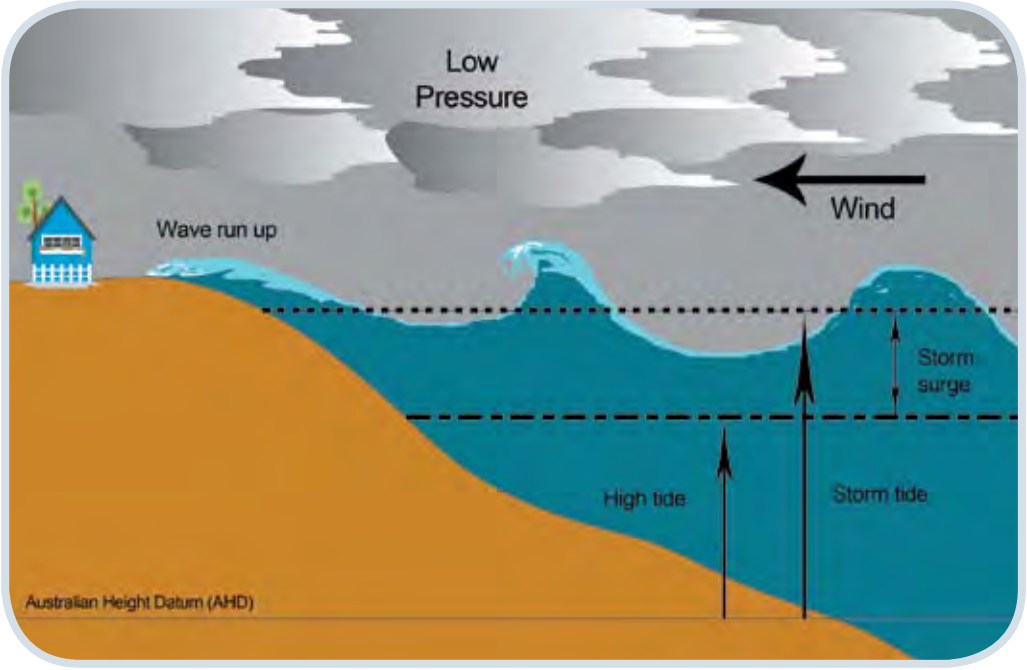


Figure 2.1 Storms greatly increase the height of tides and the level of wave run-up. Storm surge (due to wind and low pressure) increases the height of the tide and wind pushes the waves further onshore. Final inundation height = storm tide + wave run-up.

water above the predicted tide level. Wind blowing across water creates waves, currents and 'wave set-up' where sea water is pushed up into bays and estuaries and piles up against shores. The stronger the wind, the greater these effects will be. All of these can increase the water height during a storm. When a wave breaks it can also 'run up' the shoreline to an even greater height, depending on the size of the wave and the slope of the shore. Together the final water level is called the 'storm tide'.

Effect of low-pressure systems in Tasmania

Low atmospheric pressure itself causes a rise in sea level. Less downward pressure on the sea surface allows the sea level to rise about 1cm per 1hPa fall in pressure.

For example, in the extreme storm off north-east Tasmania that hit the Sydney–Hobart yacht race in 1998 pressure, dropped to just below 980hPa. This means that if all other factors were equal, the sea level was approximately 40cm higher than a typical high pressure system of around 1020hPa at that time of year.

In addition, the same low-pressure system that is producing a storm may result in tens of centimetres of rain in nearby catchments. When this rain enters the lower reaches of rivers, estuaries and narrow mouthed bays, it may be unable to escape if a storm tide is also pushing up coastal water levels. This can rapidly cause increased flooding in estuaries.

Severe storms coinciding with a high tide and interacting with the shape of the coastline can not only flood low-lying coastal areas but also quickly cause severe erosion. All of these processes are natural and affect shores episodically under stable sea levels. However, with sea level rise, storm surges that have the ability to cause erosion and flooding will become more frequent, and wave or sea water intrusion will reach higher levels than in the past. Any significant rise in sea level will mean that storm events appear to occur more often because what used to be a minor storm event will become a larger magnitude event due to the increased sea level.



Potential consequences of storms during high tides in light of sea level projections

In simple terms, sea level rise will raise the average water level of oceans and estuaries. As the average water level rises, so too will high and low tide levels affecting the natural processes responsible for shaping the coastline. Exactly how the coast and estuaries will respond is complex and often driven by local conditions but, in general, higher sea levels will lead to:

- increased or permanent tidal inundation of land by seawater
- recession of beach and dune systems and to a lesser extent cliffs and bluffs
- changes in the way that tides behave within estuaries
- saltwater extending further upstream in estuaries
- higher saline water tables in coastal areas and
- increased coastal flood levels due to a reduced ability to effectively drain low-lying coastal areas

These physical changes will have an impact on coastal ecosystems, access to and use of public and private lands, historical and cultural heritage values, arable land used for agriculture, freshwater access, public and private infrastructure, and low-lying areas of coastal land that are affected by flooding.

From *NSW Sea Level Rise Policy Statement* (Department of Environment, Climate Change and Water 2009a)

2.2.2 Coastal erosion and recession

Climate change has implications for the natural coastal processes of coastal erosion and accretion.

Erosion (wearing away of sand, rock and sediment) and accretion (build-up of sand or sediment) are normal cyclical events on soft sediment coastlines (such as beaches and dunes). Where sea levels are rising a threshold is reached where erosion outstrips accretion and the beach will erode more than it is replenished. Once this tipping point is reached, the shoreline will tend to retreat (this process is known as coastal recession).

Many open-coast sandy beaches in south-east Australia have yet to reach this critical threshold, although some appear to have already passed it. Probable examples in Tasmania include the high energy south-west beaches and those subject to unusual conditions such as Roches Beach in south-east Tasmania. Once a beach is in a receding state, the rate of recession and how far it will continue will depend very much on the local characteristics of the area, such as the geomorphology, underlying bedrock, modifications to the shoreline and development of coastal land behind the beach.



2.3 Managing the coast for climate change

This section provides information on the implications of climate change and sea level rise for managing the natural and built environment in coastal areas. Management of the coast and planning new infrastructure or development must take climate change and sea level rise into account. To do this requires an understanding of localised coastal and marine processes and assessing risks to coastal values and infrastructure.

Risk management and responding to hazardous events, such as storms, are critical to coastal planning and management in the light of climate change. In some areas, planning for retreat will also be required. ***Refer to Chapter 3 Coastal hazards.***

Adapting to climate change will cost money. However, planning early to reduce the vulnerability of natural ecosystems and infrastructure to climate change impacts, and initiating appropriate adaptation strategies to reduce these impacts, will save money in the long term.

A growing number of detailed studies of specific coastal areas have identified the extent of the risk from climate change and sea level rise. In Tasmania, Clarence City Council has produced a thorough report *Climate change impacts on Clarence coastal areas – Final report.* (SGS Economics et al. 2009) identifying buildings and infrastructure in low-lying coastal areas in the municipality at risk over this century. This study was in response to community concerns about erosion of beaches and flooding events in coastal areas.

A further example, from Victoria, is a report to the Gippsland Coastal Board on the implications of climate change and sea level rise on vulnerable coastal areas (Gippsland Coastal Board 2008).

The concerning findings of both the Gippsland and Clarence studies highlight the importance of understanding inundation and erosion risks to property and infrastructure in vulnerable low-lying coastal areas. Both these reports have used the best available science, including high-resolution mapping of the height of the land above sea level (digital elevation model). This is obviously essential when working out how far sea level rise or storm tides will penetrate inland. They have also used good geological mapping of the coast to identify, for example, how far soft erodible sediments extend inland and what type of underlying bedrock is present.

In Tasmania the Sharples Report (Sharples 2006) provides information about the state's coastal landform types and their vulnerability to coastal processes such as erosion, recession and storm surge flooding, as a result of sea level rise. Sharples' data on the shoreline type for any part of Tasmania can be found on the Land Information System for Tasmania (LIST) website, and has more recently been incorporated into the national Smartline map, which can be used on the OzCoasts website.

2.3.1 Climate change and coastal values

This section includes a very brief discussion of the natural and cultural coastal values most likely to be affected by climate change and sea level rise. More detailed information is available in Vulnerability of Tasmania's natural values to climate change (DPIPWE 2010). ***Refer also to Chapter 6 Coastal landscape management, Chapter 7 Vegetation management and Chapter 10 Wildlife and pest management.***

In general, the coastlines that are vulnerable to inundation or erosion and recession are low-lying and/or composed of soft erodible materials. However other important factors include the degree of exposure to ocean storms and swells, or to locally



generated wind waves (which may be quite erosive over longer fetches within estuaries and lagoons) and whether the location is in an estuary or embayment fed by an inland catchment where a river flood peak may be held up by a storm tide.

Beach and dune systems may be more resilient to sea level rise because of their dynamic nature and ability to accrete new sediments. There is a summary of the range of coastal landscapes and landforms in ***Chapter 6***, which describes both soft sediment (sandy) and rocky coastlines and coastal values.

Coastal wetlands, and the vegetation communities and biodiversity associated with these systems, will be affected by changes to rainfall patterns and water regimes, along with inundation associated with sea level rise and increased intrusion of salty groundwater.

Vegetation communities and wildlife habitat in other coastal environments will also be affected by changes to rainfall patterns, increased temperatures and changes to fire regimes. Weeds and pests may be favoured by the changed conditions and put increased pressure on species and systems. Loss of threatened species and diminished biodiversity are likely to occur.

The marine environment is also vulnerable to increases in water temperature and changes to ocean currents, which will see species expand their range and compete with Tasmania's unique temperate marine life. Increased acidification of oceans due to rising absorption of CO_2 has the potential to impact on many marine species.

It is more important than ever to conserve natural values and communities and restore degraded ecosystems to help them adapt to the impacts of climate change.

Tasmania's coastline is rich in Aboriginal heritage values and there are also significant maritime and cultural heritage sites. These sites are at risk of damage or loss from erosion and sea level rise.

Recreational areas on the coast will also be affected by erosion and sea level rise. Some sites may become hazardous due to erosion and storm events. Coastal recreation and residential areas may require special management to enable current use to continue. In other areas, retreat may be the only viable option and land managers may need to identify new, more appropriate areas for coastal living and recreation where possible.

2.3.2 Climate change and built assets

Particular built asset types might be more vulnerable to climate change and sea level rise than others. Any low-lying infrastructure near the coast should be assessed for erosion and inundation risk from rising sea levels and other consequences.

It is often forgotten that water tables will rise and salt water will penetrate further inland in ground water as the average sea level rises. Buried linear infrastructure may be particularly vulnerable, including sewer, storm water and water mains, buried electrical and telecommunications cabling, and gas mains.

Greater hydrostatic pressure on some types of foundations, cellars, tunnels, underground car parks, pools, tanks and sumps will occur. The possibility of mechanical damage and/or corrosion of susceptible structures and materials is real and should be included in maintenance checks. When planning new infrastructure of these types, the design should take into account rising ground water and possible salt water intrusion.

Roads, rail and other transport infrastructure may also be affected by higher ground water levels causing softening and greater plasticity in the underlying substrate.



Information for planning, designing and constructing coastal infrastructure (such as seawalls and revetments, stormwater outfalls, roads and tracks, boat ramps and crossings) to minimise impacts on the environment is considered in more detail in later chapters. ***Refer to Chapter 12 Stormwater and crossings, Chapter 13 Access management, Chapter 14 Structures and facilities and Chapter 15 Shoreline modification.*** The Manual does not provide particular guidance on how to manage the infrastructure itself to mitigate climate change effects. Expert advice from engineers will be required.

2.3.3 Climate change and coastal industry

Climate change has the potential to affect industries in coastal areas, like tourism, agriculture, fisheries and aquaculture. Major industries should be making their own detailed assessment of the long-term consequences of climate change.

Coastal industries that are based on the productive capacity of the environment, such as fisheries and aquaculture, will be susceptible to rising water

Figure 2.2 The impacts of sea level rise have been noticeable during king tide events. Tidal waters of the Hunter River submerging residential areas in Newcastle, NSW. The king tide in December 2008 combined with a low pressure system to inundate low-lying areas of New South Wales and Queensland. Source: A snapshot of future sea levels: Photographing the king tide (Watson and Frazer 2009). © Bruce Coates





temperatures, changes to ocean currents and ocean acidification. Agriculture will need to take into account changing weather patterns, especially rainfall and altered fire regimes. Any industries with shore-based infrastructure will need to plan for sea level rise.

The tourism industry has an affinity for coastal locations, and planning and maintenance of both major and minor infrastructure will need to take climate change and sea level rise into account. The ecological values on which many recreational tourism initiatives are based may also be affected. The industry does, however, have the opportunity to play a valuable part in raising public awareness of these changes.

2.3.4 Tools for assessing climate change impacts

Antarctic Climate Ecosystems Cooperative Research Centre (ACE CRC) web tool

This web based tool is based on the history of sea levels mapped at 29 ports around Australia provided by the Australian National Tidal Centre. A number of projected sea level rise scenarios from the Intergovernmental Panel on Climate Change, Assessment Report Four (AR4; IPCC 2007) are used in the calculations. The user of the tool may expect to gain an understanding of the increase in probability of extreme events caused by a rise in average sea level. The tool is only available to those who have undertaken a workshop and understand the limitations of the data.

Coastal values of southern, northern and north western Tasmania: NRM projects (Coastal Values data)

Through three projects, easily accessible mapped data sets on vegetation, species habitat and geomorphology have been produced to support better strategic planning, land use planning and management of the coast. The projects looked at a 100m-wide coastal strip (from the high water mark) of the Northern, Southern and Cradle Coast Tasmania Natural Resource Management (NRM)

Table 2.1 Mapped data sets for the Coastal Values data projects.

Vegetation and fauna layers (8)	Geomorphology layers (9)
• Vegetation	• Geomorphic lines – Condition
• Native vegetation condition	• Geomorphic lines – Geoconservation values
• Native vegetation viability	• Geomorphic lines – Sensitivity
• Vegetation significance	• Geomorphic lines – Lower intertidal landforms
• Weeds	• Geomorphic lines – Upper intertidal landforms
• Observed fauna habitat	• Geomorphic lines – Backshore landforms
• Potential fauna habitat	• Polygons – Historic dune mobility
• Fauna significance	• Polygons – Present dune mobility
	• Polygons – Soft sediment landforms



Regions, and collected and assessed a range of coastal vegetation, species habitat and geomorphic values data. National parks and some larger coastal reserves are not included. Available mapped data sets are summarised in Table 2.1.

All these mapped data sets are available on the Tasmanian Land Information System LIST website.

Follow the links to the 'Coastal Values' layer in the layer management function of LISTMaps. Experienced GIS Software users can also download the data sets from the DPIPWE website, or obtain them on CD from the Coastal and Marine Branch, EPA Division, DPIPWE, to upload onto their own computers. Supplementary resources such as Interpretation Manuals and photographs are also available for download.

Foreshore values mapping

The foreshore values database holds information on the values and condition of the foreshore for the three NRM regions in Tasmania. It provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. It is designed to enable an integrated approach to foreshore management, and is aimed at managers, interested stakeholders and the wider community.

For the purposes of this project, the foreshore is defined as 'the area between the high and low water marks where tidal influence exists, together with saltmarshes, rock platforms and un-vegetated beaches (excluding dunes)'. Adjoining areas are also included where relevant.

The mapped data available includes a single line map for each of four indices and the 13 supporting attributes of foreshores:

- Natural value – biology and geomorphology
- Human use value – amenities, recreation and European heritage
- Condition – ecological disturbance, geomorphology and introduced marine species and beach weeds
- Pressure – anthropogenic modification, recreation and tourism, pollution sources, vulnerability to climate change, and introduced marine species and beach weeds

These electronic mapping layers can be viewed on the Land Information System Tasmania (LIST) website, or requested from DPIPWE. The mapping layers can operate as a stand-alone interpretive tool or be used with other maps.

Maps of vulnerability of the coast to sea level rise (Smartline)

The vulnerability of coastal areas has been mapped by Sharples 2006 using available data, termed a '1st pass' assessment. A more detailed assessment or 2nd pass assessment is currently underway. Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

Tasmanian Coastal Vulnerability Assessment Project (Tasmanian Planning Commission)

The objective of the Project is to assess the physical vulnerability of Tasmania's coast to climate change.

The first stage of the Project is being undertaken

by the University of Tasmania in partnership with the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). It involves modelling the extent of potential future coastal inundation under various sea level rise projections and storm surge events.

The modelling results have been mapped using the *Climate Futures for Tasmania* project, Light Detection and Ranging (LiDAR) and Digital Elevation Model (DEM), which provides a new generation of mapping accuracy for the most populated areas of the Tasmanian coast. It is anticipated that the Project outputs will inform strategic land use planning and decision making in the coastal zone.

TASMARC project: monitoring shoreline erosion in Tasmania

The Tasmanian shoreline monitoring and archiving (TASMARC) project is a joint project between the Antarctic Climate Ecosystems Cooperative Research Centre (ACE CRC) and the University of Tasmania (UTAS). It aims to increase knowledge of the effects of rising sea levels and storm surges by carrying out long term monitoring of shoreline movement on beaches on vulnerable parts of Tasmania's coastline.

TASMARC relies on volunteers to survey beach profiles. Over time the TASMARC project aims to build a record of long- and short-term changes to beaches and an understanding of how beaches recover after storms. Results are to be published on the web in late 2010. The network of coastal locations being monitored with TASMARC is growing, and volunteers wanting to monitor new sites are welcomed. For more information contact: nicholas.boden@acecrc.org.au

2.3.5 Adapting coastal land management activities for climate change impacts

This section directs the reader to parts of the Manual where impacts of climate change and sea level rise on natural values are discussed and management adaptations or guidelines are provided to respond to the risk of climate change and sea level rise. Determination of risk and appropriate measures will be specific to each location and situation. Collect all relevant information on the site as suggested in ***Chapter 1*** and make an assessment of the level of risk using the suggested tools in ***section 2.4*** or seek specialist advice.

Figure 2.3 A TASMARC monitoring site is identified by a simple fixed marker. © Leah Page



*Table 2.2 Where to find climate change information throughout the Manual. **

Topic	Section
Chapter 1 Working on the coast	
Coastal processes	1.2
Chapter 3 Coastal hazards	
Storm surges, erosion and other coastal hazards	3.2
Remediation after storm events	3.3
Chapter 4 Community Values	
Throughout chapter where appropriate	
Chapter 5 Cultural heritage management	
Climate change and cultural heritage	5.3
Chapter 6 Coastal landscape management	
Assessing dune erosion	6.2.5
Methods for stabilising dunes	6.2.6
Climate change and dune systems	6.2.8
Climate change and beaches, barways, spits and river mouths	6.3.4
Climate change and estuaries, coastal wetlands and saltmarsh	6.4.9
Climate change and soft rock coastlines	6.6.1
Chapter 7 Vegetation management	
Vegetation management and climate change	7.8
Chapter 8 Weed and disease management	
Climate change and weeds and disease in Tasmania	8.6
Chapter 9 Fire management	
Climate change and fire	9.4
Chapter 10 Wildlife and pest management	
Climate change, wildlife management and pests	10.6
Chapter 11 Soil management and earthworks	
Climate change and acid sulfate soils	11.4.6
Chapter 12 Stormwater and crossings	
Climate change and stormwater management	12.1.7
Chapter 13 Access management	
Throughout chapter, in particular in sections 'Guidelines for...'	
Chapter 14 Structures and facilities	
Throughout chapter, in particular in sections 'Guidelines for...'	
Chapter 15 Shoreline modification	
Shoreline protection works	15.1

*Throughout the Manual, climate change considerations and issues are mentioned where information is available.



2.4 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Antarctic Climate Ecosystems Cooperative Research Centre (ACE CRC) web tool

This web based tool is based on the history of sea levels mapped at 29 ports around Australia provided by the Australian National Tidal Centre.

www.sealevelrise.info

Australian coastal Smartline geomorphic and stability map version 1: Project report (Sharples et al. 2009b)

Climate change 2009: Faster change and more serious risks (Steffen 2009)

Climate change impacts on Clarence coastal areas – Final Report (SGS Economics et al. 2009)

www.ccc.tas.gov.au/

Climate change risks to Australia's coast – A first pass national assessment. (Department of Climate Change 2009)

www.climatechange.gov.au

Climate change, sea level rise and coastal subsidence along the Gippsland coast. (Gippsland Coastal Board 2008)

www.gcb.vic.gov.au/sealevelrise

Coastal climate change – The science basis. (Department of Climate Change and Energy Efficiency 2010)

Australian Government Fact Sheet

www.climatechange.gov.au

Coastal engineering guidelines for working with the Australian coast in an ecologically sustainable way (Gourley et al. 2004)

Provides an overview of coastal engineering principle and practice in Australia and includes many checklists useful for those contemplating a coastal project at any scale.

http://www.engineersaustralia.org.au/search/resources/?query=coastal

Coastal hazards and climate change: A guidance manual for local government in New Zealand. (Ministry for the Environment NZ 2008b)

www.mfe.govt.nz/

Coastal values data

Vegetation, species habitat and geomorphic values data for a 100m wide coastal strip of the northern, southern and north western Tasmania NRM Regions. Available on the LIST.

www.thelist.tas.gov.au

CSIRO GIS layer: Wave height direction and period in the Australian region.

A compilation of essential wave statistics. Although the map appears very coarse each pixel is attributed with locally relevant data obtained from satellite instruments.

http://www.marine.csiro.au/marq/edd_search.Browse_Citation?txtSession=8083



Climate change and coastal risk assessment project.

A suite of tools and documents including:

- Coastal risk management plan: Template and guidelines (DPIW 2009)
- Coastal hazards in Tasmania: General information paper (DPIW 2008c)
- Climate change and coastal asset vulnerability: An audit of Tasmania's coastal assets potentially vulnerable to flooding and sea-level rise (DPIW 2008b)
- Sea-level extremes in Tasmania: Summary and practical guide for planners and managers (DPIW 2008e)
- Historical and projected sea-level extremes for Hobart and Burnie, Tasmania (Hunter 2008)
- Background report: Coastal flooding - Review of the use of exceedence statistics in Tasmania (DPIW 2008a)

www.dpiw.tas.gov.au/climatechange

Draft Queensland coastal plan: Draft state planning policy coastal protection. (Department of Environment and Resource Management, QLD 2009)

Foreshore values mapping

Provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. Available on the LIST or by request from DPIPWE.

www.thelist.tas.gov.au

General practice note 18: Managing coastal hazards and the coastal impacts of climate change (Department of Planning and Community Development, VIC 2008)

www.dpcd.vic.gov.au/planning

Historical and projected sea-level extremes for Hobart and Burnie, Tasmania. (Hunter 2008)

Technical Report by Antarctic Climate & Ecosystems Cooperative Research Centre (ACE CRC).

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

NSW sea level rise policy statement (Department of Environment, Climate Change and Water, NSW 2009)

Position analysis - climate change, sea-level rise and extreme events: impacts and adaptation issues. (Antarctic Climate & Ecosystems Cooperative Research Centre 2008)

www.sealevelrise.info

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

TASMARC project: monitoring shoreline erosion in Tasmania

TASMARC relies on volunteers to survey beach profiles. For more information contact: nicholas.boden@acecrc.org.au

Understanding sea-level rise and variability (Church et al. 2010)



3 Coastal hazards

At the time of producing this manual a number of key Tasmanian government initiatives were still underway and are expected to be achieved over the course of 2011:

- Development of a new Tasmanian Framework for Action on Climate Change
- Finalisation of the state's Regional Planning Initiative
- Development of a state Framework for Mitigating the Impact of Natural Hazards through Land Use Planning
- Consideration of a new State Coastal Policy for Tasmania.

As with all topics addressed by the Manual, chapters will be regularly updated online as these initiatives are finalised and new information is released.

3.1 *Planning for hazard management*

3.2 *Storm surges, erosion and other coastal hazards*

3.3 *Remediation after storm events*

3.4 *Oil and chemical spills on the coast*

3.5 *Tools and resources*

Tab photo: Wave erosion has left bank in potential unstable and unsafe state at Conningham in southern Tasmania. © Kevin Phillips.

This chapter details common coastal hazards and incidents and strategies to reduce risks and manage these incidents when they occur. A hazard can be defined as a potential source of harm, injury or difficulty. The classes of hazard considered in this chapter include both the consequences of natural physical coastal events, such as storms and erosion, and those hazards created by the transport and storage of oil and chemicals. All these have the potential to cause harm to people, property and the environment.

Sudden, hazardous events such as floods, erosion, storm surges, king tides and tsunamis are a possibility for Tasmania's coastline, while soft, sandy coastlines are especially prone to landslips and serious erosion. Climate change and sea level rise will also exacerbate the risk of coastal hazards, and storm frequency and severity are likely to increase over time.

It is important that appropriate mitigation techniques are used to minimise the damage from hazardous events. Planning for emergencies can make responses more timely and effective. For places with sensitive values, such as cultural heritage sites and threatened species habitats, developing and correctly implementing an emergency response plan can minimise the impact of an event.

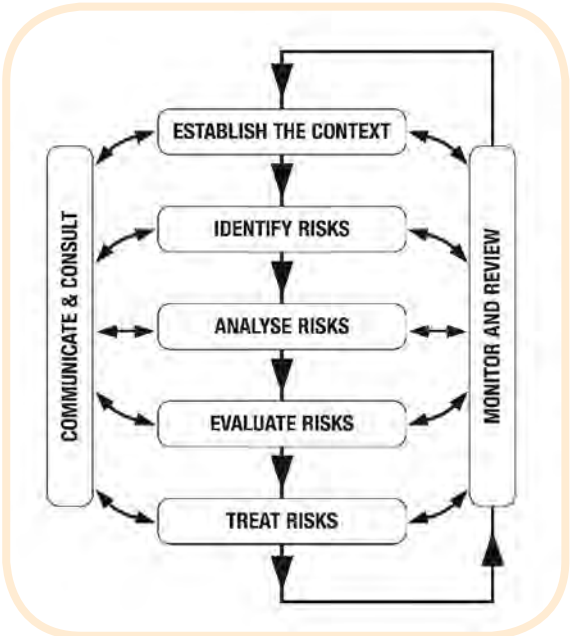


3.1 Planning for hazard management

This section provides information on planning for hazard management and minimising risk. Coastal hazards are a physical process or events on the coastline that could potentially be harmful to a person's life, health, property, or the environment (Tarbuck & Lutgens 1987).

The risk posed by a coastal hazard can be determined by looking at the likelihood of it occurring, the level of vulnerability to that hazard and the consequences of the event happening. The Australian Standard *AS/NZS ISO 31000:2009 Risk management* provides a framework for identifying risk and this has been used throughout Australia, adopted by Emergency Management Australia, the Tasmanian State Disaster Committee and the Tasmanian Climate Change and Coastal Risk Assessment Project.

Figure 3.1 The risk management process. Source: Australian Government, Emergency Management in Australia: Concepts and Principles, (Emergency Management Australia 2004). © Commonwealth of Australia reproduced by permission.



Assessing risk of coastal hazards in Tasmania requires consideration of regional and local factors, including coastal processes, land use, modification of the shoreline and the types of coastal landforms. For example, a soft, sandy coastal embayment is more vulnerable to coastal hazards than a rocky headland or a cobbled beach. Landforms such as spits, coastal estuaries and lagoons are among the most mobile and dynamically changing environments on earth (Sharples 2006).

Mapping the vulnerability of the coastline is a good foundation for planning and management of coastal hazards (Sharples 2006). Most planning and regulatory standards use an emergency response plan based on good technical advice which:

- identifies risks
- sets out clear procedures and responsibilities
- complies with government regulations, policies and strategies.

A risk assessment to identify, analyse and evaluate existing and emerging risks is a critical first step in developing a good risk management plan. The Australian Standard *AS/NZS ISO 31000:2009 Risk management* provides a generic framework for identifying, analysing and communicating risk. This standard has been adopted throughout Australia.

To identify risks and vulnerable sites, advice may be required from a coastal engineer, coastal geomorphologist (a specialist in coastal soils and landforms), Aboriginal Heritage Tasmania, botanists or wildlife biologists.

For sources of information, see ***section 3.5 Tools and resources***.

3.2 Storm surges, erosion and other coastal hazards

Storms and Flood Emergency

Contact State Emergency Service 132 500

http://www.ses.tas.gov.au/

Climate change is projected to have an impact on the frequency and intensity of extreme weather events such as storms, bushfires, drought and heatwaves. In particular, coastal storms, with flooding and storm surges, will create extreme sea level events resulting in coastal inundation and erosion. Therefore, sea level rise will exacerbate the existing problems of erosion or inundation of coastal land caused by high tides, storm surges and low-pressure systems.

In future we can expect physical changes to shorelines as they adapt to changing sea levels, especially on vulnerable areas such as soft sandy, muddy, clayey and gravelly shores and low-lying coastal areas (Sharples 2006).

3.2.1 Hazardous erosion

Sand dunes can develop hazardous erosion scarps that are prone to toppling, and in some areas may pose a risk to the public. These may be formed by severe erosion during high-magnitude storms or when several low-magnitude storms in quick succession

Figure 3.2 Recent erosion scarp exposing old soils at North Beach on Perkins Island. © Chris Sharples





Figure 3.3 Evidence of flood tide levels on the banks of the Leven River in north-west Tasmania. © Haylee Alderson

make it difficult for the coastline to recover. There may be insufficient time between storm events for normal swell waves to push sediment back on shore.

Erosion of sandy environments occurs seasonally, mostly during the winter months when storms generate waves that can erode the front of foredunes. In the summer months gentler swell waves push the sediment back to the shoreline and rebuild the foredune. This process can take up to a few years to repair severe storm damage, aided by dune vegetation that can trap and bind sand.

Erosion of rocky shorelines may create hazardous cliff areas. Softer rocky shorelines, such as semi-consolidated sediments, cannot be replenished by sand and sediment. Erosion of these shorelines leads to coastal recession. The retreat of the shoreline may threaten coastal infrastructure and make access hazardous for the public.

Refer to section 3.3.1 Dune reshaping after storms (in this chapter), Chapter 6 Coastal landscape management and Chapter 15 Shoreline modification.

3.2.2 Storm surges and extreme storm events

Over 20% of Tasmania's coastline will be vulnerable to sea level rise and more severe storm surges associated with climate change (Sharples 2006).

A storm surge is an area of heightened sea level at the coast caused by a low-pressure system and strong winds from offshore storms and high tides (DPIW 2009). For every hectopascal fall in barometric pressure, the sea level will rise about 10mm. However, the strong winds are the most significant factor as they push water against the coast and, if combined with significant rainfall and a high tide, there may be flooding along the coastline (DPIW 2008).

Planners, managers and developers need to know the probability of an event happening during the expected life of a development; it is no longer appropriate to use the traditional approach of designing for storm-surge events recurring every 100 years (Hunter 2008). For many locations in Tasmania, a sea level rise of 50cm will mean that these events will occur every year, or even more frequently, by 2100 (Church et al. 2008).

This new focus is important for risk management, where development and management regimes can be adapted to reduce the risks to acceptable levels. For a brief explanation of the most recent climate change and sea level rise assessment tools ***refer to section 2.3.4 in Chapter 2 and sections 3.2.8 and 3.5 in this chapter.***

3.2.3 Storms and floods

Storms and floods, like drought, are a normal and inevitable part of climate variability. Controlling the effects of storms and floods is very difficult, however, land managers must seek to minimise risks to public health and safety, property and infrastructure.

Flash floods usually happen on the coast when a large amount of rain falls in a localised area over a very short period of time, in combination with a high or spring tide. These localised storms would generally be within the capacity of the stormwater drainage system, but in a spring tide high water levels may prevent the rainwater draining away. The excess water may build rapidly and flood roads, gardens and buildings. In these situations with low-lying areas full of water, it can be impossible to pump water away until the tide recedes.

A flood risk plan should be developed, to provide a clear process for reviewing flood risks and procedures for monitoring the effect of flood risk management measures over time. As well as assessing safety and economic factors, a flood risk plan will include the social impacts of floods, such as stress and disruption.

The flood risk plan should set out a method for developing a flood risk matrix, which will identify 'intolerable' flood risks that should be reduced or eliminated. Further information can be found on the Melbourne Water website.

Figure 3.4 Excavator cleaning up flood debris in the Leven River in Ulverstone in north-west Tasmania. © Phil Barker





3.2.4 King tides

When associated with low pressures and/or storm events, the highest tides of each season, known as **king tides**, can lead to localised inundation and flooding. This will be exacerbated by sea level rise.

Key impacts of spring or king tides:

- localised tidal inundation penetrating through stormwater systems and affecting private property, public reserves and local road networks
- limited clearance between the peak water level and the top of seawalls currently protecting waterfront properties, commercial precincts, public reserves and significant public infrastructure
- widespread submergence of gravity stormwater drainage systems, fixed jetties and wharf infrastructure, as well as public walkways, boardwalks, bicycle paths and car parks situated around intertidal foreshores
- substantial narrowing of useable beach widths
- overtopping of beach berm barriers in areas where intermittently open and closed lakes and lagoons are currently closed to the sea
- increased tidal currents within estuaries and larger rip systems on open-coast beaches
- inundation and destruction of nesting in roosting sites of endangered birds (such as little terns)
- immediate threats to Aboriginal cultural heritage sites such as middens close to intertidal margins
- breaching sewage pump stations and associated sewage infrastructure
- flooding commercial premises and dwellings within 50cm of the king tide level
- wave action submerging and overtopping public ocean baths and similar facilities.

Figure 3.5 Coastal inundation event associated with king tide in NSW in January 2009. Tidal waters of Coffs Creek penetrating back up through stormwater system. Source: A snapshot of future sea levels: Photographing the king tide (Watson and Frazer 2009). © Mel Bradbury





3.2.5 Landslides

Landslides are a natural hazard that can be studied in order to understand their distribution, frequency of movement, triggering conditions and likely effects. By properly understanding them it is often possible to minimise the effects on engineered structures (e.g. houses and roads) and the community.

For example, landslide susceptibility maps produced by Mineral Resources Tasmania can be used by town planners to avoid unstable areas when new subdivisions are being proposed. The Mineral Resources website has maps of landslide susceptibility and of legislated landslip areas (declared areas), a database of landslide information and events in Tasmania, and monitoring and investigation of some Tasmanian landslips.

Other information on coastal rock falls, collapse, slumping and retreat of hard rock coastal cliffs and progressive erosion, retreat and/or slumping of soft (typically clayey-gravelly) bedrock or colluvial (loose rock) shores has been mapped as part of the *Indicative mapping of Tasmanian coastal vulnerability to climate change and sea-level rise: explanatory report* (Sharples 2006). This data is available on the LIST website.

3.2.6 Tsunami

A tsunami is a series of ocean waves with very long wavelengths (typically hundreds of kilometres) caused by large-scale disturbances of the ocean, such as:

- earthquakes
- landslide
- volcanic eruptions
- explosions
- meteorites

These disturbances can either be from below (e.g. underwater earthquakes with large vertical displacements, submarine landslides) or from above (e.g. meteorite impacts).

The English translation of the Japanese word '*tsunami*' is 'harbour wave'. The previously used terms, tidal waves and seismic sea waves are misleading, as tsunamis are unrelated to the tides and can be caused by non-seismic events such as landslides.

A landslide on the steep underwater slope about 50km off the Australian coastline could generate a local tsunami. This might be triggered by a small earthquake or the landslide might feel like an earthquake at the coast. It would take less than 30 minutes for the tsunami to reach the coast. Tsunamis are also often confused with storm surges, even though they are quite different phenomena.

Call 1300 TSUNAMI (1300 878 6264) for the latest warning information.

For emergency assistance, call your local emergency authority on 132 500.

The east coast of Australia is recognised as being vulnerable to mega-tsunamis, like the one that devastated coastlines around the Indian Ocean on 26 December 2004. Australian civil authorities are now preparing tsunami action plans to deal with this low-probability but high-consequence event.



3.2.7 Assessing inundation and erosion risks

How do you decide if a site requires a risk assessment for inundation and erosion, including the possible longer-term effects of climate change and sea level rise?

In general, a risk assessment should be considered for sites on low-lying coastal land and erodible landforms where there is a risk to public or private infrastructure, public safety or important plant and animal communities.

It should not be assumed that 'sheltered' shores (e.g. in estuaries or tidal lagoons) are at less risk; indeed such places experience as much flooding and erosion as open coasts.

For a particular work site, check whether there has been a previous risk assessment. Some information sources are suggested in the Tasmanian coastal risk management project template (see Table 3.1).

Assessing the risk

The major risks from rising sea levels and extreme events are coastal inundation erosion and recession. In Tasmania severe storms, floods, shoreline erosion and other hazards already affect coastal areas, causing damage to property and infrastructure and risking loss of life.

A rising sea level and potentially greater storm activity will produce an ever-growing risk of inundation and erosion in low-lying coastal areas. Events will occur increasingly more often in the future.

The severity of the risks in a given location will be affected by a range of factors related to climate, oceanography, geomorphology, geology and the way low-lying areas have been modified by construction or drainage.

Table 3.1 Example of a component of the risk assessment template in the Coastal risk management plan (DPIW 2009)

Level of existing Risk Assessment	Yes/No
Location has been highlighted as at risk by simply looking at topographical maps or digital elevation models	
Area has been highlighted by a previous report (e.g. Sharples 2006)	
Risk has been determined by site visit	
Calculations of still-water sea levels are available	
Assessment of extreme tide events is available	
Detailed storm surge and wind wave calculations are available	

As the sea level rises, storm events reach higher levels on the shore, so appear to increase in magnitude and frequency resulting in severe flooding events becoming more frequent. This will put vulnerable coastal locations and infrastructure at increasing risk of inundation or erosion. It is important to assess the risk of an extreme event occurring during the lifetime of any existing or new infrastructure and then plan accordingly.

Assessing this risk as accurately as possible will allow for prioritisation of climate change risks, and subsequent adaptive responses. A thorough assessment will also include consideration of these management responses in light of other risks (including impacts on natural and cultural values), resource availability and cost of works faced by the land manager.

3.2.8 Risk assessment tools

Assessing the erosion and inundation risk in a given coastal location can be a complex task and requires good data, and the skills and experience to analyse it. A number of tools have been produced to assist in this exercise, which can provide a degree of reliability that, for some activities and locations, may be adequate. For more critical areas and projects, it is important to seek specialist advice.

For example, xperience suggests that applying the Tasmanian coastal risk assessment tool (Tool # 1 in Table 3.2) to an area might require up to two weeks' work and a budget of approximately $10 000.

Figure 3.6 It may be useful to understand the history of a site by looking at a time sequence of aerial photos. Most of Tasmania has coverage of aerial photography dating back to the 1950s (post–Second World War). This aerial photo of Ringarooma River mouth in northern Tasmania clearly shows landward movement of the coastal dune system © DPIPWE





Table 3.2 Risk assessment tools currently available

	Tool	Description	Project	Organisation and web address
1	Climate Change and Coastal Risk Assessment Tool - Template, Guidelines and Case Study	A method and template for producing a coastal risk management plan for a coastal area or asset.	Climate Change and Coastal Risk Assessment Project	Tasmanian Department of Primary Industries, Parks, Water and Environment www.dpipwe.tas.gov.au/climatechange
2	ACE CRC Web Tool	An internet-based decision-support tool that estimates the probability that a given asset will be flooded by the sea during its lifetime, under different climate projections.	Tasmanian Coastal Vulnerability Project	Antarctic Climate & Ecosystems CRC www.sealevelrise.info/
3	High resolution (LiDAR-based) Coastal inundation modelling for selected sea level rise and storm scenarios. ***Refer to Chapter 2.***	Spatial maps accurate to 25cm modelling the extent of coastal inundation under various sea level rise projections and storm surge events. LiDAR data exist for the most populated parts of the Tasmania coast.	This project is in progress, and will provide inundation modelling for those areas of the state's coastline covered by LiDAR.	Tasmanian Planning Commission www.planning.tas.gov.au/ Available on the LIST under Topographic Information – Relief – Climate Future LiDAR coverage.
4	New Zealand Coastal Hazards Manual and related factsheets	Understanding and managing coastal hazard and related climate change risks.	Coastal hazards and climate change: a Guidance Manual for local government in New Zealand (Ministry for the Environment 2008)	Ministry for Environment, NZ www.mfe.govt.nz/



3.3 Remediation after storm events

This section deals with managing hazardous shorelines and landforms after extreme storm events. Rehabilitation of coastal landforms and shorelines is sometimes required, to protect public safety, to restore wildlife habitat or to stabilise the damaged area.

Public safety is the most important factor in remediating hazardous sites, but you should minimise damage to the natural environment and cultural sites, wherever possible.

After storms or landslides, where unstable foredunes or cliffs are hazardous, erect warning signs or temporary exclusion fences. Obtain specialist advice from a coastal geomorphologist about the risk to the public and any remediation work.

Before attempting remediation, obtain specialist advice to assess the situation and consider different options for managing the issue and site. ***Refer to Chapter 6 Coastal landscape management.***

3.3.1 Dune reshaping after storms

The steep faces of foredunes carved by severe and prolonged storms are unstable and can be hazardous to beach users. Eventually the dune face will slump to a more stable shape, but until this happens it may be necessary for land managers to erect warning signs or temporary fences or to undertake dune reshaping. If in doubt, obtain specialist advice about the risk to the public.

As the erosion effects of sea level rise on sandy shores become more common, some beaches will begin to exhibit almost permanently scarped and slumping dune fronts. This has already been the case for several decades on high energy south-west Tasmanian beaches which are receding earliest in response to sea level rise.

If public risk is particularly high, machinery can be cautiously used to slump the seaward face of the dune to create a more stable dune profile. Do not undertake this type of work without specialist advice from a coastal geomorphologist and permission from the land manager.

Minimise damage to vegetation during works, as plant roots help bind and stabilise sand, and other plant roots and stems that drape down the dune face will trap wind-blown sand and help to repair the damaged foredune.

Consult Aboriginal Heritage Tasmania well before works, and notify them if you believe an Aboriginal heritage site or relic has been uncovered. ***Refer to Chapter 6 Coastal landscape management, for more information on dune stabilisation.***

3.3.2 Monitoring remediation works

All erosion control structures require regular maintenance to make sure they remain serviceable. Inspections and maintenance are very important during and after stormy periods to check that structures are in place, are working as intended and are in good condition. Structures can be quickly damaged or destroyed by waves and winds, and become a hazard to the public. Prepare an inspection and maintenance plan, which includes inspections on a regular basis and after major storm events. ***Refer to Chapter 6 Coastal landscape management, for more information on monitoring landform remediation works.***



3.4 Oil and chemical spills on the coast

To report a chemical or oil spill

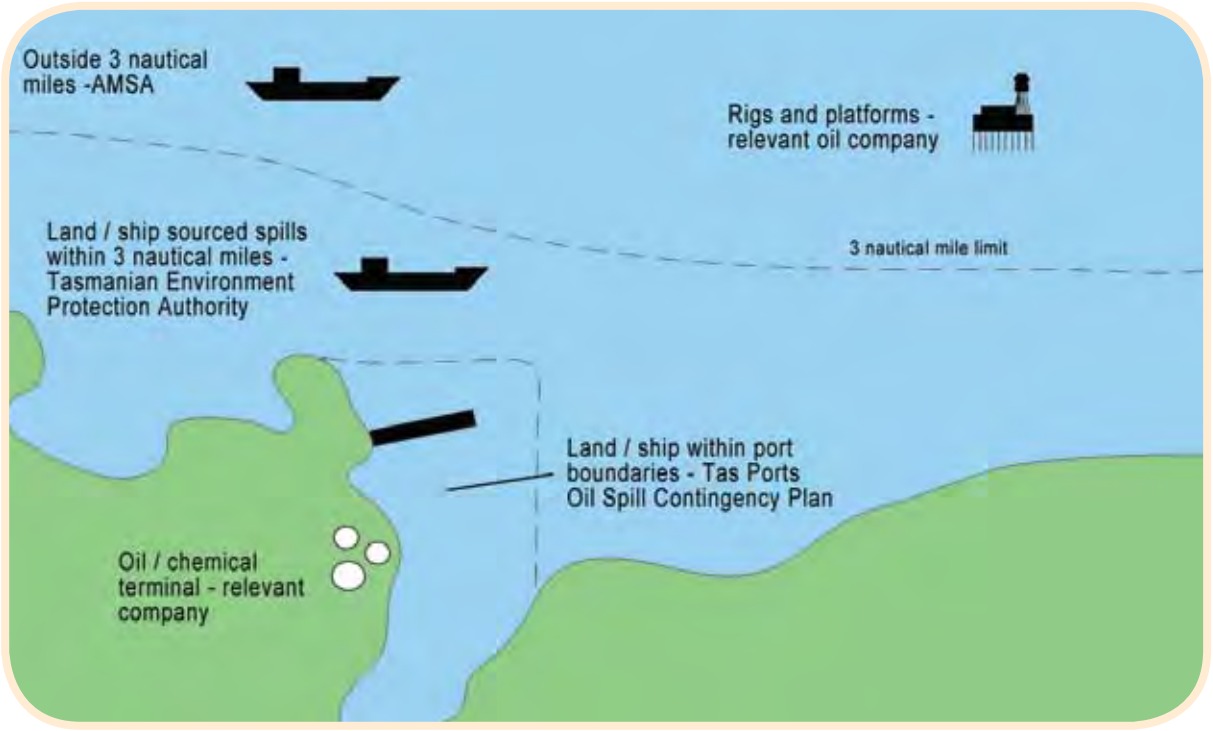
Contact the Environment Protection Authority's 24-hour Pollution Incidents and Complaints Hotline: 1800 005 171

Oil spills in the marine environment can range from small levels of contamination from recreational boats to large-scale spills from commercial operations. All oil spills can impact on wildlife, fisheries, coastal and marine habitats, and human health, as well as the commercial and recreational resources of coastal communities. In the case of large-scale events, these impacts can be widespread and long term.

Procedures for combating oil spill pollution are contained within the *Tasmanian marine oil pollution contingency plan (TASPLAN)* (DPIWE & SES 2001); Tas Ports oil spill contingency plans are localised plans for specific ports where a spill occurs within port boundaries.

The Australian Maritime Safety Authority (AMSA) is responsible for oil spill responses outside of 3 nautical miles.

Figure 3.7 Agencies responsible for oil and chemical spills in Tasmania.





Initial reports of a marine oil spill should be made to the State Oil Pollution Control Officer on the 24-hour response number. The officer will advise the chair of the State Marine Pollution committee (where relevant), and other relevant agencies and personnel. A response appropriate to the spill type is then undertaken. An initial assessment will be carried out by trained personnel, which could include people from Tas Ports and the Department of Primary Industry, Parks, Water and Environment (DPIPWE).

In the oil spill response incident control system, roles and responsibilities are assigned to people in the areas of logistics, operations, finance, administration and planning. The Incident Control Officer is in charge of these sections, forming an incident control team that is responsible to the Tasmanian Marine Pollution Controller.

Local governments participate in the incident control team in several key ways:

- representing the Local Government Association on the State Marine Pollution Committee
- cleaning up shorelines
- providing local advice on areas threatened by pollution
- assisting with liaison between the State Marine Pollution Committee, the incident controller and local communities
- assisting in clean-up operations within areas under their control, in larger operations.



Figure 3.8 The sunken vessel in the Tamar River in Launceston – note small patch of black coloured oil behind vertical fender. © Duane Richardson

Case Study 3.1: Recreational boat sinking at Seaport, Launceston, in January 2010

A minor oil spill from a wooden yacht that sank in the Tamar River at Launceston's Seaport Marina was reported to the Environmental Protection Authority's (EPA) Environmental Complaints and Incidents 1800 005 171 Hotline by Tasmania Police on 25 January 2010.

The EPA's State Oil Pollution Control Officer (SOPCO) based in Hobart responded to the report.

SOPCO then contacted Tas Ports, who advised that, if required, they would send responders and oil-spill-absorbent materials to Seaport from Bell Bay.

An officer from the EPA in Launceston was sent to Seaport to do an initial inspection. The notes and photographs he took were forwarded (via email) to the SOPCO in Hobart, who examined this material and decided that the deployment of oil-absorbent booms was not necessary in this instance.

Another SOPCO from the EPA Ulverstone office was in Launceston at the time and took over the investigation. When contacted, the owner of the vessel reported, that at the time of sinking, the vessel had very little fuel onboard and approx 5L of lube oil in the engine. He arranged for enough water to be pumped out of the vessel's hull at low tide to make it sufficiently buoyant to be towed to a nearby slip. The next day the hull was examined but no leaks or sprung planks were found.

The only explanation offered for the sinking was that the vessel became stuck fast in the silt/mud at low tide and as the tide rose again the hull filled with water. Apparently other vessels have sunk in similar incidents in the Tamar River around the marina.

On this occasion it was fortunate that the vessel had little fuel and oil onboard and a significant spill of hydrocarbons into the river was avoided.



3.5 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Australian Standard

AS/NZS ISO 31000:2009 Risk management

Bureau of Meteorology

Current Tasmanian weather warnings

www.bom.gov.au/weather/tas/

Climate change impacts & risk management: A guide for business and government (Australian Greenhouse Office, Department of the Environment and Heritage 2006)

A guide to integrating climate change impacts into risk management and other strategic planning activities in Australian public and private sector organisations to assist Australian businesses and organisations to adapt to climate change.

http://www.climatechange.gov.au/what-you-can-do/community/local-government/~/media/publications/local-govt/risk-management.ashx

Floodplain mapping, flood data and flood timelines in Tasmania

www.dpiw.tas.gov.au/ Go to Water > Tasmania's water resources > Floods

Geodata Services

Aerial photographs and mapping products.

geodata.clientservices@dpipwe.tas.gov.au

Guidelines for responding to the effects of climate change in coastal and ocean engineering. (National Committee on Coastal and Ocean Engineering 2004)

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

Melbourne Water

Flood management information.

http://www.melbournewater.com.au/content/drainage_and_stormwater/flood_management

Mineral Resources Tasmania

Landslide susceptibility maps

http://www.mrt.tas.gov.au

Sea-level change around Tasmania: Information paper (Department of Primary Industries Water and Environment 2004c)

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

Tasmanian Flood Warning Centre, Bureau of Meteorology

Issues flood warnings

www.bom.gov.au/hydro/flood/tas/



Hazard management planning

The following agencies and resources will be useful in preparing for hazardous events and remediation works.

Climate change and coastal risk assessment project.

A suite of tools and documents including:

- *Coastal risk management plan: Template and guidelines (DPIW 2009)*
- *Coastal hazards in Tasmania: General information paper (DPIW 2008c)*
- *Climate change and coastal asset vulnerability: An audit of Tasmania's coastal assets potentially vulnerable to flooding and sea-level rise (DPIW 2008b)*
- *Sea-level extremes in Tasmania: Summary and practical guide for planners and managers (DPIW 2008e)*
- *Historical and projected sea-level extremes for Hobart and Burnie, Tasmania (Hunter 2008)*
- *Background report: Coastal flooding - Review of the use of exceedence statistics in Tasmania (DPIW 2008a)*

www.dpiw.tas.gov.au/climatechange

Management Australia (EMA)

Australian Emergency Manual Series

- Manual 1 Emergency management concepts and principles
- Manual 2 Australian emergency management arrangements
- Manual 7 Planning safer communities—land use planning for natural hazards
- Manual 14 Post disaster survey and assessment
- Manual 17 Multi-agency incident management
- Manual 19 Managing the floodplain
- Manual 20 Flood preparedness
- Manual 22 Flood response
- Manual 24 Reducing the community impact of landslides
- Manual 43 Emergency planning

EMA highlighted the potential benefits of its 'Critical Infrastructure Protection Modelling and Analysis' (CIPMA) program for disaster management in the coastal zone in their submission to the House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts report Managing our coastal zone in a changing climate (House of Reps. SCCWEA 2009).

www.ema.gov.au

State Emergency Service, Department of Police and Public Safety

Tasmanian Emergency Risk Management Project (CD-ROM) conducted risk assessments of natural and technological hazards and proposed risk treatment strategies for the three Tasmanian regions.

Hazardous material emergency manual (SES 2001)

State summary: The Tasmanian emergency risk management project - a community perspective includes GIS maps of flooding, storms, wildfire, severe weather and earthquake/landslip risks

Tasmanian hazardous materials emergency plan (SES 2005)

www.ses.tas.gov.au



Tasmanian Fire Service

6230 8600 or 1800 000 699

www.fire.tas.gov.au

Tasmania Police, Department of Police and Public Safety

www.police.tas.gov.au

Oil spills

Australian Marine Oil Spill Centre (AMOSC)

www.aip.com.au/amosc/

Australian Maritime Safety Authority (AMSA)

Has recently undertaken a series of initiatives involving new technological developments to assist in larger-scale oil and chemical pollution response in the marine environment. Details are in *Oil Spills in the Australian Marine Environment: Environmental Consequences and Response Technologies* (Gilbert 1999).

National Guideline for the Development of Oiled Wildlife Response Contingency Plans (AMSA 2002)

Safety First in Oiled Wildlife Response (Video). (AMSA 2002)

National Marine Oil Spill Contingency Plan: Australia's National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances (AMSA 2005)

http://www.amsa.gov.au

National Oil Spill Response Atlas (OSRA)

The National Oil Spill Response Atlas for Australia is a computerised Geographic Information System (GIS) that authorities can use to identify priorities for protection and to manage clean ups.

The OSRA program identifies marine and shoreline ecosystems and biological resources, and provides information on response options (e.g. chemical dispersant use, shoreline clean-up techniques and disposal sites for wastes).

National OSRA datasets include:

- biological, environmental, wildlife and man-made resources
- geomorphological mapping and shoreline sensitivity to oil spills
- human-use resource considerations
- logistical and infrastructure information to support a spill response

OSRA data is available through the List www.thelist.tas.gov.au/ or phone 1300 135 5130.

State special plan for environmental pollution emergencies (in prep).

The state special plan is a strategic document listing roles and responsibilities in the case of an environmental emergency. The State Emergency Service and the Environmental Protection Authority are the contact points for this document.

Tasmanian marine chemical spill contingency plan (TASCHEMPLAN). (DPIWE 2003)

Tasmanian marine oil pollution contingency plan (TASPLAN). (DPIWE & SES 2001)





4 Community values

4.1 Recreation and social values of the coast

4.2 Working with community

4.3 Tools and resources

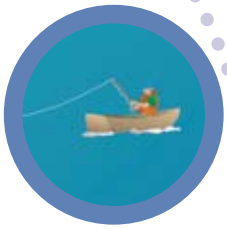
This chapter provides a summary of contemporary community values and use of the coast and the impacts associated with those activities. It also provides guidance for engaging local communities and working with community groups when undertaking coastal management works.

Tasmanians are fortunate to have such vast and diverse coastal areas to enjoy and they have a long association with living and recreating on the coast. However some recreational pursuits can be very damaging to coastal values in particular areas, or if not managed appropriately.

Community involvement is essential to achieving the protection and conservation of natural and cultural heritage along Tasmania's coastline. Many coastal areas are fortunate enough to have dedicated community groups of local volunteers that regularly care for the coastal environment.

For the broader community, education, awareness-raising and the use of interpretive tools and products are important to encourage community stewardship of coastal areas. Involving the community in coastal management planning and decision-making processes will help to foster this stewardship.

Tab photo: Sunset at a popular beach in south-east Tasmania. © Leah Page.



4.1 Recreation and social values of the coast

This section outlines some of the key recreational pursuits and the impacts on Tasmania's coastline associated with those activities. Specific management actions are provided, where available, and detailed in other chapters where appropriate.

Recreational pursuits include fishing, surfing, sailing, kayaking, birdwatching, swimming, bushwalking, horseriding, dog-walking and camping. Some recreational activities can have unwanted impacts on the coastal environment. Some recreational community groups, such as surf clubs and sailing clubs, rely on the coast for their activities. The provision and maintenance of infrastructure or access for recreational activities need to be balanced against the preservation and protection of coastal values.

Figure 4.1 Tasmanians have a strong affinity with the coast. © Leah Page



The provision of facilities is covered in ***Chapter 14*** and requires careful planning and consultation to ensure that facilities are appropriate for the users, meet occupational health and safety (OH&S) requirements and will not impact on natural or cultural values. It is also now important to ensure that facilities are appropriate for sea level rise predictions and other potential climate change impacts. ***Refer to Chapter 13 Access management and Chapter 14 Structures and facilities.***

4.1.1 Recreational use conflicts

In many instances recreational activities are concentrated on tracks, beaches and reserves where the different needs of various users may conflict. Recreational values can also be in conflict with other coastal land uses, such as industry and commercial fishing operations. Some activities are inappropriate in some locations where the impact on coastal values is unsustainable, such as disturbance to bird breeding areas or threats to endangered flora and fauna.

The needs of various users must be managed in conjunction with human impacts on coastal values. Providing opportunities for communities to enjoy and use the coast may involve providing facilities and will always involve managing public risk and liability and impacts.

4.1.2 Recreational fishing

Over-fishing and illegal fishing practices are obvious impacts, but the activities of recreational fishers can have various other impacts on the coast. Irresponsible boating practices can lead to the spread of marine pests and discharge of pollutants and litter into coastal waters; inappropriate access to fishing spots through dunes and beaches and ad-hoc launch sites exacerbates coastal erosion, spreads weeds and

threatens wildlife such as breeding shorebirds. ***Refer to section 4.1.3 Recreational boating and section 4.1.6 Coastal access***

What coastal land managers and recreational fishers can do to minimise harm:

- Fishing regulations have been developed to support sustainable fisheries and reduce the risk of over fishing. Get involved with initiatives such as Fishcare to improve awareness of catch limits, fishing pressure and responsible boating practices.

Figure 4.2 Pacific Gull entangled and drowned in fishing line. © Anna Wind



- Recreational gill nets are banned and are extremely hazardous to marine life, often killing many non-target species including penguins. Recreational fishers should take care to protect birds and other wildlife from hooks and fishing line.
- Consider providing facilities for cleaning and gutting fish at suitable locations; otherwise provide information to encourage fishers to clean fish at home.
- Support efforts to inform the public of the human health issues associated with seafood collection and consumption, in particular shellfish.

4.1.3 Recreational boating

Recreational boating is a great way to enjoy the many coves and bays that make up Tasmania's unique coastline. It provides access to areas that may otherwise be inaccessible and for this reason recreational boaters need to be particularly careful to minimise their impact on the coastal environment. ***Refer to section 4.1.6 Coastal access.***

Coastal land managers, in conjunction with the Tasmanian Port Authority and Marine and Safety Tasmania (MAST), are responsible for boating facilities, including the maintenance of shipping channels and launching ramps. Land managers should investigate infrastructure and practices at slipways and improve facilities to meet best practice environmental standards. ***Refer to Chapter 14 Structures and facilities.***

Pests and pollutants

Recreational vessels may inadvertently spread introduced species, attached to the hull, in gear or areas that are not cleaned and dried thoroughly. A piece of the introduced alga *Undaria pinnatifida* (wakame) left on a net or anchor will survive for



one or two days, possibly more. Microscopic spores floating in water in the bottom of boats will stay alive for a similar time. In mooring areas and marinas, boat hulls can quickly become infested which can result in the rapid spread of the weed around the state (DPIPWE website, accessed 7th October 2010).

What boat users can do to minimise harm:

- Remove any weeds, animals or sediment from boats, trailers and gear and place them in the bin, not back in the water. After each trip CHECK, CLEAN, DRAIN and DRY your boat, trailer and gear. Using water with a mild detergent, disinfectant or soap, wash vessels and equipment away from the shore where it will not drain into the marine environment.
- Slip and clean moored boats regularly, at least every year and anytime there is a build up of fouling. Maintain the boat with a suitable antifouling paint (ensure paint residue does not get washed into the water) and treat internal seawater systems (including water inlets and bilge tanks) regularly – flush with fresh water or an approved treatment. Ensure appropriate disposal of sewage and bilge water at an approved pump out facility.
- Fishing gear and rubbish not stowed correctly on board can end up as marine debris in coastal waters. Poorly maintained boats or irresponsible practices at boat ramps can lead to oils and pollutants draining into waterways.

Wildlife

Inappropriate access of foreshore areas to launch boats or landing on offshore islands can threaten vegetation and wildlife communities through spreading weeds or trampling vegetation, leading to erosion and disturbing breeding birds. ***Refer to section 4.1.6 Coastal access.***

Recreational boat operators will come into contact with wildlife and must minimise impacts on wildlife and wildlife habitat. Boat operators can report whale sightings and strandings on the whales hotline. Humpback and southern right whales are the two best known species that make the annual winter migration north to breed.

Boat operators are not permitted to go any closer than 100m to a whale in any boat and should only approach from the side of the whale. The *Australian national guidelines for whale and dolphin watching* (Dept Environment & Heritage 2005) outlines standards that allow people to observe and interact with whales and dolphins in a way that ensures animals are not harmed. ***Refer to Chapter 10 Wildlife Management.***

Motor boats

Motor boats may increase shoreline erosion in susceptible sheltered waters of estuaries and inlets, particularly when driven at high speeds. Some Tasmanian water bodies are suffering unnatural and largely unnecessary erosion as a result of boating activities. Once initiated, the erosion caused by wave wake or other vessel effects may be very difficult to control. Remediation works may be expensive or in themselves cause further habitat damage or loss of amenity. The trends towards increasing boat ownership, more powerful engines and rising sea level all add to the potential for problems so there is a need for greater awareness of vessel effects on both natural values and other users of our waterways. All boaters can help care for Tasmanian waterways by limiting their wake to a size appropriate to the area (DPIPWE website, accessed 7th October 2010).

Marine and Safety Tasmania (MAST) enforces a 5-knot speed limit in most port areas and has regulations limiting vessel speed to control damage to shores,

facilities and other vessels. *Tasmania Marine and Safety (Motor Boats and Licenses) By-laws 1997*, Section 28 states, amongst other things, that a person must not drive a motorboat at a speed exceeding 5 knots within 60m of any shoreline, river bank, etc. (DPIPWE website, accessed 7th October 2010).

Within the World Heritage Area, motorised boating is only permitted on specified water bodies – for details contact the Tasmanian Parks and Wildlife Service.

4.1.4 Kayaking

Kayaking is often considered to be minimal impact but, as well as the potential to create some of the same problems as recreational boating, there are also some special considerations with kayaking, especially because it can provide access to remote locations and proximity to coastal wildlife.

Guidelines for minimal impact kayaking

- Take home all rubbish, including empty packaging, food scraps and sanitary products. Collect rubbish left by others if possible.
- Use existing campsites and tracks whenever possible. If visiting a previously undisturbed site,

Figure 4.3 Hauling boats out onto the shoreline is destructive to the vegetation and can lead to increased erosion. © Leah Page





Figure 4.4 Kayaking allows access to remote coastal locations such as the Bathurst Channel in south-west Tasmania. © Chris Rees

keep movement around the area to a minimum. Carry, rather than drag, your kayak.

- Use a fuel stove for cooking. Campfires leave ugly scars, reduce the availability of dead timber as habitat and can escape and start destructive wildfires.
- When depositing human waste, burying it is a minimum requirement: consider disposal in the sea. Best of all, carry it away with you.
- Avoid using soap or detergent when camping. Beach sand is an excellent alternative for cleaning cookware.
- Maintain a respectful distance from all wildlife, both on land and water (100m from whales).
- Do not disturb breeding wildlife. Avoid landing on smaller offshore islands used for breeding, and camp well away from other breeding sites.

4.1.5 Camping

Many Tasmanians have long enjoyed camping in coastal areas and some families have returned to the same sites annually for many years. Environmental knowledge and understanding of human impacts on coastal values has increased significantly over the years and camping practices have had to be modified to reflect this knowledge. Ongoing education of campers and provision of appropriate facilities is essential to minimise impacts from coastal camping.

Guidelines for minimal impact camping

- Camping in coastal areas should be restricted to formed campsites. Keep camping equipment and vehicles within site boundaries. Many coastal campsites are located within reserved land and are managed by the Parks and Wildlife Service with strict guidelines about permissible activities depending on the status of the reserve.
- Dispose of waste properly, to minimise environmental impacts. Visitors should take all rubbish away with them or use rubbish receptacles if provided. Disposal of black water (toilet and kitchen waste water) into campground composting toilets will destroy the composting process. Dispose of black water only at facilities listed in the *Caravan and holiday park guide to Tasmania.* (Tourism Tasmania, n.d.)
- Do not remove or damage plants, animals, historic artefacts and rocks: they are protected.
- Do not cut or remove dead trees and branches for firewood or other purposes: they provide refuges and homes for wildlife.
- Do not disturb Aboriginal middens (shell and bone deposits), which are found in and around sand dunes, or remains of historic use such as huts, footings, walls and fences. These sites are protected.
- Avoid digging drains, channels or pits, they are destructive to the vegetation and landscape; and channel water which will increase erosion.
- Campfires are permitted in some camping areas (except on days of total fire ban) and usually only in fireplaces provided. Fires should not be left unattended and should be kept small. They must be extinguished fully with water before leaving. It is an offence to leave a fire unattended without fully extinguishing it. Total fire bans can be imposed at short notice - it is advisable to carry a fuel stove.
- Do not feed wildlife: inappropriate food can make them very ill and feeding discourages them from foraging for themselves. Maintain a respectful distance from all wildlife.
- Dogs and horses are permitted in some camping areas – check with the land manager for permission and conditions.

4.1.6 Coastal access

Historically, coastal accessways were often developed in an ad-hoc manner and often by adjacent landholders. Land managers need to work together and develop plans to ratify public access, to ensure protection of fragile or valuable environments. This involves identifying access points and undertaking public awareness (including signage) and management actions to direct access in foreshore areas, to reduce erosion and degradation. This work should be undertaken in collaboration with local community care groups and in consultation with public users.

Designated coastal access needs to be provided; the demographics of the area and the user groups should be considered, to ensure that access is appropriate. It might be necessary to consider ramps for disabled access. Many elderly people can use steps with hand rails but could not use ladder-and-chain-style access. ***Refer to Chapter 13 Access management.***

Access to beaches and coastal areas by 4WD vehicles, quad bikes and trail bikes can be extremely damaging to the coastal environment, leading to destruction of natural and cultural values. Aboriginal heritage sites, dune vegetation, dune stability and breeding shorebirds are all extremely vulnerable to vehicles on beaches.

Vehicles can spread weeds and diseases and cause severe erosion, and can lead to compaction of the

Figure 4.5 Access to coastal areas by trail bikes, quad bikes and 4WDs can be extremely destructive and should be very carefully managed. © Shaun Thurstans





Figure 4.6 Poorly designed and sited rubbish bin in southern Tasmania. © Leah Page

sand, affecting the animals living within the sand (meiofauna) which are an important food source for sea and shorebirds. On popular beaches and dune systems, 4WD vehicles, quad bikes and trail bikes can also be dangerous to other beach users.

What coastal land managers can do:

- Consult with user groups and establish the reasons for 4WD access and the social context of the activity. Provide education about the impacts of vehicles on beaches and dunes through signage, newsletters and notices. Most importantly invite representatives of recreational groups to get involved in coastal management and encourage them to inform their members of coastal values, the risks associated with their activity and the best ways to minimise those risks.
- Review beaches with vehicle access and assess environmental impacts against social benefit. Consolidate vehicle access through dune systems and provide board-and-chain tracks to reduce dune erosion. Signage is essential on beaches where boat launching is permitted, to tell users to restrict vehicle access to the launch site. ***Refer to Chapter 13 Access management.***
- Enforcement of vehicle restrictions requires collaboration between all land managers, usually the Parks and Wildlife Service and local council as well as Tasmania Police.

Offshore islands

There are around 600 named islands, rocks and reefs around the Tasmanian coast. The majority of these are true islands, with most of the landmass lying just above the high water mark.

Many islands support flora and fauna of conservation significance, including breeding populations of seabirds and seals. Because of their geographic separation, offshore islands are very vulnerable to the introduction of weeds, pests and diseases, but their isolation also makes them highly defendable against threats and impacts.

Anyone accessing offshore islands must take care not to introduce new weeds, pests or diseases, by practising good hygiene for boats and personal equipment. Visitors should take care to minimise disturbance to vegetation communities and wildlife. Land managers should consider involving local communities in management plans for offshore islands and should play a role in educating the broader community about the value and sensitivity of these important environments.

4.1.7 Litter

Litter in coastal landscapes has a visual impact and degrades vegetation communities and wildlife habitat. Litter in coastal waters (known as marine debris) threatens wildlife, who may become entangled in or eat it. Illegal dumping of household waste and unwanted items in coastal areas is a public health hazard, is destructive to the local environment and has a very serious aesthetic impact.

Rubbish bins

For many popular coastal locations, rubbish collection services are the responsibility of the land manager. Sometimes it is acceptable in more remote areas to encourage people to take their rubbish away with them. But if other public facilities are provided at a site, users will often expect to be able to dispose of rubbish there, too.

Figure 4.7 Rubbish bins for specific purposes such as dog faeces need to be accompanied by signage and checked regularly to ensure that the bags provided are not creating a litter problem. © Leah Page



What coastal land managers can do:

- Ensure that the size and design of the rubbish bins are appropriate for the amount and type of waste. Bins designed to prevent scavenging by seagulls and possums should be considered in coastal areas.
- Provide separate bins for waste/rubbish, recyclables and dog faeces, where appropriate.
- Consider where the bins are located and how often they are emptied. Monitor usage to ensure bins are located in the right spot.
- To minimise litter escaping into the environment, ensure that bins are never more than 75% full and ensure that spilt litter is cleaned up when bins are serviced.

Rubbish dumping

Coastal areas are also sometimes used as dumps for garden waste, household refuse, unwanted items such as furniture and even cars. Dumping of garden waste may introduce weeds and diseases. Rubbish looks unsightly, can destroy vegetation and impact on wildlife values, and cause contamination of waterways.

There are also considerable public health and safety risks associated with the dumping of household refuse and large items.

Any illegal rubbish dumping should be reported to Tasmania Police or the local land management authority; usually Crown Land Services, the local council or the Parks and Wildlife Service.

Education of the public and strict enforcement is essential to manage the issue of illegal dumping.

Marine debris

Sources of marine debris include stormwater, fishing and aquaculture industry waste, shipping operations



and recreational use of coasts and waterways. Marine debris can entangle and strangle or cause starvation of marine wildlife, pollute water and look unsightly, detracting from recreational enjoyment.

Common marine debris items include plastic bags, cigarette butts, ropes and bait box straps, plastic wrappers and small pieces of plastic. Cigarette butts persist for a long time in the environment, ropes and straps are very prone to causing entanglement, and small pieces of plastic and bags and wrappers are commonly ingested by marine life.

The Tasmanian Fishing Industry Council is the peak commercial fishing industry body in Tasmania. It has developed a code of conduct for a responsible seafood industry and actively promotes to its members the importance of reducing marine debris and encourages the provision of improved waste facilities.

Many community groups undertake clean-up activities and these efforts should be supported by land managers and other coastal stakeholders. Marine debris clean-up operations must consider the impact of the activity on other coastal values, in particular wildlife, such as breeding shorebirds. ***Refer to Chapter 10 Wildlife management.***

The installation and servicing of litter traps on stormwater facilities can greatly reduce stormwater pollutants entering waterways. ***Refer to Chapter 12 Stormwater and crossings.***

4.1.8 Surfing and water recreation

In addition to recreational boating, kayaking and jet-skiing, popular water sports in Tasmania include scuba diving, surfing, kite surfing, wind surfing, snorkelling and swimming.

These activities can have unwanted impacts on coastal values. Popular surfing spots often have formalised access and sometimes other facilities; other surf spots are more remote and not easily accessed. It is important that surfers and other users minimise their impact on coastal values when accessing the foreshore, in particular where there no formalised access or facilities are provided.

Artificial reefs

The creation of artificial reefs to modify swells to change the surf conditions should be avoided. Complex hydrological processes are responsible for the transport and deposition of sand on beaches and any modification to wave action and swells could upset the balance of this process. This is of particular concern with climate change also increasing the pressure on shorelines through sea level rise and increased storm activity.

4.1.9 Coastal views

Coastal views are highly prized and enjoyed by Tasmanians. Developments and structures on the coast can degrade the visual appearance of the area. Sometimes local residents in coastal areas try to modify their own coastal view by illegally removing vegetation in adjacent coastal reserves.

View field maintenance

The visual appearance of the coast fosters a powerful sense of place within local communities, enriches recreational experiences and adds to enjoyment of coastal areas.

Planning for coastal development should consider the importance of maintaining coastal landscape views or view fields (the view of the coastline from another vantage point). There are very few prescriptive guidelines for view field maintenance in existing

policy and legislation, so currently it is up to individual planning bodies to consider these issues when assessing development applications.

Illegal removal of vegetation

Some coastal foreshores have suffered the illegal removal of coastal vegetation by adjacent landowners, usually to open up coastal views. Removal of vegetation from any coastal foreshores can cause severe damage to these fragile ecosystems and lead to erosion and instability. In light of sea level rise, foreshore stability is increasingly important, as is protecting remnant coastal vegetation and ecosystems such as wetlands.

It is critical to educate the public about the value of coastal vegetation and ways in which they can care for their coastal areas. Law enforcement will also be needed where problems are occurring. ***Refer to section 7.7 Vegetation removal.***

4.1.10 Horseriding

Horseriders enjoy riding along beaches and on a number of coastal horseriding trails around the state. Like vehicles on beaches, horses can spread weeds and diseases (in their hooves and droppings) and can easily trample shorebird nesting sites, eggs and chicks. Some riders utilise catch bags to collect their horse droppings.

Access to coastal areas for horses should be restricted to particular locations. It is important to consult with user groups and establish workable outcomes that provide access whilst protecting important coastal values. Education about the impacts of horses on beaches and dunes can be provided through signage, newsletters and notices.

Most importantly, representatives of horseriding recreational groups should be invited to get involved in coastal management and encouraged to inform their members about coastal values, the risks associated with their activity and the importance of sticking to designated tracks to minimise those risks.

4.1.11 Dog-walking

Walking dogs on beaches is an extremely popular recreational activity and many local councils have dog management plans that designate particular beaches for this. Dogs on beaches raise obvious health and safety concerns for other beach users that need to be managed; restrictions on dog access often apply to popular beaches during the summer months.

Figure 4.8 Many dog owners enjoy exercising their pets on the beach but some beaches should be dog free to provide space for wildlife. © Leah Page





Dogs can also have significant impacts on coastal wildlife and should be totally excluded from some beaches where coastal values are sensitive, such as those where shorebirds breed.

Dogs leave behind scents that will impact on the behaviour of wildlife. Even the sight of a dog in the distance will stress shorebirds and other wildlife who recognise its shape as a predator. When dogs chase birds, the feeding time of the birds is reduced, affecting their ability to provide enough food for themselves and their young. Unsupervised dogs can eat shorebird eggs and attack and kill penguins, shearwaters and other wildlife.

Dog owners should be educated about coastal values and potential impacts of their dog in coastal areas. They should be encouraged to use beaches designated for dog-walking and obey any local restrictions, and should carry bags to collect dog faeces and dispose of these appropriately.

Community organisations such as Birds Tasmania, the Tasmanian Conservation Trust, the Southern Coastcare Association of Tasmania and the Natural Resource Management (NRM) regional bodies have joined forces to deliver community awareness events such as 'Dog's Breakfasts' at popular beaches: dog owners and their pets are given a free BBQ and the owners are educated about coastal values in their area and ways to minimise their dog's impact on these values.

4.1.12 Birdwatching

Birdwatching is a significant recreational activity in Tasmania that is increasing in popularity and attracting tourists to Tasmania from the mainland and from overseas. Ecotourism and specifically birdwatching make an economic contribution to Tasmania, but the exact value is unknown. Volunteers from Tasmania and further afield get involved in bird counts and observations for organisations like Birds Tasmania and Wildcare.

Viewing coastal birds should be undertaken with great care. Seek advice from the local Parks and Wildlife Service and Birds Tasmania.

Shearwater and penguin burrows can be easily damaged or destroyed by inappropriate access. Because these birds come ashore at dusk, lighting is often required to view them, which can be very disturbing to the birds. Ensure torches are covered with red cellophane to minimise this disturbance. ***Refer to Chapter 10 Wildlife management.***

4.1.13 Removal of seaweed and other coastal resources

Sand, seaweed pebbles and driftwood are resources that have a value as landscaping or gardening products. However, it is illegal to remove seaweed and other resources from public beaches without approval from the land manager, and a licence from Crown Land Services (DPIPWE).

Seaweed and seagrass wrack plays a role in trapping sand and building up beaches. It also provides habitat and food for small invertebrates and micro-organisms that live on the beach, which are an important part of the food chain, in particular for shorebirds. On shorebird breeding beaches seaweed also provides camouflage for nests and shelter for chicks.

Land managers who remove wrack for aesthetic reasons should only remove it from above the low tide mark and only on high-use beaches that do not support breeding shorebirds.

Sand should not be removed from the beach or dunes as this can lead to instability and erosion. It is illegal to remove sand without a permit. Sand mining requires specialist advice and consideration of the local processes of erosion and deposition to determine if the activity is sustainable. ***Refer to Chapter***

11 Soil management and earthworks.

Beach rocks and pebbles also play an important role in slowing down wave action, therefore reducing coastal erosion. It is illegal to remove any rocks, pebbles and stones without a permit.

Logs and driftwood on beaches have a function of trapping sand and providing shorebirds with shelter and a place to hide from predators. If it is necessary to remove large logs that pose a hazard, the land manager's approval is required.

4.1.14 Surf clubs, rowing clubs and sailing clubs

Surf clubs, sailing clubs and often rowing clubs are located on coastal foreshores and their activities rely on access to the coast. These clubs play an important role in providing healthy experiences in the coastal environment, particularly for young people. However, the intensity of their activities on the foreshore can have unwanted impacts on the coast.

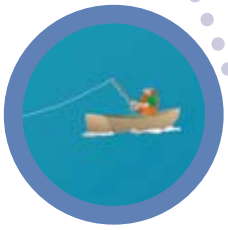
In summer, surf clubs hold regular training activities, at least weekly and a number of state-wide carnivals occur on various beaches, involving large numbers of people. They generate a lot of rubbish and can harm local vegetation and wildlife, in particular breeding shorebirds.

Sailing clubs and rowing clubs also train regularly and hold events that attract large numbers of people to foreshore areas.

Sporting clubs should work closely with local land managers to ensure their activities are not damaging coastal values. This is particularly important when planning events. Adequate facilities and resources for cleaning up after events need to be provided. Coastal sporting clubs should raise awareness of coastal values and the potential impacts of their activities on the coastal environment with their members.

Figure 4.9 Surf club carnivals attract large numbers of people to the beach which can impact on coastal values. They are a great opportunity to raise awareness about coastal issues and protecting the coastal environment. © Leah Page





4.2 Working with community

This section deals with involving the local community in coastal management and working with local community groups, in particular environmental groups. Works on the coast will be more effective if they have community support rather than indifference, or even opposition.

Before developing a works plan, pro-active land managers involve the local community, so that people know what works are planned and why, and have the chance to put forward their ideas and concerns. Communication and collaboration at the start will help to identify important issues and to gain acceptance and support for projects.

Community groups (such as Coastcare groups) often undertake very significant coastal land management works in partnership with local land managers and other coastal stakeholders.

It is essential to recognise, respect and support Aboriginal connections and concerns for the coast. This includes consulting with Aboriginal communities about proposed activities that may interfere with Aboriginal values. Working with the Aboriginal community involves its own set of requirements and legislation and is covered in ***Chapter 5 Cultural heritage management.***

Figure 4.10 Coastcare volunteers learning about coastal issues at a regional workshop.
© Southern Coastcare Association of Tasmania





4.2.1 Identifying stakeholders

For any given coastal area in Tasmania there will be user groups and members of the community that have a vested interest in the area. Before commencing works it is important to identify who will be interested in or affected by the proposed activity. It is even better to establish long-term partnerships with community stakeholders that will allow meaningful dialogue on coastal management issues.

When planning projects on the coast, it is important to identify the different values of all coastline users, not just local residents and regular visitors. One stretch of coastline may be used at different times for walking, swimming, picnicking, dog-exercising, fishing, surfing, boating, birdwatching, off-road-vehicle driving, horseriding, surf carnivals, sports training, education and ecotourism. Identifying and recognising people's different values will also help to identify and minimise conflicts between different users.

People living next to a coastal reserve are the most likely to become involved in hands-on activities. They are also more likely to help with ongoing maintenance and reporting and deterring vandalism and arson.

Know your community. Local councils can best achieve this by having a dedicated employee such as an NRM Officer who regularly works with the community in their municipality on environmental management issues. If there is local volunteer group in the area it probably has its own aspirations and plans for the area and may even be working with other agencies to achieve them.

Local communities often don't know or care who manages the coastline (local council, Parks and Wildlife Service, Crown Land Services), they just want it managed in a way that reflects their values.

4.2.2 Consultation with the community

Community consultation is important to inform people and gain public support for coastal works and developments that might affect public use and enjoyment of the area. Residents and visitors feel that their concerns, ideas and needs have been carefully addressed. It is important that they understand the reasons behind a project especially if they oppose it. This may elicit support for protecting cultural and natural heritage, even if it might interfere with some people's recreational activities.

Consultation with established community groups should be ongoing and involves visiting group work sites, participating in group meetings and inviting group representatives to be involved in land management planning and decisions. Local people often know more about some local issues (e.g. bird nesting sites) than the professional managers.

The broader community is consulted when projects or management issues arise. Putting a notice in the newspaper advising of works is not enough. It is better to have face-to-face contact, such as conducting informal beach walks or public workshops. Brochures in local shops, surveys, temporary signs and letterbox drops are good ways of informing people and inviting consultation. Developing a community engagement strategy is advisable.

Consultation takes time and money, but it may be cheaper than having contractors and expensive equipment standing idle while a dispute brings work to a halt. Consider also the cost to future generations of doing the wrong thing.

4.2.3 Types of community organisations

There are many different community organisations with an interest or involvement in coastal land management.

Key individual community organisations and their contact information is summarised in ***Appendix 4***.

Environmental non-government organisations (NGO's) such as Birds Tasmania, the Tasmanian Conservation Trust, Ocean Planet and the Understorey Network provide advice to community groups and, in some instances, coordinate coastal projects for groups.

For a fee, **volunteer providers** such as Conservation Volunteers Australia, Green Corps and other organisations provide teams of volunteers with an experienced leader to undertake a range of environmental activities, from weeding and revegetation to track work and monitoring.

Local community groups such as Coastcare and Landcare groups get involved in coastal land management and Scout clubs or sporting groups such as Surfrider's Foundation are keen to get involved in beach clean-ups or revegetation projects.

Community support organisations such as the Southern Coastcare Association of Tasmania and Tasmanian Landcare Association provide support and regional coordination for local volunteer groups. ***Refer to 4.2.4 Volunteer support programs.***

Many **schools** have environmental programs and are interested in coastal issues and coastal management. These little environmentalists will be the custodians

Figure 4.11 School group involved in water quality monitoring. © Leah Page





of the land in the future and it is never too early to introduce them to best practice coastal management. It is very effective when an expert in coastal issues takes the time to work with staff and students.

Community organisations such as the Understorey Network and local Coastcare groups create opportunities for working with school groups when resources allow. School groups can get involved in revegetation works and monitoring programs. Coastal land managers and NRM regional bodies should consider working with school groups whenever possible.

4.2.4 Volunteer support programs

A range of organisations and programs offer support to community volunteer groups interested in coastal management. Umbrella groups such as the Tasmanian Landcare Association (TLCA), Southern Coastcare Association of Tasmania (SCAT), the Tasmanian Conservation Trust (TCT) and Wildcare provide opportunities and resources and foster networks and linkages among local volunteer groups.

The TLCA and Wildcare maintain databases of volunteers keen to work on short-term projects or particular activities such as whale-stranding rescue operations.

Conservation Volunteers Australia also works on short-term projects. For a fee, it provides a highly motivated workforce that can work in partnership with land management authorities to manage and protect the coastline.

Regional NRM bodies provide opportunities for funding, training and guidance on regional issues. They have facilitators that support community groups and encourage groups to address regional priorities.

Many local groups utilise Australian Government programs (e.g. Caring for Our Country) to access funding for their projects.

Land managers (e.g. local councils, Parks and Wildlife Service) can provide support through developing agreed management plans with local volunteer groups and providing on-ground assistance.

Volunteer support programs can help:

- individuals to join an existing group or set up a new one
- identify local problems and possible solutions
- work with groups and land managers to develop projects and apply for funding
- identify local specialists and other volunteers (e.g. schools, Scout clubs)
- make sure that community projects are well planned, with input from land managers, and fit into local or regional coastal management plans
- ensure community projects are technically sound and feasible, and comply with relevant legislation.

4.2.5 Understanding community groups

Many people in Coastcare, Landcare, Fishcare, Wildcare, progress associations, service clubs, youth clubs and similar groups regularly volunteer many thousands of dollars' worth of time and resources for environmental projects. Most are from environmental care groups like Coastcare, and local Scout groups and service clubs often partner with Coastcare groups to tackle specific projects.

Volunteers from environmental care groups are often very skilled and experienced and highly motivated but should not be regarded as a free labour force. Some will also have work and personal commitments; others may be retirees with varying physical abilities.

All volunteers deserve respect and need to be



supported and appreciated. Most do not want rewards but request that land managers provide resources (e.g. tools and equipment), funding, expertise (e.g. training) or advice, and approval of activities.

Community groups come in many forms but most have a least a basic structure that requires them to hold regular meetings and be accountable to their members. Many Coastcare and other groups are incorporated bodies that satisfy a host of legal criteria, including having a committee, insurance and a constitution. When working with community groups it is important to remember that they have a responsibility to fulfil the functions within their constitution and/or to respond to the needs and directives of their membership.

Most groups hold monthly meetings at which members plan activities and manage their administrative affairs and funds.

Most groups also hold monthly, or regular working bees where members work on local projects and on-ground activities to protect or enhance their coastal environment.

The majority of volunteers prefer hands-on activities and find the administrative burden of running an incorporated body taxing. Umbrella organisations like Wildcare, Tasmanian Landcare Association and the Southern Coastcare Association of Tasmania attempt to reduce some of this administrative burden on groups through different initiatives such as advice on insurance and incorporation and coordination of regional projects.

Membership fees are usually nominal and projects require external funding, often in the form of government or corporate grants. Such funds are highly competitive; applications take a considerable amount of effort to apply for; and funds are tied to defined and non-negotiable expectations from the funding body. Funding can also be sourced from NRM regional bodies, state government programs and corporate sponsorships.

4.2.6 Working with community groups

Supporting volunteers does not have to be expensive. Many organisations and volunteer programs have extension officers or facilitators who can help to seek funding and develop agreements between volunteers and land managers. Volunteers also appreciate help with funding applications from other sources.

Many public works (e.g. management of weeds, native vegetation and wildlife) require ongoing work and maintenance and will be more successful if carried out in partnership with the community. Community groups can help with many tasks, including the essential monitoring and maintenance after weed removal, planting and maintaining revegetation projects, conducting wildlife tours to educate the public about protecting wildlife, and developing signage to raise public awareness of such issues. However, there should not be exclusive reliance on volunteers to undertake land management responsibilities.

Local councils that invest in their own NRM facilitators have very successful working relationships with volunteer groups working on coastal management issues. Organising and holding educational workshops and working bees can be a good way to support groups and attract new volunteers. Support from the land manager greatly increases volunteers' motivation and enjoyment. Without this support, community groups can become discouraged and fade away. Some local councils offer simple small grant schemes for community groups in their area, to support and acknowledge the contribution made by their volunteers.

The volunteering experience should be a two-way relationship. Volunteering is a vital component of a healthy community. The volunteering experience should be enjoyable and satisfying. The best way to achieve this is with regular consultation through meetings and a formal agreement with the groups, to outline everyone's responsibilities and establish common goals. ***Refer to section 4.2.9 Partnership agreements***.

It is also important to train works crews and contractors to avoid practices that may (often unintentionally) cause damage and upset local residents or dedicated volunteers who care for their environment, such as depriving wildlife of habitat by cutting down old trees, or removing fallen branches just because they look untidy.

4.2.7 Guidelines for collaborating with community groups

Community groups can be great advocates for your organisation and your work if you develop a healthy partnership with them.

- Provide a regular open channel for community groups to provide input in coastal management decisions and planning (i.e. NRM facilitators in land management agencies).
- Consult with community groups before planning coastal management works. Provide at least six weeks' notice wherever possible to allow groups to consult their members at one of their regular monthly meetings then consolidate that input into a response.

Figure 4.12 Some local councils provide resources in the form of tool trailers to assist Coastcare and Landcare groups with their activities. © Leah Page





- Provide support for community groups in the form of resources, advice and training. Visit the sites where the community groups are working and make note of their concerns and aspirations.
- Encourage community groups to seek support and advice from other NRM organisations, such as NRM regional bodies and community group umbrella organisations such as the Tasmanian Landcare Association and the Southern Coastcare Association of Tasmania.
- Become familiar with NRM funding programs and the constraints and processes involved. Be prepared to respond in a timely way when funding rounds open. Community groups will often be keen to apply and will need support and approvals from land managers prior to submitting funding applications.
- Review existing works programs, activities and management plans to ensure that land management practices align with community group programs and activities, and that community group activities are compatible with local, regional and state strategies. If there are inconsistencies, work with the group to resolve these.
- Establish a partnership agreement or management plan with your local community group to provide clear direction on everyone's responsibilities and establish common goals. Review these regularly with the group.
- Attend meetings and working bees when possible to update groups on land management activities and plans and to hear about the groups' activities and plans.

Common community group concerns

- Management decisions made without consultation
- Tight time frames for providing input or feedback that do not allow enough time for consultation with members
- Lack of support from local land managers and other agencies to raise awareness of coastal values and provide education about coastal issues
- Lack of enforcement of illegal coastal activity such as vegetation removal

4.2.8 Community involvement in working groups and advisory bodies

Coastal projects will benefit from community group representation on steering committees, working groups and advisory bodies. Ongoing coastal land management activities will benefit from ongoing consultation with community groups.

Land managers often have to liaise with numerous groups. One approach is to form a working group involving all local groups and the land manager in a meeting twice a year to exchange information about works plans, programs, aspirations and issues. This would not replace individual consultation with each group but could be an effective way for a land manager to receive input on development proposals and other works programs and local groups could benefit from the opportunity to discuss their activities in the region and share ideas and concerns with each other.



4.2.9 Partnership agreements between land managers and community groups

Asset and site plans should include reference to community groups with an interest in that particular location. Ideally they should include strategic actions that will be undertaken to support and work with the community group/s. It is even better to establish a partnership agreement with key groups, to establish a truly collaborative approach to coastal land management.

The purpose of a partnership agreement is to provide guidance to the community group and the land manager for certain activities related to the management of coastal land. The agreement may satisfy legislative requirements for authorisation to work on the land manager's property, but more importantly it will provide details of each party's role and responsibilities and provide a foundation for community group works to be undertaken in collaboration and with the support of the land manager.

Keep partnership agreements as simple as possible and use plain English. A partnership agreement should specify key pieces of information that will assist its implementation. The agreement could specify the location or areas covered by the agreement and provide some background information on those locations and also on the community group and its aspirations and history of involvement. The agreement could also nominate a liaison person for each party.

Works program

A partnership agreement outlines the works program to be undertaken by the group and the works or support that will be undertaken by the land manager. It can list tasks that the group, in consultation with the land manager, has agreed to undertake. It can also list support that the land manager will give to the group's tasks in the form of works, training, resources etc.

The works program may include a site plan, maps and other technical information and a time frame for agreed activities. It may be specific (e.g. authorising particular works on a certain day) or it may describe a general work program. It is important to remember that a works program does not hand over management responsibilities to the community group: rather, it outlines the scope and any limitations of the community group's work activities and what the group can expect from the land manager. It also provides strategic direction for planning activities and seeking funding.

Examples of works community groups might undertake:

- weed management
- foreshore management such as access management and removal of feral oysters
- protection of threatened species habitat
- visitor services site management (e.g. camping or picnic areas)
- walking track maintenance or construction
- revegetation of degraded areas
- maintenance of cultural heritage assets (e.g. historic huts)
- rubbish collection and removal, such as marine debris beach clean-ups
- monitoring coastal values such as penguins, shorebirds or vegetation
- monitoring coastal processes



4.2

Examples of land manager works and support:

- management advice for the area
- risk assessment of proposed activities
- training for group members
- administrative support for the group (e.g. photocopying, newsletter distribution)
- logistical support (e.g. transport) for group activities
- provision of personal protective equipment (PPE)
- provision of materials (e.g. herbicide, timber)
- provision of funding (where appropriate or possible)
- loan of tools
- assistance with specialist equipment and/or skills (e.g. design of track work, rubbish removal, spraying weeds, chainsaws, large vehicles)
- general assistance with on-ground works
- events to recognise the contribution of community group volunteers
- assistance with grant applications
- assistance with organising community events
- assistance with promotion of activities

Support and assistance from land managers

Land managers can provide important guidance and assistance to community groups, using their staff resources to undertake risk assessments with the group and help them to implement high standards of OH&S through training and the provision of safety equipment. Land managers can offer to provide supervision of tasks where deemed necessary by both parties.

The partnership agreement should clarify responsibilities for OH&S and specify the processes for undertaking a risk assessment and reporting hazards or incidents.

Land managers could explore the possibility of providing insurance cover for groups working on their land. It is highly recommended that groups also seek their own insurance cover, regardless of arrangements with land managers, as coastal land tenure is complicated and confusing and volunteers may find themselves unwittingly working on another manager's land.

The partnership agreement can also provide some key organisational tips for community groups, such as recording volunteer attendance, registration and annual activity summaries. This information will assist groups in demonstrating a safe work environment and will be valuable when seeking funding or recognition for work activities.



4.3 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. A list of community support organisations is provided in ***Appendix 4***. Other tools and resources including websites are collated in ***Appendix 5***.

Australian national guidelines for whale and dolphin watching (Department of Environment and Heritage 2005)

http://www.environment.gov.au/coasts/publications/pubs/whale-watching-guidelines-2005.pdf

Caravan and holiday park guide to Tasmania. (Tourism Tasmania)

Annual publication

Fishwatch

0427 655 557

Report suspected illegal fishing and fishing offences

Leave no wake: Minimal impact sea kayaking

Brochure available from Parks and Wildlife Service and information on the website

www.parks.tas.gov.au

NRM regional bodies and volunteer support organisations

See Appendix 4

Partnership Agreement template

See Guidelines at the back of this Manual

Recreational Sea Fishing Guide

Produced annually by DPIPWE

www.dpipwe.tas.gov.au

Stow it don't throw it (brochure)

Guidelines for minimising risk of rubbish and pollutants for boating activities

Australian Maritime Safety Authority (AMSA)

http://www.amsa.gov.au/publications/Marine_Environment_Protection/Stow%20it.pdf

Whale hotline

0427 942 537

Report whale sightings and strandings





5 Cultural heritage management

5.1 Aboriginal heritage

5.2 Historic and maritime heritage

5.3 Climate change and cultural heritage

5.4 Tools and resources

This chapter deals with Tasmania's rich cultural heritage. Cultural heritage values include Aboriginal heritage sites and artefacts and historic heritage sites and artefacts, both are protected under specific legislation.

Cultural heritage places offer an insight into past ways of life, and for Aboriginal people they provide a powerful connection to place.

Cultural heritage sites are often fragile and easily damaged. They can be difficult to identify and once they are lost or destroyed they are gone forever.

Everyone who undertakes land management works has a legal and moral obligation to protect Tasmania's cultural heritage values for future generations.

Tab photo: Remnant Jetty Bridport northern Tasmania.
© Renee Hodskiss.

5.1 Aboriginal heritage

This section deals with Aboriginal heritage management and the importance of working with the Tasmanian Aboriginal community to ensure that Aboriginal heritage values are valued and protected.

Aboriginal occupation of Tasmania stretches back at least 40 000 years, and the entire Tasmanian landscape is part of the Aboriginal story. As a result, there are numerous Aboriginal heritage places including shell middens, rock markings, stone quarries, stone arrangements, rock shelters and fish traps in coastal areas.

All Aboriginal places are important, as each one is an integral part of the 'country'. 'Country' describes all of the areas that Aboriginal people traditionally used or occupied. Aboriginal people have strong physical and spiritual links with the 'country.'

Tasmanian Aboriginal people have strong and ongoing connections to coastal landscapes and heritage sites. They are the primary source of information about their heritage and should be involved in its protection, identification and management.

5.1.1 Tasmanian Aboriginal people

Tasmanian Aboriginal culture is one of the oldest living cultures on earth. Sites bearing signs of occupation and past traditions and practices have been scientifically dated back to 40 000 years ago.

Tasmanian Aborigines lived through ice ages and major geographical change such as the sea level rise which inundated the Bassian Plains, separating Tasmania from mainland Australia.

Tasmanian Aborigines are the only group of humans

Figure 5.1 Aboriginal midden on thenorth-east coast of Tasmania. © Chris Rees





to evolve in isolation for 10 000 years. Their culture and heritage is unlike any other and they are a diverse group of people with many nations, languages and traditions.

Aboriginal heritage places, both tangible and non-tangible, provide a spiritual link for Aboriginal people to their tradition, culture and roots. These places are of great interest to archaeologists and historians globally.

Tasmanian Aboriginal people have a long association with the coast and have sustainably used coastal resources for thousands of years, gathering food items such as short-tailed shearwaters (yolla or muttonbirds), seals, swan eggs and shellfish. Today many Tasmanian Aboriginal people continue to practice traditional cultural practices such as going birding (gathering yolla) and collecting coastal resources such as shells, grasses and kelp to make necklaces, baskets and water carriers.

Aboriginal middens can be found on most Tasmanian coastlines and contain layers of shell, stone artefacts, charcoal, ochre and animal bones. Aboriginal shell middens hold ancient cultural knowledge and information and are extremely important on a local and a global scale.

Middens provide an insight into the way people lived in Tasmania and the resources that were available in any particular area. With the ongoing threat from development and sea level rising, middens are a non-renewable source of information and hold great potential for further understanding and appreciation of the lives of Tasmanian Aboriginal people.

5.1.2 Legislation and approvals

Currently Aboriginal heritage in Tasmania is protected under both Tasmanian and Commonwealth heritage legislation.

The *Aboriginal Lands Act 1995* (Tasmania) covers management of access to land and waters for mineral and petroleum exploration purposes.

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Commonwealth) protects Aboriginal Heritage at a National level.

The *Aboriginal Relics Act 1975* protects Aboriginal 'relics', 'protected sites' and 'protected objects' in Tasmania.

'Relic' is defined as:

- any artefact, painting, carving, engraving, arrangement of stones, midden, or other object made or created by any of the original inhabitants of Australia or their descendants before 1876;
- any object, site, or place that bears signs of the activities of any such original inhabitants or their descendants which occurred before 1876; or
- the remains of the body of an original inhabitant or of a descendant who died before the year 1876 that are not buried in:
    1. any land that is or has been set aside or used as a burial ground or cemetery under any Act, deed, or other instrument; or
    2. a marked grave in any other land.

A 'protected site' is land where a relic is situated which the Minister has declared ought to be protected and preserved.

A 'protected object' is the specified relic to which a Ministerial order declaring a protected site relates.



It is an offence under the *Aboriginal Relics Act 1975* to:

- destroy, damage, disfigure, conceal, or otherwise interfere with a protected object or relic
- carry out an act which is likely to endanger a protected object
- remove a relic from where it was found or abandoned
- sell or otherwise dispose of a relic or remove it from the state
- destroy, damage, deface or otherwise interfere with any fencing or notice erected, or any other work carried out in, or in respect of, a protected site under the Act, other than in accordance with a permit granted by the Director of National Parks and Wildlife
- remove a protected object from a protected site, other than in accordance with a permit granted by the Tasmanian Minister. (However, the Director of National Parks and Wildlife can direct the removal of protected objects from a protected site to a place of safety if he or she is satisfied that they are likely be damaged, destroyed or lost.)

The penalty for a contravention is a fine of up to $1000 or imprisonment for up to six months.

You must report any discovery of Aboriginal heritage relics

Any person who finds a relic must (with limited exceptions), inform the director or an authorised officer as soon as practicable after the find. The penalty for failing to comply with this requirement is a fine of up to $1000.

You must have a permit before doing anything that will impact on Aboriginal heritage

All Aboriginal heritage places are protected under the *Aboriginal Relics Act 1975* and any action that will have an impact on Aboriginal heritage, no matter its size or condition, requires a permit under section 14 of the Act. All Aboriginal heritage places are protected, whether on private or public land.

5.1.3 Role of Aboriginal Heritage Tasmania

Aboriginal Heritage Tasmania is the state government agency responsible for preventing natural and human actions from adversely affecting Aboriginal heritage places and values.

Aboriginal Heritage Tasmania works with the Tasmanian Aboriginal community to recognise and respect Tasmanian Aboriginal culture and heritage, and secure the protection and promotion of Tasmanian Aboriginal heritage for present and future generations.

The agency is responsible for administering the *Aboriginal Relics Act 1975* and provides land management and expert advice for responsible management of Tasmanian Aboriginal heritage. It also undertakes research and interpretive activities to help protect and promote Tasmanian Aboriginal heritage throughout the state.

The vast cave middens of the Rocky Cape National Park in the state's north-west provide one of the most complete records of the lifestyle of coastal Aboriginal people anywhere in Australia.

Material accumulated in the cave middens reveal 8000 years of continuous occupation. Evidence shows that seals, scale fish and a variety of shellfish, supplemented by other game and edible plants such as grass tree and fern, formed a large part of the diet at Rocky Cape. Tools used for gathering and preparing food and for other cultural activities have also been discovered at the site.

5.1.4 Tasmanian Aboriginal Land and Sea Council

Tasmanian Aboriginal Land and Sea Council (TALSC) plays a role in consulting with and representing the Aboriginal community through providing advice and services to the public and land managers on heritage, land management and land rights issues as well as sea management and sea issues.

TALSC offers the following range of services:

- Cultural awareness and education program
- Heritage and site assessments
- Aboriginal heritage consultancy advice and services
- Direction for and provision of 'Welcome to Country' at events

The Tasmanian Aboriginal Land and Sea Council endorses Aboriginal Heritage Officers (AHO). It investigates areas of land for the presence or absence of Aboriginal heritage and provides advice on the ongoing management of this heritage.

5.1.5 Tasmanian Aboriginal Site Index (TASI)

Aboriginal Heritage Tasmania is the custodian of the Tasmanian Aboriginal Site Index (TASI), which provides the main listing of recorded Aboriginal heritage places. Over 11 000 places are listed on the Index, which is maintained by Aboriginal Heritage Tasmania in the Department of Primary Industries, Parks, Water and the Environment (DPIPWE).

Access to TASI is a formal process. For any

Figure 5.2 Middens provide a wealth of information about the lifestyle of Aboriginal people in a particular area and are an extremely valuable historic record. © Aboriginal Heritage Tasmania





development/works outside an existing footprint, contact Aboriginal Heritage Tasmania at the beginning of your planning process. Access forms are available from Aboriginal Heritage Tasmania or on the website. TASI is used by Aboriginal Heritage Tasmania to determine whether on-ground Aboriginal heritage assessments are required prior to development.

5.1.6 Aboriginal heritage assessments

In most cases, the purpose of conducting an Aboriginal heritage assessment is to:

- locate indicators of (known or previously unrecorded) Aboriginal heritage within a specific project area
- help protect Aboriginal heritage by offering mitigation advice
- provide recommendations regarding the need for further investigation
- inform the proponent of its obligations under the Act.

Therefore the most important part of a survey report is to clearly state:

- what the proposed project is
- if and how it will affect any Aboriginal heritage
- whether there are any alternatives to the impact on Aboriginal heritage or options for mitigating damage.

This information is then used by AHT to:

- keep an accurate record of Aboriginal heritage sites
- make desk-top decisions about the need for further investigations, the requirement for a permit under the Act and/or the future management of sites
- ensure that the proponent is complying with the Act
- make decisions and recommendations to the Minister regarding permit applications.

It is the role of AHOs to determine whether Aboriginal heritage will be affected by the proposed activities. AHT needs accurate reports with adequate information to be able to make decisions and provide further advice to proponents regarding legislative requirements.

Aboriginal Heritage Tasmania will advise you what level of assessment is required for your development. Aboriginal heritage assessments are undertaken by an archaeologist and/or Aboriginal Heritage Officers according to the *Standards and guidelines for consulting archaeologist and Aboriginal heritage officers*.

A consultancy brief will be provided by Aboriginal Heritage Tasmania. This template forms the basis for the work to be carried out and will help define the survey requirements for both the proponent and the consultant. It also sets out Aboriginal Heritage Tasmania's expected Aboriginal heritage investigation and reporting standards.

The brief for an Aboriginal heritage assessment needs to include details of the project and all associated infrastructure and techniques and methods that will be used to carry out the work.

5.1.7 Guidelines for working with the Aboriginal community

Before undertaking works in the coastal zone you need to consult with the Aboriginal community. Contact Aboriginal Heritage Tasmania and request a desktop TASI search of your proposed work site.

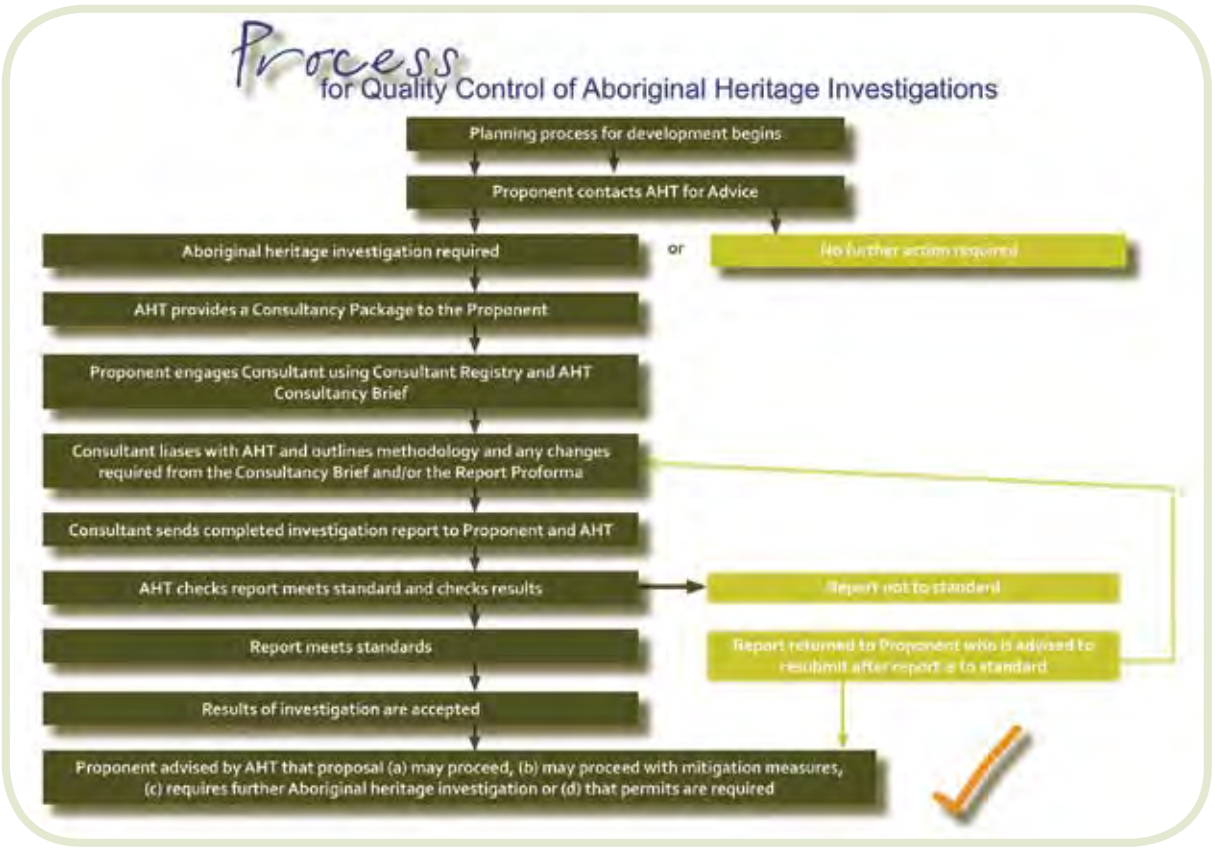
An Aboriginal assessment is often required before a project can be undertaken. A survey will identify any constraints on the proposed activities that might be necessary to avoid damage to Tasmanian Aboriginal heritage values.

Aboriginal involvement in some projects may be required, especially if they are close to or on Aboriginal heritage places.

You may be required to undertake specific rehabilitation techniques that have been developed for dealing with Aboriginal heritage places. These recommendations will be part of your assessment and can be discussed with Aboriginal Heritage Tasmania or the Tasmanian Aboriginal Land and Sea Council.

You must stop work immediately if you discover any Aboriginal artefacts. Contact Aboriginal Heritage Tasmania for advice. It is often a simple case of having

Figure 5.3 Procedure for Aboriginal heritage investigations.
Source: Aboriginal Heritage Tasmania website accessed 7th October 2010.





the site recorded and minimising future disturbance.

Tasmanian Aboriginal people should be involved in the development of any interpretative and educational material associated with Tasmanian coastal areas. Their association with the coast is so significant that material that fails to incorporate acknowledgement of Aboriginal custodianship and values is no longer acceptable.

Include a 'Welcome to Country' at events. Contact TALSC for more information.

Aboriginal Heritage Tasmania can provide advice about protecting heritage places, including development setback requirements and all other aspects of Aboriginal heritage protection and management. Additional information can be obtained from TALSC.

5.2 Historic and maritime heritage

Historic places mark the many important events and activities that shaped the more recent history of Tasmania. These include convict sites, pioneer cemeteries, old buildings, shack communities and mining sites. Tasmanian maritime heritage includes numerous shipwrecks, some Victorian-era light stations, and a range of old wharves, jetties and ports.

5.2.1 Legislation and approvals for historic heritage

Under the *Historic Cultural Heritage Act 1995*, a works application is required for any works or development which may impact on the significance of a place entered in the Tasmanian Heritage Register. Where proposed works are minor and will not affect the significance of the place, the Heritage Council may provide an 'exclusion' from the normal works application process.

Heritage Tasmania is the state government body that fulfils statutory responsibilities under the *Historic Cultural Heritage Act 1995*.

The *Commonwealth Historic Shipwrecks Act 1976* protects historic wrecks and associated relics that are more than 75 years old and in Commonwealth waters, extending from below the low water mark to the edge of the continental shelf. Shipwrecks within Tasmanian state waters are protected under the *Historic Cultural Heritage Act 1995*.

In Tasmania, the Historic Heritage Section of the Parks and Wildlife Service is the government authority responsible for the management of the State's historic shipwrecks and other maritime heritage sites.

The Burra Charter: The Australia ICOMOS Charter for the conservation of places of cultural significance provides detailed guidance for assessing the significance of cultural heritage places.

The *National Parks and Reserves Management Act 2002* covers historic sites within Tasmania's parks and reserves system.

5.2.2 Types of heritage listings

The Tasmanian Heritage Register lists places that the Tasmanian Heritage Council considers to be of historic cultural heritage significance, that is, of significance to any group or community in relation to the archaeological, architectural, cultural, historical, scientific, social or technical value of the place.

Other government listings include the Tasmanian Historic Places Index held by DPIPWE. Supplementary lists may exist in local government planning schemes, and in management plans under

the *National Parks and Reserves Management Act 2002*.

Historic shipwrecks are listed in the *Australian National Shipwrecks Database* hosted by the Australian Government, Department of Sustainability, Environment, Water, Population and Communities.

The Tasmanian Heritage Register and local planning scheme schedules list places of mainly national and State significance. Other sites of significance to local communities and places not yet listed or assessed for entry on these lists may be at risk from development.

5.2.3 Managing historic and maritime heritage

The main objective for managing historic and maritime heritage is to preserve the heritage values for future generations, adding to our understanding of human history in Tasmania.

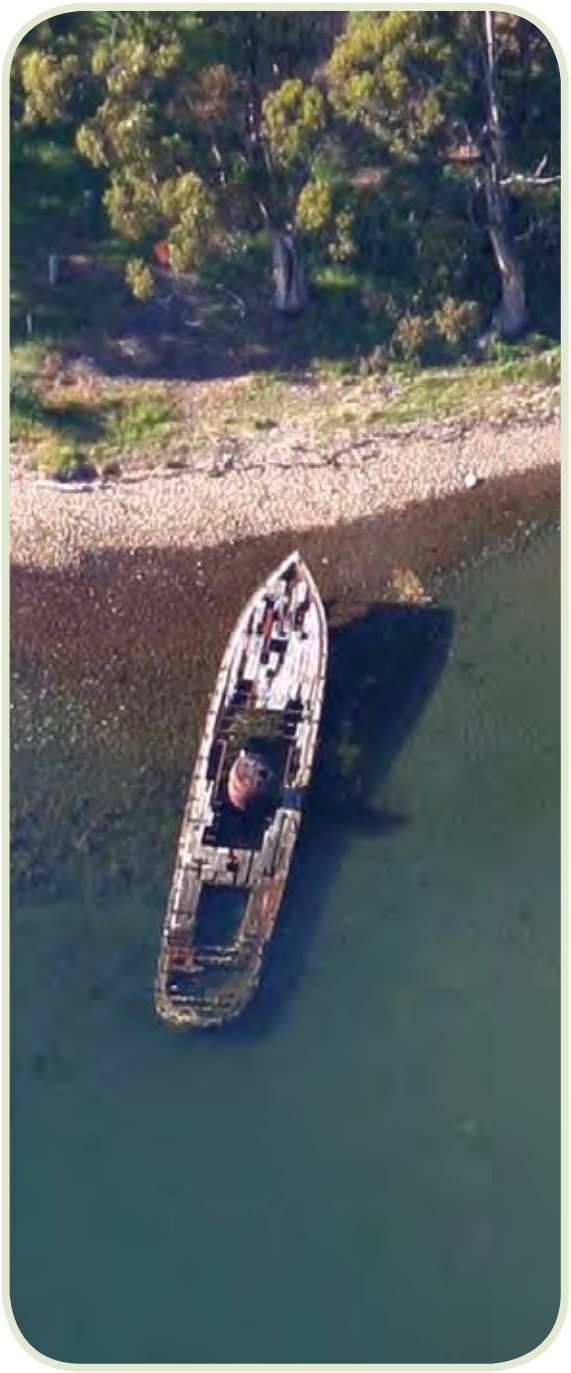
Management often involves minimising the adverse effects of natural processes and human actions on these often fragile heritage values.

Key management objectives for protection of historic heritage:

- identifying and recording of historic heritage sites
- seeking specialist advice
- determining conservation significance and management requirements of the site
- undertaking protective projects
- involving local community groups
- increasing community awareness by interpreting cultural values to broader community and visitors

Coastal land managers have an obligation to know the whereabouts of historic heritage sites and to ensure that their works program and activities do not have an adverse impact on those sites and their values.

Figure 5.4 Shipwreck off the coast of northern Tasmania. ©Stewart Wells, Heritage Tasmania





They can play a role in educating the community about historic sites and values and in working with local community groups to protect and restore historic heritage values.

Before undertaking works in coastal areas it is important to consider historic or maritime heritage values.

- Identify if any sites are present by contacting Heritage Tasmania and/or the Historic Heritage Section of the Parks and Wildlife Service.
- Ensure that historic or maritime heritage will not be adversely affected by work activities or the building of infrastructure.

5.2.4 Tasmanian Heritage Council

The Tasmanian Heritage Council came into existence in 1997, following the proclamation of the *Historic Cultural Heritage Act 1995*. The Council is made up of councillors representing diverse community and professional interests including property owners, farmers and graziers, conservation interests and areas of expertise such as history, architecture, archaeology, engineering and tourism.

The Heritage Council is a statutory body, separate to government, responsible for the administration of the Act and the establishment of the Tasmanian Heritage Register. Its primary task is as a resource management and planning body, focused on heritage conservation issues. As such, any development on heritage-listed places require the approval of the Heritage Council before works can commence.

5.2.5 Tasmanian Heritage Register

The Tasmanian Heritage Register is a register of those places that are recognised as being of historic cultural heritage significance to the whole of Tasmania. These places are important to Tasmania and Tasmanians because of their contribution to our culture and society. They are also important as part of the cultural fabric that is so much a part of our tourism industry, our state's identity and brand.

The Register is maintained by the Heritage Council under the *Historic Cultural Heritage Act 1995*. Any person may nominate a place to be entered in the Heritage Register.

5.2.6 Community historical societies

In many coastal areas there are community groups with an interest in local historic heritage. These historical societies meet regularly and share their research on local history features and stories. They seek funds to protect or restore heritage sites and features; promote historic sites and features with signage, publications and guided tours; and are often a wealth of knowledge and enthusiasm.

Any planning for management of historic heritage values should be undertaken in collaboration with community historical societies where they are present.



5.3 Climate change and cultural heritage

The Tasmanian coastline is rich in Aboriginal heritage values and sites. These and other heritage values and sites on the coast are susceptible to impacts of climate change, in particular sea level rise. Low-lying sites are at risk of coastal inundation due to sea level rise. There are risks to heritage infrastructure from rising groundwater, erosion and landslips, and exposure of acid sulfate soils that can lead to corrosion. ***Refer to section 11.4 Acid sulfate soils.***

Many Aboriginal heritage sites are already located in intertidal and subtidal areas as a result of sea level rise associated with the last interglacial period. More and more coastal Aboriginal heritage sites will be affected by rising sea levels and therefore it is more important than ever to protect Aboriginal sites and values from human impacts such as works activities.

Land managers should monitor sites carefully for any change or potential impact and undertake risk assessments to determine the best strategies for mitigation and protection of heritage values where appropriate.

5.4 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Aboriginal heritage

A list of Aboriginal Heritage Officers

Available from the Tasmanian Aboriginal Land and Sea Council (TALSC).

http://www.talsc.net.au/

Aboriginal Heritage Tasmania

http://www.aboriginalheritage.tas.gov.au

Information about the importance of protecting Aboriginal heritage.

- List of registered archaeologists
- Standards and Guidelines for Consulting Archaeologist and Aboriginal Heritage Officers
- Forms requesting access to TASI database for Aboriginal heritage site searches

Ask First: A guide to respecting Indigenous heritage places and values (Australian Heritage Commission 2002)

Historic and maritime heritage

Australian national shipwreck database

http://www.environment.gov.au/heritage/shipwrecks/database.html

Heritage Conservation Funding Program

Aims to assist heritage property owners by providing funding. The Heritage Council operates the program on behalf of the Tasmanian Government. Places permanently entered in the Tasmanian Heritage Register are eligible.

Heritage Tasmania

Advice on works on heritage sites

1300 850 332.





6 Coastal landscape management

6.1 Legislation and approvals

6.2 Coastal dune systems

6.3 Beaches, spits, sandbars and river mouths

6.4 Estuaries, coastal wetlands and saltmarsh

6.5 Rocky shores

6.6 Soft-rock shores

6.7 Offshore islands

6.8 Tools and resources

Tab photo: Friendly Beaches – east coast of Tasmania. © Leah Page.

This chapter provides an overview of Tasmania's diverse coastal landscapes and relevant key management issues.

The Tasmanian coastal landscape includes rocky reefs, sandy beaches, sea cliffs, headlands, lagoons, river estuaries, harbours and open coast. The diversity of landforms and temperate conditions support a rich variety of terrestrial, intertidal and marine communities and species, some common, some threatened and others only found in Tasmania (endemic).

The interplay of coastal processes, such as wind and waves, with the different rocky and sandy landforms, combined with tidal ranges, rainfall, river discharge and climate, has moulded the Tasmanian coast. Vegetation too has played a very significant role in shaping many of these landscapes, such as plants stabilising soft sediments on dunes and in seagrass beds.

The Tasmanian coastal environment is vulnerable to the impacts of climate change, with significant areas of coast at risk of erosion from exposure to sea level rise and storm surge inundation.

More than 1440km of Tasmania's coastline has been identified as being at risk of coastal flooding, and more than 975km of shoreline are at risk of erosion, sand dune mobility, rock falls and slumping as a result of sea level rise and storm surges (Sharples 2006), with consequent impacts on natural values. Impacts on Tasmania's coastal landforms will be complex and variable, reflecting the diversity of coastal systems (DPIPWE 2010).

Changes in rainfall and temperature will change vegetation communities which will in turn modify these landscapes further, and rainfall changes and the potential for decreased flow in some river systems



will modify estuarine environments.

Managing unstable coastal landforms such as dunes and beaches is not easy and technical advice is essential. Vegetation management is critical as coastlines alter rapidly when vegetation is destroyed and sediments become re-mobilised.

Inappropriate coastal works can easily be destroyed by waves, tides, currents or winds. In addition they can also cause problems in nearby coastal areas, such as erosion and movement of sand to places where it is not wanted. Coastal works must be undertaken with great care: many works in the past have been ineffective or caused needless damage to coastal values through poor planning and inappropriate techniques.

6.1 Legislation and approvals

Management of coastal landforms such as dunes, beaches and wetlands involves a range of legislation and approval processes that provide for protection of natural and cultural values and authority from land managers. In addition to the legislation detailed in ***Chapter 1***, the most likely legislation to be applied is provided in ***Appendices 1 and 2***.

Permission from the land manager must be given before any management of coastal landscapes takes place, and assessments and approval will probably be required to ensure that coastal values are indentified and protected. Works on Crown land, which includes many coastal reserves and all land below high water mark, require approval from Crown Land Services (DPIPWE). Seek advice from Crown Land Services about which assessments and approvals are required.

Estuaries and river mouths often support port operations and boating facilities, therefore the *Marine and Safety Authority Act 1997* and the *Tasmanian Ports Corporation Act 2005* also come into effect in these areas.

6.2 Coastal dune systems

This section describes the role and functions of coastal dune systems and provides guidance on how best to manage these dynamic landforms.

Coastal dunes are generally active landforms, with a few exceptions, and require special management. There is usually a cyclic pattern of erosion and deposition on open coast beaches and foredunes. The vegetation on the dunes plays a vital role in the balance of the dune/beach system by holding the sand in place. Because dunes are highly mobile, sand blows can occur naturally. In fact many plants and animal species (e.g. dune grasses) and various ecosystems depend on dune movement for their survival.

However, human impacts and coastal processes can lead to significant sand blows and erosion that require management. Dune vegetation is easily damaged by vehicles, livestock and pedestrian traffic, burning and grazing. Once the vegetation is gone, it is difficult for plants to re-establish in the dry, loose, wind-blown sand. Loss of dune vegetation may lead to wind and wave erosion and loss of sand from the system.

Stable dunes are fairly rare. Most dune fronts around Tasmania are mobile and the movement of their sand can result in extensive erosion. In some areas, such as south-west Tasmania, this is probably related to the rise in sea level, 14cm since 1841 and still rising (Hunter et al. 2003) and the limited supply of sand. Exceptions include the east coasts of Flinders Island and King Island, where large amounts of sand are accumulating.

6.2.1 Values of dunes

A healthy dune system protects the shoreline from erosion and the backshore from flooding. The sand bank provides for natural replenishment of the beach and the dunes trap wind-blown sand, protecting the coastal landscapes behind. These unique environments support many specialised coastal plants that bind the sand together. Some shorebirds depend on sand dunes for nesting habitat and many other wildlife species depend on the dunes and their vegetation.

Many dunes around Tasmania contain shell middens, as well as other Aboriginal place types, such as artefact scatters, that are important Aboriginal heritage places.

Coastal dunes are one of the important coastal landscapes for monitoring the impact of changes in sea level, because they erode quickly when the sea is rising.

Geoconservation values of coastal dunes

Tasmania's many sandy landforms include: parallel dunes at Marion Bay; beach ridges at Seven Mile Beach; parabolic dunes at Henty dunes; headland bypass dunes at Stephens Bay–Noyhener Beach in the south-west; and cliff-top dunes at Cape Deslacs at Clifton Beach. Dating some of the Henty dunes at Strahan has shown them to be 500 000 years old (Bradbury, J. pers. comm. 14th Sept 2010).

Coastal dunes and other sandy landforms are an important part of our heritage and are protected for their geoconservation values. Some sites of geoconservation significance may be fossil (non-renewable) and there are numerous fossil dune forms and fossil shorelines inland of the current coast, some of which preserve evidence of coastal processes during the last Interglacial phase circa 125 000 years ago. Other geoconservation sites are active landforms that require maintenance of the natural rates of change and movement.

Figure 6.1: Dune system at Noyhener Beach, Port Davey, in Tasmania's south-west. © Chris Sharples



Many outstanding landscapes and areas of high nature conservation value are protected as parks and reserves. Most significant sites have management plans that control developments, for instance, local government planning schemes often have 'visual protection areas'.

Trying to stabilise dunes may not be appropriate at sites with high geoconservation values. In some areas, especially along the north-east and west coasts, some dunes are naturally mobile, and attempting to stabilise the sand may interfere with natural processes and values. Before attempting such work, seek advice from a coastal geomorphologist and refer to the Tasmanian Geoconservation Database on Tasmania's Land Information System (the LIST) on the internet.

6.2.2 Understanding dune systems

Coastal sand dunes are formed by the transport of sand onto the beach by wave action and then landward from the beach by wind. Vegetation growing on the shoreline traps the sand, forming a ridge. Dune grasses colonise these ridges and more sand builds up over time, forming a dune.

Successive lines of dunes can form parallel dunes, where slow shoreline growth or 'progradation' has occurred. Where phases of rapid shoreline growth have occurred in the past, a series of lower parallel beach ridges may exist behind the present shore, representing earlier temporary shoreline positions.

Under stable sea level conditions, the seaward side of the dune system is maintained by the cyclic patterns of erosion and deposition. The dunes further landward become stabilised by vegetation. The dunes on the seaward side, known as foredunes, are regularly eroded by storm waves, and replenished during calmer weather when waves bring sand back to the beach.

Dune vegetation plays an important role by trapping sand and stabilising the dunes. Dune vegetation is specially adapted to withstand the windy, salty environment. The type of dune vegetation determines the shape and profile of the dunes. The protection provided by the foredunes enables more complex vegetation to develop in the hind dunes.

Under some conditions, including vegetation dieback or increased storm erosion frequency, foredunes and hind-dunes may become unstable, with blowouts developing into parabolic (or transgressive) dunes that move inland. This occurs naturally in many cases, but can also be triggered by human disturbances.

Figure 6.2 Coastal grasses trap wind-blown sand and form dunes. © Terry Hartin



Figure 6.3 The dune system at Friendly Beaches on Tasmania's east coast displaying a healthy incipient dune. © Leah Page



Foredunes are the dune(s) nearest the sea in a dune system that runs parallel to the beach. They are formed by windblown sand deposited within vegetation. Foredunes are active within short time frames (less than 50 years, i.e. within planning time frames) and are subject to cycles of erosion and deposition. If the beach is actively depositing sediment then an incipient foredune will be present in front of the foredune. If the beach is actively eroding then only a scarped established foredune will be present.

An **incipient dune** is a small ephemeral dune located in front of an established foredune at the upper margin of the beach, behind the swash (water washing onto beach) zone. One or more incipient dunes may be present. They may exist for a season, a year or longer (e.g. more than 10 years). Their durability depends on a number of factors, including whether they form around seasonal, annual or perennial pioneering plant species, seaweed or flotsam, but primarily upon whether the coast is grossly eroding or in a state of deposition.

A **foredune complex** is the active part of a coastal dune system that is parallel to the shore. It includes the incipient dune and established foredunes (of which there may be more than one). A foredune complex has a natural tendency to undergo significant physical change within periods of less than 50 years as part of normal landform processes. Disturbance such as vegetation removal can lead to instability. The term 'frontal dune' is no longer recommended as it is ambiguous and does not indicate the stability or otherwise of a dune complex.

Hind-dune complex refers to older dunes lying behind the foredune complex, which have a natural tendency to be stable over periods longer than 50 years unless natural or artificial disturbances cause blowouts. These are the dunes where trees and larger vegetation are established and these dunes are often exploited by coastal developments.



6.2.3 Dune management

It is often possible to reduce the effects of wind erosion by fixing (stabilising) the sand with natural vegetation. On the other hand, very little can be done to stop the effects of waves and currents eroding dune fronts, except with properly designed and costly 'hard' engineering constructions, such as rock walls and groynes. Attempts to control coastal erosion with cheap under-engineered structures very commonly fail.

Such hard structures should be used with great care however, because they deflect the waves and sand, and can result in worse erosion problems nearby, including scouring of beaches in front of the structures. Hard engineering solutions are usually expensive and will require ongoing and costly maintenance. ***Refer to Chapter 15 Shoreline modification.***

'Soft' techniques, such as revegetation, allow the flow of the natural coastal processes. As a result they are generally more physically effective and cost-effective, and less destructive than hard structures such as large rocks and concrete seawalls. Using soft engineering solutions wherever possible can save much effort and money.

However, past attempts to stabilise dunes have caused problems in adjacent coastal areas, including increased erosion, sedimentation, and invasion of exotic species such as marram grass – which was previously used to stabilise dunes and is now a significant weed problem – which alter the natural shapes and dynamics of dunes.

It is essential to understand the history of dune development and changes over time at a particular site and the way the coastal system operates. This will provide an indication of how the proposed works

Figure 6.4 Fresh dune erosion scarp at Ocean Beach on Tasmania's west coast. © Chris Sharples





may alter sand movement. Often, with careful planning and assessments of the direction of dune movement and sand availability, past problems can be avoided.

Many dunes are naturally unstable and mobile. These can be very difficult to stabilise permanently and the reasons for doing so need to be clearly justified and worth the effort and expense that will be required.

6.2.4 Types of dune conservation and stabilisation works

Stabilisation may be appropriate where there is a small blowout, or erosion caused by vegetation damage or removal. Using structures such as mesh fences, brush mulches or geotextiles slows the movement of sand so that plants can establish and hold the sand in place.

Avoid works in the foredunes unless they are to maintain access to the foreshore or for protective or rehabilitation work.

The types of works selected will depend on the purpose, budget and the site conditions. Suitable works may include any or all of the following:

- dune-forming fences (mesh or brush)
- geotextiles, jute mesh, brush mulches and other surface stabilisation methods
- revegetation *(refer to Chapter 7)*
- access control: fences, barriers, signs *(refer to Chapter 13)*

Repairing erosion caused by wave attack is very difficult and costly. Such repair works are usually unsuccessful and it is impossible to fix dune fronts on eroding beaches in the long term. The natural erosion (coastal recession) of many beaches will increase with the predicted rise in sea level and will become increasingly harder to prevent with artificial interventions as sea level continues to rise.

6.2.5 Assessing dune erosion

Before planning rehabilitation works, assess whether the problem is caused by natural coastal processes or human activities, and whether it is possible to manage the sand movement or erosion.

Dune erosion, sand blows and blowouts do not need treatment if they are caused by natural processes and/or are not causing a problem. Erosion and small blowouts caused by human activities, such as grazing livestock or on- or off-road vehicles, may require stabilisation.

Seek specialist advice to identify the factors that drive natural coastal dune processes, in particular the seasonal patterns in wind speed, wind direction, tide and wave action, the natural dune mobility or stability that might be expected given local rainfall, micro-topography and exposure to winds, and the likely effects of the works.

If a dune blowout appears to be caused by human activity, find out whether the blowout is growing or stabilising by itself. If revegetation is occurring naturally, the blowout may stabilise by itself.

Even large coastal sand blows will eventually stop within some hundreds of metres from the beach. If a foredune is receding, assess foredune erosion to see if the problem can or should be treated.

Dune erosion can be measured by establishing a benchmark behind the dune. Take measurements at regular intervals from the benchmark over the dune, to the dune erosion scarp. Ideally, the protocols used in the Tasmanian shoreline monitoring and archiving (TASMARC) project should be adopted. ***Refer to Chapter 2 Climate change and the coast***



6.2.6 Methods for stabilising dunes impacted by wind erosion

The main methods of stabilising dunes are to remove human activities that are causing the problem, and/or to obstruct wind erosion with fences, mulches, jute mesh or geotextiles so as to allow revegetation.

The methods described here are suitable for relatively small sand blows and minor erosion of foredunes caused by local artificial disturbances (unless the beach and dune is steadily receding due to natural coastal processes or recent sea level rise).

It is important to monitor the works carefully to assess success and to repair any damage quickly.

Remove destabilising activities and allow natural regeneration

If a dune has started to blow due to human activity, such as inappropriate access, immediately take steps to control the activity. Otherwise there is no point trying to fix the damage.

Choose a suitable method for stabilisation. Consider leaving the area to fix itself by fencing it off and monitor the result for up to a year (or less if revegetation is too slow to stabilise the site). Reduce or restrict access to the area while it is being rehabilitated.

Do not allow livestock to graze there, and keep them off dunes after stabilisation. Avoid grazing on dunes that are mobile or potentially mobile.

Figure 6.5 Geotextile dune-forming fence erected near surf club in South Australia is helping to trap sand and discourage access whilst plantings of dune grasses become established. © Leah Page





Use dune-forming fences, brush or textiles

If a sand blow does not stabilise by itself, these methods will reduce erosion. They slow the ground-level wind speed and allow sand to deposit. Then native vegetation can establish and start to bind the sand.

Dune-forming fences are useful for small blowouts and areas where stabilisation could take some years. They are more permanent than brush mulches, jute mesh or geotextiles and are cost-effective, but take several years to work. These fences are meant to be covered by sand and can stay in place when this happens; then, if a higher dune is required, construct another fence on top.

Avoid using dune-forming fences along a progressively or frequently eroding beachfront, as they will not be successful unless the prevailing wind blows straight onto the beach, allowing sand blown off the beach to rebuild dunes faster than storms are eroding them. There must also be enough sand supply in the dune-beach system to rebuild the dunes, which is rarely the case on a progressively receding shore.

Obtain specialist advice about where and how fences should be placed. This will be based on the site conditions, including prevailing wind speeds and directions. Choose the cheapest materials if the fences are likely to be buried quickly.

The most important areas of a sand blow to stabilise are the edges, especially the forward edge and other places where the wind is funnelling sand away more quickly.

During works, protect the vegetation that stabilises the sand by restricting access by vehicles and people.

Assess the need for revegetation. If there is no natural vegetation nearby to supply seed, plant the area with appropriate local native species, or use direct seeding after the works are in place. ***Refer to Chapter 7 Vegetation management.***

Geotextiles and jute mesh fabrics

Geotextiles are mesh materials that help to stabilise the sand and retain water. But they quickly become covered with sand if there is a lot of sand movement. Geotextiles can be expensive and can be easily vandalised. For stabilising sand dunes they are only recommended for difficult sites or where urgent repairs are needed. However, geotextile sand bags are a useful product for creating banks and revetments and have been used successfully in other Australian states to stabilise eroded foreshores. ***Refer to Chapter 15 Shoreline modification.***

Choose a cost-effective textile. Jute mesh is relatively cheap, it allows light through, and plants can grow through it. Jute mesh lasts longer if it is placed as a double layer. It breaks down after a few years, so replace it if revegetation is very slow.

Peg the edges down well to stop the wind from dislodging the material. Secure the mesh by placing it at least 1m into stable vegetation on each side. Check regularly that the textile is not becoming loose or damaged.

Do not use geotextiles in accessways as they will trap sand and obstruct access.

6.2.7 Ongoing maintenance of dune stabilisation works

All dune stabilisation works require regular maintenance to make sure they are in good repair and are effective. Dunes are so unstable that works can be very quickly damaged or destroyed by wind and waves. Inspect and carry out maintenance on new works after stormy periods.



Inspection and maintenance should check that:

- structures are in place and secured, especially at the margins of the erosion
- access to the area is controlled adequately so rehabilitation can occur
- erosion is not getting worse
- structures are not becoming a hazard to the public.

6.2.8 Climate change and dune systems

Recent climate science has progressed significantly since the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (IPCC 2007), and sea level rise projections are currently being revised upwards.

Climate change and sea level rise impacts on dunes include more frequent storms removing sand from the dune system and foredunes changing shape and receding in response to the removal of sand. Provided the dune system is healthy, the dunes can migrate landwards as shorelines retreat. However in areas where very little dune system remains, the rise in sea level and more frequent storms could result in complete loss of this natural buffer and associated habitats, leading to increased erosion and inundation of coastal areas.

Monitoring of dunes may be able to provide an indication of climate change. Many Tasmanian beaches show evidence of ongoing retreat and some of progradation (build-up or growth) over the past few decades. It is likely that at least some of the erosion and retreat is linked to recent sea level rise induced by climate change; however, it is difficult to tell how much is just a part of natural variability.

The vulnerability of coastal systems to climate change is exacerbated by increasing human-induced pressures in the coastal zone. Coastlines that are subject to development have a lower capacity to adapt to changes in sea level, because they are no longer in their natural state of being dynamic and highly mobile. In addition, if human responses to rising sea levels are to defend the coast with artificial structures such as sea walls, the existing potential for natural shoreline adjustment to the changing conditions will be further reduced (DPIPWE 2010).

6.3 Beaches, spits, sandbars and sandy river mouths

This section describes the extremely dynamic coastal landforms of beaches, spits, river mouths and barways, the coastal processes that shape them and techniques for managing these landscapes.

The erosion and movement of sand along sandy coasts can cause problems such as loss of beaches and the growth of sandbars and spits. Continual sand movement and change is an ongoing natural process on many coasts, but problems may be caused or exacerbated by human constructions such as hardening of the foreshore, bridges and groynes, or dams upstream restricting water flows through river mouths.

It is critical to understand how a coastal system operates before doing any proposed works, so that you can predict the effects of proposed works and deal wisely with any changes to the movement of sand. This is particularly important now, with climate change and projected sea level rises predicted to increase storm erosion of sandy landforms. Proper planning, design and maintenance of appropriate beach and sandy coast conservation and remediation works will make these land management activities more effective.

6.3.1 Values of sandy coastlines

River mouths, beaches and sandspits are highly valued by local industry, communities and tourists for commercial and recreational activities. Larger rivers provide ports and shelter for boats, and river mouths need to be kept open to provide access to open water. Smaller river mouths are used for fishing and boating; and beaches are enjoyed for relaxation and recreation.

These environments are rich in natural and cultural values too. Beaches and sand spits are important nesting places for shorebirds, including threatened species such as fairy terns. Aboriginal heritage sites are often associated with the rich estuarine areas of river mouths. Beaches support highly specialised vegetation that can withstand the windy, salty conditions. Beneath the sand a diverse and immeasurable meiofauna community breaks down plant and animal material and plays a vital role in the food chain, especially in the diet of many sea and shorebirds.

Certain mobile spits and barways in Tasmania have important geoheritage values. Highly significant sandy landforms in Tasmania include a bay mouth spit at Nine Mile Beach in Great Oyster Bay; mid-bay spits at Seven Mile Beach; an old barrier island (King Island) and extensive sand sheet deposits inland from Tomahawk Bay in the north-east.

Natural coastal erosion, longshore drift and tidal currents supply and replenish the sand for local beaches and others further along the coast. Beaches, spits and sandbars are always changing in response to changes in waves, tides and currents.

Figure 6.6 Natural beach in northern Tasmania. © Chris Sharples





6.3.2 Managing beaches, spits, barways and sandy river mouths

Waves, wind and currents move sand along many open coastlines by a process known as longshore drift. Beach sand is also moved on and off the shore by the action of waves, tides and currents. During stormy weather or large swells, sand is removed from the beach and deposited offshore in sand bars. During calmer weather the waves deposit the sand back onto the beach, forming a berm or ridge parallel to the shoreline.

Storm waves can move huge amounts of sand quite quickly. Beaches and sand spits can also lose or gain sand as a result of damage to adjacent foredunes by human activities such as sand extraction, vehicle and pedestrian access, burning and grazing.

Structures that are built in an attempt to control the movement of sand include groynes, breakwaters, seawalls and river training walls. However, these coastal protection works are expensive to build and maintain, and long-term success is difficult to achieve. Hard structures (e.g. concrete seawalls) on soft sandy coastlines affect wave patterns and can lead to erosion nearby.

Many of these structures have been built without adequate understanding of local processes, or are under-engineered, and continue to cause local problems. Before planning new constructions, it is crucial to get proper assessments of coastal processes (the actions and interactions of wind, waves and currents) and proper engineering advice, and to consider potential sea level rise.

Such works usually need regular maintenance and, unless they are extremely robust, will normally only buy some time for a particular section of eroding coast. It is much cheaper and more environmentally sound to avoid trying to control the movement of sand and waves on sandy coasts, and plan developments in sympathy with existing coastal processes.

Choosing the appropriate site is critical for structures that extend across the shore and/or into the water, such as groynes. Such structures are susceptible to wave erosion and sediment build-up, as well as corrosion from salt water, and can be expensive to maintain. Resilient but permeable structures are generally preferable to rigid and impermeable structures that resist wind and waves and impede sediment movement.

It is extremely difficult to stabilise spits at river mouths. Spits will always form in the direction of the prevailing waves. Works to protect beaches from erosion caused by wave attack, or to breach spits or maintain barways, are very difficult and costly, and may require heavy machinery, which can cause severe damage to adjacent areas.

Where recession of beaches is causing concern, land managers and residents might consider artificially replenishing the beach, known as beach nourishment. However, this requires intensive research, is expensive and ongoing and may create unforseen impacts on the coastal ecosystem. Nonetheless, in some urbanised and highly valuable recreational beaches it may be a desirable management option. ***Refer to Chapter 15 Shoreline modification.***

6.3.3 Guidelines for working on barways, spits and sandy river mouths

Sandbars, barways, spits and river mouths are highly mobile systems. They should be left alone where possible, to protect natural ecosystems – and to avoid considerable ongoing expenses. Many coastal lagoons are temporarily cut off from the sea by the growth of a sandbar, which may be breached after heavy rain, usually in winter.

Where a barway is causing elevated water levels upstream that threaten property and infrastructure, artificial opening may be necessary. Ecological consequences need to be balanced against economic damage and systems have been developed to facilitate the prior identification of trigger points when breaching is justified. The Victorian *Estuary entrance management support system* (EEMSS) (Arundel 2006) provides information to guide land managers.

In locations where shipping and boating is a priority, river training walls are sometimes built on either side of a river mouth to improve navigation. The constricting walls are designed to speed up the water flow, which increases the scouring action of the river so as to prevent build-up of sandbars in the river mouth. However, training walls at river mouths exposed to longshore drift can cause shoreline erosion on their downdrift side and can be undermined, or cause sand to be deposited where the training wall ends, unless the training walls terminate in deep water on the seaward side of the structure.

Before starting works, thorough investigation and planning is essential. This may take some time. Obtain specialist advice from an experienced coastal

Figure 6.7 River mouths and spits, such as this one on the Prosser River, provide valuable habitat for shorebirds. © David Moser





geomorphologist, who can advise on the natural sand movements. If structures are being considered, consult a coastal engineer to ensure a properly designed structure. Specialist advice is essential to find out whether managing sand movement is possible and will save you money in the long term.

Potential environmental impacts

- Breaching barways or spits can greatly alter the movement of sand and currents, sometimes with unexpected effects. To keep them open in the long run, expensive ongoing maintenance work is inevitable.
- River training walls can act as groynes, and often project much further out to sea than ordinary groynes, with the potential to cause extensive erosion further along the coast.
- Disturbing beaches, barways, spits and river mouths may damage valuable habitat for wildlife, including shorebirds and marine life.
- Disturbing sandy landforms may damage Aboriginal heritage places or geoconservation values.

Minimise environmental impacts

Obtain specialist advice from a coastal geomorphologist to identify what drives the natural coastal processes (seasonal patterns in wind speed, wind direction, tides and wave action) and the likely changes to sand movement and coastal processes that will result from the works.

Obtain specialist advice on the potential impact on any Aboriginal heritage, historic sites or geoheritage sites.

Identify the cause of the problem. Beach erosion and moving or growing barways and spits do not need treatment if they are caused by natural processes and if artificial developments have been appropriately sited to avoid damage from natural coastal mobility. However, where erosion and sand movement is caused by human activities disturbing the natural sand transport patterns, and this is causing a problem, then intervention may be necessary.

Barways and coastal lagoon barriers should not be breached unless public safety is demonstrably at risk, water quality is a risk to public health or there is significant risk of economic damage to property or land.

If breaching of spits and barways is required (e.g. to prevent flooding or allow boat access), it should only be undertaken with extreme caution. Breaching a barred lagoon at the end of winter rains, if that is when the barway normally opens, may cause less harm than breaching in summer.

Obtain specialist advice about the potential impacts of breaching a lagoon barrier. Consider the local watercourse and catchment and waterbirds, aquatic life and other wildlife. The ecosystems and life in coastal lagoons are adapted to the natural seasonal changes in water level.

Design and engineer the river training walls properly to minimise erosion of the riverbed, which can undermine the walls. To limit erosion, sand can be pumped from the updrift shore to the downdrift shoreline, bypassing the training walls. But these are expensive and ongoing operations. Also, sand might be deposited where the training wall ends (because the river flow slows and loses energy), meaning that the training wall needs to be extended into deeper water (where sand deposition is not an issue). If sand is deposited after training walls are constructed, dredging may be required. ***Refer to Chapter 15 Shoreline modification.***

6.3.4 Climate change and beaches, barways, spits and river mouths

Climate change impacts in coastal areas are not limited to sea level rise. Changes to rainfall will affect river flows, which affects the natural flushing regime of river mouths. In areas where rainfall has decreased and water has already been diverted for agricultural reasons, the river flows may be reduced dramatically enough that the river mouth becomes closed off by sediment. However in open river mouths the rising sea level and increased storminess is likely to result in increased erosion of soft estuarine river banks.

All of these changes in sediment flows have implications for maintaining beaches for recreation, river access and barways for boating, and the natural habitats and values of the coastal environment such as sand spits for shorebird nesting.

Beaches with healthy dune systems have more resilience to climate change impacts. Sand in healthy beach-dune systems is episodically exchanged between the dune, beach and subtidal zone in an ongoing cycle. Storm waves remove sand into the subtidal zone and gentle waves return sand to the beach where it is blown back into the dunes. This process is still counteracting sea level rise effects on many Australian open coast sandy beaches. ***Refer to section 6.1 Coastal dune systems.***

Some beaches will be highly susceptible to loss of sand from increased storm activity and higher sea levels. These beaches are the ones with no supply of sediment or wave action to replenish the losses. Beaches where artificial disturbances have already modified the sand supply may be more susceptible to receding due to sea level rise than otherwise would have been the case.

Figure 6.8 The river training walls at Ulverstone are not preventing the build up of sediment as intended. © Jocelyn Phillips





The IPCC is revising sea level rise projections since its *Fourth Assessment Report* (IPCC 2007). It is likely that coastal communities are going to put increased pressure on land managers to protect beaches from erosion and recession.

However it is neither possible nor desirable to defend all erodible shores. Land managers are going to need to assess locations to determine for which areas beach protection works are suitable and viable and which areas should be allowed to recede and find a natural equilibrium.

It is increasingly important to protect the natural areas and values that remain from human impacts because the added pressure of climate change and sea level rise will result in increased stresses on these environments, making it harder for these ecosystems to adapt.

6.4 Estuaries, coastal wetlands and saltmarsh

This section provides information on the diverse waterway and wetland landscapes of Tasmania and some key management issues that must be considered in these areas. This manual is only concerned with estuaries and coastal wetlands such as saltmarsh, intertidal flats and coastal lagoons and not freshwater systems or inland lakes.

The Tasmanian coastline has a large number of estuaries due to the many coves, embayments and river systems. The two most significant estuaries from a land management perspective are the Tamar Estuary in the north and the Derwent Estuary in the south.

Coastal estuaries and wetlands in Tasmania support significant seagrass beds which are important fish nursery areas. The diverse range of wetland types, including lagoons, saltmarsh and mudflats, all have specialised and unique vegetation communities and provide important habitat to coastal wildlife. Protecting the water quality in estuaries and wetlands is essential for the health of many aquatic species, habitats and ecosystems, including fish and other marine life such as seagrass and kelp.

Coastal embayments (sometimes known as coastal re-entrants) are important landscapes for indicating sea level rise impacts due to climate change. Their sheltered location away from ocean waves and swell means that they are not readily replenished with sand and erosion activity is therefore ongoing and obvious.

Tasmania has numerous coastal habitats of significant conservation value, including several Ramsar wetlands of international significance recognised for their migratory bird values, such as Pitt Water-Orielton Lagoon, Moulting Lagoon and Lavinia State Reserve (a feeding stopover on King Island for the endangered orange-bellied parrot). The Robbins Passage–Boullanger Bay wetlands in the far north-west provide breeding, roosting and feeding habitat for the largest diversity and density of migratory and resident shorebirds found anywhere in Tasmania, with more shorebirds present there than the rest of Tasmania combined.

6.4.1 Estuaries

An estuary is a semi-enclosed or periodically closed coastal body of water in which the aquatic environment is affected by both freshwater and marine systems.

The convoluted Tasmanian coastline results in a number of marine embayments, many of which have estuaries associated with them. Each estuary is a unique environment due to its shape, size, depth, degree of tidal variation and catchment characteristics such as rainfall, run-off and vegetation cover. Tasmania has many types of estuaries including coastal inlets, drowned river valleys, barrier estuaries, river estuaries and coastal lagoons.

Presently, catchments in the west, north-west and south are characterised by high rainfall and run-off, resulting a predominance of river estuaries, whereas catchments in the east and north-east are relatively dry and barrier estuaries and coastal lagoons dominate. Estuaries in the north possess much greater tidal ranges (approximately 3m) than those on the east, south and west coasts (1m).

Because the nature of estuaries is determined by a balance of factors such as rainfall, tidal levels, and vegetation cover, they are highly susceptible to climate change impacts. Significant changes in the types of estuaries that can be supported at different sites around Tasmania can be expected as climatic changes become more pronounced.

Figure 6.9 Boullanger Bay in Tasmania's north-west is an important wetland area for migratory birds. © Vishnu Prahalad





The sheltered tidal waters of estuaries support unique communities of plants and animals which are specially adapted for life at the margin of the sea, and estuarine environments are among the most productive on earth. A wide range of habitat types is found in and around estuaries. In temperate regions such as Tasmania, these include beaches and dunes, rocky foreshores, saltmarshes and other wetlands, intertidal flats, seagrass beds, kelp forests and rocky reefs.

Estuaries are essential for the survival of many birds, fish and mammals. Estuaries have been referred to as the 'nurseries of the sea', as they provide many species of fish with sheltered waters for spawning and safe habitat for juveniles to develop. Many commercially valuable fish species depend on estuaries during some point in their life cycles. Some migratory birds rely on estuaries as resting and feeding grounds during their long journeys.

Most of Tasmania's major cities and towns are situated on estuaries, from which they receive many direct economic benefits. Tourism, fisheries, aquaculture and other commercial activities thrive on the natural resources supplied by estuaries and their protected coastal waters support important public infrastructure, providing ports and harbours vital for shipping, transport and industry.

In Tasmania, many of the remaining Aboriginal sites are situated along estuarine shorelines. Estuaries and their surrounds also offer aesthetic and recreational pleasures such as boating, fishing, swimming and birdwatching.

Human use and development creates significant pressures such as agricultural run-off from the catchment, development of foreshore areas and the impacts associated with intensive human use, all of which affect the water quality of the estuary as well as impacting on other coastal values.

Rice grass (*Spartina anglica*) is an invasive weed that often occupies the intertidal, muddy flats of estuaries. This weed is a threat to the ecology of estuaries and adjacent saltmarshes, changing native flora and fauna habitat. In Tasmania, the major infestations are in the Smithton, Rubicon/Port Sorell, Tamar River, Bridport, St Helens/Georges Bay, Little Swanport and Derwent Estuary regions (DPIPWE website accessed 7th October 2010).

Seagrass beds

A number of estuarine and other sheltered coastal environments support extensive seagrass beds, the most significant of which is Robbins Passage in north-west Tasmania. Whilst not an estuary, this extensive sheltered waterway supports vast areas of seagrass. Seagrass beds help to stabilise coastal sediments and are important fish nursery areas. They are some of the most productive ecosystems on earth but are in decline and are threatened by water pollution and disturbance of the sea floor. It is important to ensure that any activities such as dredging and boat moorings avoid seagrass.

6.4.2 Threats to estuaries

Protecting water quality is critical to sustaining healthy estuary ecosystems. As estuaries receive water from catchment and urban run-off, they are susceptible to land management practices within the catchment, such as agricultural run-off, which can degrade water quality.

Discharges from industry or waste water treatment plants (point source inputs) can also degrade water quality and damage marine ecosystems. Pollution may be in the form of heavy metal contamination, increased nutrient levels, faecal contamination and increased sediment loads. Pollutants or excess



nutrients can result in algal blooms or putrid, smelly water, particularly in coastal lagoons.

At a local level, pollution may come from discharge of boat wastes, boat maintenance facilities, use of herbicides near waterways; poor control of sediment at coastal construction and work sites, stormwater and litter. Litter entering waterways via stormwater gutters can entangle and starve penguins, seals and other wildlife.

Poor water quality is the primary factor in the destruction of seagrass beds, which play a key ecological role in coastal and estuarine ecosystems. The major loss of seagrass beds is one of the most serious issues in Tasmania's estuarine and marine environments. Coastal development, along with damage from land reclamation, dredging and, to a lesser extent, boat moorings, all contribute to the destruction of seagrass.

Poor water quality not only has an impact on marine ecosystems and species, it has implications for humans too, including unsightly stained shorelines and unpleasant odours from algal blooms; beach closures due to health risks to humans; toxins in the food chain and death of valued recreational fishing species.

6.4.3 Coastal wetlands

Coastal wetlands include lagoons, saltmarshes and associated intertidal flats and can be defined as any coastal area periodically covered in water. Ephemeral wetlands are only wet for short periods of time; they can remain dry for very long periods.

For the purposes of this manual, wetlands that are open to the ocean are described as estuaries and referred to in ***section 6.4.1 Estuaries***.

Important features of wetlands ecosystems:

- breeding grounds for many animals, especially macroinvertebrates, fish and waterbirds
- provide protection from floods
- provide habitat and protection for animals
- areas of high biodiversity
- important refuge areas for wildlife in times of drought

Coastal wetlands tend to be highly productive environments, supporting both high biodiversity and large numbers of individual species. Lagoons and saltmarsh are habitat for many unique species and provide nurseries for fish and other marine life and, because of this, they are critical to Tasmania's commercial and recreational fishing industries. Saltmarshes are particularly specialised and are discussed in ***section 6.4.5 Saltmarsh***.

Many coastal wetlands in Tasmania provide habitat for several listed rare and endangered flora and fauna species, in particular migratory birds. Over 25 species of migratory birds are listed on the Japan–Australia Migratory Birds Agreement (JAMBA) and/or China–Australia Migratory Birds Agreement (CAMBA) and the Republic of Korea–Australia Migratory Birds Agreement (ROKAMBA) conventions.

Wetlands play an important role in purifying our waterways by filtering water through specialised plant and bacteria communities. They can be important for recreational and commercial activities, although many, in particular ephemeral (sometimes dry) and saltmarsh wetlands, have been traditionally undervalued. In Tasmania many wetlands have been degraded and reduced in area since European settlement.

Native vegetation within and adjacent to wetlands plays an important role in their ecosystem function and processes, providing important habitat and food resources for organisms as well as filtering nutrients



and capturing sediment.

The riparian zone is defined as the strip of land immediately adjacent to the wetland that influences, and is influenced by it. The vegetation within this zone protects the wetland from erosion and excess nutrient and sediment input. The vegetation within wetland areas in Tasmania can range from herblands and sedgelands to swamp forests (DPIW 2008d).

Aquatic wetland vegetation provides important habitat and a food source for aquatic species such as macroinvertebrates, frogs, native fish and waterbirds, as well limiting light for algal growth and stabilising sediments (DPIW 2008d).

6.4.4 Ramsar wetlands in Tasmania

Wetlands with significant natural values are recognised both nationally and internationally.

Tasmania has 89 wetlands listed in the *Directory of Important Wetlands in Australia* (Blackhall et al. 2001); of these, 10 are designated under the Ramsar Convention as being of international significance.

Ramsar wetlands meet particular criteria under the convention such as supporting rare, vulnerable and endangered species of plants or animals; supporting substantial numbers of waterbirds; maintaining genetic diversity; or having special values of endemic plant or

Table 6.1 List of Tasmanian Ramsar wetlands

Ramsar wetland	Location	Size (hectares)	Type
Apsley Marshes	Mouth of the Apsley River adjacent Moulting Lagoon	880	Freshwater and estuarine
East Coast-Cape Barren Island Lagoons	Cape Barren Island	4473	Estuarine
Flood Plain Lower Ringarooma River	Far north-east coast of Tasmania, between Cape Portland and Waterhouse Point	3519	Freshwater and estuarine
Interlaken*	Lake Crescent, Central Highlands	517	Freshwater
Jocks Lagoon	South-east of St Helens on the north-east coast	19^	Freshwater and estuarine
Lavinia	North-east coast of King Island	7034	Freshwater and estuarine
Little Waterhouse Lake	North-east Tasmania just south of Waterhouse	57^	Freshwater and estuarine
Logan Lagoon	South-east Flinders Island	2257	Estuarine
Moulting Lagoon	Central east coast	4507	Estuarine
Pitt Water-Orielton Lagoon	South-east coast	3334	Estuarine

*Freshwater wetland ^rounded up

animal species or communities.

Tasmanian Ramsar wetlands provide important habitat for resting migratory shorebirds, waterbirds and waders. They provide important habitat for many resident birds too. Moulting Lagoon, for example, supports vast numbers of black swan.

Many Ramsar wetlands provide protection for threatened wetland and saltmarsh species. The threatened propeller plant (*Stenanthemum pimeleoides*) is found almost exclusively in Moulting Lagoon. Pitt Water-Orielton Lagoon is one of only five locations in Tasmania (and the world) that is home to the tiny, threatened, live-bearing seastar (*Parvulastra vivipara*).

Ramsar Convention

Australia is a signatory to the Ramsar Convention on wetlands (1971), an intergovernmental treaty that provides the framework for international cooperation for the conservation and wise use of wetlands. Management of Ramsar wetlands, in accordance with the duties and obligations of signatories to the convention, is presently undertaken through the *Environment Protection and Biodiversity Conservation Act 1999*.

National Guidelines for Ramsar Wetlands are currently being developed by the Australian Government to provide a framework for Ramsar Convention implementation in Australia and to provide jurisdictions and other interested parties with

Figure 6.10 Red-necked stints migrate annually from the northern hemisphere to feed at Pittwater-Orielton Lagoon on the saltmarsh fringe. © Vishnu Prahalad





clear guidance on the management of Ramsar sites.

The *Implementation of the Ramsar Convention on Wetlands in Tasmania, Australia* (Prahalad & Kriwoken 2010) Provides information on the legislative framework and other initiatives that have been undertaken to manage and protect Ramsar wetlands and the way Tasmania declares and manages them. Three case studies illustrate the interaction of multi-stakeholder implementation of Ramsar wetland management in Tasmania and the future course of action to support the Ramsar Convention and the conservation of wetlands in Tasmania.

Ramsar legislation

Ramsar values are protected under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Under the Act, Ramsar wetlands are defined as a matter of National Environmental Significance and therefore any actions, works or activities within Ramsar sites that are likely to have a significant impact require the approval of the Commonwealth Minister for the Environment.

The following are considered to be significant impacts:

- areas of the wetland are destroyed or substantially modified
- there is a major and measurable change in the natural hydrological regime of the wetland (e.g. change to the timing, duration and frequency of ground and surface water flows to and within the wetland)
- the habitat or lifecycle of native species dependent upon the wetland is seriously affected
- there is a major and measurable change in the physico-chemical status of the wetland (e.g. salinity, pollutants, nutrients, temperature, turbidity)
- invasive species are introduced into the wetland.

6.4.5 Saltmarsh

Saltmarshes are wetland-like areas associated with estuaries that contain communities of plants and animals that can tolerate high soil salinity and periodic inundation by marine or brackish water.

Coastal saltmarshes are dynamic ecosystems which support highly specialised flora and fauna species and provide temporary habitat for numerous other species (such as shorebirds) which use saltmarshes opportunistically, regularly or sporadically.

Saltmarshes are important habitats, which provide essential feeding, roosting and breeding areas for a large variety of birds, particularly migratory species. These intertidal areas are also important nursery areas for a range of marine organisms (DPIW 2008d).

Saltmarshes are influenced by tidal movement and therefore are generally located within estuaries and along the high tide zones of low-energy coastlines. Saltmarshes should be considered as part of the estuary system and managed with the estuary as a whole.

The tidal regime controls both the salinity and level of inundation and as such is the most important factor influencing saltmarsh character (DPIW 2008d). Saltmarshes also receive freshwater inputs and hence are affected by land and catchment activities (DPIW 2008d).

Saltmarsh often exhibits distinct vegetation zonation. Saline areas of saltmarsh at lower tide levels are dominated by succulent herbs and shrubs such as samphire or beaded glasswort (*Sarcocornia quinqueflora*). Tidal creeks and freshwater streams cut through the saltmarsh, supporting the mildly salt-tolerant rushes, grasses and sedges which act as the water-filtration system, and in the higher tide regions non-succulent herbs survive.

Apart from the structurally dominant higher plants of the saltmarsh, there is a vastly extensive benthic (bottom-dwelling) algal community that lives on the uppermost layers of the saltmarsh substrate, including the tidal channels and marsh pools (Mount et al. 2010).

This ordered vegetation structure means that saltmarshes are very susceptible to sea level rise. Increased sea levels will result in saltmarsh areas being inundated further and more often and unless the vegetation communities can retreat inland they will not be able to withstand these changes.

Like many freshwater-dependent ecosystems, vegetation surrounding saltmarshes plays an important role in maintaining the health and ecological integrity of the ecosystem. Vegetation adjacent to saltmarshes protects them from pollutants and nutrient inputs, stabilises surrounding banks or dunes to reduce erosion and provides habitat for a wide range of animals including low-tide and high-tide visitors, such as fish and waterbirds (DPIW 2008d).

Saltmarshes act as a buffer and filtration system for sediments and nutrients, while also providing important nutrients to estuarine systems. Bacteria found in and on the mudflats, commonly associated with saltmarsh areas, decompose organic matter and maintain a delicate balance of nutrients and detritus within the saltmarsh. The detritus and nutrients nourish plants and are an essential part of the saltmarsh food chain.

Figure 6.1 | Saltmarsh at Pittwater-Orielton Lagoon Ramsar site in south-east Tasmania. © Vishnu Prahalad





The specialised qualities of saltmarsh vegetation mean that saltmarsh areas support many unique and threatened species. Silky wilsonia (*Wilsonia humilis*) forms mats of grey amongst other saltmarsh vegetation, and is listed as rare under the Tasmanian *Threatened Species Protection Act 1995.*

Several saltmarshes in Tasmania have decreased in area. In the south-east, in Pitt Water and South Arm areas, 17ha (5% since the 1970s) were lost due to coastal erosion. The saltmarsh shorelines have eroded at about 6cm to 20cm a year, with erosion highest on the shorelines more exposed to wind-generated waves. Nearly 31ha of saltmarshes in the area were lost due to land reclamation (Prahalad 2009).

In the north-west of Tasmania (west of Stanley), levees or embankments have been built over 21km (about 20%) of the shoreline, reclaiming land from saltmarsh. While the exact area of saltmarsh lost is yet to be ascertained, these levees have no doubt had a major impact on saltmarsh extent in the area (Mount et al. 2010).

6.4.6 Threats to coastal wetlands and saltmarsh

Traditionally saltmarsh and wetlands (in particular ephemeral wetlands) have been undervalued and perceived as wasteland. Many have suffered from direct drainage or alterations to water flows upstream and are also subject to pollution from catchments, urban developments, and localised activities.

Wetlands are threatened by changes to water quality through pollution or sediment, increases in nutrients from freshwater run-off; changes to water regimes; introduction of weeds and removal or loss of native vegetation. These human processes all have impacts on wetland health.

Loss of vegetation communities destroys habitat for both terrestrial and aquatic species such as migratory birds and fish, and has implications for biodiversity and threatened species. Removal of fringing vegetation can further reduce habitat quality by exposing the marsh to other human impacts such as weed invasion and pollution due to increased temperature, light and noise (Prahalad **in** Mount et al. 2010).

Excess nutrients in wetlands can cause increased occurrences of algal blooms and encourage aquatic weed invasion. This in turn can reduce the biodiversity of the wetland and the capacity to filter water.

Certain land practices associated with intensive animal production and agriculture, both within the wetland and upstream in the catchment, are extremely destructive to coastal wetlands. Drainage for agriculture, removal of water for irrigation, damming to retain water for irrigation, nutrient run-off, stock grazing and land clearing (vegetation removal) all threaten wetland values and ecosystems.

Saltmarshes are vulnerable to clearing and land reclamation for coastal housing and industrial developments. They are often considered wastelands and ideal sites for rubbish dumps. Landfill directly affects the flora and fauna of the saltmarsh through the destruction of habitat and can also influence hydrology, physical structure and water quality of the saltmarsh (DPIW 2008d).

The construction of roads and tracks within saltmarshes can be detrimental to the ecology, through the physical effects of excavation, pollutants that enter the saltmarsh via run-off and restriction of tidal/water flow within the saltmarsh area (DPIW 2008d).

While roads and tracks adjacent to saltmarshes are not considered to be as damaging to saltmarshes as those constructed within the ecosystem, they can still

restrict in-flowing water movement and contribute to pollutants and sediment entering the saltmarsh via run-off (DPIW 2008d).

Horseriding and recreational access by 4WDs and trail bikes are also very destructive to saltmarsh areas, destroying vegetation and introducing weeds. Inappropriate access disturbs wildlife, in particular migratory and resident shorebirds, many of which are threatened species protected under a range of legislation.

Many smaller wetlands and saltmarshes are located on private land or unallocated Crown land, where their values might be poorly protected. Inappropriate access by livestock, horses and vehicles can lead to trampling and destruction of the fragile vegetation. Other threats include dumping of waste and incursions of weeds, diseases and feral pests.

Climate change impacts such as projected sea level rise and changes in rainfall will lead to coastal inundation and altered water regimes which will have very significant impacts on vegetation communities, aquatic communities and biodiversity. ***Refer to section 6.4.9 Climate change and estuaries, coastal wetlands and saltmarsh.***

6.4.7 Protecting estuaries, coastal wetlands and saltmarsh

Land managers should work together on whole-of-catchment approaches to estuary and wetland management. Natural Resource Management regional bodies can coordinate regional projects to address catchment issues and funding is often available through Australian Government programs and incentives.

Monitor discharges from industry and wastewater plants, to ensure that nutrients and other pollutants are maintained at acceptable levels. Improve stormwater outfalls. Wherever possible provide vegetated swales or treatment trains and minimise pipes on the beach. ***Refer to Chapter 12 Stormwater and Crossings.***

Figure 6.12 This saltmarsh on private land at Rokeby is illegally accessed by vehicles which are causing damage to the vegetation which includes a threatened species. © Wendy Andrew





Ensure that saltmarsh communities are valued for their uniqueness and the role they play in our coastal ecosystem. Retain any existing areas of wetland and saltmarsh in an undisturbed condition. Often the best management practice is to 'leave alone'. Do not drain saltmarsh areas or allow soil or other material to be dumped there.

Establish buffer zones around saltmarsh and wetland areas of at least 200m, to protect against influx of nutrients and pollutants.

Avoid building drains or levees that alter drainage patterns, direct fluids and waste into wetland or saltmarsh areas, or act as barriers that prevent saltmarsh migrating inland with sea level rise.

Control access and keep horses, livestock and recreational vehicles out of saltmarsh areas. Fencing will not only control access but may also prevent dumping of soil, rubbish and chemicals.

Monitoring of saltmarsh is essential to determine the current health of saltmarsh communities and to ensure that land managers and specialists are alerted to any changes or degradation.

Use signage and information sheets or brochures to educate the local community about saltmarsh values. Work in collaboration with local community groups when developing signs and informative material.

The Private Land Conservation Program aims to develop and encourage an integrated approach to private land management and planning that helps landowners to fully benefit from the sustainable management of their properties' natural diversity. The program promotes high-level recognition of

Figure 6.13 Damage to saltmarsh vegetation from livestock grazing is obvious when compared with ungrazed vegetation on the other side of the fence. © Vishnu Prahalad





the biodiversity values of natural systems and the need to appropriately protect them, and supports individuals who voluntarily manage these systems for conservation outcomes. Conservation covenants can be an effective way to protect wetland values on private land. More information is available from DPIPWE.

6.4.8 Guidelines for working in coastal wetlands and saltmarshes

Sometimes it is necessary to undertake works in fragile wetland and saltmarsh areas to remove weeds or rubbish, erect fencing or undertake more comprehensive rehabilitation of wetland values.

Always seek specialist advice before planning or undertaking works and ensure that you have identified all the natural and cultural values that you need to protect during your activity.

Avoid using machinery in wetland and saltmarsh areas as the vegetation is easily destroyed and is extremely difficult and expensive to rehabilitate. You can also introduce weeds and waterborne diseases and pathogens. If you must use machinery, seek specialist advice and use operators with environmental credentials.

Ensure that you adequately control any soil and run-off from works adjacent to wetlands and saltmarsh. Monitor water quality before and after works to determine if there has been any impact.

Avoid using herbicides in wetland areas or near waterways. If herbicide must be used, consult the Department of Primary Industry, Parks, Water and Environment (DPIPWE) weed specialists and be sure to choose one that is approved for use around waterways. Herbicides cause pollution, expose the soil to erosion and kill frogs and other animals (avoid spraying in their breeding seasons).

Follow the DPIPWE Codes of Practice, Guidelines and Information Sheets for using herbicides, which can be found at the DPIPWE biosecurity website.

When mowing or slashing, ensure that slashed material is removed and does not get into the waterway. Sometimes it is safe to spread slashed material on site away from the waterway but only if it does not contain ripe weed seeds. ***Refer to Chapter 7 Vegetation management.***

6.4.9 Climate change and estuaries, coastal wetlands and saltmarsh

The ability of estuarine and wetland systems to respond to the sea level rise hazard depends on their current condition. If they are healthy and resilient, they will be able to respond more strongly; weakened, threatened and pressured habitats will succumb to sea level rise more readily (Prahalad **in** Mount et al. 2010).

Current IPCC projections of sea level rise will result in inundation of low-lying wetland and saltmarsh areas. Changes to rainfall will result in altered water regimes which further complicate the situation.

Altered salinity, sediment inputs and nutrient loadings are all likely to put estuarine-dependent species under threat. Inundation of low-lying areas around Tasmanian estuaries could affect saltmarshes, wetlands and intertidal sandflats – important wading bird habitat (DPIPWE 2010).

Other concerns include changes in estuarine fisheries and habitats, and increased vulnerability to marine pests and weeds (DPIPWE 2010).

Specialised saltmarsh vegetation will need space (refugia) to colonise inland to remain within its



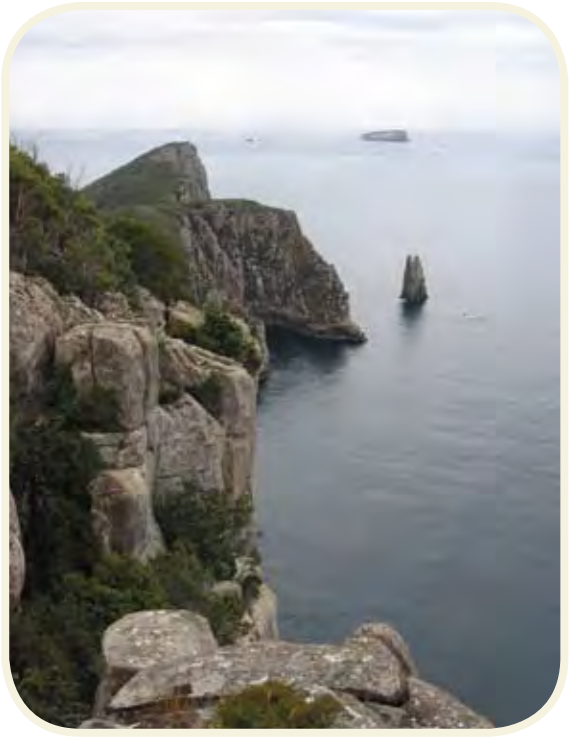
optimal tidal range. These communities can migrate landwards if the topography permits and there are no obstacles such as roads or seawalls. If these unique and important wetland areas are to survive, land managers will need to provide opportunities and space for the saltmarsh to encroach inland wherever possible.

Land managers should seek expert advice about where local saltmarsh communities might retreat to. Modelling of future sea level rise in local areas using a high-resolution digital elevation model such as LiDAR (light detection and ranging) mapping, is a useful means of identifying potential saltmarsh migration pathways and refugia. LiDAR data and basic overlays can be viewed on the LIST.

Often barriers such as roads prevent the movement of saltmarsh and wetland communities landward. In some areas it may be possible to provide culverts under roads or other shoreline infrastructure in order to enable wetland areas to retreat.

The future extent and migration pathways of tidal wetlands in the Derwent Estuary, in the event of projected future sea level rise, has been predicted in *The future of the Derwent Estuary saltmarshes and tidal freshwater wetlands in response to sea level rise* (Prahalad et al. 2009). The current extent of all tidally influenced wetlands and saltmarshes and their immediately adjacent freshwater wetlands were mapped (though not verified on the ground) and then the entire estuary was analysed with inundation modelling using the best available sea level rise projections for the year 2100.

Figure 6.14 The south-east coast of Tasmania features dolerite cliffs that form spectacular coastlines.
© Chris Rees



6.5 Rocky shores

This section describes the formations of rocky coastal landscapes in Tasmania. Where the coast is exposed to the forces of the ocean, soft sediments can be removed and the bedrock directly eroded by the sea. In such areas sea cliffs and sea-stacks are common.

Much of the south-western coast from Cape Sorell to South East Cape is like this, as are parts of the south-eastern coasts of south Bruny Island, the Tasman Peninsula, Maria Island and Freycinet Peninsula.

Given appropriate conditions, other formations may include sea caves, rock arches and wave-cut platforms, examples of all of which are seen on the Tasman Peninsula.

More resistant zones of bedrock gradually wear away to form rocky reefs offshore. Rocky reefs provide important habitat for marine communities.

Rocky shore often provide rocky intertidal habitat that can support a complex assemblage of marine invertebrates. Many sessile (non-moving) invertebrate species such as ascidians (seasquirts) and sea anemones require a rocky substrate to attach to. Other invertebrates such as seastars, urchins and many molluscs (snails) live on rocky shorelines and shelter in crevices and scrape algae off the rocks. Rocky outcrops and headlands are important roosting spots for seabirds such as cormorants and gulls, and rocky intertidal areas are important foraging areas.

Rocky shorelines are least likely to show major effects of climate change but rising seas will submerge wave platforms and intertidal rocky habitats, which may affect intertidal marine assemblages.

Hard-rock coastlines are, in general, likely to show only negligible change through coastal erosion within human lifetimes. Some hard-rock shores in

Figure 6.15 The north-east coast of Tasmania boasts striking granite outcrops. © Chris Rees





6.6 Soft-rock shores

This section describes soft-rock sediment types in Tasmania, which are more prone to erosion. Management issues and techniques for these shorelines are described in ***Chapter 15 Shoreline modification***.

Although there are many hard-rock coastlines in Tasmania, certain bedrock types are relatively soft and more prone to erosion than hard rock, albeit less rapidly responsive to erosion than soft unconsolidated sandy and muddy shores. These soft (semi-consolidated) rock coastlines do not recover from erosion events in the way that sandy shores and dune systems can, as they are composed of significant proportions of clay and/or cobble material which, once eroded, is not returned by fair-weather swells to rebuild the shorelines in the way that occurs on sandy coasts.

Many of these soft-rock shores have been slowly but progressively eroding throughout the last 6500 years while sea level has been stable at roughly its present level, and their rate of erosion is likely to increase with future sea level rise. In contrast to hard-rock shores, soft-rock shores typically exhibit noticeable change through erosion, within a human lifetime.

The most important soft-rock shore types in Tasmania are those formed in Tertiary-age clays, soft sandstones and clayey gravels, although shores formed in slumped deposits of basalt debris are another important type. Examples of soft-rock coastlines in Tasmania whose erosion is currently threatening roads and houses include those in the Margate-to-Coningham region and along parts of the Taroona coast south of Hobart, at Parnella near St Helens, at Ansons Bay and in a number of locations in the Tamar Estuary.

Long term erosion of soft-rock cliffs also characterise the northern shore of Macquarie Harbour, although

Tasmania have shore platforms 10m to 20m wide, which is indicative of the limited amount of erosion they have undergone over the last 6500 years while the sea has been roughly at its present level. Gently to moderately sloping hard-rock coasts are the safest places for near-shore coastal development, including residences, as in most cases they are likely to experience only minimal erosion or flooding from projected sea level rise over the next few centuries. Sloping hard-rock shores comprise about 20% of Tasmania's coastal length (Sharples 2006) and are common in the Hobart region and along parts of the east, north and west coasts.

However, steep coastal slopes and vertical sea cliffs in hard rock may exhibit increased instability through rock falls and slumping, especially where most exposed to high wave energy or where composed of intensely fractured bedrock, as is the case with many Tasmanian sea cliffs of Permian-age siltstone bedrock. Hard-rock sea cliffs comprise a further 20% of Tasmania's coastal length (Sharples 2006) and areas near their edges are generally less suitable for development.

Although hard-rock coasts are generally the safest for development, any plans for development in such locations should consider the nature, slope, fracturing and stability of the bedrock, as some locations will have potential for slumping and instability.

there is little infrastructure or development at risk there. Basaltic debris (ancient landslides) also form soft-rock shores along parts of the north coast between Devonport and Stanley, including key locations such as Boat Harbour.

On open coasts the higher wave energy has mostly already eroded shorelines to a point where they have become buried under sandy deposits and form sandy coastlines. But often, in comparatively sheltered inlets and embayments, less energetic locally generated wind waves are still progressively eroding the shore and in some cases is already putting infrastructure at risk in some areas mentioned above.

6.6.1 Climate change and soft-rock shores

Soft-rock shores with a lower gradient are mostly prone to simple progressive erosion and recession; however, many of these shores form steep-to-cliffed shores (as at Taroona and Parnella), and these are prone to occasional slumps and block-slides. Soft-rock shores may present a range of management issues in light of climate change and sea level rise, since the rise in sea level – and hence increased frequency of wave attack – means that the rate of erosion and slumping of these shores is likely to increase.

Soft-rock coastlines are increasingly being considered an early indicator of climate change impacts, as the early effects such as increased rates of erosion are not masked by the erosion-accretion cycles characteristic of sandy or saltmarsh shores.

Figure 6.16 Eroded soft-rock coastline in southern Tasmania. © Chris Sharples





Because of the inability of soft sediment coastlines to rebuild themselves after erosion, land managers will need to assess for which areas shoreline protection works are suitable and viable and which areas should be allowed to recede and find a natural equilibrium. It may be deemed necessary to undertake shoreline protection works such as revetments to protect infrastructure assets of high community value.

The location of soft-rock shorelines predominantly in sheltered waters of estuaries means that they are already under pressure from a range of human developments and uses. It is increasingly important to protect remaining natural areas and values from human impacts, because climate change and sea level rise will increase stresses on these environments, making it harder for the associated ecosystems to adapt.

In many cases it will be preferable to allow soft-rock shores to erode, allowing the associated landforms and ecosystems to migrate landwards as sea level rise moves the shores.

6.6.2 Erosion control on soft-rock shores

Soft-rock shorelines need to be monitored regularly for new erosion events and hazardous damage. The monitoring program should include checks after storm events, particularly in high use areas where damage could be dangerous to the public.

Maintaining or re-establishing native vegetation along the foreshore may help to stabilise the bank. Areas where lawn has been encouraged to grow to the water's edge are highly susceptible to erosion due to the lack of substantial root systems. Restoring native vegetation may improve shoreline stability but in some cases large trees can be undermined by shoreline erosion and will actually exacerbate the problem when they eventually topple, pulling large clumps of bank with them.

Seek expert advice before undertaking any revegetation work to attempt to stabilise these types of shorelines.

If possible, it is best to allow the shoreline to recede until naturally stabilised but in some instances it may be necessary to artificially stabilise the shoreline. There is a range of temporary and permanent shoreline stabilisation techniques; all need to be planned carefully in consultation with geomorphologists, coastal engineers and other coastal specialists, and will incur initial and ongoing (maintenance) costs.

As is the case with other types of coastal erosion, it is important to recognise that under-engineered protection works are likely to rapidly fail. Any works intended to stop erosion of soft-rock shores need to be well designed and robustly constructed. In most cases this will mean creating a mostly artificial shoreline.

Refer to Chapter 15 Shoreline modification.

6.7 Offshore islands

This section highlights the unique and significant habitats of offshore islands. There are around 600 named islands, rocks and reefs around the Tasmanian coast. Many islands support flora and fauna of conservation significance, including breeding populations of seabirds and seals.

Because of their geographic isolation, offshore islands can support unique and isolated species such as the Pedra Branca skink (Niveoscincus palfreymani), only found on Pedra Branca Island. This isolation also makes them very vulnerable to introduced species such as weeds and pests. It is extremely important that visitors to offshore islands take care not to introduce any weeds, pests or disease by ensuring that everything they bring onshore – e.g. boats, equipment, boots – is clean.

Offshore islands are one of the few landscapes where complete eradication of existing pests is possible; land managers should consider implementing weeds and works programs to target these issues.

Offshore islands often have historic heritage values such as lighthouses and other remnant structures associated with early whaling and shipping that require protection. In some more urban areas offshore islands are a refuge for wildlife such as seabirds and shorebirds.

Figure 6.17 Offshore islands, such as the Breaksea Islands near Port Davey in the south-west, provide important habitat for seabirds. © Chris Rees





6.8 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

A Wetlands strategy for Tasmania (DPIWE 2004a)

Aboriginal Heritage Tasmania

Desktop searches for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Coastal dune management: A manual of coastal dune management and rehabilitation techniques (NSW Department of Land and Water Conservation 2001)

Coastal values data

Vegetation, species habitat and geomorphic values data for a 100m-wide coastal strip of the northern, southern and north-western Tasmania NRM Regions. Available on the LIST.

www.thelist.tas.gov.au

Conservation of freshwater ecosystem values (CFEV) project: Technical report (DPIW 2008d) Information on Tasmania's wetlands and their conservation values, developed within DPIPWE as part of the Conservation of Freshwater Ecosystem Values Project. Web-based information is available through Water Information Systems Tasmania

www.dpipwe.tas.gov.au Go to Water > CFEV program > CFEV resources or

http://waterplanning.org.au/news/conservation-of-freshwater-ecosystems-values-project

DPIPWE biosecurity website

Codes of practice, guidelines and information sheets for using herbicides

www.dpipwe.tas.gov.au

Estuary entrance management support system (Arundel 2006)

Foreshore values mapping

Provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. Available on the LIST.

www.thelist.tas.gov.au

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

Keeping it clean: A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens (Allan & Gartenstein 2010)

http://www.nrmsouth.org.au/uploaded/287/15130799_22keepingitcleanweb.pdf

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. To access, download a free registration form from the website

https://www.naturalvaluesatlas.tas.gov.au



Private Land Conservation Program

www.dpipwe.tas.gov.au Go to managing our natural resources > the private land conservation program

Rivercare guideline for the use of herbicides near waterways and wetlands

www.dpipwe.tas.gov.au Go to food and agriculture > Agricultural & Veterinary Chemicals > Codes of Practice & Guidelines

Saltwater wetlands rehabilitation manual. (Department of Environment and Climate Change NSW 2008b)

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

The coast of Australia (Short & Woodroffe 2009)

The future of the Derwent Estuary saltmarshes and tidal freshwater wetlands in response to sea level rise (Prahalad et al. 2009)

Waterways and wetlands works manual: Environmental best practice guidelines for undertaking works in waterways and wetlands in Tasmania (Gallagher 2003)





7 Vegetation management

7.1 Conservation of coastal vegetation

7.2 Plant and vegetation community identification

7.3 Revegetation

7.4 Plant propagation

7.5 Landscaping with native plants

7.6 Stock management

7.7 Vegetation removal

7.8 Vegetation management and climate change

7.9 Tools and resources

Tab photo: Native vegetation at Bellerive in south-east Tasmania. © Leah Page.

This chapter deals with managing coastal vegetation adjacent to the shoreline where specialised plants such as dune grasses, saltbushes and pigface grow; riparian vegetation adjacent to coastal wetlands; specialised wetland vegetation such as saltmarsh; and coastal vegetation found in coastal reserves, private land and along roadsides adjacent to the coast.

Native coastal vegetation provides wildlife habitat, stabilises sand, and is important for its biodiversity values. Coastal wetland vegetation is highly specialised and plays an important role in water quality. The major threats to coastal vegetation are clearing for development, unrestricted access to the coast, coastal weeds, fire and illegal clearing for views. Protection of vegetation and management of access, weeds and fire are important parts of many coastal works.

Priorities for vegetation conservation and management include communities that play significant functional roles (such as saltmarshes and dune plants), threatened species or communities and plants that provide habitat for significant fauna.

Managing roadside and other vegetation in coastal areas is not very different from managing vegetation in non-coastal areas, with the possible exception of sand blows, which occasionally affect roadside vegetation and roads.

Managing native vegetation closer to the shore is a much greater challenge than managing vegetation growing in more protected coastal areas. Vegetation near the shoreline is exposed to salt spray, sea breezes and intense sun, and plants near the high



water mark or in low-lying areas are often inundated by high tides or storm waves.

Native vegetation is adapted to these natural coastal processes and it is important to recognise that coastal vegetation communities require these natural cycles and processes to survive, and should be managed accordingly. Climate change is increasing coastal stresses and will make it difficult to determine where vegetation protection or intervention is required or will be successful.

Vegetation management activities should be monitored closely (measuring the response of the vegetation to each management strategy) and evaluated and adjusted in response to emerging issues. This is often termed 'adaptive management' and should form the basis of all vegetation management practices.

7.1 Conservation of coastal vegetation

This section deals with special considerations for threatened vegetation communities and threatened plant species which are a priority for protection and rehabilitation in the coastal zone.

A wide range of threatened native vegetation communities may occur in the coastal zone. In Tasmania these include: the coastal complex on King island, *Eucalyptus globulus* dry forest and woodland, heathland on calcarenite, *Melaleuca ericifolia* swamp forest, seabird rookery complex and wetlands.

Many threatened species occur in the coastal zone, such as Tasmania's only EPBC-listed* saltmarsh species, *Limonium baudinii* (Tasmanian sea-lavender), known

Figure 7.1 Threatened lemon beauty head (Calocephalus citreus) occurs in the Ramsar wetland, Orielton Lagoon. This rare species is found in dry, disturbed grassland areas in a few locations in south-east Tasmania. © Lynne Sparrow





only from the Triabunna area. These species are further threatened by processes such as vegetation clearance, weeds and disease, inappropriate fire regimes, inappropriate stock grazing and climate change. The most efficient and cost-effective way to manage most of the state's threatened species is to address these threatening processes. (****See section 7.1.1**.)

As a general principle, healthy intact vegetation should be left undisturbed. Natural disturbance will naturally regenerate and should not require specific management. However, vegetation management may be required for hazard removal (e.g. fuel loads or dangerous trees), for revegetation where damage has occurred or for stabilisation of dunes.

Land managers have a duty of care to maintain undisturbed vegetation cover for threatened species. Seek expert botanical advice where threatened communities or threatened species may be affected by proposed actions.

Mapping of some threatened plants and threatened vegetation communities is available through the Natural Values Atlas and Coastal Values data sets on the internet. ***Refer to section 7.8 Tools and resources***. It should be noted that not all areas have been mapped. On-ground surveys and field checks are advised if significant vegetation intervention is being considered. Consult vegetation specialists for more information.

7.1.1 Legislation

A number of pieces of legislation cover native vegetation management. Please refer to ***Appendix 1 and 2*** for details.

Predominantly the *Threatened Species Protection Act 1995* and *Nature Conservation Act 2002* provide for the protection of vegetation communities at a state level and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the same at a national level.

Threatened species in Tasmania are classified, according to the level of threats to its survival, as endangered, vulnerable or rare in the schedules of the *Threatened Species Protection Act 1995*.

7.2 Plant and vegetation community identification

This section deals with the importance of correctly identifying plant species and communities to ensure native vegetation is managed appropriately.

Correct identification is important to ensure that appropriate native species are planted at a particular site, to identify weeds and also to avoid removing native species wrongly identified as weeds.

Land managers should become familiar with scientific names for native plants, as there can be many different common names in use. This is also important when ordering plants from a nursery as certain species (e.g. prickly Moses, *Acacia verticillata*) have different subspecies (e.g. *Acacia verticillata* subsp. *verticillata*), some of which may not thrive on the coast.

All native species should be identified at vegetation rehabilitation sites and other work sites, wherever possible, to assist the conservation of threatened species and vegetation communities.

If a new or unrecognised plant is discovered in an area then specialist advice should be sought from DPIPWE. It may be a threatened species or a new weed incursion.



Flora surveys can be seasonally dependent and therefore it may be necessary to time surveys to allow for particular seasonal variations to be assessed.

7.2.1 Local and non-local native species

'Local provenance' plants are adapted to the local conditions, and are often genetically distinct from the same species growing elsewhere in the state or Australia. They may also provide the most suitable food and habitat for native wildlife, which is adapted to the local plant species.

Wherever possible it is best to use species of local origin in any revegetation projects as this provides the best outcomes for the coastal ecosystem. Australian or Tasmanian natives that are not local to the area may grow more prolifically if introduced and dominate a vegetation community in much the same way as a weed, leading to lower biodiversity and reduced habitat for some fauna.

It is important to correctly identify species and be aware of the source of revegetation plants. Some northern Tasmanian species, such as coast tea-tree (*Leptospermum laevigatum*) and swamp paperbark (*Melaleuca ericifolia*) are regarded as weeds in the south. Coast wirilida (*Acacia uncifolia*) occurs naturally only on King and Flinders islands. Sydney coast wattle (*Acacia longifolia* subsp. *longifolia*) is very similar to the widespread native coast wattle (*Acacia longifolia* subsp. *sophorae*).

7.2.2 Vegetation mapping and assessment

It is important for land managers to identify the vegetation communities within the areas for which they are responsible.

Guidelines for mapping vegetation are in *A technical manual for vegetation monitoring* (Barker, 2001). There are skilled consultants available that can undertake vegetation mapping. The *TASVEG vegetation condition manual* provides a methodology for assessing vegetation condition (Michaels 2006).

Some mapping can be found on the TASVEG maps, Tasmania's Land Information System, (the LIST) and the Natural Values Atlas. Consider all mapping to be indicative and check the site in question to verify accuracy.

TASVEG

TASVEG is a Tasmania-wide vegetation map, produced by the Tasmanian Vegetation Mapping and Monitoring Program (TVMMP) within the Department of Primary Industries, Parks, Water and Environment (DPIPWE). TASVEG uses 154 distinct vegetation communities to produce maps at a scale of 1:25 000.

TASVEG incorporates mapping from various sources, such as that done for the Regional Forest Agreement. Non-forest community types include grasslands, heathlands, scrub, wetlands and saltmarshes as well as riparian and coastal vegetation, woodlands and forest remnants. A number of these vegetation communities are listed as threatened under the Tasmanian *Nature Conservation Act 2002*.

TASVEG is the official state vegetation map and land managers should use its classifications in planning and assessment processes to ensure consistency. The maps are available online through the LIST (go to LISTmap), or from the Tasmanian Vegetation Monitoring and Mapping Program (TVMMP) at DPIPWE. An important resource is the TASVEG 2.0 Metadata release notes to accompany the LIST maps, available from DPIPWE.

From Forest to Fjaeldmark: Descriptions of Tasmania's vegetation (Harris & Kitchener 2005) is an essential companion for people using TASVEG. It contains not



only descriptions of all the vegetation communities, but also keys that help to differentiate them and identify them, and a state-wide map of the distribution of each vegetation type.

Note that vegetation maps are always being updated, and are not always accurate at a property scale. They are just a guide to the vegetation at a site – get confirmation from a local botanist.

Figure 7.2 Plants in the native pea family in Tasmania such as Bossiaea cinerea are often confused with the highly invasive gorse weed. Take care to identify plant species carefully, a number of coastal species have weed look-alikes. © Leah Page



7.3 Revegetation

This section provides information to guide revegetation works in coastal vegetation communities. Revegetation may be necessary to restore vegetation degraded by vehicle or foot traffic, burning, grazing, sand extraction, land clearing or weeds. Vegetation loss can destabilise dunes and increase the natural rate of erosion, as well as remove important wildlife habitat and reduce biodiversity.

Revegetation should replicate the patterns of the local natural vegetation, especially where different native species live in zones based on distance from the sea. Wherever possible it is best to propagate and plant species that are native to the local area.

As part of the planning process, identify any natural and cultural values in the area that may be affected by revegetation works. Seek specialist advice. This is particularly important for shorebird and seabird rookeries such as penguin colonies.

Access control, and weed and fire management are also important aspects of vegetation management. ***Refer to Chapter 13 Access management, Chapter 8 Weed and disease management and Chapter 9 Fire management.***

7.3.1 Planning a revegetation strategy

Thorough investigation and planning are essential for effective revegetation and to minimise the resources or effort required in the future.

Many coastal areas contain important and protected Aboriginal heritage sites. To determine whether there are values in the area or if your works are likely to impact on heritage values, before commencing works contact Aboriginal Heritage Tasmania (AHT), who can provide advice, assessments and permits if required. If an Aboriginal site or artefact is discovered, stop work immediately and contact AHT.



Some dunes that appear to be degraded might be naturally unstable areas, of high geoconservation significance. Search the Tasmanian Geoconservation database before working in dunes, to ensure they are not of heritage value. ***Refer to Chapter 6 Coastal landscape management.***

Identify any natural values or threatened species and communities that require protection, with reference to DPIPWE's Natural Values Atlas website, the Coastal Values data set and specialist advice. Bare sand patches and blowouts can occur naturally, and are essential nesting sites for some shorebirds, including hooded plovers and pied oystercatchers, which are declining in numbers. There are particular considerations when working around penguins and shorebirds (covered in ***Chapter 10 Wildlife management***).

Undertake mapping and assessment to identify the area's vegetation type. Explore the TASVEG maps initially. A survey of nearby healthy vegetation may be required if the site is highly degraded. Seek specialist advice to ensure the nearby vegetation is not a different community.

Consult with local community groups such as Coastcare groups when planning revegetation works. Many groups undertake revegetation as part of their activities and may be able to contribute time to planting or monitoring revegetation works. Community organisations such as the Understorey Network have vast experience in propagating and growing native plants and non-government organisations such as Greening Australia have undertaken many revegetation and monitoring projects.

The *Bushcare Toolkit,* whilst dated, still provides good information for vegetation management planning and revegetation methods. Refer to the *Tasmanian Bushcare Toolkit, Kit 2, Managing your bush* (Kirkpatrick et al. 1999) and the *Tasmanian Bushcare Toolkit, Kit 4, Revegetating your farm* (Gilfedder et al. 1999).

General principles of revegetation planning:

- Identify and map the native vegetation and weeds.
- Identify and map causes of vegetation loss (e.g. uncontrolled access).
- Identify the highest priority locations for revegetation.
- Choose the best methods to restore native vegetation and make the site more resilient to weed invasion.
- Develop a works program to rehabilitate vegetation in the most effective way with the resources available.
- Monitor and record results.
- Be prepared to follow up with weeding (and possibly planting) for years afterwards.

7.3.2 Methods of vegetation restoration and revegetation

Vegetation restoration can be undertaken by allowing or assisting natural regeneration of the vegetation or by actively planting native species (revegetation). In some instances ecological burning may be appropriate but this needs to be determined by a fire ecologist. The types of works selected will depend on the purpose, budget and site conditions.

Natural regeneration

Encouraging natural regeneration (allowing the vegetation to grow back by itself) is the cheapest and easiest option. This will only occur if there is sufficient natural vegetation nearby as a seed source. Protecting the area from vehicles, stock and pedestrians is essential for regeneration, so there may be some costs for infrastructure to manage access. But constructing fences or other barriers can be cheaper in the long run than repeated planting in sites exposed to high foot traffic or grazing. ***Refer to Chapter 13 Access management.***

Monitoring is essential to assess whether natural regeneration is occurring. It will take at least one to two years before native seedlings appear. If no regeneration occurs, use one or more of the following methods.

Assisting natural regeneration

Natural regeneration may be assisted in various ways:

- Remove weeds that are preventing seed germination or suppressing native plant growth. ***Refer to Chapter 8 Weed and disease management.***
- Lightly scarify or rake the soil at the time of seed fall, to help create a seedbed and bury or hide seed, so that ants do not eat them.
- Lay native brush bearing ripe seed. Native brush cut from the area as part of access or vegetation management works can be laid down to stabilise the sand and provide a source of seed. Brush must be cut when seed is ripe, usually summer. Brush discourages grazing of new vegetation by rabbits and wallabies, and trampling by people.
- In some circumstances fire can be useful, but use it cautiously and only in vegetation types that may

Figure 7.3 Natural regeneration of coastal dune vegetation. © Leah Page



benefit, such as coastal heathland. It is essential to seek advice from a fire ecologist. Land managers must approve use of fire; they may require a fire permit from Tasmania Fire Service. Qualified firefighters should undertake the burning.

- Do not fertilise (unless the topsoil has been removed), because coastal plants are adapted to low levels of soil nutrients and may be out-competed by weeds such as pasture grasses.

Planting native species

Many native species are useful as ornamental plants around facilities or recreational areas. They are attractive and will be easier to maintain than introduced species. ***Refer to section 7.5 Landscaping with native species.***

Revegetation of natural areas should only be necessary in places where natural regeneration is too slow. Planting can help where natural regeneration is inadequate, or if revegetation is required more quickly (e.g. to provide habitat for wildlife or to rehabilitate areas after construction works). Revegetating with tube-stock or direct seeding can be difficult in coastal sands and sandy soils.

Figure 7.4 Revegetation work by volunteers on Carlton Bluff in south-east Tasmania. © Understorey Network





7.3.3 Where to plant coastal species

Coastal vegetation grows in zones based on proximity to the sea (see Figure 7.5 and Tables 7.1 and 7.2).

Coastal plants are classed as primary, secondary or tertiary species for the purposes of revegetation. The primary species grow closest to the sea (in the foredune zone). Secondary species grow a little further inland, and the tertiary species grow in more sheltered places, further inland.

The most effective revegetation usually starts with the primary species.

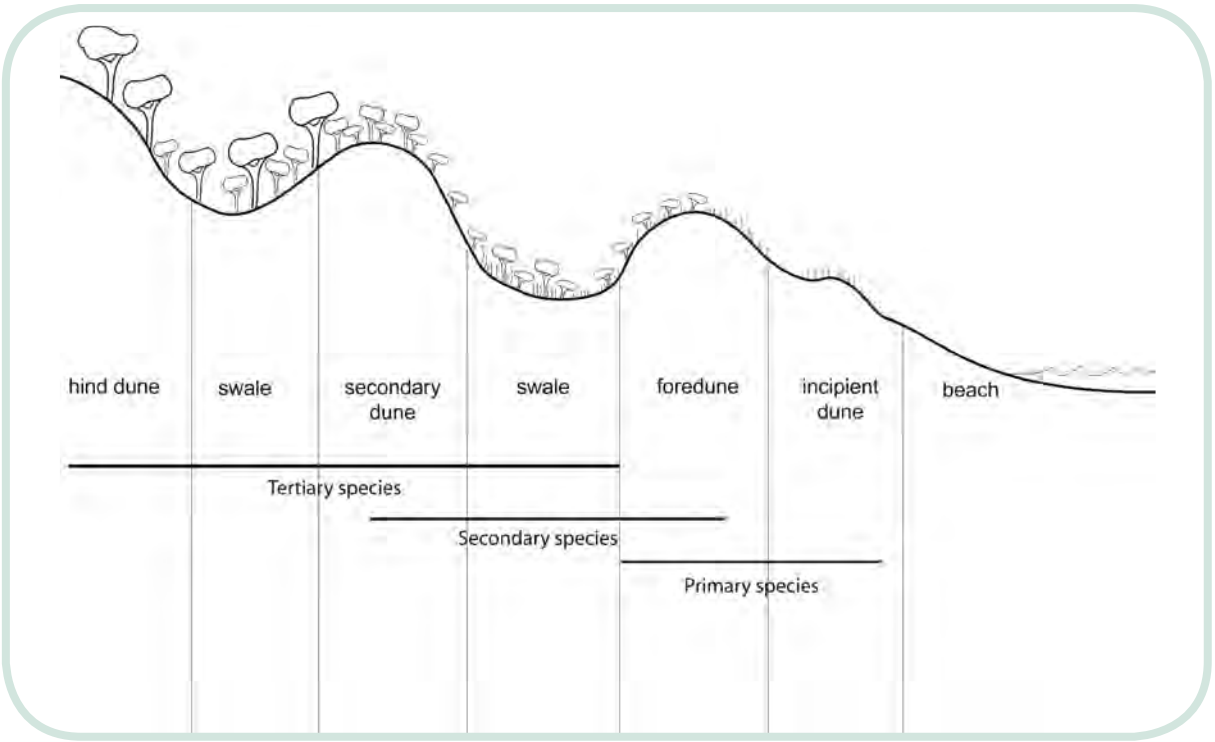
Primary, secondary and tertiary species

Primary species (sand-binding grasses, succulent creepers) grow in unstable sand nearest the sea. These pioneer plants can cope with being partly buried by sand. However, only *Spinifex sericeus* and *Austrofestuca littoralis* can grow in rapidly accumulating sand.

Secondary species (grasses, sedges, herbs, low shrubs) can also grow close to the sea but do not tolerate much burial by sand.

Tertiary species (taller shrubs, trees) can grow behind the top of the foredune but many species grow better further back from the sea.

Figure 7.5 Zones where plants grow on coastal dunes. Based on Coastal, Heath and Wetland Vegetation (Kirkpatrick & Harris 1999) in Vegetation of Tasmania Reid et al. (eds).





7.3

Table 7.1 Recommended places to plant species on coastal dunes.

Zone	Scientific name	Common name
Primary species Sand and salt tolerant. Plant on seaward side of foredune in unstable sand.	*Spinifex sericeus** *Austrofestuca littoralis* *Carpobrotus rossii* *Tetragonia implexicoma* *Atriplex cinerea*	spinifex coast fescue native pigface bower spinach grey saltbush
Secondary species Tolerate salt spray. Plant on foredune behind established primary species.	*Senecio pinnatifolius* *Poa poiformis* *Distichlis distichophylla* *Isolepis nodosa* *Acacia longifolia subsp. sophorae* *Acaena novae-zelandiae* *Pelargonium australe* *Leucopyhta brownii* (northern Tasmania) *Lomandra longifolia* *Kennedia prostrata* *Austrostipa flavescens* *Rhagodia candolleana* *Ozothamnus turbinatus* *Olearia axillaris* (northern Tasmania) *Correa alba* *Leucopogon parviflorus* *Dianella* species (coastal species only)	coast groundsel coast tussock grass salt grass knobby clubrush coast wattle buzzy native geranium cushion bush common sagg running postman yellow spear grass seaberry saltbush coast everlasting coast daisy bush white correa coast beard-heath flax-lilies
Tertiary species Need protection from wind and salt spray. Plant behind foredune crest once primary and secondary species established.	*Banksia marginata* *Myoporum insulare* *Leptospermum scoparium* *Leptospermum laevigatum* (northern Tasmania)	silver banksia boobyalla manuka coast tea-tree
Plant on second dune.	*Allocasuarina verticillata* *Dodonaea viscosa* var. *spathulata* *Acacia dealbata*	drooping she-oak native hop silver wattle
Plant on hind dunes.	*Bursaria spinosa* *Acacia verticillata subsp. verticillata* *Acacia melanoxylon* or other local *Acacia* species Local *Eucalyptus* species	prickly box prickly moses blackwood eucalypts

Most species, apart from *Spinifex* and *Austrofestuca*, can also be planted further back. Some species are found nearer the sea, but they will establish better if planted further inland. **Spinifex sericeus* is difficult to propagate and grow in southern Tasmania because the species prefers warmer temperatures – it is near the limit of its climatic range. Source: *Community Coastcare handbook* (Thorp (2005), based on Coastal, Heath and Wetland Vegetation (Kirkpatrick & Harris 1999) in *Vegetation of Tasmania*. Reid et al. (eds)



On exposed bare sites, only primary species should be planted, to stabilise the soil and provide a buffer for secondary species (which are usually planted in the following years).

Secondary species are suitable for planting on the seaward side of the foredune but only if the primary vegetation is in place to provide shelter.

Tertiary species can be planted later when conditions are suitable for their growth, or at the same time in sheltered sites.

Planting to stabilise dunes

A well-developed vegetation cover reduces wind erosion by raising the wind above the ground surface. The minimum vegetation cover required to fix sand can vary between 30% to 60%, depending on how exposed the site is to the prevailing wind, the types of vegetation and the density of planting. Generally, the higher the percentage of vegetation covering the ground, the more resistant the surface is to erosion, but this depends on the type of vegetation.

Low-growing plants, such as grasses, are more effective at stabilising sand than trees or shrubs. This is because 90% of wind-borne sand is transported in the 0.5m closest to the ground. Planting a mix of plants of different height and life form will lift the wind above the ground more effectively.

In some circumstances blowouts in dunes or coastal erosion sites may occur in areas of non-native vegetation such as dunes dominated by marram grass. Blowouts in marram grass dunes may need to be rehabilitated with marram grass, particularly if dunes are encroaching onto roadsides, as has occurred in the Scamander marram dunefield.

The Tasmanian *Community Coastcare handbook* (Thorp 2005) has more detailed information about local variations in dune vegetation, saltmarsh and coastal heathland vegetation.



7.3.4 Planting methods

The methods selected will depend on the purpose, budget and site conditions. Suitable methods may include any or all of the following:

- tube-stock or other seedlings
- direct seeding (requires careful soil preparation)
- laying brush (useful for small areas if brush with ripe seed is available).

Large-scale direct seeding is not often used on sand dunes as it is difficult to operate machinery safely on soft undulating areas and seed does not germinate well in loose soils. This method may be appropriate on some coastal sites, but requires extensive preparation well in advance of sowing. Useful guidelines are provided in the South Australian *Coastcare community handbook* (Brooke et al. 2001).

The following methods have been adapted for planting in sand or very sandy soils.

Table 7.2 Zones where native plants grow on headlands and cliffs (in order starting nearest the sea).

Zone	Scientific name	Common name
Damp saline niches closest to the sea	*Sarcocornia quinqueflora* *Samolus repens* *Apium prostratum*	beaded glasswort brookweed sea celery
Succulent herbs	*Disphyma crassifolium* *Carpobrotus rossii* *Tetragonia implexicoma* *Tetragonia tetragonoides*	round-leaved pig face pigface bower spinach New Zealand spinach
Tussock grasses	*Austrostipa stipoides* *Poi poiformis* and/or *Poa labillardierei*	coast spear grass coast tussock grass
Heath	*Melaleuca, Leptospermum*, other plants in the *Myrtaceae* family *Asteraceae* family	coastal tea-trees, melaleucas daisy shrubs
Scrub	Plants in the *Myrtaceae* family Plants in the *Asteraceae* family	tea-trees, melaleucas coastal daisy shrubs
Woodland	*Allocasuarina* species	she-oaks
Low forest	*Eucalyptus viminalis* *Eucalyptus amygdalina* *Eucalyptus globulus* (eastern Tasmania) *Eucalyptus nitida* (north-west and western Tasmania)	white gum black peppermint blue gum Smithton peppermint

The number of zones may be fewer on some sites. Source: *Community Coastcare handbook* (Thorp (2005), based on Coastal, Heath and Wetland Vegetation (Kirkpatrick & Harris 1999) in *Vegetation of Tasmania*. Reid et al. (eds)



Tube-stock or other seedlings

Planting tube-stock is a reliable planting method if undertaken correctly. For successful planting, follow the steps in the **Guidelines** accompanying this manual.

Direct seeding by hand

Direct seeding is the spreading of seed onto carefully prepared soil. To be successful it requires good soil, adequate moisture and a lack of weed competition. This method has had limited success in coastal soils, especially on sand dunes. In loose, bare sand, seeds will often be uncovered or buried too deeply before they can germinate and the seedlings become established.

Direct seeding requires planning well in advance to ensure the site is thoroughly weed-free. This can involve weeding for two years or more prior to seeding; follow-up weeding is essential for years afterwards.

Collect seeds in late spring and summer (***see section 7.4.2 Propagation from seed***) and plant when soils have a high soil moisture content. This may be after heavy rainfalls have started in late autumn or winter; however, heavy rainfall after direct seeding may result in seed being washed away so care must be taken.

Choose sites where soil is not too loose or too hard. Heavy soils should be soft enough to enable water, air and roots to easily penetrate.

Rake the top few centimetres of soil with a rake-hoe (a heavy duty firefighting tool that combines both a rake and a hoe and is particularly useful for scraping away leaf litter and the top layer of soil) and sprinkle a pinch of seeds (mixed with sand to help make sowing more even). Lightly rake in the seeds and then firm down the soil with the back of the rake-hoe. Bury the seeds at a depth of about one or two times their size.

7.3.5 Monitoring revegetation projects

Revegetation is often quite difficult on the coast, and many projects have limited success. It is important to keep good records of works and the progress of revegetation, to find out whether the methods used are successful. Revegetation practices can then be modified to achieve the best results.

If good records are kept, it will be possible for someone else to determine the ecological effectiveness of the works, even if scientific monitoring was not the original purpose of record-keeping.

Ongoing monitoring will enable land managers to identify problems as they arise, such as new weed incursions, and help to determine future maintenance needs.

Use vegetation mapping and photopoints (locations, identified by marking with a tent peg or using a hand-held GPS, used to take photos at regular intervals from the same point) to record revegetation progress. Methods are provided in *A technical manual for vegetation monitoring* (Barker 2001) and *A user's guide to monitoring vegetation* (McCoull & Barnes 2002).

Tasmanian Vegetation Condition Assessment

Vegetation Condition Assessment (VCA) is one of the options for monitoring rehabilitation. It may be used alongside other techniques that assess particulars of plant survival etc.

The Vegetation Condition Assessment is a method for monitoring vegetation condition over time and comparing it to the benchmark health for that vegetation community. Different remnants of the same vegetation type can be compared using their benchmark scores.

This method is in fact a simple approach but needs



to be done by a trained person in accordance with *A manual for assessing vegetation condition in Tasmania* (Michaels 2006). A number of Natural Resource Management (NRM) officers have been trained in using this method and should be approached for assistance. Contact the regional NRM organisations, refer to ***Appendix 4***.

The method is most useful where some of the integrity of the native vegetation remains, allowing a native TASVEG unit to be defined for the area. It must be used when monitoring change over time if the data is to be contributed to regional environmental status reports.

Ecological monitoring projects

Ecological monitoring projects are more extensive (complex and long-term scientific) projects, usually organised by vegetation ecologists, which systematically measure the health of the native vegetation.

There are three common types:

- monitoring the impact of a change in the environment (e.g. monitoring the impact of a wildfire or a development)
- monitoring the impact of a management treatment (e.g. monitoring the impact of an ecological burn or a particular grazing regime)
- monitoring changes in plant populations or communities over time (e.g. monitoring a population of rare plants in a particular location).

An ecological monitoring project typically takes many years to complete because it must record changes over a number of seasons. To be effective, it requires a commitment to conducting reliable and systematic measurements, including control sites, which requires considerable resources and planning. This can only be achieved if a professional ecologist, who should also analyse the results and recommend the most appropriate management responses to changes in the vegetation, scientifically designs the project.

Land managers must approve any ecological monitoring project and commit to being involved in reviewing the outcomes and modifying or improving land management practices as required. This adaptive management should continue in a cycle that includes measuring the biodiversity response of each management change. Methods suitable for ecologists and non-ecologists are provided in *A technical manual for vegetation monitoring* (Barker 2001), including monitoring ecological burns.

7.3.6 Marking sites for protection or management

Significant vegetation communities and values, such as threatened species, can be identified at the site through markers, which will inform all land managers and users of the presence of these values and help them to manage the site appropriately to protect these values. There are several marking methods but simple signage is most effective.

Enviromark

Enviromark is a corridor management system designed for managing threats and significant values along corridors (corridors of land with native vegetation left intact, which allows fauna to move across a wider territory and maintains connectivity of vegetation communities). It is designed for managing corridors along roads, railways and powerlines, and other areas where significant values are at risk, including coastlines.

This simple system can be used by land managers to protect threatened species, maximise vegetation conservation and habitat values and manage weeds

and revegetation areas. It assists councils and other corridor managers in fulfilling their obligations under weed and threatened species legislation.

The Enviromark system provides an integrated set of field markers, specifications, user guide, training and monitoring and evaluation (Figure 7.6).

The field markers show the location of the significant value or threat. The colours and symbols on the markers indicate the issue being managed, while the codes relate to relevant specification sheets, which set out how normal maintenance activities (e.g. mowing and slashing, drain clearing, grading, pruning and weeding) and constructions can be modified to avoid damaging significant conservation values or spreading weeds. In this way management plans and strategies can be translated into appropriate on-ground actions.

Enviromark is being used to manage weeds of national significance and of regional significance, as well as threatened species, significant native habitat, revegetation areas, no-spraying areas, hygiene areas and stockpile and parking areas. It is being used in three states so far, by both state corridor managers and local councils.

The system is run by Greening Australia (Tasmania), which produces the materials and conducts training sessions. Refer to *Introduction to Enviromark: a system for managing roadside and corridor vegetation* at the Greening Australia website.

Figure 7.6 Enviromark field markers. The picture on the right shows the revegetation marker on a roadside planting site. Although the new plantings are obvious now, in summer they will be hidden in long grass and vulnerable to accidental damage or destruction by slashers, herbicide or fire. Source: Introduction to Enviromark: a system for managing roadside and corridor vegetation. (Greening Australia, n.d.)





7.4 Plant propagation

This section provides guidance for successful plant propagation. It is more cost-effective to rely on natural regeneration of native vegetation, but in some circumstances propagating plants may be necessary to supplement the natural growth. Growing plants for coastal rehabilitation is quite different from growing plants for ornamental gardens. It requires tough plants with deep root systems that will survive being planted out in dry, salty and windy sites.

It is important to grow only plants that have been propagated from parent material (seed or cuttings) collected from local plants that are native to the area. This local provenance stock is adapted to the local conditions, provides the best habitat for wildlife and is often genetically distinct from the same species growing elsewhere.

The main propagation methods are by seed, cuttings and division. Many common coastal plants will propagate readily from one or more of these methods, which are generally used in spring or autumn. The Tasmanian Understorey Network plant database has information about the identification, habitat and propagation of most Tasmanian native species.

7.4.1 Guidelines for successful plant propagation

Propagating only plant species that are native to the local area will protect genetic diversity and provide hardy plants suitable for local conditions.

Correct identification is important to avoid propagating the wrong species. In some cases, such as prickly Moses (*Acacia verticillata*), certain subspecies may not thrive on the coast (only *Acacia verticillata* subsp. *verticillata* is adapted to dry coastal sites). ***Refer to section 7.2 Plant and vegetation community identification.***

Planning ahead is essential because propagation can take months or more and plants must be ready for the planting season (usually late autumn and winter).

Standard propagation methods may require modifying to produce hardy plants suitable for coastal planting.

Correct hygiene is critical to avoid spreading weeds, pests or diseases.

7.4.2 Propagation from seed

Propagation from seed enables land managers to ensure stock for planting comes from local species and that genetic populations are maintained. Propagation from seed involves collecting seed (a permit may be required); drying and cleaning seed; and planting the seed.

7.4.3 Propagation from cuttings

Most native plants will grow from cuttings. The exceptions include eucalypts, she-oaks and some acacias.

- Early morning is the best time to take cuttings.
- Choose healthy plants without signs of disease or insect attack.
- Take tip cuttings (tips) at the end of shoots and from the top of the plant, to avoid soil contamination.
- Softwood cuttings (from new soft shoots) can be taken whenever new shoots are available, usually after flowering. Cut a number of tips 100–150mm in length.
- Semi-hardwood cuttings can be taken in March or April. Cut tips 50–80mm long.
- Avoid cuttings with buds or flowers. If this is not possible, cut them off.



- Place cuttings in moist paper or in plastic bags (labelled with the species name). Keep cuttings cool. Place in an Esky-type cooler with a freezer block, if travelling long distances.
- Plant cuttings deeply into trays or pots of sterile, well-drained potting mix (e.g. 3 parts river sand, 1 part Cocopeat (coir dust made from coconut husks), 1 part perlite or vermiculite).
- Use mist spray indoors to keep cuttings moist. Supplying heat under pots indoors is generally unnecessary – striking may take longer, but the success rate is likely to be higher without a heat bed.
- Alternatively grow the cuttings in a warm, shady place outdoors for a few days before gradually moving them to a sunnier spot. Use bottom-watering or spray gently each day to keep them moist.
- Harden off indoor cuttings before planting, by putting them outside for an hour or two in cooler, sunnier conditions and gradually increasing the time each day.
- When the cuttings have rooted, transfer each seedling to its own pot. Gently remove each cutting from its pot and tease out the root mass. Put one cutting into each pot, so that the roots are straight, and firm the soil around the stem. Label the pot and water gently.
- Place pots in a sheltered, sunny (but not hot) spot, and water regularly. Plants may take from one to 18 months to grow 100–150mm tall, large enough for planting.

7.4.4 Propagation from division

Grasses, sedges and similar plants can be propagated by dividing the tussocks.

Divide plants just before or during the start of the root-growing season. This time will vary between species. It may be in late autumn, winter or early spring. Refer to the Understorey Network plant database.

Use a mattock to divide the plant into 100–300mm diameter sections, preferably after watering. Lift the plant carefully to retain the roots, and cut back the top to about 10cm.

Plant divisions in 50mm diameter tubes filled with potting mix and a little slow-release fertiliser.

7.4.5 Plant hygiene when propagating

Good hygiene is critical when collecting propagation material in coastal areas, to avoid spreading weeds, pests and diseases from an infested area to an unaffected area on vehicles, machinery and other equipment and boots.

Take care not to introduce plant diseases like phytophthora root rot (*Phytophthora cinnamomi*).

Generally *P. cinnamomi* will not be an issue in coastal revegetation, in primary sand dunes, saltmarsh and coastal scrub (e.g. *Meleuca ericoides*). If working in coastal heath or heathy forest/moorland do not propagate and plant out without further advice on the disease status of the site and the nursery hygiene required to minimise the chance of diseased stock being used.

Do not take seed or cuttings from plants in infected areas. Maps of areas with, or susceptible to, phytophthora are at the DPIPWE weeds website. Seed and cuttings will not spread *P. cinnamomi*, but your shoes might.



Wash boots and other equipment before visiting coastal vegetation or moving to another site.

Keep vehicles clean, especially underneath.

Also refer to Chapter 8 Weed and disease management and section 7.8 Tools and resources.

7.5 Landscaping with native plants

This section briefly describes the opportunity to improve the vegetation values of public spaces and urban areas through the use of local native plant species in landscaping and gardens.

Local native plants can be incorporated into gardens and urban public spaces in the same way in which exotic plants are used. There are many striking coastal plants, from ground covers and grasses to shrubs, flowering plants and screening trees. They offer a good variety of colours and textures and are highly

Figure 7.7 Cleaning boots and personal equipment is the best way to prevent the spread of weeds and diseases. Source: Keeping it clean: A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens. © Hydro Tasmania



suited to plantings designed to create visual interest and contrast.

Being suited to the local conditions, local natives will be easier and cheaper to maintain and have the added benefit of providing habitat for local wildlife.

Consider collaborating with the local community to create landscaped native gardens in recreational spaces or high-use points along the coast. These gardens can become an inspiration and a learning tool for local residents who are struggling to maintain traditional exotic gardens.

There are several brochures and resources that provide information on selecting native plants, including the South Australian publication *Coastal gardens: A planting guide* (Adelaide and Mount Lofty Ranges Natural Resources Management Board n.d.), which provides information on plant selection for landscaping in a variety of different styles. ***Refer to section 7.9 Tools and resources.***

Figure 7.8 Local native plants incorporated into public open space at Port Willunga in South Australia, has greatly improved the aesthetic value of this popular coastal location. © Leah Page





7.6 Stock management

This section provides guidance for minimising impacts of livestock on coastal vegetation. Allowing livestock access to coastal dunes and wetlands for grazing or water can easily cause environmental damage, which may be difficult and expensive to remediate. Coastal dunes and wetlands are particularly fragile and highly vulnerable to damage by livestock.

Livestock grazing in coastal dunes (in addition to rabbits, wallabies and wombats) can increase wind erosion by reducing the plant cover and exposing bare sand. The hard hooves of livestock break the ground surface and sever the soil-binding plant roots, which may result in erosion and remobilisation of dunes. For these reasons, grazing should be avoided on actively or potentially mobile dunes. Livestock can also introduce and transport weed species.

Also, as livestock are likely to expend more energy climbing dunes than grazing in paddocks, this may negate the feed value of these areas.

Tasmania has many coastal wetlands, including lagoons and saltmarshes, which provide food and habitat for numerous animals. Grazing in wetlands can destroy the vegetation, spread weeds, damage the soil structure and degrade the water quality.

Excluding livestock from wetlands and pumping their drinking water into troughs can increase their weight gain. The stock are less prone to disease and footrot, erosion problems are reduced and water supplies kept clean, producing benefits and savings that can offset the cost of fencing and water-supply equipment.

Future sea level rises will threaten coastal wetlands. Protecting them from stock grazing pressure should help these important ecosystems adjust to future changes.

Figure 7.9 Livestock are very destructive to coastal areas. Stock should be excluded from dunes and wetland areas. © Emma Williams





7.6.1 Impacts of stock grazing in coastal environments

Coastal dunes and wetlands have important nature conservation values including threatened communities and species. They are vital nesting and feeding places for shorebirds, penguins, shearwaters and waterbirds, including threatened species such as fairy terns.

Many of the threatened plants in coastal environments have a highly restricted distribution, with small vulnerable populations in dunes and wetlands that could be eliminated by poor site management. Certain dunes have important geoheritage values that can be damaged by stock grazing.

Management plans have been prepared for some significant wetlands. Seek specialist advice from the Department of Primary Industries, Parks, Water and the Environment (DPIPWE) to identify whether these wetlands will be affected by the proposed stock grazing.

Grazing should be avoided in dunes and wetlands, especially foredune complexes and other mobile dunes and saltmarshes. ***Refer to Chapter 6 Coastal landscape management.***

Vegetation loss from over-grazing can destabilise dunes and increase erosion, allowing large quantities of sand to be blown onto productive paddocks.

Grazing in or near water may degrade the water quality with excess nutrients and bacteria. As a result, grazing may damage valuable habitat for wildlife.

Aboriginal heritage values can be disturbed and compromised by erosion caused by stock grazing.

7.6.2 Guidelines for grazing in dunes

Where grazing is practised in coastal dunes, thorough management is necessary and the following guidelines are recommended.

- Obtain specialist advice about the potential impacts of grazing on dunes and other sandy landforms (from a geomorphologist) and the vegetation and wildlife (from a biologist) in sensitive areas, to identify areas where grazing should be avoided or managed carefully.
- Avoid grazing livestock on dunes where this could damage vegetation with high conservation values or cause erosion (e.g. on mobile or potentially mobile dunes).
- Where grazing is practised, reduce the stocking rate, and use short grazing periods
- Restrict grazing preferably to the moist months of the year but avoid or limit grazing, if possible, when the vegetation is establishing itself or flowering (usually in spring and summer). Heavy grazing at these times makes it hard for the plants to develop roots or to flower and set seed.
- Maintain a vegetation cover of at least 30%, preferably 60%, to stabilise the sand (depending on how exposed the site is to the prevailing wind and the types of vegetation). Do not use fire to increase green pick, as this can promote erosion.
- Avoid grazing after wildfire, when the bare soil is prone to erosion. Fire often triggers the germination of new seedlings, which could be destroyed by trampling if grazing occurs.
- Exclude stock from dunes, by fencing, to help improve the stability of vulnerable dunes that have been damaged by grazing.



7.6.3 Guidelines for grazing near wetlands

The following guidelines are recommended when managing livestock in or near wetlands. Careful management is necessary and includes the following measures.

- Avoid grazing livestock on sensitive coastal wetlands such as saltmarshes. Excluding grazing is the best option on all wetlands, where practicable.
- Check the conservation significance of wetlands with the Biodiversity Conservation Branch, DPIPWE. Prepare management plans for significant wetlands.
- If grazing is allowed, obtain specialist advice about managing it wisely (e.g. using appropriate grazing intensities and maintaining water levels and quality).
- Determine a sustainable stocking rate appropriate to the seasonal conditions, and use short grazing periods.
- Avoid or limit grazing when plants are actively growing and producing seed (spring and summer), where practicable.
- Grazing in wetlands that dry out is least damaging when the wetland is totally dry. Exclude stock while the wetland is drying out, as trampling on boggy soil will destroy the vegetation mat that is important to sustain a healthy wetland.
- Ideally, provide alternative watering points away from the wetland. If that is not viable, fence off most of the wetland so access is limited to the most suitable watering point(s). Consider the options for fencing and alternative watering systems in *Managing streamsides: stock control, fencing and watering options* (Wright & Jacobson 2000) available from DPIPWE.

7.6.4 Ongoing monitoring of grazing

Monitoring is important to see whether grazing levels are appropriate and to check for any damage to coastal values and systems. Visit the site regularly to monitor grazing and ensure damage is minimal.

It may be necessary to repair erosion, protect water quality or deal with weeds.

Inspection and maintenance should check the effects of grazing on the vegetation, landforms and wildlife or water quality.

Figure 7.10 Damage to wetland area from inappropriate stock access. Source: Waterways and wetlands works manual: Environmental best practice guidelines for undertaking works in waterways and wetlands in Tasmania (Gallagher 2003)





7.7 Vegetation removal

This section deals with legal vegetation removal by land managers and illegal vegetation removal. It is sometimes necessary to remove native vegetation as part of land management works such as to reduce fire hazard in coastal reserves, to remove dangerous trees, to clear lines of sight along coastal roadsides or to provide access to the foreshore. ***More information on vegetation management for fire hazard reduction is available in Chapter 9 Fire management.***

Identify any threatened species or communities and ensure appropriate approval has been granted before any vegetation removal works are undertaken. Removal of vegetation from coastal foreshores such as dunes and wetlands can cause severe damage to these fragile systems and lead to erosion and foreshore instability. Such works should be avoided if possible and only undertaken with specialist advice.

Consult with the local community prior to undertaking works. This is very important as many local residents and community group volunteers will be distressed by the removal of vegetation, in particular large trees, if they do not understand the reasons for their removal. Give them enough time to become informed about the proposed vegetation removal and to ask questions and seek advice.

Ensure that appropriate riparian buffers are maintained as vegetation on the edge of waterways protects the water from neighbouring land uses and pollutants.

Some coastal foreshores have been subject to illegal removal of coastal vegetation by adjacent landowners, usually to open up coastal views. Land managers can play a role in educating the public about the value of coastal vegetation and in enforcing illegal activity.

7.7.1. Tree removal and pruning

Sometimes it is necessary to remove or prune large trees. Inappropriate techniques look unsightly and do not allow the tree to heal properly, causing rot in the remaining limb which can spread into the trunk and reduce the structural integrity of the tree, making it unsafe. Correct pruning techniques will protect both the appearance and structural integrity of the tree.

Tree pruning and removal should only be undertaken by qualified and experienced staff and contractors. All staff and contractors should be briefed on the environmental considerations of the site and any restrictions or specific work practices that are required to meet those considerations. Appropriate supervision is required to ensure environmental standards are being met.

Figure 7.11 Correct pruning cut allows for wound to heal, preventing water from rotting the remaining limb and trunk. © Leah Page





7.7.2 Guidelines for slashing vegetation

Slashing is a form of mechanical vegetation removal that can be undertaken with large specialised machinery, smaller mowers and hand-held brush-cutters.

As for any coastal works, land managers should complete a risk assessment, which should also consider potential impacts to the coastal environment and values.

Identify the following values:

- areas that are being actively managed by a local Coastcare or other community group – ensure the slashing will not be detrimental to any revegetation or natural regeneration works
- vegetation values that warrant protection
- natural or wildlife values that may be at risk from accessing the site with machinery and slashing
- Aboriginal or other heritage values that might be affected by the works – seek assessments and approvals if that is the case
- Aesthetic values and visual appearance.

Implement the following practices to minimise impacts on other values:

- Consider the life cycle of local native species. Allow flowering and seed ripening before slashing, to maintain the seed supply and the capacity for natural regeneration.
- Brief all staff and contractors on environmental considerations for the site and any consequent restrictions or specific work practices required. Appropriate supervision is required, to ensure environmental standards are being met.
- Scalping is sometimes used as a weed management tool where immediate rehabilitation is planned. Be aware that slashing scalps the ground if the mower is set too low and causes substantial soil disturbance, leaving bare patches of earth subject to erosion. In sandy soils the risk of erosion and destabilisation is very high.
- Remove grass clippings after mowing and edging if possible, as they can be washed or blown down stormwater drains or into waterways, spreading weeds, causing problems for gross pollutant traps and reducing water quality.
- Maintain appropriate riparian buffers on the edge of waterways to protect the water from neighbouring land uses and pollutants.
- Take care with fuel products especially around waterways and avoid spills when filling machinery. Ensure that managing a fuel spill is covered within the risk assessment. Clean up any spills immediately.
- Remove all litter and debris prior to slashing to prevent further spreading of these contaminants.
- Ensure mowers and brush-cutters project grass clippings away from waterways, drains and gutters and use a grass catcher in sensitive areas. If possible, send collected grass clippings to a composting facility or worm farm (where it will be recycled for use in gardens).
- Avoid mowing or slashing if the ground is very wet, as this can lead to erosion, and tyre tracks can become unwanted water conduits.
- Slashing has a history of spreading weeds. Ensure the sites to be slashed are surveyed for weeds and slashing is undertaken when there is the least risk of them being in seed. Ensure all machinery and vehicles are free from weeds and diseases prior to bringing them on site. If weeds or disease are present at the site, ensure that tools, boots, vehicles and machinery are cleaned at a suitable location before leaving the site. ***Refer to Chapter 8 Weed and disease management.***



7.7.3 Illegal removal of vegetation

The illegal removal of coastal vegetation to 'improve' views is unfortunately not uncommon. Another common reason for illegal vegetation removal is the harvesting of timber for firewood.

Vegetation destruction in coastal areas not only destroys vegetation communities and wildlife habitat, but may put threatened species at risk and, in many cases, makes foreshore areas more susceptible to coastal erosion.

Education and enforcement are critical to managing illegal vegetation removal, as many perpetrators simply do not realise that their actions have a serious impact.

Figure 7.12 Kingborough Council has erected a sign where local residents illegally removed coastal vegetation. © Bridget Jupe



Local residents and community group volunteers are often the first to notice illegal vegetation removal and are willing to report it to authorities. These reports should be followed up promptly by the land manager, involving Tasmania Police where appropriate.

Where vegetation has obviously been illegally removed to 'improve' a view, some local councils, both interstate and in Tasmania, have erected signage on public land to impede the perpetrator's view and serve as a deterrent to others who might consider similar action.

7.8 Vegetation management and climate change

This section provides an overview of potential climate change impacts on native coastal vegetation and is primarily sourced from the *Vulnerability of Tasmania's natural environment to climate change: An overview* (DPIPWE 2010).

Climate change is likely to lead to ecosystem changes and local species extinctions. Changes such as decreased rainfall and increased temperature, and increased frequency of extreme events such as drought, storm surges, and fire, will variably impact on biodiversity in different regions in Tasmania (DPIPWE 2010).

Native coastal vegetation is already under pressure from a range of threats including weeds and diseases, inappropriate fire regimes, and illegal or inappropriate clearing. It is difficult to predict the ways in which climate change will interact with these existing pressures.



Possible particular impacts on coastal vegetation:

- marram grass out-competing native grasses
- loss of coastal habitat; reduction in area of beach grasslands and beach sedgelands
- loss of shrubland communities such as coast beardheath (*Leucopogon parviflorus*) shrubland
- loss of coastal communities such as sandy beaches and dunes and loss of frontline beach foredune
- saltmarsh migrating inland, if suitable habitat is available
- inundation of coastal wetlands and saltmarshes where they are unable to migrate inland.

Some of these changes will put threatened species and restricted distribution species found only on coastal dunes at risk. In north-west Tasmania these include coast speedwell (*Veronica novae hollandiae*) and *Stackhousia spathulata*.

To mitigate the impact of climate change, it is essential to conserve natural vegetation communities and ecosystems and restore degraded ones, thereby protecting habitat diversity. In view of uncertainty about the specific impacts of climate change, maintaining diversity will act as an insurance policy (DPIPWE 2010).

7.9 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Threatened species

Threatened Communities listing

http://www.dpipwe.tas.gov.au Go to native plants and animals > threatened species > list of threatened species

Threatened native vegetation community information sheet: Threatened native vegetation communities (Forest Practices Authority 2007)

Information sheet for identifying threatened vegetation communities
http://www.fpa.tas.gov.au/fileadmin/user_upload/PDFs/Botany/threatened_veg_intro_info_sheet.pdf

Plant ID and mapping tools

Use field guides and keys to identify plants. Further weed identification resources are provided in ***section 8.7***.

A key to Tasmanian vascular plants

University of Tasmania

Based on pictures and perhaps the easiest to use of the keys

http://www.utas.edu.au/dicotkey/dicotkey/key.htm



Coastal values data

Vegetation, species habitat and geomorphic values data for a 100m wide coastal strip of the northern, southern and north western Tasmania NRM Regions. Available on the LIST.

www.thelist.tas.gov.au

Community Coastcare handbook (Thorp 2005)

Photo comparisons between weeds and similar looking native species

Guide to the flowers and plants of Tasmania (Simmons et al. 2008)

Herbarium: Tasmanian Museum and Art Gallery

Advice about identification and natural distribution of species http://www.tmag.tas.gov.au/Herbarium

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. Download a free registration form from the website to access

https://www.naturalvaluesatlas.tas.gov.au

Plant Identikit Series: Coastal plants of Tasmania and woodland wildflowers of Tasmania (Australian Plants Society Tasmania 1988-2003)

Tasmania's natural flora (Whiting et al. 2004)

The little book of common names for Tasmanian plants (Wapstra et al. 2005)

Revegetation and monitoring

In addition to the resources for plant and plant community identification, the following may be helpful for planning and monitoring revegetation works.

A manual for assessing vegetation condition in Tasmania, Version 1.0. (Michaels 2006)

A technical manual for vegetation monitoring (Barker 2001)

A users guide to monitoring vegetation (McCoull & Barnes 2002).

Coastcare community handbook (South Australia) (Brooke et al. 2001)

From Forest to Fjaeldmark: Descriptions of Tasmania's vegetation (Harris & Kitchener 2005) Available on the DPIPWE website

http://www.dpipwe.tas.gov.au

Introduction to Enviromark, A system for managing roadside and corridor vegetation

www.greeningaustralia.org.au

Monitoring remnant bushland (Greening Australia 2002)

Technical notes available from Greening Australia

http://www.granitenet.com.au/assets/files/Landcare/FB_MonitoringRemnant.pdf

TASVEG metadata notes and on-line maps available through the LIST website, under Vegetation

http://www.thelist.tas.gov.au/



Plant propagation

Community Coastcare handbook (Thorp 2005)

Detailed information about propagating common coastal species is in Chapter 13.

FloraBank Model

Code of practice for community-based collectors and suppliers and other guidelines on the website

www.florabank.org.au

Royal Tasmanian Botanical Gardens

Provides advice on seed propagation. In 2005 the Gardens established the Tasmanian Seed Conservation Centre (TSCC), a seed-bank focused on Tasmania's native flora. The TSCC conducts current international best practice in seed collecting, cleaning, storage and germination. Current priorities are focused on rare and threatened flora but the seed-bank aims to ultimately hold multiple provenance collections for all Tasmania's flora. Germination tests are regularly conducted on collections to ascertain and monitor seed viability. Germination testing data for the seed-bank collections are made publicly available on the RTBG website.

http://www.rtbg.tas.gov.au/index.aspx?base=227

In addition 26 pages of information on the germination and dormancy of wild seed can be found at Tasmanian Seed Conservation Centre web pages.

http://www.rtbg.tas.gov.au/index.aspx?base=224

Understorey Network

Plant database provides information on the identification, habitat and propagation of most Tasmanian native species. Seeding times, best times for taking cuttings and a step-by-step method for plant propagation is provided in: *The understorey network guide to growing native plants in Tasmania* (Thorp 2001) available from the Understorey Network.

www.understorey-network.org.au

Landscaping with native plants

In addition to plant identification and propagation tools, the following resources will be helpful when landscaping with native plants.

Coastal gardens: A planting guide (Adelaide and Mount Lofty Ranges Natural Resources Management Board, n.d.)

Very useful booklet on which native plants can replace more traditional exotics. Also provides design ideas for a number of landscaping styles. Although plants described are local to South Australia, many of the species, or similar ones, are also native to Tasmania

www.amlrnrm.sa.gov.au

Plants for a water friendly garden: Native plant field guide (Clarence City Council, n.d.)

A booklet providing photos and descriptions of native plants suitable for the Clarence municipality but could be applied more broadly across south-east Tasmania. A water-friendly garden is displayed at the Rosny Historic Centre in Clarence in southern Tasmania.

http://www.ccc.tas.gov.au/webdata/resources/files/PlantBkFINAL3.pdf



Urban forest biodiversity program

Information on establishing native plants and making gardens wildlife-friendly

www.backyards4wildlife.com.au

Weed and disease hygiene

More information about weed and disease management is available in ***Chapter 8 Weed and disease management.***

Interim *Phytophthora cinnamomi* management guidelines (Rudman 2005)

Keeping it clean: A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens (Allan & Gartenstein 2010)

Tasmanian washdown guidelines for weed and disease control (Rudman et al. 2004)

Grazing

Managing streamsides: Stock control, fencing and watering options (Wright & Jacobson 2000)

Detailed guidelines and fencing designs. Available from DPIPWE

www.dpipwe.tas.gov.au

Tasmanian Bushcare Toolkit, Kit 9, other bush types (Kirkpatrick 1999)





8 Weed and disease management

8.1 *Weed management*

8.2 *Methods of weed control*

8.3 *Monitoring weed management works*

8.4 *Phytophthora root rot*

8.5 *Weed and disease hygiene*

8.6 *Climate change and weeds and disease in Tasmania*

8.7 *Tools and resources*

This chapter deals mainly with the special considerations for weed and disease management on or near the shoreline. Many aspects of coastal weed management away from the immediate shoreline are the same as further inland, but conditions are quite different beside the sea, where salt laden winds, unstable sands, and sandy soils are common.

Weed and disease management is an essential component of any coastal works. Weeds often spread quickly after any disturbance to the soil and diseases are easily introduced via machinery, tools and mulches. Weeds are a major problem in many coastal areas, and their removal is often the most important part of any revegetation program.

Weeds degrade coastal ecosystems by competing with native plants, reducing biodiversity, disrupting ecological processes (e.g. weeds like boneseed and gorse may increase the frequency of fire) and disrupting coastal processes (e.g. by altering dune shape – marram grass). Diseases such as phytophthora root rot can be devastating to coastal heath vegetation.

Disturbance of the soil, including the removal of existing weeds, can expose the soil and promote new weed growth. It can also destabilise dunes, cause erosion and result in the introduction of soil pathogens. Planting and/or mulching may be required soon after weeding, to prevent more weeds from establishing.

Tab photo: Boneseed infestation in south-east Tasmania.
© Leah Page.

8.1 Weed management

This section deals with the tools and techniques required for effective weed management.

Good weed management – not just trying to eradicate weeds – is part of good land management. It aims to maintain native biodiversity and landscape resistance to invasion by weeds, by protecting sites that are weed-free, restoring natural vegetation cover and improving soil health. In the long run, this approach will prevent weed invasion and reduce the damage caused by weeds and the time and money spent on controlling weeds. ***Refer to Chapter 7 Vegetation management.***

Many coastal sites have a large number of weeds present from grasses and small herbs through to large shrubs or trees. To make effective use of the resources available, good weed management does not necessarily require that all weed species are controlled or that complete eradication of any one weed species will achieve biodiversity protection. It is important to determine the priorities and degree of weed control required for any particular site.

Making landscapes resistant to weed invasion requires an integrated approach. This means using a variety of control methods to target each weed, reducing the risk of introduction of weeds and improving the health of the site to reduce the risk of weeds re-establishing.

Timing of weed control is also important, to ensure that weed species are treated when they are most vulnerable.

Weed management is obviously a long-term exercise. To have a real impact, it needs thorough planning and regular targeted work on an annual basis, done at the right time.

Figure 8.1 Roadsides in coastal areas can be subject to a number of significant weed invasions. This roadside is supporting a community of African boxthorn Lycium ferocissimum, boneseed, Chrysanthemoides monilifera subsp. monilifera, Montpellier broom, Genista monspessulana, gazania, Gazania linearis, and some plants that have escaped from nearby gardens. © Leah Page





8.1.1 Legislation and policy

In addition to legislation detailed in ***Appendices 1 and 2***, the following legislation provides specifically for the management of weeds.

The objectives of the *Weed Management Act 1999* further the objectives of the resource management and planning system (RMPS) of Tasmania and, in particular, provide for the control and eradication of weeds, having regard to the need to:

- minimise the deleterious effects of weeds on the sustainability of Tasmania's productive capacity and natural ecosystems
- promote a strategic and sustainable approach to weed management
- encourage community involvement in weed management
- promote the sharing of responsibility for weed management between the different spheres of government, natural resource managers, the community and industry in Tasmania.

A core component of the legislation is the legal process of declaring a weed species under the Act. A Statutory Weed Management Plan (SWMP) must be prepared for all declared weeds under the Act.

The *Plant Quarantine Act 1997* provides for the quarantine of plants and the control of pests and diseases. The **Tasmanian Biosecurity Policy 2006** and the **Tasmanian Biosecurity Strategy 2006** provide guidance for the implementation of the Act.

8.1.2 Weeding in coastal environments

Weed management activities have potential impacts on other coastal values and it is important to plan for ways to minimise those impacts when weeding in coastal environments.

Unique and vulnerable values such as Aboriginal heritage sites and shorebirds must be considered when planning weed management on the coast. There are many Aboriginal heritage sites along the coast such as middens and artefact scatters that will be vulnerable to soil disturbance associated with mechanical weed removal. Weeding on Aboriginal sites might require a permit under the *Aboriginal Relics Act 1975*. ***Refer to Chapter 5 Cultural heritage management.***

Beach-nesting shorebirds and colonies of penguins and shearwaters can be adversely affected by the level of activity and disturbance associated with weed-removal techniques. In less natural coastal environments, weeds sometimes play useful roles in stabilising dunes and even protecting wildlife habitat. For instance, African boxthorn can provide shelter for penguin or bandicoot burrows and removing these weeds during breeding times, and without a careful replacement strategy, can put wildlife at risk. ***Refer to Chapter 10 Wildlife management.***

Weeding activities that disturb and expose the soil can promote weed growth, destabilise dunes and cause erosion. Planting and/or mulching may be required soon after weeding, to prevent more weeds from establishing.

New weeds and diseases can be introduced on vehicles, footwear or dumped garden rubbish, and by birds, wind and waves. To protect the spread of weeds and protect natural ecosystems, it is vital to practise good weed and disease hygiene during all coastal work activities.

8.1.3 Planning for weed management

Plan works carefully: a good tool is the development of a local weed management plan. Plans should comply with the Tasmanian *Weed Management Act*

1999, statutory weed management plans for declared weeds, national strategies for Weeds of National Significance (WoNS) and regional weed strategies.

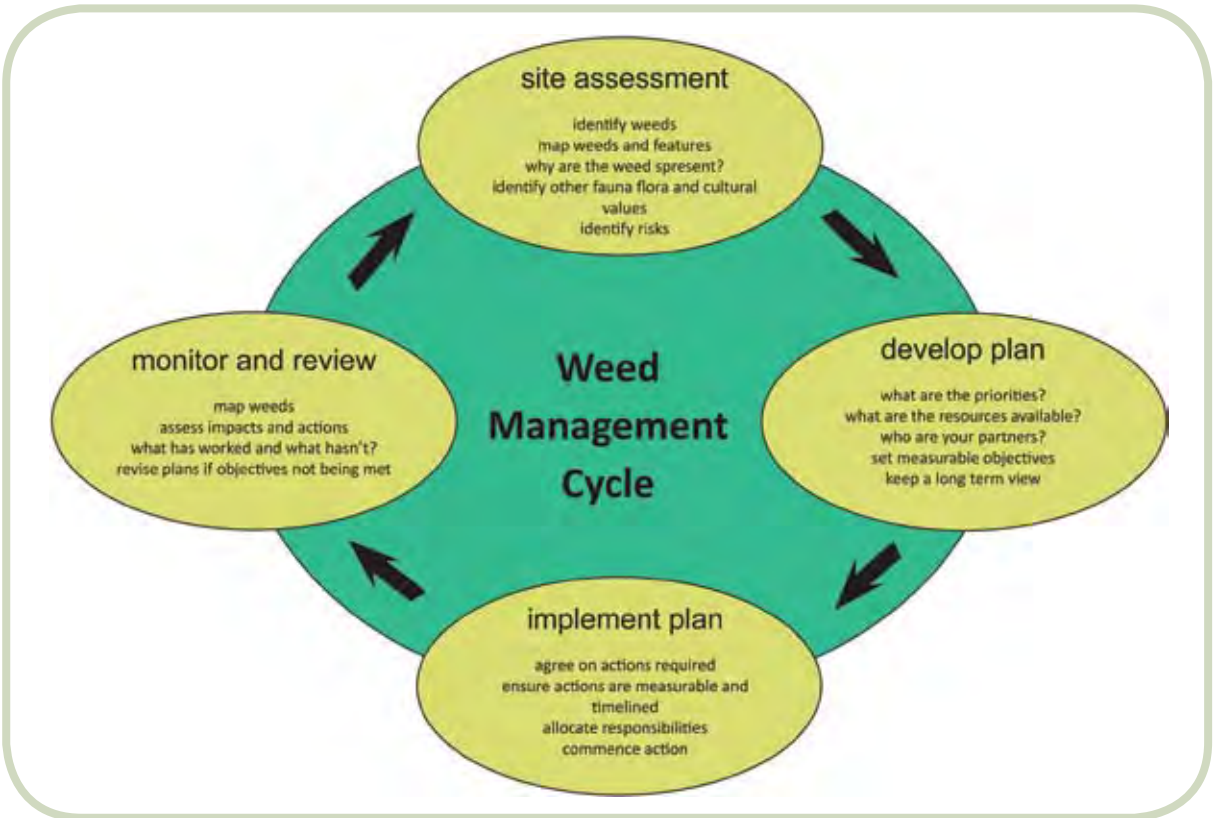
Seek specialist advice from Weed officers within regional Natural Resource Management organisations and Department of Primary Industries, Parks, Water and Environment (DPIPWE) Regional Weed Management Officers.

Consult with local groups such as Coastcare about their involvement in and aspirations for weed management in the area. Many of these groups have acquired external funding enabling them to develop local weed management plans. It is extremely beneficial and important to incorporate these into any new management plans.

The *Bushcare Toolkit, Kit 3, Weeds in your Bush* (Glazik & Rudman 2002) has comprehensive guidelines for weed management planning.

As part of the planning process, identify risks to other coastal values as a result of weed management works. Consult specialists such as wildlife and cultural heritage experts.

Figure 8.2 Weed management cycle. Adapted from Introductory weed management manual (Cooperative Research Centre for Australian Weed Management, Natural Heritage Trust Australia & Department of the Environment and Heritage, 2004)





General principles of weed management planning:

- Mapping the weeds will enable sound weed management planning and progress to be assessed (refer to *A field manual for surveying and mapping nationally significant weeds*, McNaught et al. 2006).
- Identify the weed problems.
- Identify the causes of weed problems.
- Determine the priority weed species. These are the greatest threats to native vegetation and wildlife.
- Determine the resources available.
- Identify the best times and the best methods to control priority weeds to minimise environmental damage.
- Identify whether rehabilitation will be required and any land management changes are needed to make the site more resilient to future weed invasion.
- Develop a works program to control weeds in the most timely and effective way with the resources available.
- Implement the works program
- Monitor and record results.
- Be persistent in applying follow-up treatment.

These steps need to be repeated over time. Weed management is an ongoing cycle of planning, doing, reviewing and re-planning, as set out in Figure 8.2.

What are the weeds? What effect are they having?

Which weeds are a high priority? Why should they be controlled?

Who is going to control the weeds? How and when will they control the weeds?

8.1.4 Weed identification

Some coastal weeds are similar in appearance to native species, so it is very important that plants have been identified correctly before management works commence.

Good weed identification resources are available. The *WeedDeck* is a pocket-sized deck of laminated cards with full colour photos for identifying weeds. The *Community Coastcare handbook* has helpful comparisons between common weeds and look-alike native species. ***Refer to 8.7 Tools and resources.***

It is important that land managers are trained to identify weed species so that they can play a role in identifying new weed incursions during the course of their land management activities.

8.1.5 Priorities for weed control

Effective weed management requires prioritisation. It is not possible to manage all weeds in a given area and it is important to maximise the benefit of any investment in weed works. Some weeds are more invasive than others and some vegetation communities and habitats are more susceptible to weed invasion or have other values that warrant special consideration or protection. Some land managers have limited resources and capacity for weed management.

In prioritising weed management works, first consider state and regional plans, which cover all declared weeds, Weeds of National Significance (WoNS) and weed alerts.

Assess the impact of each weed and the feasibility of controlling it. Weeds that invade bushland and threaten native plants by out-competing them are known as environmental weeds. The result can be the death of these native plants and often the animals,



birds, insects and other creatures that depend upon them. This loss can in turn cause further declines in local biodiversity.

Consider any localised or site-specific issues such as impacts on fauna, threatened species or communities, geoheritage and cultural heritage. Consideration of available and future resources will also govern priorities. Sensitive habitats with few weeds or new incursions of invasive weeds may be more important than large established infestations of WoNS.

In many cases weed surveys may uncover new weed problems and these should be reported to DPIPWE Regional Weed Management Officers for documentation. They can provide advice on the importance of managing new weeds and their likely impact. Reporting weeds improves the understanding of the behaviour of weeds.

Declared weeds

The Tasmanian *Weed Management Act 1999* requires that each declared weed is contained or eradicated. Approved Statutory Weed Management Plans (SWMPs) are on the DPIPWE website.

The SWMP for each declared weed specifies what land managers are required to do to manage that weed within each municipality. It provides information about the distribution and extent of the weed, restrictions and measures required to control, eradicate or restrict the spread of a weed.

Weed Plan: Tasmania's weed management strategy (DPIWE 2005) and Response Plan are also on the DPIPWE website.

Declared coastal weeds with SWMPs in place:

African boxthorn
blackberry*
boneseed*
gorse*
bridal creeper*
English broom
pampas grass
Montpellier broom
Spanish heath
serrated tussock*

(* indicates a Weed of National Significance)

Weeds of National Significance (WoNS)

Weeds of National Significance (WoNS) are listed in the *National Weeds Strategy: A strategic approach to weed problems of national significance* (ANZCC & ARMCANZ 1997). All WoNS are declared under the Tasmanian *Weed Management Act 1999*.

Seven of the 20 Weeds of National Significance occur in Tasmania: blackberry, willow, serrated tussock, bridal creeper, boneseed, Chilean needle grass and gorse. From time to time, Australian Government funding is targeted at the management of WoNS weeds, because of their national recognition.

National Alert List weeds

The Alert List for Environmental Weeds, available on the Australian Government weeds website, is a list of 28 non-native plants that threaten biodiversity and cause other environmental damage. Although only in the early stages of establishment, these weeds have the potential to seriously degrade Australia's ecosystems. In Tasmania these include *Calluna vulgaris* or heather, orange hawkweed and horsetail species.

Tasmanian beach weeds

The *Tasmanian beach weed strategy* (Rudman 2003) contains information for identifying and managing sea spurge (*Euphorbia paralias*), marram grass (*Ammophila arenaria*), sea wheat grass (*Thinopyrum junceiforme*), pyp grass (*Erharta villosa*) and beach daisy (*Arctotheca populifolia*). The strategy is on the DPIPWE weeds website.

Rice grass

The *Strategy for the management of rice grass* (Spartina anglica) *in Tasmania, Australia* (DPIWE 2002) contains information for identifying and managing this estuarine weed. The strategy is on the DPIPWE weeds website.

8.1.6 Deciding whether to eradicate or contain weeds

Eradication may not be realistic. Certain weeds are widespread, aggressive colonisers that are impossible to eradicate. It is generally too difficult to remove large infestations of some long-established species such as marram grass. But it is extremely important to report and control new infestations in areas that were previously free of the weed, including those listed in the *Tasmanian beach weed strategy for marram grass, sea spurge, sea wheat grass, pyp grass and beach daisy* (Rudman 2003).

Containment to prevent and control new infestations is more realistic than eradication if the weeds are widespread and well established. Focus on treating outlying infestations, on the fringes, rather than the main infestations. This will help to prevent the spread of weeds into new areas. Containment also involves restoring

Figure 8.3 Boneseed seedlings have germinated where adult plants have been removed and require follow-up removal. © Leah Page





weeded areas by assisting regeneration of native vegetation to limit opportunities for weeds to re-invade.

For those areas where it is not the objective to remove the weed, it may be appropriate to mitigate against the impact of the weed by periodically controlling infestations to prevent the population growing to the point where it is detrimental to the native biodiversity.

NOTE: Regardless of your decision, it is essential that weed programs are followed up with monitoring and control at least annually.

8.1.7 Timing of weed management works

Knowing the life cycle of each species is essential to determine the timing of different treatments. Refer to the *Introductory weed management manual* (CRC for Australian Weed Management 2004).

The best times for various methods of weed control are shown in Table 8.1.

Some methods, such as slashing weeds, may also remove seed heads of native vegetation – thereby reducing the success of natural regeneration. Before

Table 8.1 Weed control methods and timing for the southern temperate zone.

	Woody weeds	Shrubs	Herbaceous plants	Grasses	Vines & scramblers	Bulbs, tubers & rhizomes
Mulch/ smother			All year	All year		All year
Solarisation			Spring & summer	Spring & summer		Spring & summer
Pull*	Before seed set	Before seed set	Before seed set	Before seed set	Before seed set	Before seed set
Cut & paint	Spring	Spring			Spring & summer	
Foliar spray			Spring	Spring & summer	Spring & summer	Spring & summer
Inject	Spring				Spring	
Wipe					Spring	Before flowering

*Most weeds in Tasmania are flowering by September and set seed soon after. As a general rule, pulling weeds out in September–October is the safest option (avoid shorebird nesting beaches) but there are exceptions, such as Spanish heath, which is best done earlier (June–July). Note that flowering times vary from season to season, and often by months, not just weeks. Check the growth and flowering times of individual species to ensure weeds are targeted at the optimum times.



undertaking non-specific mechanical weed control, it is important to consider the life cycle of local native species and time works to benefit them.

Shorebirds nest on many Tasmanian beaches from September to March and disturbance to their breeding sites could be fatal for their eggs and chicks. *Refer to Chapter 10 Wildlife management.*

SPRATS (Sea Spurge Remote Area Teams) have incorporated shorebird monitoring into their weed work programs. They have worked closely with Birds Tasmania and the Parks and Wildlife Service to minimise their impacts on breeding and roosting birds. **Refer to case study 8.1.**

Best time for hand removal

There are optimal times for hand removal of some common coastal weeds. However, when planning the timing of weed-removal activities, it is important to consider other environmental, cultural and recreational values.

Shorebirds nesting between September and March will be disturbed by activities on beaches and dunes. Penguin and shearwater rookeries should also be avoided during breeding and moulting times. **Refer to Chapter 10 Wildlife management.**

Best times for hand-removal of some common coastal weeds:

Early spring: boneseed, boxthorn, brooms, Cape Leeuwin wattle, Spanish heath, sweet pittosporum (but watch for attached fruit), tree lucerne

Spring: coprosma, rice grass, sea spurge (CAUTION: spurge sap produces a toxic sap that is irritating to the skin and can be particularly painful if rubbed into the eyes)
This is shorebird breeding season.

Autumn: sea spurge, boneseed



Figure 8.4 Sea spurge volunteers removing weeds at Pennerowne Point in the remote south-west. © Nick Fitzgerald

Case Study 8.1: Weed Management on Tasmania's South & West Coasts

Sea Spurge Remote Area Teams

Winners of the 2009 Community Award
Tasmanian Awards for Environmental Excellence

Sea spurge and marram grass are devastating coastal ecosystems across southern Australia including Tasmania's World Heritage–listed south and west coasts. SPRATS (Sea Spurge Remote Area Teams) formed in 2007, following a trial weeding program and site surveys, to tackle coastal weeds in the south-west before it was too late. SPRATS received the 2009 Tasmanian Award for Environmental Excellence in the Community section for their achievements.

The SPRATS volunteers have a 10-year plan to remove these weeds from the coastline between Cape Sorell and Cockle Creek. In the past three summers they have surveyed the south-west coastline; 350km of its 600km has been mapped as susceptible to invasion. To date they have treated 315km (91%) of susceptible areas. SPRATS groups have secured funding support from the Australian Government to undertake their valuable work.

While sea spurge is the main weed problem, the volunteers are also targeting marram grass. Both weeds form huge colonies which displace native sand-dune vegetation and also blanket flat sandy areas used for nesting by beach birds, including rare and endangered species such as the little tern.

The south-west coast presents a number of challenges including inaccessibility, rugged terrain, wild weather and thick scrub. These challenges are part of the attraction for SPRATS volunteers, who are experienced bushwalkers.

Their remote area weeding techniques are highly practical and effective, with the potential to remove up to 99% of weeds after two or three treatments. SPRATS have developed best practice techniques that minimise the impact of their weeding activities on significant coastal values such as shorebirds and Aboriginal heritage.

By the end of the 2012–13 field season SPRATS are aiming to have controlled all infestations of these weeds, and to be concentrating on surveillance and follow-up of minor infestations. SPRATS work closely with the Parks and Wildlife Service, Birds Tasmania and regional NRM bodies and are also supported by Wildcare Inc.



8.2 Methods of weed control

It is important to choose methods that minimise disturbance of the soil near the shore, especially in sand dunes, which are easily destabilised.

The porosity of some soil types – especially sandy soils – and the amount of organic matter and clay they contain can affect the way herbicides work and move once they enter the ground. Herbicides generally move further in sand and sandy soils, but have a shorter residual effect (i.e. do not last as long in the soil). The typically windy weather on the coast is often unsuitable for spraying weeds – a sea breeze may blow up suddenly by mid-morning.

Choose weed control methods that suit the purpose, budget and site conditions, and avoid damaging native vegetation.

Often the most efficient and cost-effective way to control weeds is to combine a number of different methods, at different times. Each method needs to target the weeds when they are most vulnerable.

Many weed species, especially perennials, are successful because they have more than one way of reproducing. To control or eradicate these species from a site, a three-pronged approach may be necessary:

1. kill/remove the mature plants
2. kill/remove newly emerged seedlings
3. stop opportunities for further re-infestation.

Suitable weed control works may include any or all of the following:

- prevention/cultural control
- mechanical/physical removal
- biological control
- chemical control
- fire.

Guidelines for weed control methods are readily available from the DPIPWE weeds website and are only briefly covered here.

8.2.1 Prevention/cultural control

Methods include over-planting to shade weeds and cultivation to stop seed germinating. These are ineffective alone and are normally combined with other methods. Burning can be useful in some situations, but may have undesirable effects in others. Burning should only be considered in consultation with biodiversity, vegetation, wildlife and fire specialists.

8.2.2 Mechanical/physical removal

Methods include hand-pulling, slashing, mowing, scalping, burning, steam and solarisation. Mechanical removal is almost never a solution by itself, but it can reduce the mass of weeds to be treated and limit further seeding. Timing of these methods is critical – they must be done at or before flowering.

Hand-weeding can be easy and effective for a number of weeds, particularly young plants that have not developed an extensive root system. This method can be very effective when dealing with small infestations of woody weeds (e.g. boneseed, broom and sweet pittosporum). It is not suitable for plants that produce lots of small underground bulbs (e.g. bridal creeper). If tubers are carefully dug out and surrounding area sieved then this can be a good way to treat isolated bridal creeper plants.



Mowing and slashing are not suitable for plants that may regrow from roots or fragments (e.g. poplars) – and can make it much harder to control them by other methods. Mowing is also not appropriate for weeds that send out extensive underground root systems such as pyp grass.

Wherever possible, if slashing grass, do it before weeds flower and set seed, and after the flowering and seed-setting of native species.

Scalping causes substantial soil disturbance and is only appropriate in areas dominated by weeds where immediate rehabilitation is planned. This works quite well for plants such as monbretia and watsonia, but in sandy soils the risk of erosion and destabilisation is very high.

Burning can be useful as an initial treatment for certain species (e.g. gorse, blackberry and willow) in some situations. It must be followed up with spraying or other treatment. Burning should only be considered in consultation with biodiversity, vegetation, wildlife and fire specialists.

8.2.3 Biological control

Sometimes invertebrate predators or pathogens from the country where the weed originated can be introduced to reduce the vigour of the weed infestation.

Biological control can be useful for a few species that have been identified as suitable after stringent testing. To eradicate a weed from a site, consider direct controls instead. If using a biological control, the site needs to be monitored for effectiveness and this may place limitations on the use of direct control techniques such as spraying.

Before using chemicals, find out if any biological control agents are present. Contact a Regional Weed Management Officer in DPIPWE or the Tasmanian Institute of Agricultural Research (TIAR) Biological control program.

8.2.4 Chemical control

Herbicides can be applied by cut and paint, drill and fill, or stem injection methods, or by spraying. Herbicides have the advantage of not disturbing the soil, but they are poisons that should be used with great care, especially near waterways and coastal environments. Minimise their use.

Personal health and safety are paramount: anyone handling and using herbicides should wear correct personal protective equipment and is advised to attend a ChemCert training course on chemical use at the Tasmanian Skills Institute. Land managers should address these matters in a risk assessment prior to any chemical control works.

When spraying weeds, wear a protective suit, gloves, eye goggles and breathing apparatus. After applying herbicides, wash hands and any other skin that may have come into contact with the chemical. Store and dispose of the chemicals safely.

Avoid spraying chemicals in winds greater than 15 km/hr, or when conditions are hot, dry and dusty. Significant spray drift can occur even in very still conditions, when it is hot, dry and dusty, as droplets stay in the air for longer periods. Spray drift can harm native plants and pollute nearby waters, killing frogs and other aquatic life. If spraying near waterways, check that the chemical is appropriate for this use: read the label. To reduce spray drift and target small plants, a plastic guard (like an upside-down funnel shape) can be attached to the end of the nozzle.

Selecting the appropriate herbicide and dilution is critical. Get specialist advice about the best herbicide

to use and any dilutions required. Note that by law, only chemical herbicides registered for specific weeds and situations may be used. Information on choosing herbicides, and precautions when using herbicides, are available in the *Tasmanian Bushcare Toolkit, Kit 3, Weeds in your bush* (Glazik & Rudman 2002).

Follow the DPIPWE Codes of practice, guidelines and information sheets for using herbicides, available from the DPIPWE website.

Note that some herbicide use is off-label (meaning that it is necessary to apply the herbicide using methods not included on the label). This if often the case when treating environmental weeds as they are usually not listed on the label. A general off-label permit exists in Tasmania for a range of herbicides, weeds and situations for environmental use. If in doubt, contact a DPIPWE Regional Weed Management Officer.

Follow herbicide instructions carefully. It is very important to wear the recommended personal protective equipment and read the information on the label and any other documentation provided (which is often in a plastic sleeve attached to the container), e.g. the Material Safety Data Sheet. Never remove the label from the container, and always ensure all the documentation is on-site during weed control work.

The cut-and-paint method is the best technique for large or woody weeds. Check with DPIPWE Regional Weed Management Officers about correct dilutions of herbicide for this purpose. Add a dye to herbicides to identify treated plants and any unintended damage to native plants, and to make spillage easy to see.

Figure 8.5 Spray application of herbicides should only be undertaken by trained individuals with the appropriate personal protective equipment. © Tim Rudman





8.3 Monitoring weed management works

All weed management works require regular maintenance for years afterwards. It is essential to monitor the area, at least annually, for new weeds and spread of existing weeds into new areas. Community groups can play an important role in monitoring but should be supported by land managers and other community coordinators.

Inspection and maintenance should involve:

- photopoint photos
- mapping changes to weed distribution and extent
- checking for germinants (e.g. seedlings)
- checking for regrowth of previously treated plants
- searching for new weed invasions
- determining what ongoing works are required and when.

Marking weed-infested sites with information signs can be useful to inform all land managers, contractors and users of the presence of weeds and the management techniques required to minimise their spread. ***Refer to section 7.3.6 Marking sites for protection or management.***

Tasmanian Weed Alert Network

The Tasmanian Conservation Trust (TCT) has received funding from the Tasmanian Community Fund to re-establish the Tasmanian Weed Alert Network during 2009–2011. The project is being run in collaboration with the Department of Primary Industries, Parks, Water and Environment's Weed Management Section, Tasmanian Herbarium, Tasmanian Farmers and Graziers Association and the Tasmanian Weed Society. This project aims to establish the Tasmanian Weed Alert Network as a self-sustaining network of volunteers which assists with preventing the establishment of new weeds in Tasmania.

8.4 Phytophthora root rot

This section provides information on an important soil-borne disease in Tasmania. Phytophthora root rot (*Phytophthora cinnamomi*) is a key management issue in the relatively warm and moist lowland parts of Tasmania. It is a microscopic pathogen (disease-causing organism) that can be spread by moving soil and infected machinery and vehicles.

P. cinnamomi spores and infected root material can be transported in minute quantities of soil the more soil is moved, the more risk of infection increases. Machinery, especially earth-moving equipment, vehicles, infected planting stock and the movement of infected soil or gravel, produce the greatest risk of infestation of native vegetation.

P. cinnamomi (root rot or die-back) is listed as a key threatening process in the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*. A national *P. cinnamomi* threat abatement plan has been prepared and is supported by national guidelines.

The pathogen is recognised as being a very real and rapidly spreading threat to many of Tasmania's plant species and communities. It has the capacity to kill a wide variety of native plant species and is widely recognised as one of the most threatening of all disease epidemics to affect native plant communities anywhere on the globe (Schahinger et al. 2003).

Signs of phytophthora infection include patches of dead or dying peas and heaths, often extending down slopes and showing older areas of mortality towards the centre. Sedges and grasses remain unaffected.

In areas with phytophthora root rot, follow procedures outlined in the *Interim* Phytophthora cinnamomi *management guidelines* (Rudman 2005).

See also section 5.3 Plant Disease Management in the *Tasmanian reserve management code of practice* (PWS et al. 2003).

P. cinnamomi Management Areas have been designated to protect plant communities and species that are highly susceptible. The locations of these and maps of areas infested with or susceptible to phytophthora are at the DPIPWE weeds website.

Vulnerable vegetation types include coastal heathlands, heathy eucalypt woodlands and buttongrass moorland. Phytophthora root rot is unlikely to be an issue in wetland or foreshore beach vegetation.

The best way to prevent the spread of phytophthora is to clean all tools and machinery before entering and leaving work sites. ***Refer to section 8.5 Weed and disease hygiene.***

Figure 8.6 Evidence of die-back in grass trees due to phytophthora root rot disease. © Tim Rudman



8.5 Weed and disease hygiene

This section highlights the importance of good weed and disease hygiene, which is critical in coastal areas to avoid introducing weeds and diseases in imported materials and spreading weeds or diseases from an infested area to an uninfested area on vehicles, machinery, other equipment and clothing.

Mulches are often used to prevent the spread of weeds onto bare patches of soil. It is important to ensure that imported landscape materials such as mulches are free of weeds and diseases – ask for a statement from the vendor. Mulches tend to be made from a variety of products with varying origins and may contain weed propagules (e.g. seeds or root fragments). Use mulches made from single products (e.g. gum bark) or which are heat treated in some way (avoid materials treated with chemicals or irradiation, which may harm the natural vegetation).

Avoid slashing in weed infected areas when seed heads are mature, to reduce the risk of spreading the weed on-site and collecting seeds on machinery that could be transported to new sites.

Wash down tools, machinery and personal equipment when moving between work sites. This is particularly important when a site is known to be either infested or free of weeds and disease. Although wash-down procedures take time, they will soon save time and money by greatly reducing future weed and disease management needs.

Washdown is advisable:

- before entering a new site
- after operating in an area affected by a weed or disease
- after transporting weeds or soil known to be infected with weed seeds or a plant pathogen
- before moving machinery along roadsides or river banks
- before transporting soil and quarry materials.

Washdown standards are detailed in DPIPWE *Tasmanian washdown guidelines for weed and disease control* (Rudman et al. 2004).

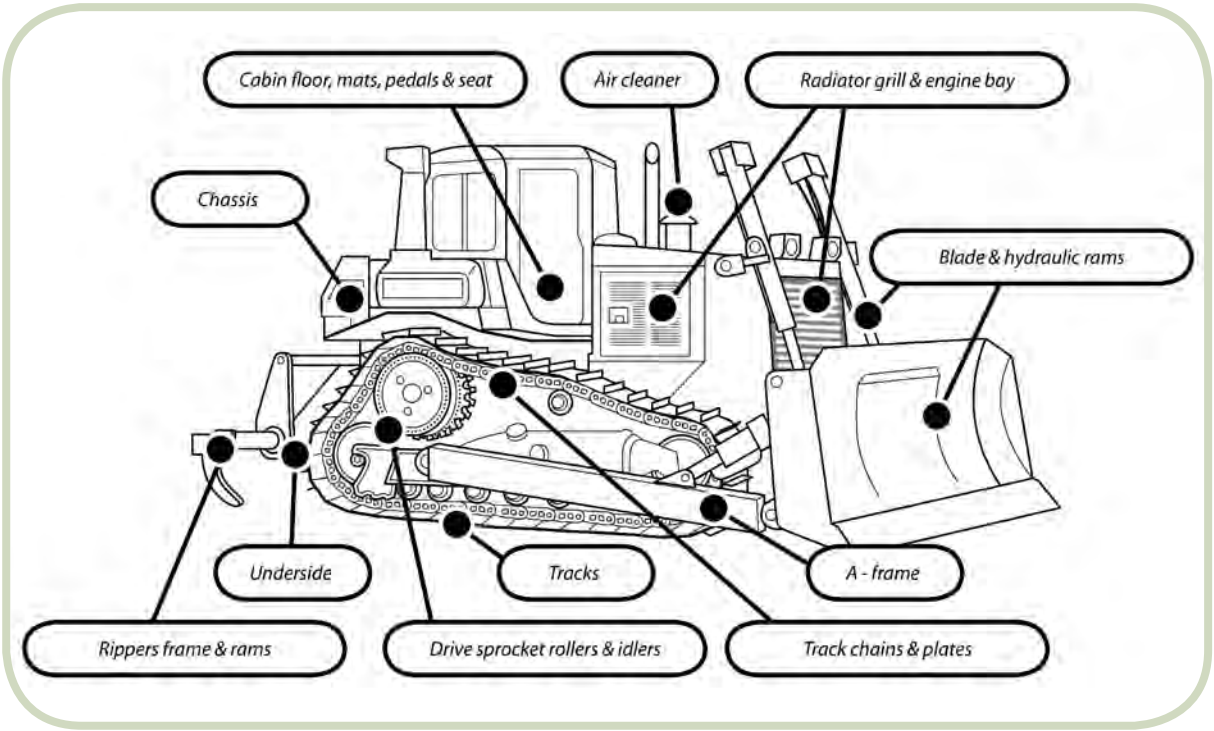
Personal equipment and small tools

Portable washbaths are recommended for washing footwear and small tools.

Washbaths can be made from a fish box (or other suitably sized plastic box) fitted with an open weave plastic doormat, a scrubbing brush, a pair of safety gloves, glasses, detergent or fungicide, and a container of clean water. For backpacking, a 2L bottle, scrubbing brush, safety gloves and glasses can be used for washing small tools and boots.

A biocide such as F10SC or Phytoclean™ should be added to washbaths to control the spread of pathogens and disease (e.g. *P. cinnamomi*) if required.

Figure 8.7 Important washdown points on vehicles and machinery to control the spread of weeds and diseases. © DPIPWE





Machinery

Permanent commercial washdown stations are installed in most large towns.

Portable washdown stations can be taken out into the field and involve a tank and pump fixed to a trailer. A shovel, crow bar and stiff brush are also required. Where a blowdown only is required, compressors or portable blower vacs may be used along with a small brush.

Ensure the siting of the portable washdown station will minimise the potential to spread weeds and diseases. Choose sites at the edge of the work site where the land slopes back into the infested area and will not enter a watercourse. Mud free sites are best but avoid sensitive vegetation.

General washdown techniques for machinery:

- remove cover plates etc that can be quickly and easily removed and replaced
- ensure no clods of dirt or loose soil are present after washdown (smeared soil stains are acceptable)
- ensure radiator grills and the interior of vehicles are free of accumulations of seed and other plant material.

Note that some machinery, such as harvesting equipment, cannot be washed with water because of potential damage to sensitive electronic equipment. Always consult and comply with the manufacturer's recommended cleaning method. Such equipment can be treated with an air compressor.

8.6 Climate change and weeds and disease in Tasmania

This section summarises some of the potential impacts of climate change on weed and disease in Tasmania and recommended management approaches.

There may be unexpected and complex changes with weeds and diseases as Tasmania's climate varies into the future. The complex interactions between climate, carbon dioxide (CO_2), plants, pathogens and competition amongst species are not well understood.

Some current weeds and diseases may be less favoured by the changing conditions and others may thrive. New problems could also emerge as some vegetation communities may have less capacity to dominate existing weeds. Vegetation communities may become more susceptible to disease or weed invasion as new niches become available if ecosystem function degrades. For more information see *Vulnerability of Tasmania's natural environment to climate change: An overview* (DPIPWE 2010).

As the scale of climate shifts and the effects of carbon dioxide on plants are better understood, the way agencies and land managers approach weed and disease management will need to change. For instance, *P. cinnamomi* may become active in susceptible wet forest or rainforest communities at low elevation. If so, authorities would need to be prepared for this, and rehabilitation plans would need to consider using the best-adapted stock rather than stock of local provenance.

Weeds may spread to new areas of the state and decisions about which weeds to control will need to consider new potential and emerging threats. As weed problems change, reporting new incursions



will be a critical early warning system for effective management.

For the time being, management should continue dealing with the current problems but, increasingly, climate risk management guidelines will become available to aid preparation for emerging new threats. However, the highest priority now is to maintain healthy diverse ecosystems, to foster resilience and maintain the biological links across the landscape. Weed and disease management should support this through the principle of working from the most intact to the least intact areas, and addressing the most damaging and potentially damaging invasive species.

8.7 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Weed identification

Alert List for Environmental Weeds

http://www.weeds.gov.au/publications/guidelines/alert/index.html

Bush invaders of south-east Australia (Muyt 2001)

Coastal weeds of Tasmania: Are you growing invaders? (Connolly 2003)

A booklet containing descriptions and management recommendations for 50 environmental weeds and a list of alternative Tasmanian native coastal plants for use in garden plantings.

Community Coastcare handbook. (Thorp 2005)

Photo comparisons between weeds and similar-looking native species

Environmental weeds: A field guide for SE Australia. (Blood 2001)

Natural Values Atlas

Maps and records of recorded vegetation values

http://www.dpipwe.tas.gov.au/



WeedDeck

Handy pocket sized ID cards of the major weeds of Australia

http://www.sainty.com.au/

Weeds of the south east: An identification guide for Australia (Richardson et al. 2006)

Weed management

A field manual for surveying and mapping nationally significant weeds (McNaught et al. 2006)

Australian weeds strategy – A national strategy for weed management in Australia (Natural Resource Management Council 2006)

Coastal weed strategy for the Cradle Coast natural resource management region (Coastal Weeds Working Group 2008)

DPIPWE Codes of practice and guidelines

Information for using herbicides on the website

www.dpipwe.tas.gov.au Go to Biosecurity > Agricultural & Veterinary Chemicals > Codes of Practice & Guidelines

- Code of practice for ground spraying
- Code of practice for spraying in public spaces
- Guidelines for disposing of washings and rinsates
- Rivercare guideline for the use of herbicides near waterways and wetlands
- Guidelines for interpreting labels

DPIPWE weed control guides

Control guides for specific weeds replace the former weed service sheets and are available online.

www.dpipwe.tas.gov.au Go to > Weeds, Pests & Diseases > Weeds > Weeds Index

DPIPWE weed information

Information on the website includes Approved Statutory Weed Management Plans, the *Strategy for the management of rice grass* (Spartina anglica) *in Tasmania, Australia* (DPIWE 2002) and *Weed plan: Tasmania's weed management strategy* (DPIWE 2005).

www.dpipwe.tas.gov.au Go to > Weeds, Pests & Diseases > Weeds

Introductory weed management manual (Cooperative Research Centre for Australian Weed Management et al 2004)

Southern Tasmanian weed strategy (Schrammeyer 2005)

Contains descriptions and management recommendations for 80 environmental weeds.



8.7

Tasmanian beach weed strategy (Rudman 2003)

www.dpipwe.tas.gov.au Go to Weeds, Pests & Diseases > Weeds > Weed Legislation and Management Plans > Tasmanian Beach Weeds Strategy

Tasmanian Bushcare Toolkit, Kit 3, Weeds in your bush. (Glazik & Rudman 2002)

Tasmanian Institute of Agricultural Research (TIAR) Biological Control Program

A joint venture between the University of Tasmania and DPIPWE

http://www.tiar.tas.edu.au/extensive/biological-control-of-weeds

Tasmanian reserve management code of practice (Parks and Wildlife Service et al. 2003)

Tasmanian Skills Institute. Chemical Handling Training

Contact Loretta Satterly on (03) 6434 5846.

Weed and disease hygiene

Conservation of Tasmanian plant species & communities threatened by *Phytophthora cinnamomi:* Strategic regional plan for Tasmania (Schahinger et al. 2003)

Keeping it clean: A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens (Allan & Gartenstein 2010)

Interim *Phytophthora cinnamomi* Management Guidelines (Rudman 2005)

Management of *Phytophthora cinnamomi* for biodiversity conservation in Australia: Part 2 . National best practice guidelines. (O'Gara et al. 2005)

http://www.environment.gov.au/biodiversity/invasive/publications/pubs/part2.pdf

Management areas *P. cinnamomi* and maps of infected areas

www.dpipwe.tas.gov.au Go to Weeds, Pests & Diseases > Plant Diseases > Phytophthora > Distribution of *P. cinnamomi*

Tasmanian washdown guidelines for weed and disease control. (Rudman et al. 2004)

Detailed procedures for preventing the spread of weeds and diseases from tools and machinery

Threat Abatement Plan for dieback caused by the root-rot fungus *Phytophthora cinnamomi* (Environment Australia, 2002)

A national threat abatement plan

http://www.environment.gov.au/biodiversity/threatened/publications/tap/pubs/phytophthora.pdf



9 Fire management

9.1 Bushfires

9.2 Fire hazard reduction

9.3 Ecological burns

9.4 Climate change and fire

9.5 Tools and resources

This chapter deals with fire hazard reduction and fire management as tools for maintaining coastal vegetation communities, how to reduce impacts on coastal areas when fighting fires, and potential climate change issues.

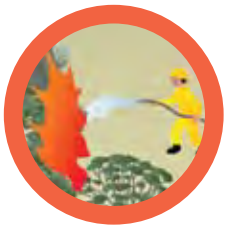
Fire is a fundamental aspect of the Australian environment and many vegetation types require periodic fire to maintain ecological values. However, not all fires are desirable. They can threaten human life and property, cause ecological damage (if too frequent or too intense) and cause temporary reduction of air quality or disruptions to the public.

Coastal vegetation communities in Tasmania are fire prone and are generally well adapted to fire. However, fire is not desirable in all vegetation communities and fire regime requirements (the combination of season, intensity and frequency of burning) vary from one vegetation type to another. For example, in some vegetation types, fires occurring too frequently can bring about long-term changes in vegetation community structure, introduction of weeds and destabilisation of dunes.

Fire management is more than just controlled burning, it is how land managers and fire authorities respond to wildfires: manage fuel, ecology and community expectations; and facilitate recovery once a fire has passed.

There are three key fire management agencies in Tasmania, The Tasmania Fire Service (TFS), the Parks and Wildlife Service (PWS) and Forestry Tasmania (FT). These agencies work together under the Inter-Agency Fire Management Protocol and are responsible for responding to wildfires and undertaking year-round fire management.

Tab photo: Managing fire on King Island.
© Parks and Wildlife Service.



Local councils and private landholders are also responsible for managing fire hazards on their land.

The primary objective for fire management is to protect human life and property. Other important objectives include maintenance of natural diversity and protection of conservation values, but these can only be pursued in so far as they are consistent with the primary objective.

Climate change projections indicate that south-eastern Australia is likely to become hotter and drier. Tasmania may not feel the impact of this as strongly as the other south-eastern states but more frequent extreme-weather days are likely to occur, thus increasing the risk of wildfire.

This chapter deals with the special considerations required for fire management in coastal areas, particularly near the shoreline. It must only be used in conjunction with the suite of guidelines available from the TFS and in consultation with fire authorities and experts.

9.1 Bushfires

This section deals with minimising impacts of bushfire-fighting on the coastal environment. For comprehensive information on bushfires and wildfires, consult the TFS.

Uncontrolled bushfires can threaten lives, houses and other property, and put native vegetation and animals at risk. Landowners and land managers have a responsibility to reduce the threat of bushfire through careful planning and fire hazard reduction, and to minimise the environmental impacts of firefighting.

Fire can move very rapidly in dry coastal vegetation and residents need to be prepared for this. Leaving their home can be risky unless roads are clear. This is especially true in long, narrow shoreline subdivisions with only one access road or a limited number of very narrow roads.

Beaches are not necessarily safe from fire, as coastal dune vegetation is highly flammable (e.g. marram grass and coast wattle). Even the dry seaweed on a beach can burn.

Being prepared for bushfire in coastal areas involves planning and obtaining specialist advice well before bushfires are expected. The local fire brigade can provide on-ground advice about fire permits, burning off and local vegetation.

Other land management activities may increase the risk of destructive fires, such as leaving piles of combustible materials on sites, allowing weeds to prevail, allowing fuel loads to build up and not providing or allowing for adequate access for firefighting equipment. ***Refer to section 9.2 for information on fire hazard reduction.***

9.1.1 Guidelines to reduce impact on coastal areas when fighting fires

When fighting fires public safety and protection of infrastructure is paramount, but the following guidelines will help to minimise impact on fragile coastal areas.

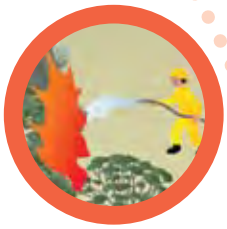
- Minimise disturbance of vegetation and dune profiles – sand or very sandy soils in dunes and beaches are easily destabilised.
- Use existing roads and fire breaks as control lines wherever possible, to minimise construction of additional control lines.
- Rehabilitate any disturbance to dune and shoreline profiles, and damage to vegetation. If machinery must encroach onto these fragile areas, ensure that restoration of the dune profile and

rehabilitation of the vegetation are undertaken as soon as possible once the fire has passed, and as part of the rehabilitation works program. ***Refer to Chapter 6 Coastal landscape management and Chapter 7 Vegetation management.***

- If possible, consult specialists and obtain information about natural and cultural values in the area.
- Avoid damage to Aboriginal cultural heritage values such as middens.
- Avoid damage to fragile penguin or shearwater rookeries.
- Keep vehicles off beaches known to host shorebird populations (breeding season, from September to March, coincides with bushfire season).
- Avoid introducing weeds and diseases on machinery and equipment. Ensure all equipment is maintained clean and mud-free, including personal equipment such as boots.
- Keep vehicles off saltmarsh areas. These highly fragile environments often support rare and threatened vegetation and are important for waterway health. Vehicles and machinery can have a severe impact on saltmarsh, which is difficult to rehabilitate.
- Minimise risk of fuel and chemical spills: secure chemicals securely during transport and service machinery away from waterways, wetlands and saltmarsh.
- Remove any rubbish as soon as practicable.
- Avoid leaving debris in penguin and shearwater rookeries, as it may obstruct birds' access to their nests.
- Work with local community groups such as Coastcare when planning rehabilitation of burnt-out areas. They can be a great source of knowledge and have a strong sense of ownership of their local patch.

Figure 9.1 The immediate aftermath of a fire on King Island. © Parks and Wildlife Service





9.2 Fire hazard reduction

This section deals with maintaining vegetation in coastal areas to reduce the threat of bushfires. Fire management near the shore requires special care, especially in sand or very sandy soils, which are easily destabilised – it is important to minimise disturbance of the soil. In addition, changeable weather and sea breezes need to be taken into account.

Increased fire frequency due to arson and accidental fires can be detrimental for coastal areas. Some coastal plants, such as the Oyster Bay pine, are easily killed by fire.

Managing fuel loads through slashing, prescribed burns and constructing access tracks are often essential components of fire management. These works should be governed by a fire management plan that includes a risk assessment, prepared in consultation with specialists, to balance the impacts on all values in the area.

9.2.1 Legislation and approvals for fire hazard reduction

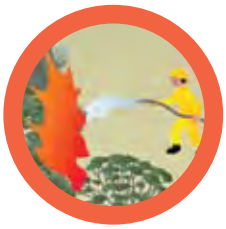
In addition to the legislation in ***Appendices 1 and 2***, fire management activities must abide by the *Fire Service Act 1979* which states that all landowners/occupiers have a responsibility to maintain their properties to reduce fire hazard.

Permission from the landowner is required for any fuel hazard reduction work; in the case of prescribed burns the TFS should also be consulted. Approvals from Aboriginal Heritage Tasmania and other government agencies may also be required if the work has the potential to impact on other environmental and cultural values.

Depending on the location and vegetation type, there are a number of fire danger prescriptions that must be considered prior to burning. These are set out in the publication *Planned burning in Tasmania –*

Figure 9.2 Back burning on King Island. © Parks and Wildlife Service





operational guidelines and review of current knowledge (Marsden-Smedley 2009).

9.2.2 Methods and potential impacts of fire hazard reduction

Methods of fire hazard reduction include prescribed (planned) burns, slashing, mowing, grazing and mechanical removal of fuel. Prescribed burns should only be undertaken in consultation with fire management authorities.

Fire management works can cause environmental damage by:

- removing vegetation
- increasing erosion
- spreading weeds and diseases on equipment and vehicles
- harming native plants and animals
- harming Aboriginal heritage and historic heritage
- removing wildlife habitat (e.g. prickly bushes protecting penguin burrows).

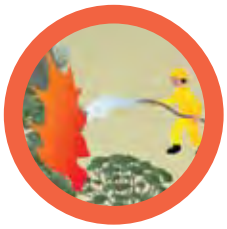
A well-researched and balanced risk assessment will minimise any impacts of fire management on natural and cultural values on the coast. Generally, the impacts of carefully managed fire management works are far more beneficial than the consequences of high-intensity wildfire in areas where no works have been undertaken.

The use of fire as a vegetation management tool in coastal areas should only be undertaken by trained professionals in consultation with a fire ecologist. The use of fire in coastal areas by private landowners is not recommended.

9.2.3 Guidelines to minimise impact of fire hazard reduction on coastal areas

Environmental damage can be minimised when undertaking fire hazard reduction work, such as slashing vegetation and creating access and containment lines, by careful consideration of the values in the area and careful consultation and planning.

- Plan fire hazard reduction works and undertake a risk assessment, including consultation with specialists and fire experts. In particular, consult the Threatened Species Unit, and the Biodiversity Conservation Branch, DPIPWE.
- Always obtain specialist advice from a fire ecologist before undertaking prescribed burns.
- Undertake a fuel hazard assessment prior to any prescribed burns, to target the specific fuel load/species and to enable measurement of success.
- Consult the local community care group to ensure that any hazard reduction work will not destroy their restoration and conservation efforts.
- Protect Aboriginal heritage values. Many coastal areas contain shell middens that are important Aboriginal heritage places. ***Refer to Chapter 5 Cultural heritage management.*** Fire should not be used in Aboriginal cultural heritage sites without consultation and permission. Contact Aboriginal Heritage Tasmania.
- Prevent the spread of weeds and diseases by machinery used to reduce fuel loads. Slashers and mowers are particularly notorious for trapping seeds and spreading them to new locations. It is essential to practise good weed hygiene to reduce the spread of weeds.



- Minimise disturbance of soil and ensure slashing, mowing and vegetation removal does not leave bare patches that can be invaded by weeds.
- Minimise disturbance of fragile dune systems, as they can be destabilised.
- Avoid damage to fragile penguin or shearwater rookeries.

Reduce the spread of weeds

- Plan fire hazard reduction works so that weed-free areas are dealt with first.
- Clean machinery, tools and even boots between sites.
- Only use contractors with a high standard of weed hygiene.
- Time slashing to discourage seed-setting of weed species and encourage seed-setting of native species. Sometimes this is achieved simply by moving activities by only a couple of weeks.

Table 9.1 Fire intervals for different coastal vegetation types for fire hazard reduction burns.

Vegetation type	TASVEG code	Recommended prescribed fire regime
Coastal heathland	SCH	8-30 years
Saltmarsh	AUS	No planned burning
Acacia longlifolia coastal scrub	SAC	Unknown
Coastal scrub	SSC	10-30 years
Seabird rookery complex	SRC	Exclude fire
Banksia serrata woodland	NBS	8-30 years
Coastal grass and herbfield	GHC	5-20 years
Marram grassland	FMG	Exclude fire
Eucalyptus amygdalina coastal forest and woodland	DAC	6-20 years
Eucalyptus viminalis – Eucalyptus globulus coastal forest and woodland	DVC	6-30 years
Callitris rhomboidea forest (Oyster Bay pine)	NCR	No planned burning
Acacia dealbata forest	NAD	Unknown
Allocasuarina verticillata forest	NAV	Not necessary

The fire regimes that best maintain a particular vegetation type vary with the condition of the vegetation. Please note that these are only recommended regimes that require ongoing monitoring. Adapted from *Tasmanian Bushcare Toolkit, Kit 2, Managing your bush* (Kirkpatrick et al. 1999).



9.2.4 Monitoring hazard reduction work

All hazard reduction works require regular ongoing monitoring and maintenance to make sure they are effective.

Inspection and maintenance should check:

- whether fuel hazards are still present
- whether rehabilitation is required (e.g. for soil erosion or vegetation, or weed invasions)
- the impacts on or response of natural and cultural values to the burn (ongoing monitoring)
- what further works are required and when.

Land managers should

- Identify and assess fire hazards and risks.
- Issue hazard abatement notices to landowners.
- Prepare fire management plans for larger vegetated coastal reserves and areas.
- Play a role in community education of bushfire response and hazard reduction in conjunction with the Tasmania Fire Service.
- Assess and monitor all coastal revegetation projects to ensure there is no unacceptable increase in the bushfire risk to public and private assets and that they do not compromise the effectiveness of firebreaks, fire trails and other fire abatement measures.

Local councils can:

- Use the local planning scheme to ensure developments have adequate bushfire protection and are excluded from areas where this cannot be provided.
- Ensure that developments enable creation of defendable space with minimal vegetation removal.
- Not permit new developments if fire protection requires clearing of adjoining coastal reserves.

9.3 Ecological burns

This section deals with fire as a useful management tool for maintaining the diversity of coastal vegetation communities where biodiversity is at risk of declining. For instance fire can help to preserve plant species diversity in coastal heathlands and some plants, such as many acacias and eucalypts, need fire for seeds to germinate.

An ecological burn is a specialised prescribed burn that targets a particular vegetation community or species in a particular area to achieve specified ecological objectives.

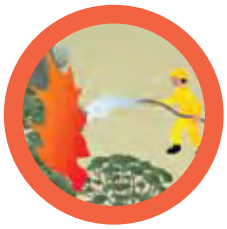
Ecological burns are a complex, specialised management tool that should only be used under the guidance of a fire ecologist and in consultation with the state fire authorities. Ecological burns should be part of a comprehensive community/species recovery plan, including a biodiversity monitoring system and the identification of an appropriate fire regime, based on the requirements for that particular community/species.

9.3.1 Planning for ecological burns

Planning for ecological burns involves identifying and monitoring a range of parameters, from fuel characteristics and weather, moisture and landscape qualities to ecological objectives, and requires consultation with a fire ecologist and other specialists.

Ecological burning has two aims:

- to increase and/or promote fire-dependent species or associations (e.g. the foraging habitat of orange-bellied parrots requires periodic burning)
- to reduce and/or remove unwanted species or associations (e.g. weeds).



9.3

These aims typically include:

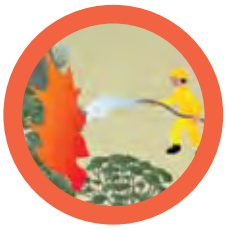
- species regeneration (the frequency used will vary between different species)
- habitat manipulation to increase native animal food availability (e.g. New Holland mouse)
- development of mosaics of burnt and unburnt areas.

Ecological burning is used in coastal heathland in north east Tasmania to maintain habitat for the New Holland mouse.

The threatened New Holland mouse, *Pseudomys novaehollandiae*, lives in coastal heathland in north-east Tasmania and benefits from regular firing of its habitat. Numbers increase soon after fire, as this releases the seeds that are the mouse's main food source. However, if another fire occurs before the new plants can produce seed, then the mouse will be left with little food and the population will be at risk.

Figure 9.3 New Holland mouse. © Billie Lazenby





9.3.2 Fire as a weed management tool

Fire can be used as a weed management tool but it requires careful organisation and must be integrated with other techniques to ensure weed regeneration is not stimulated by fire.

To protect other natural values, fire should only be used for weed management under the direction of a fire ecologist and in consultation with fire authorities.

In Tasmania, the main species for which fire is used for weed management are gorse (*Ulex europaeus*) and, to a lesser extent, broom (*Cytisus* spp. and *Genista* sp.), Spanish heath (*Erica lusitanica*) and blackberry (*Rubus fruticosus*) (Marsden-Smedley 2009).

Weeds should be treated by mechanical or chemical means prior to burning. The increased fire intensity caused by piles of slashed weed can be beneficial in killing shallowly buried seeds and can enhance seedling germination of more deeply buried seeds, to enable follow-up treatment (Marsden-Smedley, 2009).

Fire will result in extensive areas of bare ground, requiring revegetation to reduce the subsequent reinvasion by weeds. The costs associated with this type of intensive weed management are such that it will probably only be justified in areas adjacent to, or within high value ecological or natural assets (Marsden-Smedley, 2009).

9.3.3 Monitoring of ecological burns in coastal areas

After a fire, monitoring is important to see whether the ecological burning objectives were achieved, and to check for any damage to ecosystems. A comprehensive monitoring plan should be developed in consultation with specialists. In addition to the monitoring requirements prescribed in the plan, inspection and maintenance should also check:

- progress of natural regeneration
- damage such as weed invasions or soil erosion
- dune erosion and destabilisation - look for ripples on the sand surface, which are reliable indicators of erosion.

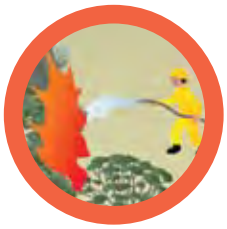
9.4 Climate change and fire

Anecdotally, there have been increased dry lightning storms igniting more wildfires; however, these are generally not in coastal management zones. The biggest fire risk in coastal areas continues to be human activity – both arson and accidental fires.

There is a broad increased risk of larger areas being burnt by wildfire as the number of extreme weather days increases. Predicted increasing numbers of drought years will also affect the ability of species to recover after fire.

There are concerns that drier summers are more likely for western Tasmania, which will increase the length of the fire season and the number of vegetation types dry enough to burn – including fire-sensitive vegetation.

There is potential for shorter intervals between fires, with more summer burning, especially in fire-adapted



vegetation communities such as coastal heath. Some species may not have time to replenish their seedbank, or even set seed before the next fire (if intervals are less than five years). This will result in changes to habitat structure and flow-on impacts for the whole ecosystem.

Changes in vegetation response to fire may mean that fire management strategies and protocols that were designed for existing fire regimes will become less applicable.

Community perception of increased fire risk could readily lead to higher demand for hazard-reduction activities on public land. Poorly planned mechanical fire breaks may cause erosion and weed management issues. Increases in fuel hazard reduction and fire abatement activities, such as frequent prescribed burns, could lead to worse ecological impacts than those created by the natural changes associated with climate change (Dunlop & Brown 2008).

9.5 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Bushfires

Bureau of Meteorology

Up-to-date weather forecasts and some climate change predictions

http://www.bom.gov.au/tas/

Emergency Services

Phone 000

Tasmania Fire Service (TFS)

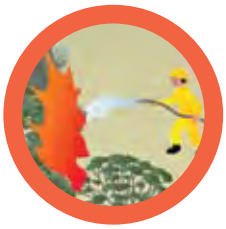
Local advice and permits

Includes bushfire information and publications about hazard reduction and planned burning.

Phone 1800 000 699

www.fire.tas.gov.au

Guidelines for development in bushfire prone areas of Tasmania. Living with fire in Tasmania (Bushfire Planning Group, Tasmania Fire Service, 2005)



Fire hazard reduction

Aboriginal Heritage Tasmania

Desktop searches for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Overall fuel hazard guide for South Australia (Department for Environment and Heritage, SA 2008)

Fuel hazard assessment standards

Planned burning in Tasmania: Operational guidelines and review of current knowledge. (Marsden-Smedley 2009)

This document must be consulted if planning a controlled burn.

Tasmanian reserve management code of practice (Parks and Wildlife Service et al. 2003)

The broad principles for fire management set out in the Tasmanian reserve management code of practice are appropriate guidelines for all vegetation types including coastal vegetation.

Ecological burns

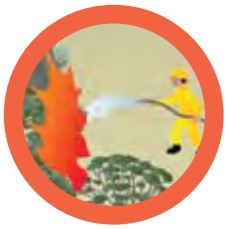
In addition to the resources listed above the following are useful if considering ecological burns.

Flammable Australia: The fire regimes and biodiversity of a continent (Bradstock et al. 2002)

Tasmanian Bushcare Toolkit, Kit 2, Managing your bush (Kirkpatrick et al. 1999)

Bush information and management

http://www.dpipwe.tas.gov.au Go to Home > Managing Our Natural Resources > Bush Information and Management > Tasmanian Bushcare Toolkit





10 Wildlife and pest management

10.1 Conservation of coastal wildlife and marine animals

10.2 Seabirds

10.3 Shorebirds

10.4 Injured and orphaned wildlife

10.5 Feral animals and introduced pests

10.6 Climate change, wildlife management and pests

10.7 Tools and resources

This chapter deals with the special considerations required for wildlife management on or near the shoreline and in marine environments, with special reference to threatened species, particularly sensitive wildlife values and the significant threats posed by feral animals and marine pests.

Tasmania's diverse coastal, estuarine and marine ecosystems support a rich variety of coastal and marine life including shorebirds and seabirds, seals, whales and globally significant marine assemblages. This includes a number of threatened species, such as the spotted handfish (endemic to Tasmania), fairy tern and southern right whale. Many of these animals are highly adapted to and dependent on the coastal environment, whilst some species are found in other habitats too.

Native wildlife is important in environmental terms and is highly valued as part of the richness of Tasmania's coastline. The protection of wildlife and marine species is an essential component of any coastal works activity. Sometimes the purpose of coastal works is to assist in the protection of wildlife species from threats and human disturbance.

Many aspects of wildlife management away from the immediate shoreline are the same as further inland. More care, however, is necessary in the immediate coastal zone and intertidal area, as many species are highly adapted and cannot survive anywhere else. Increasing human use of coastal areas in most parts of Tasmania, and climate change impacts such as sea level rise and changes in ocean currents, make it more important than ever to protect coastal wildlife and habitat.

Tab photo: Pelicans at Musselroe Bay, northern Tasmania. © Kathy Noble.

10.1 Conservation of coastal wildlife and marine animals

This section provides information on the spectrum of wildlife values in the coastal and marine environment, with particular attention to threatened species. Tasmania has vast areas of natural coastline that provide habitat for many diverse and specialised coastal animals.

Many birds frequent our coastlines. Little penguins nest in sand dunes, on rocky shores, under dense vegetation and on offshore islands; migratory shearwaters nest in soft soils on the steeper headlands. Hooded plovers and other shorebirds breed along many of the more remote beaches, while terns, shy albatross, gannets and many other seabirds breed on offshore rocks and islands.

New Zealand and Australian fur seals haul out on offshore islands. Humpback and southern right whales migrate along Tasmania's east coast. Pilot whales, dolphins, sperm whales and killer whales are all visitors to our coastal waters and, sadly, some species sometimes strand on the Tasmanian coast.

Figure 10.1 Humpback whales are frequent visitors to Tasmanian waters on their annual migration along the east coast.
© Biodiversity Conservation Branch DPIPWE





Many terrestrial mammals also inhabit coastal areas: echidnas, wallabies, bettongs, bandicoots and eastern quolls are common, even in more urban environments. Reptiles, skinks and snakes live throughout Tasmania's coastal areas, with some species unique to offshore islands, and frogs inhabit coastal wetlands.

Tasmania's marine environments contain some of the most distinctive flora and fauna (marine assemblages) in the world. Many of these species are endemic to Tasmanian waters (i.e. not found anywhere else in the world). In fact, Tasmanian temperate waters have globally significant levels of endemism (DPIWE 2000b). A number of marine protected areas around Tasmania have been established to help protect these unique temperate species. These reserves are managed under the *Living Marine Resources Management Act 1995*. Some reserves are subject to 'no take' fishing restrictions, defined by the Fisheries Rules 1999.

In many coastal areas, increased pressure from development and human use of coastal resources results in permanent destruction and loss of habitat, which threatens coastal and marine wildlife. Other pressures include wandering cats and dogs, feral animals, marine pests, litter, pollution, sea level rise and other climate change impacts that may see changes in marine assemblages, vegetation communities and wildlife habitat.

10.1.1 Legislation

All Tasmanian species are protected under the *Nature Conservation Act 2002*; marine species are protected under the *Living Marine Resources Management Act 1995*.

Legislation that specifically relates to threatened species protection is listed here. ***See also Chapter 1 Working on the Coast and Appendices 1 and 2 for more detailed legislative information.***

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* lists threatened species and ecological communities; migratory species and threatening processes; and prepares recovery plans, wildlife conservation plans and threat abatement plans (TAPs).

The *Threatened Species Protection Act 1995* provides for the protection and management of threatened native flora and fauna and promotes the conservation of native flora and fauna.

10.1.2 Tasmanian threatened species on the coast

'Threatened species' refers to those species listed under the *Threatened Species Protection Act 1995*. Some listed species have recovery plans and there are also threat abatement plans that cover threats common to a number of species.

Tasmania's coastline is home to more than 35 threatened fauna species including the white-bellied sea eagle (*Haliaeetus leucogaster*), shorebirds and seabirds such as the little tern (*Sterna albifrons sinensis*) and fairy tern (*Sterna nereis*), and mammals such as the New Holland mouse (*Pseudomys novaehollandiae*), New Zealand fur seal (*Arctocephalus forsteri*) and many whale species, including the southern right whale (*Eubalaena australis*). Threatened invertebrates include the live-bearing seastar (*Parvulastra vivipara*) and the chequered blue butterfly (*Theclinesthes serpentata lavara*).

Many species declared as threatened in Tasmania are also protected under Commonwealth legislation. Table 10.1 lists a number of threatened fauna species that live on the coast and their key threats (but this is not a comprehensive list).

Table 10.1 Examples of threatened coastal fauna in Tasmania, their current status and key threats. (Not a comprehensive list.)

Common Name	Scientific name	Habitat	Status Tasmania	Status Commonwealth	Threats
Mammals					
New Zealand fur seal	*Arctocephalus forsteri*	Haul-outs around the coast	rare		Fishing entanglements, fisheries interactions (including aquaculture)
New Holland mouse	*Pseudomys novaehollandiae*	Prefers coastal heath vegetation (predominantly NE Tas)	endangered		Habitat loss and destruction, inappropriate fire regimes, predation by feral pests
Southern right whale	*Eubalaena australis*	Migrates annually through east coast waters	endangered	endangered	Habitat or resource destruction
humpback whale	*Megaptera novaengliae*	Migrates annually through east coast waters	endangered	vulnerable	Habitat or resource destruction
Birds					
white-bellied sea eagle	*Haliaeetus leucogaster*	Nests on offshore islands and rocky headlands	vulnerable		Habitat destruction
little tern	*Sterna albifrons sinensis*	Breeding colonies on beaches under threat	endangered		Habitat loss and destruction, predation by feral pests, human impacts
fairy tern	*Sterna nereis*	Breeding colonies on beaches under threat	vulnerable		Habitat loss and destruction, predation by feral pests, human impacts
shy albatross	*Thalassarche cauta*	Offshore species	vulnerable	vulnerable	Long-line fishing
Fish					
spotted handfish	*Brachionichthys hirsutus*	Declining isolated colonies in Derwent Estuary and adjoining bays	endangered	endangered	Disturbance to seabed through dredging, pumping and marine development
Invertebrates					
chevron looper moth	*Amelora acontistica*	Saltmarsh in Cremorne and Lauderdale area	vulnerable		Habitat destruction: driving off-road vehicles on saltmarsh; stock grazing leading to displacement of native plants, weed invasion and soil compaction; changes to drainage pattern
chequered blue butterfly	*Theclinesthes serpentata lavara*	Saltmarsh in Pittwater and Lauderdale area	rare		As per looper moth
live-bearing seastar	*Parvulastra vivipara*	Small number of locations on rocky intertidal in SE Tas	vulnerable	vulnerable	Loss of habitat due to development, collection

Everyone undertaking works on the coast has a responsibility to protect threatened species. Coastal land management activities must identify the presence of threatened species as part of planning and risk assessments and put in place measures to manage impacts from work activities on threatened species.

Conservation categories of threatened species

The following definitions apply under Tasmania's *Threatened Species Protection Act 1995*

Endangered: a species that is either:

- in danger of extinction because long-term survival is unlikely while the factors causing the species to be endangered continue operating

or

- presumed extinct on the grounds that no occurrence of the species in the wild can be confirmed during the past 50 years.

Vulnerable: a species that is likely to become endangered while the factors causing it to be vulnerable continue operating.

Rare: a species that has a small population in Tasmania which is not endangered or vulnerable but is at risk.

Figure 10.2 Fairy terns are listed under the Threatened Species Protection Act 1995. © Birds Tasmania





Nomination of a new threatened species

Threatened species status is under ongoing review. Anyone can nominate a species for consideration through an official nomination process. If a species recovers, the committee can remove it from the threatened species list.

The Tasmanian Scientific Advisory Committee (SAC) has produced a set of guidelines (or rule sets) based on scientific information which determines whether a species qualifies as being threatened (extinct, endangered, vulnerable or rare) in Tasmania. The criteria are based on internationally accepted definitions but are modified to suit the Tasmanian regional context.

10.1.3 Guidelines for protecting wildlife during coastal management works

Specific information for the protection of threatened species and significant species such as shorebirds and penguins is provided in other sections of this chapter.

Management and conservation of wildlife needs to be taken into account in development proposals and in all aspects of planning for works in coastal and marine environments in Tasmania. Consider the potential impacts of work activities on wildlife and marine species.

Coastal works that create disturbance to marine areas can have a devastating impact on the unique temperate marine assemblages. Localised sediment disturbance, pollution, and increases in nutrient levels can all have an impact on marine species.

Identify any marine habitats or values that might be affected by the works. Seek specialist advice and assessments and approvals where required. More complex coastal works such as shoreline protection structures will require a comprehensive assessment of the marine values of the site and likely impacts.

Identify any wildlife values and habitats that may be affected by the work activity. Assessments and approvals may be required. Seek specialist advice.

Ensure works are properly supervised by qualified people and that follow-up surveys are done. Ensure all staff and contractors are aware of the operational constraints required to protect wildlife values and habitat.

Minimise damage to wildlife habitat during works and rehabilitate the site soon after works are completed. Ensure follow-up surveys and monitoring are undertaken.

Land management activities in coastal reserves and foreshore areas should promote biodiversity outcomes and reduce the impact of weeds and feral pests.

10.1.4 Special considerations for protecting threatened species

In addition to the guidelines in 10.1.3, the following matters must be considered in areas where threatened species are present.

It is an offence to take a threatened species without a permit. 'Take' includes kill, injure, catch, damage, destroy or collect and can include the destruction of critical habitat for a threatened species.

Consider potential impacts of coastal works on threatened species and critical habitats. Any development-related threats to listed species must be discussed with the Department of Primary Industries, Parks, Water and Environment (DPIPWE) Policy and Conservation Assessment Branch (PCAB), which is responsible for coordinating advice.

Before planning or undertaking works on the coast,



determine whether there are threatened species in the proposed work area.

- Search the EPBC database
- Search lists on the Department of Primary Industries, Parks, Water and the Environment (DPIPWE) website for locations of threatened species.
- Consult specialists in the Threatened Species Section of DPIPWE.
- Check for the existence of recovery plans for species in your work area, which can provide guidelines to ensure your works are complementary to species management work.

Make use of existing recovery and threat abatement plans prepared by specialists. These can provide guidance for protecting particular species such as procedures for vegetation clearance on coastal land.

Develop asset or area management plans, in consultation with specialists, which provide specified objectives and actions in areas known to support threatened species. Identify threatening processes and their impacts.

Monitoring is essential to maintain up-to-date information on threatened species and their habitat and to improve management outcomes. Be sure to incorporate monitoring protocols into any asset or area management plan. Report any occurrences of threatened species in areas outside of their known range to the Threatened Species Section, DPIPWE.

10.1.5 Relocating coastal species

Sometimes it is necessary to relocate coastal species, either for their own protection or for health and safety reasons. Seagulls, for example, can form large breeding colonies during August and September in locations such as ports or along railway lines or causeways.

Pest controllers are sometimes engaged by land management authorities such as Tas Ports to relocate the birds away from areas used for industry or transport. The relocation operations are expensive and are usually only undertaken when the damage caused by large numbers of birds and their excrement is very costly or when human health or safety are at risk.

Seagull faeces can harbour a number of diseases and can be very damaging to freight. Colonies along causeways are a hazard to motorists as fledgling birds fly across the road erratically.

Case Study 10.1: Protecting threatened seastars during construction works in south-east Tasmania

In 2002 the Department of Infrastructure, Energy and Resources (DIER) upgraded McGees Bridge on the Sorell Causeway at the Pittwater–Orielton Lagoon Ramsar site. DIER worked with the Tasmanian Parks and Wildlife Service and Threatened Species Section of DPIPWE to ensure that natural coastal values in the area would be protected.

As part of the assessment process it was confirmed that the sandstone footings of the old bridge were home to a population of the threatened live-bearing seastar, *Parvulastra vivipara* (formerly *Patiriella vivipara*).

The seastar is restricted to discrete locations in south-east Tasmania because it reproduces by bearing live young and therefore does not have a dispersal stage.

To protect this unique and threatened species, teams of volunteers relocated thousands of seastars to a nearby rocky shoreline while construction work was under way.

In addition, the bridge design was modified to ensure that the surface of the new bridge footings would be suitable for the seastars. Once the work was finished, the seastars were collected and moved back to their original location.



Figure 10.3 Threatened live-bearing seastar Parvulastra vivipara © Bill Albion

10.2 Seabirds

This section provides information for protecting significant seabird species such as penguins and shearwaters. Threatened seabirds such as tern species are covered in ***section 10.3*** with shorebirds.

Penguins and shearwaters and their burrows are protected under the *Nature Conservation Act 2002.*

Potential impacts of climate change, in particular sea level rise and resulting erosion of coastal margins such as sandy beaches over the next 50 to 100 years, will compound existing conservation issues and will almost certainly have an impact on seabird habitat Predicted sea level rise may flood the existing nesting, roosting and foraging habitats of many species.

10.2.1 Little penguins

Little penguins (*Eudyptula minor*) are small, flightless birds standing about 30cm tall, ranging in length from about 40cm to 45cm and weighing around 1kg. Their average life expectancy is approximately seven years, although there are records of some reaching over 20 years.

Little penguins come ashore after dark and return to the sea before first light to reduce exposure to predators.

Penguins colonise coastal areas that have suitable habitat and few predators. They can occupy coastal areas up to 500m from the shore and nest in a wide variety of habitats including both shallow and deep burrows, rock crevices and beneath dense

Figure 10.4 Moulting penguins are easily identified due to the amount of feathers around them and should be left alone. © Perviz Marker





vegetation canopies, which shelter them from the sun and predators. A typical burrow consists of a tunnel 60–80cm long with a nest bowl at one end, large enough for a little penguin to stand in, even though the entrance may often be much smaller. Little penguins are opportunistic birds, nesting where they can achieve maximum shelter (Pryor & Wells 2009).

They breed between August and February, coinciding with an annual upsurge in marine productivity. The nesting period (around six to eight weeks), followed by the moult period (usually February to April) are particularly vulnerable times in the lives of little penguins, when they are most at risk of starvation or predation.

Understanding and considering the life cycle and habits of the little penguin when planning coastal management works will minimise any impacts on the species.

Moulting penguins

It is easy to mistake a moulting penguin for a sick or injured bird. In late summer and autumn 'scruffy-looking' penguins come ashore to moult. Usually these birds stand or rest by themselves in a sheltered area and are surrounded by freshly moulted feathers. Penguins at the start of moult are usually plump, with dull feathers sticking out from the body. They often appear hunched and 'miserable'. Birds well into moult have large patches of old feathers missing, with clean new feathers emerging.

A moulting penguin is best left alone. If it is threatened by dogs or people, contact the nearest Parks and Wildlife Service (PWS) office or the DPIPWE Wildlife Hotline. If you must move the penguin, take care because they can bite when threatened. Keep it in a cool, secure, quiet place and do not handle or feed it.

Many species of sub-Antarctic penguins come ashore to moult on Tasmania's beaches. Report all instances of such events to DPIPWE on the 24-hour Wildlife Hotline.

10.2.2 Threats to little penguins

Foxes and domestic and feral cats and dogs are highly destructive predators. Controlling them is essential for the survival of little penguins.

Marine debris and other forms of litter can be lethal to penguins. Discarded fishing nets, line and tackle and other plastic rubbish can entangle penguins and either choke or starve them to death. Oil and chemical spills also have a devastating effect on them.

Habitat loss to development and disturbance by removing shelter and nesting material, threaten the survival of little penguin colonies. Dumping of garden waste and other material can block access to burrows. Every year, many little penguins are killed on coastal roads adjacent to colonies.

Localised overfishing is a significant threat to little penguins, disrupting their feeding habits and making them go further offshore to get enough food to feed themselves and their young and prepare for their fast during the moult.

Grab-all nets (gillnets) are extremely destructive in two ways: they catch and kill all wildlife caught in them, which includes a large number of little penguins; and they disrupt the food chain on which seals, sharks and the little penguin rely, affecting breeding success. Gillnets are a threat especially when set near colonies.

Sea level rise will have an impact on available nesting sites, and increased frequency of extreme storm events and storm surges may result in destruction of existing rookeries, forcing penguins to relocate.

10.2.3 Protecting little penguins

Coastal land managers have a key role to play in the conservation of little penguin habitat, particularly around built-up areas. This role extends to training of planners, maintenance crews and natural resource managers and education of coastal user groups.

In areas with little penguin colonies, it is critical to protect birds when they are moving to or from the sea, by prohibiting dogs for one hour before and after sunrise and sunset from July to April.

Consider signage, fencing and other management approaches to educate residents and minimise impacts of dogs and cats on little penguins. Take into consideration the fact that is it preferable not to promote the location of some penguin colonies. Consult specialists at DPIPWE.

If penguins need to cross a road to access their colony and nests, consider management actions to keep them off the road, and educate residents and road users. Consider fencing to keep penguins off the road or providing tunnels under the road so that penguins can safely access their burrows. A penguin tunnel has been installed at Eaglehawk Neck in collaboration with the local Coastcare group and has reduced the number of penguins being killed on the road.

Figure 10.5 Little penguin on eggs in burrow. © Perviz Marker



10.2.4 Guidelines for working in little penguin habitat

New development applications must consider potential impacts on little penguins and their habitat.

Manage the timing of works and weed removal to minimise impact. Do not work in and around a penguin colony during breeding and moulting times, as the birds can be stressed and may abandon their nests if disturbed. The best months for works are usually from May to July, provided the birds have finished raising chicks and have completed their moult. Avoid works if any birds are present at the site.

When planning works in coastal areas adjacent to penguin colonies, you must consider the impact of lighting, noise and intense vibration on the penguins and minimise these impacts wherever possible.

Weed removal must be gradual, and combined with revegetation work, to ensure sufficient nesting habitat is always available. Prickly weeds are the only safe habitat for small marsupials and birds in many areas. Nesting penguins often shelter under African boxthorn, an invasive weed species.

Spraying of herbicides is not recommended in penguin colonies and should not be conducted in sites with sandy soils. Herbicides may persist within the soil, as the low organic content inhibits the breakdown of herbicides and may be harmful

to nesting penguins. If herbicide needs to be used, the cut-and-paste, scrape-and-paint or drill-and-fill methods are recommended, where appropriate (Pryor & Wells 2009).

The preferred species for revegetation in and around little penguin colonies generally include T*etragonia implexicoma, Rhagodia candolleana* and *Poa* spp., but this depends on the site. *Acacia sophorae* is generally not suitable as its lower branches become rooted in the ground and are too entangled for penguins to negotiate (Pryor & Wells 2009). Information on appropriate species can be obtained from the Understorey Network.

Avoid leaving rock or gravel on the roadside during road work or other infrastructure activities as these obstacles can impede little penguins trying to cross the road.

Ensure that any rubbish from work activities is removed from the site at the completion of works. Provide adequate and appropriate rubbish facilities at boat ramps and other coastal facilities and ensure that they are serviced regularly.

Include local residents and community groups in planning for management actions to protect little penguins. Local residents can make a big difference to improving outcomes for little penguins by making changes in their behaviour, such as keeping dogs locked up and not modifying the foreshore environment.

10.2.5 Short-tailed shearwaters

Short-tailed shearwaters (*Puffinus tenuirostris*) are migratory birds that breed on Tasmanian headlands from September to April. They travel approximately 30 000km on their annual round trip from the Arctic region to south east Australia.

Approximately 23 million short-tailed shearwaters breed in about 280 colonies across south-eastern Australia with 18 million of these arriving in Tasmania each year. Adult birds will return to the same burrow throughout their lifetime.

Colonies are usually found on headlands and islands, covered with tussocks and succulent vegetation such as pigface and ice plant or sea spinach. Headlands allow for easy take-off and landing. The largest colony is on Babel Island (part of the Furneaux Group in Bass Strait), which has around 3 million burrows.

Other colonies are less remote and are often associated with penguin colonies. Birds in their burrows are vulnerable to attack from feral animals and dogs that are allowed to roam free.

Short-tailed shearwaters are a very significant part of contemporary Aboriginal culture. Chicks (Tasmanian muttonbirds or yolla) are harvested annually from their burrows for their prized meat and oil. The chicks are taken under strict controls and the commercial season is limited to the period 27 March to 30 April. Many colonies are managed by the Aboriginal community in collaboration with DPIPWE.

Figure 10.6 Short-tailed shearwater. © Steve Johnson





Outside of these areas, protection of shearwater colonies and habitat can be achieved by following the guidelines for penguin habitat protection. It is important to keep machinery out of colonies as the burrows can be easily destabilised. Even walking around in colonies can be destructive: specialist advice and great care are needed for any access.

Shearwaters washed up on beaches

Short-tailed shearwaters are the most numerous bird found washed up on beaches from February to May each year, typically after a storm or a period of poor weather. At this time, chicks have fledged and are getting ready to migrate but cannot fly very well, so can fall and get washed onto beaches. Often they are starving, exhausted or even hypothermic.

Shearwaters should be placed in a box (*do not attempt to feed them*) and released at night on a beach (preferably from an elevated site) or taken into the nearest PWS office, or the Wildlife Management Branch of DPIPWE at 134 Macquarie Street, Hobart (during office hours). Call the Wildlife Emergencies 24-hour Hotline for advice if necessary. ***Refer to section 10.7 Tools and resources.***

10.2.6 Threats to shearwaters

Although there appear to be huge numbers of short-tailed shearwaters, they are still vulnerable to over-harvesting and habitat destruction. In places, pigs, cattle and sheep have destroyed whole colonies. Soil erosion after fire can destroy suitable sites for burrowing.

Gillnet fisheries in the North Pacific accidentally drown up to 50 000 birds annually.

Currently, approximately 200 000 chicks are harvested and sold annually in Tasmania by commercial operators. Birds also ingest small plastic particles while at sea, which may limit their ability to maintain condition and will contribute to deaths during migration.

Feral cats and roaming dogs (and now foxes) are also a problem, as they find shearwater chicks easy prey.

Trampling of burrows by humans can also cause the death of birds. Similarly, erosion caused by recreational vehicles can destroy suitable sites for burrowing. It is important to keep off colonies.

Natural mortality occurs mainly during the first migration due to exhaustion and starvation. The average lifespan is 15–19 years but birds can live for up to 38 years (Parks and Wildlife Service website accessed 15th Sept 2010).

10.2.7 Protecting shearwaters

Because of the shearwater's international migratory habitats, the species has become the subject of a joint protection project between Japan and Australia – the Japan Australia Migratory Bird Agreement (JAMBA). Both countries monitor the shearwater population while the birds are in their area.

In Tasmania, limits are imposed to prevent over-harvesting and a number of wildlife sanctuaries protect shearwater colonies. Japan and other countries are attempting to minimise the number of birds drowned by their fishing operations. It is hoped that these conservation methods will ensure the survival of one of the world's most amazing migratory birds (Parks and Wildlife Service website accessed 15th Sept 2010).

10.3 Shorebirds

This section provides information for minimising impacts on migratory and resident shorebirds. Small seabirds such as little and fairy terns are also considered here, due to their nesting behaviour on sandy beaches.

Shorebirds are coastal birds that breed on beaches and forage on the shoreline and in wetland areas, feeding mainly on small crustaceans and invertebrates. Tasmania is home to both migratory and resident shorebirds.

Migratory species breed in the northern hemisphere and migrate vast distances annually to feed and rest along Tasmania's coastlines and wetlands.

Tasmanian shorebirds are present on the coast all year round. Beaches and foreshores provide habitat for their entire life cycle: foraging, roosting and breeding. Tasmania is believed to be a relatively secure refuge for shorebirds compared to mainland Australia.

Figure 10.7 Pied oystercatchers nest on Tasmanian beaches from September to March. © Birds Tasmania



However, decreases in shorebird breeding populations along the Tasmanian coast, particularly on beaches in the south-east and east and at other popular beaches, have been well documented by Birds Tasmania over the past two to three decades.

Many shorebirds and small terns such as the fairy tern and little tern are listed as threatened species in the *Threatened Species Protection Act 1995*. Others, such as hooded plovers (*Thinornis rubricollis*), are rapidly decreasing in breeding numbers through much of Tasmania. Threats are common to all species of shorebird and tern and include destruction/loss of habitat due to coastal development and disturbance (poor breeding success) from recreational activities such as horseriding and vehicles on breeding beaches.

10.3.1 Migratory shorebirds

Migratory shorebirds visit Australia from the Arctic tundra in the northern hemisphere every year from September to March. Migratory birds travel on an established route known as the East Asian – Australasian Flyway. Birds on the flyway make an annual migration of over 25 000km, some flying for more than 10 000km non-stop.

Many coastal areas in Tasmania are important feeding and resting sites, where birds will rest and replenish fat reserves for their long migration back to breeding grounds in the northern hemisphere.

Sites such as Robbins Passage in the north-west, Moulting Lagoon on the east coast and Pitt Water - Orielton Lagoon and Ralphs Bay in the south-east are very important migratory bird habitats.

All migratory shorebirds are listed in the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* and under international migratory bird agreements including the Ramsar

Convention and JAMBA, the China–Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA). ***Refer to Table 10.2***

Ramsar Convention

Many important migratory bird habitats are also protected under the *Ramsar Convention on Wetlands* (1971). Australia is a signatory to the intergovernmental treaty that provides the framework for international cooperation for the conservation and wise use of wetlands.

Management of Ramsar wetlands is in accordance with the duties and obligations of signatories to the convention and is presently undertaken through the *Environment Protection and Biodiversity Conservation Act 1999.*

Figure 10.8 Bar-tailed godwits travel over 10 000 km from their breeding grounds in the northern hemisphere to rest here over the northern winter. © Alan Fletcher, Birds Tasmania



National guidelines for Ramsar Wetlands are currently being developed by the Australian Government to provide a framework for Ramsar Convention implementation in Australia and provide jurisdictions and other interested parties with clear guidance on the management of Ramsar sites.

Migratory Bird Agreements

Australia is a signatory to the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

These international bird agreements provide an important mechanism for pursuing conservation outcomes for migratory birds, including migratory shorebirds. They are bilateral agreements between two countries and more work is needed to influence conservation outcomes across their migratory path (flyway) which extends through multiple countries.

In Australia all migratory bird species listed in these bilateral agreements are protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

10.3.2 Resident shorebirds

Tasmania's resident shorebirds comprise four species: Australian pied oystercatcher (*Haematopus longirostris*), sooty oystercatcher (*Haematopus fuliginosus*), hooded plover (*Thinornis rubricollis*) and red-capped plover (*Charadrius ruficapillus*).

Hooded plover populations have decreased by more than 25% since 1982, (E. Woehler pers. comm. 2010) and monitoring programs by Birds Tasmania indicate that these decreases are continuing. In New South Wales only 10 or so breeding pairs of hooded



plovers remain and numbers of shorebirds in some mainland states are now at critically low levels and in danger of becoming locally extinct.

Due to the ecological similarities regarding nesting habitat and sensitivities to disturbance, little terns and fairy terns, although strictly seabirds, are included in shorebird protection programs. Caspian terns (*Hydroprogne caspia* formerly *Sterna caspia*) also breed on Tasmanian beaches but nests are rarely seen.

Many Tasmanian beaches are important nesting areas for resident shorebirds and seabirds between 1 October and 31 March each summer. Shorebird eggs are laid in shallow scrapes in the sand. They are hard to spot and therefore can be easily squashed by vehicles or trodden on by the unaware.

Young chicks are flightless for up to seven weeks (depending on species) and will run to the dunes, nearest vegetation or water to hide. Nests are small (around 10cm for plovers, smaller for terns) and well camouflaged, typically at the base of foredunes above high water mark and wrack, but also can be in light vegetation.

Table 10.2 Migratory bird species that make the annual migration to Tasmania over the northern hemisphere winter.

Common name	Scientific name	International bird agreements
bar-tailed godwit	*Limosa lapponica*	JAMBA, CAMBA, ROKAMBA
caspian tern	*Hydroprogne caspia* formerly *Sterna caspia*	JAMBA, CAMBA, ROKAMBA
curlew sandpiper	*Calidris ferruginea*	JAMBA, CAMBA, ROKAMBA
eastern curlew	*Numenius madagascariensis*	JAMBA, CAMBA, ROKAMBA
fleshy-footed shearwater	*Puffinus carneipes*	JAMBA, ROKAMBA
great knot	*Calidris tenuirostris*	JAMBA, CAMBA
greenshank	*Tringa nebularia*	JAMBA, CAMBA, ROKAMBA
grey plover	*Pluvialis squatarola*	JAMBA, CAMBA, ROKAMBA
grey-tailed tattler	*Tringa brevipes*	JAMBA, CAMBA, ROKAMBA
Latham's snipe	*Capella hardwickii* formerly *Gallinago hardwickii*	JAMBA, CAMBA, ROKAMBA
lesser golden plover	*Pluvialis dominica*	JAMBA, CAMBA
lesser sand plover	*Charadrius mongolus*	JAMBA, CAMBA, ROKAMBA
pectoral sandpiper	*Calidris melanotos*	JAMBA, ROKAMBA
red-necked stint	*Calidris ruficollis*	JAMBA, CAMBA, ROKAMBA
ruddy turnstone	*Arenaria interpres*	JAMBA, CAMBA, ROKAMBA
short-tailed shearwater	*Puffinus tenuirostris*	JAMBA, CAMBA, ROKAMBA
terek sandpiper	*Xenus cinereus*	JAMBA, CAMBA, ROKAMBA

Nesting birds will see people approaching from a distance of 100m or more (long before you see them) and will leave their nests, eggs and chicks. Exposed eggs and chicks will cook on hot sunny days, and chill on cool/wet days, both result in breeding failure. Exposed eggs and chicks are also vulnerable to predation by gulls and forest ravens and possibly currawongs. All dogs are predators of both chicks and eggs.

10.3.3 Signs that nesting shorebirds are present

- Nests are (relatively) easily located by behaviour of birds (calls etc.) and their footprints in sand leading to/from the nest.
- Nesting birds may distract you; pied oystercatchers will make alarm calls to their partners and chicks, some will fly at you.
- Terns will 'attack' you, swooping low over your head, calling and appearing very 'excited' – actually very agitated and distressed.
- Terns may abandon the colony if disturbed, so it is critical to avoid disturbing nesting adults.

10.3.4 Threats to shorebirds

The majority of resident shorebirds live on the beaches that are popular for human recreational activities, including (but not limited to) dog-walking, four-wheel-driving, horseriding, driftwood collecting, beachcombing and walking. There have been increases in beach use in more remote locations that were previously never or rarely visited by people (e.g. on the South Coast track, in the Arthur-Pieman, Waterhouse and Southwest Conservation Areas and the Tasmanian Wilderness World Heritage Area).

In recent years, at a number of beaches, breeding has become restricted to the least disturbed areas, or ceased entirely if adult birds have aged and died without successfully reproducing, due to continuous disturbance from human activities during their

Figure 10.9 Shorebird nests are simple scrapes in the sand and difficult to detect. Eggs and chicks are easily trampled by people or horses or crushed by vehicles. Left: fairy tern chick, Right: hooded plover eggs.
© Dr Eric Woehler and Valeria Ruoppolo







summer breeding season. While shorebird numbers may appear to be stable at a particular site, records have shown that breeding has not been successful at some sites for years (E. Woehler pers. comm. 9th August 2010).

Particular human activities such as taking 4WD vehicles and horses onto beaches can be devastating to nesting shorebirds.

Shorebirds also face threats from climate change impacts. Sea level rise and increased storm frequency will result in the modification of suitable breeding beaches and wetland areas that are used as feeding and resting sites, through coastal erosion and inundation.

Shorebird eggs and chicks are extremely camouflaged and are easily trampled by walkers, horses and vehicles on beaches. Beach users will disturb the foraging of resident and migratory shorebirds, preventing the adults from incubating or feeding their young for extended periods. Disturbance that makes birds leave their nests during hot days or cold nights will result in thermal stress to the eggs and chicks, and can result in their death.

Disturbance and destruction by feral or uncontrolled animals such as dogs, cats and foxes are key threats to shorebirds and seabirds. Dogs and people frighten birds away from their feeding and nesting sites. Domestic and feral cats kill high numbers of birds every year. Even well-behaved dogs, if they are allowed to run off-lead, are a threat. Just the sight of a dog can be enough to frighten and disturb birds.

10.3.5 Protecting shorebirds

Signage and information brochures can help to alert local residents and visitors to the bird values in the area and foster a sense of appreciation for these unique animals.

Consider temporary fencing of shorebird nests on high-use beaches. This needs to be undertaken with caution and to be accompanied by education and awareness-raising. At popular events such as surf carnivals, temporary fencing works best when volunteers or land management staff can be on hand to watch over the sites and inform beach users about shorebird values and threats.

Control access of dogs, horses and vehicles on shorebird beaches during breeding and migratory bird times, from September to March.

Birds Tasmania volunteers undertake annual monitoring of shorebird numbers and breeding success. Land managers could support these activities by undertaking their own monitoring in collaboration with Birds Tasmania.

Consider providing artificial shelters for breeding birds and their young. Techniques can be found in *A practical guide for managing beach-nesting birds in Australia* (Maguire 2008).



10.3.6 Guidelines for working in shorebird habitat

Time works to avoid shorebird breeding season if possible (sometimes the best time to manage weeds clashes with the shorebird season).

Minimise time spent working in breeding territory or close to nest, eggs and chicks, to reduce adults' times off nests, eggs and chicks.

Avoid disturbing nesting birds at night, to prevent eggs chilling: beach sands cool rapidly at night and eggs left unattended will fail.

Assume that nests, eggs and chicks are present even if you haven't found them: reduce your time at the top of the beach to the minimum time required to remove weeds or undertake works.

Travel along the tide line, preferably limiting intense activities to low tide to keep people and any vehicles away from nesting birds.

Avoid damage to the dune landscape that may affect the profile of the dunes and make it difficult for young birds to seek shelter.

Include local residents and community groups in planning for management actions to protect shorebirds. Local residents can make a big difference to improving outcomes for little penguins by making changes in their behaviour, such as keeping dogs locked up and not modifying the foreshore environment.

10.3.7 Monitoring shorebirds

Birds Tasmania undertakes annual monitoring of shorebird numbers. Community groups and land managers can assist by providing information to Birds Tasmania when working in shorebird areas.

Useful data includes:

- reports of nesting shorebirds and small terns, including GPS data and estimates of numbers
- reports of migratory shorebirds – estimates of numbers/species
- evidence of entanglement – photographs.

Birds Tasmania can provide data sheets and bird identification guides, and possibly assist in the identification of carcasses.

Remember: do not disturb birds when you are collecting data.

10.4 Injured and orphaned wildlife

This section provides information on assisting injured and orphaned wildlife and reporting wildlife emergencies.

Wildlife can be injured inadvertently, for instance in road accidents, from entanglement in fishing line, as a result of chemical or oil spills, or through deliberate cruelty. Accidents that kill parent animals may leave their offspring with little chance of survival.

Compassion and care for wildlife is commendable, but keep personal safety in mind. It is best to get appropriate advice before approaching injured or resting wildlife, as some animals can become stressed and will attack if they feel threatened. In the meantime, it is important to protect the animal from people and dogs. Seek advice from the local PWS office, the RSPCA, the Wildlife Management Branch of DPIPWE or a veterinarian.

If professional help cannot be obtained within 24 hours, follow the procedures on the DPIPWE website. Before attempting capture, observe the animal for any signs of illness or injury to help the vet or officer identify the animal's problem.

10.4.1 Legislation

In addition to the legislation detailed in ***section 10.1.1***, the state *Whales Protection Act 1988* provides further protection for whales in Tasmanian waters.

Most Tasmanian wildlife is protected by law and can only be rehabilitated with a permit. The Wildlife Management Branch of DPIPWE is responsible for issuing permits and keeps a list of trained wildlife carers who may be able to help.

10.4.2 Seals on beaches

Seals regularly come ashore (haul out) for a number of reasons and are not necessarily injured. They may just need time to rest or groom or moult. Keep a safe distance— seals have large teeth and a long, flexible neck which they can whip around with surprising speed. They can inflict painful wounds and carry a number of diseases that may include tuberculosis.

Sick or injured seals may also be found on the beach. Seals are among the most inquisitive of creatures and often end up with rope, fishing net or packaging strap wrapped around their necks. As the seal grows, this material gradually strangles it.

All seals are wholly protected throughout Australian waters.

Figure 10.10 Australian fur seals are curious animals and as such risk becoming entangled in marine debris.
© Biodiversity Conservation Branch DPIPWE



Do not approach any seal without advice from the nearest PWS Field Centre or the Biodiversity Conservation Branch at DPIPWE. In the meantime, keep dogs away and advise people not to approach the animal. It is important to report all sightings of seals on Tasmanian beaches to the Biodiversity Conservation Branch on the Wildlife Hotline or Whales Hotline. ***Refer to section 10.7 Tools and resources.***

10.4.3 Oiled animals

Treating oiled seabirds is highly specialised and should not be attempted without prior training – animals need extensive attention to remove the oil, and intensive after-care.

Contact the Wildlife Hotline if you discover oiled seabirds or mammals.

Wildlife emergency contacts

Wildlife Hotline 6233 6556 (24 hours)

Whale Hotline 0427 WHALES or 0427 942 537

This is a 24 hour monitored telephone service to receive calls of all cetacean sightings and strandings.

RSPCA 6244 3033 or 1300 139 947 (animal cruelty enquiries)

10.4.4 Whale strandings

The information in this section was taken from the *Tasmanian Whale Stranding Handbook and Directory* (DPIWE & DTPHA 2005) and the DPIPWE website.

Of all Australian states, whale strandings occur most frequently in Tasmania. A disproportionate number of these strandings have occurred in the Circular Head and Macquarie Harbour – Ocean Beach areas.

Common and bottlenose dolphins, both of which typically strand singularly, are the most commonly reported species. Sperm whales and long-finned pilot whales also are frequently reported, the latter usually in large pods. In 2008 for example, 188 pilot whales were reported as stranded near Sandy Cape. In November 2003 over 100 long-finned pilot whales stranded on a remote stretch of coastline south of Strahan. A detailed record of Tasmanian strandings is available on the DPIPWE website.

Most strandings are reported in the summer months, although it is not clear whether this is a consequence of increased human activity along the coast during this time of the year or an increase in the number of whales passing the coast.

Responses to whale and dolphin strandings are be managed on a joint basis between the Parks and Wildlife Service and the Biodiversity Conservation Branch, DPIPWE.

Successful whale stranding outcomes depend on immediate notification, seeking expert advice and mobilisation of people and equipment.

Why whales strand

The reasons whales strand are not yet fully understood. Some theories include whales following nutrient-rich waters that have been driven closer to southern Australia by climatic conditions. They may be confronted with rough seas or a single individual may stray too close to the shore and become stranded. Toothed whales have very tight family bonds. A stranded animal might continue to call and other members of the pod might follow the call, which can lead to the rest of the pod encountering a similar fate. Occasionally, stranded whales are found to be suffering from infections of the inner ear, which may affect their ability to navigate, using echo-location.

Also, certain topographical features may increase the risk of strandings. Wide, gently sloping beaches are not detected by the reflection of sonar pulses. This may result in the whales approaching too close to the shore. Similarly, bays with narrow mouths flanked by rocky headlands may give the whales the impression that they are trapped with no way out. This can cause panic which may result in beaching. In the case of stranded small whales and dolphins, it is possible that killer whales (orcas) have panicked the pod, forcing them shoreward.

Helping stranded whales

In the case of single strandings of small whales such as dolphins, it may be possible to successfully return the animal to the sea – but always seek expert advice. A mass stranding is a more formidable problem, and requires a coordinated approach.

The first priority in any attempt to save a stranded pod of whales is to seek help. Contact the Whale Hotline number. Provide details of the exact location of the stranded animals, their numbers, condition, the species (if you know), their size and any other details that may be useful.

Members of the local community and bystanders will be very keen to rescue the whales but, without experienced staff from PWS or DPIPWE, this can be very dangerous. It is essential to get assistance immediately to coordinate any response involving the general public.

Figure 10.11 A mass whale stranding, such as this one of long-finned pilot whales on the west coast of Tasmania, attract large numbers of volunteers who want to assist the whales. © Chris Arthur



Before specialist help arrives

Overheating is a big problem for stranded whales. Dig holes for the flippers so that they are hanging free. Allow water to enter these holes to assist in cooling, as the flippers and tail are important areas for heat exchange. Cover the body from the burning and drying effects of sun and wind – towels or seaweed will suffice – but don't cover the blowhole. Wet the animal down, ensuring that water does not enter the blowhole.

Once authorities have arrived, the animals will be assessed and the release coordinated so that the entire surviving pod is released. If released individually the animal will often restrand simply because it does not know where to go or responds to the continued distress calls of the individuals that are still stranded. Whales are highly social creatures. It is important not to underestimate the need to maintain their group structure.

Despite their formidable size, whales appear reluctant to cause any harm to their rescuers. Nonetheless, accidents can happen.

- Don't stand on the shoreward side of a whale, as a wave can easily roll the animal on top of you.
- Beware of sudden movements of the tail.
- Most importantly, beware of hypothermia. Tasmanian waters are cold. Rescuers should be well equipped with thick wetsuits and a change of warm clothes. Be well aware of how long you have spent in the water.

WILDCARE whale rescue volunteers

WILDCARE coordinates a group of first-response whale rescue teams made up of trained volunteers that can be called on to assist in the event of a stranding. The teams are contacted by the Parks and Wildlife Service or the Biodiversity Conservation Branch of DPIPWE.

Members of the public who are interested in assisting with whale rescues can join WILDCARE Inc and register for whale rescue on the membership form. They will receive information about WILDCARE Inc, whale rescue courses, and the formation of First Response Teams.



10.4.5 Animals and road accidents

Remove dead wildlife from the side of the road wherever possible. Carcasses left on the side of the road attract predators such as quolls, devils and birds of prey, which in turn can be killed by traffic.

Check the pouch of marsupials for young that may have survived the impact and could be rehabilitated by wildlife carers.

Your own safety is the priority, so only stop if it is safe to do so.

Reducing roadkill

Refer to the DPIPWE website for guidelines for reducing roadkill, which include the following ideas:

- Provide shelter (e.g. vegetation) on roadsides for animals to hide in.
- Build underpasses with 'funnel fencing' to encourage animals to cross underneath the road. The fences are set at an angle of 45° to the road (like a funnel) to guide animals into the underpass, and extend out into the roadside vegetation.
- Provide escape routes to help animals cross barriers (e.g. building a ramp down a steep roadside bank will enable animals to get off the road when a vehicle approaches).
- Do not create containment walls that prevent animals leaving the road.
- Erect signage to alert drivers to wildlife and use rumble strips to slow cars down in areas where wildlife cross roads.
- Do not leave material piled up on roadsides in areas known to be regularly used as crossings by animals, such as adjacent to penguin colonies.

10.5 Feral animals and introduced pests

Some feral animals (including uncontrolled domestic animals) and introduced species (from outside Tasmania) have a significant impact on our coastal and marine life. Cats and dogs allowed to roam freely in coastal areas can do enormous damage to wildlife. Foxes will increase this predator pressure if the species becomes established in coastal areas.

Introduced species can out-compete native species for resources such as habitat and food. They can change the local environment and landscape, making it less hospitable to native species.

Marine pests can cause dramatic changes to localised marine ecosystems, displace native species and impact on marine resource values.

Knowing how to identify feral animals and marine pests can help to prevent the spread of these pests and a number of identification tools have been developed. ***Refer to section 10.7 Tools and resources.***

10.5.1 Legislation

Protection is afforded to Tasmanian wildlife by the *Nature Conservation Act 2002* and the *Threatened Species Protection Act 1995*.

The *Living Marine Resources Management Act 1995* provides for management of marine pests. Some marine pests are listed as noxious species under the Act and a permit is required to possess them.

Obtain a permit or more information from the Department of Primary Industries, Parks, Water and Environment, Water and Marine Resources Division.

Australian Quarantine Act 1908

Australian Quarantine and Inspection Service (AQIS) is the Australian government agency responsible for enforcing Australian quarantine laws. A permit is required for the importation of specimens into Australia.

10.5.2 Feral animals

It is important to reduce threats from feral animals. Cats and foxes are the greatest threats to coastal wildlife, while dogs are a problem in some areas, especially where penguins or shorebirds are present.

Introduced species, such as rabbits, can cause massive damage by eating native species and/or displacing native fauna, and can cause erosion of coastal landforms such as dunes.

10.5.3 Managing feral animals

The most cost-effective approaches to feral animal management are prevention and early intervention.

Some species, such as the feral cat and rabbit, may have a significant impact on the environment but are widespread, numerous and impossible to eradicate from Tasmania due to social, financial or technological constraints. However, they can be eradicated from offshore islands, and efforts can be made to limit or exclude them around areas of high conservation significance on Tasmania's mainland, such as breeding areas or sites containing threatened plant species.

Figure 10.12 These penguins were killed by dogs (most likely domestic dogs allowed to roam free at night).
© Perviz Marker



Responsible pet ownership

Education of pet owners is extremely important in managing impacts of pets on coastal wildlife.

Local councils can play a role in education of the public about keeping pets such as cats locked up and not taking dogs into wildlife areas. Education about the disposal of unwanted pets, especially exotic species is also highly valuable.

Call the Fox Hotline (1300 369 688) if you find any trace of a fox.

Contact the local Parks and Wildlife Service (PWS) or council office or the Wildlife Management Branch (6233 6556) to report feral cats or dogs in sensitive coastal areas.

Figure 10.13 Northern Pacific seastar collection is an ongoing process. It is possible to maintain some coastal areas free of the seastar pest. © Dr Michael Sierp



10.5.4 Marine pests

There are innumerable non-indigenous species in the Tasmanian marine environment and the vast majority have very little impact on their new environment and local species. Some introduced species, however, do have very serious impacts on the Tasmanian marine environment and are considered marine pests.

Most marine pests are introduced into Australian waters by international vessels exchanging ballast water or as biofouling (i.e attached to the hull or other submerged area). In 2001 mandatory ballast water management requirements for international shipping were introduced. Requirements for managing domestic ballast water and international biofouling are still being developed.

Once a marine pest has been introduced into Australia it can be further spread around our waters by a variety of mechanisms such as recreational and commercial fishing vessels and natural coastal processes.

It is important to report new incursions to make sure that new species are identified before they become established.

There are a number of recognised marine pests in Tasmania, including the northern Pacific seastar (*Asterias amurensis*), and the European green crab (*Carcinus maenas*). These can threaten our marine environment and marine industries.

10.5.5 Impacts of marine pests

Marine pests cause damage to the marine environment such as out-competing or smothering native species. Some pests, like the northern Pacific seastar, are voracious predators of native species. In some instances this can also have an impact on aquaculture and fisheries operations. Once a species

is introduced in the marine environment, eradication is almost impossible.

The introduced commercial Pacific oyster has settled on shorelines along Tasmania's north-east and south-east coasts. They have sharp-edged shells that can injure humans or pets so are detrimental to the recreational and amenity values of the coastline.

Marine pests can also damage marine infrastructure and encrust or clog components of marine vessels.

10.5.7 Managing marine pests

The most important thing that coastal land managers can do is report any sightings of marine pests, particularly in new areas.

Some community groups are interested in ongoing removal of pests such as feral oysters or northern Pacific seastars. It is possible to locally eliminate these species from an area but it involves ongoing monitoring and follow-up. Expert advice and permits may be required. A permit is only required for listed noxious species.

Noxious species listed under *the Living Marine Resources Management Act 1995:*

Northern Pacific seastar (*Asterias amurensis*)

European carp (*Cyprinus carpio*)

black striped mussel (*Mytilopsis sallei*)

European shore crab (*Carcinus maenas*) – also known as green crab

wakame (*Undaria pinnatifida*), other than in the restricted zone

giant fan worm (*Sabella spallanzanii*)

green algae (*Caulerpa taxifolia*)

In some coastal communities the commercial Pacific oyster (*Crassostrea gigas*) has recruited onto shorelines and is harming recreational and amenity values as well as competing for space with Tasmanian native oysters (*Ostrea angasi*).

These wild oysters have become known as feral oysters to the local communities and aquaculture industries that are working together to manage the problem. Teams of volunteers collect feral oysters for disposal or use hammers to destroy them. Permits are not required to undertake these eradication activities, but permission from the land manager is required. It is important to ensure that feral oysters are correctly identified and distinguished from native oysters.

In some areas feral oysters are relocated to aquaculture facilities where they can continue to grow and then become part of the commercial stock. Removal of feral oysters for commercial purposes requires a permit as specified by the *Fisheries (Shellfish) Rules 2007*. Oysters can only be harvested from areas that are approved for shellfish harvesting, and must meet the requirements of the Tasmanian Shellfish Quality Assurance Program (TSQAP).

Feral oysters should not be eaten

It is not recommended that people eat feral oysters that they have removed from the shore, as oysters are capable of accumulating toxic algae, heavy metals and other toxins from the marine environment at levels dangerous to humans.

Boat users

Land managers who use boats need to be aware of the potential to spread marine pests and take appropriate measures to minimise the risk.

Introduced marine pests may be spread by ballast water discharge, hull fouling on commercial and recreational vessels, and marine farming operations. The pests can be spread if wash-water and biological material from cleaning boat hulls are not contained at slipways or other boat repair and maintenance facilities.

Introduced marine species spread easily if boats, trailers and fishing equipment are not cleaned after leaving an infested area. For instance, a piece of wakame left on a net or anchor survives for at least one or two days, and so do microscopic spores floating in water in the bottom of a boat. In mooring areas and marinas, boat hulls without effective antifouling treatment can become infested.

- Follow the guidelines for preventing marine pests, including ballast water management requirements and boat maintenance at the DPIPWE Sea Fishing & Acquaculture website.
- Follow the *Environmental Guidelines for Boat Repair and Maintenance* (Department of Tourism, Parks, Heritage and the Arts 2009).

Figure 10.14 Boat hull cleaning removes marine pests but the wash water needs to be contained and treated at the boat facility, such as here at the Clean Lift facility at Prince of Wales Bay. © Ruth Eriksen





10.6 Climate change, wildlife management and pests

Climate change will add increased pressure to coastal and marine wildlife and has the potential to exacerbate existing impacts from other factors such as habitat loss and disturbance and feral pests.

Rising sea levels will result in further habitat loss for shorebirds and seabirds. Inundation of wetland areas may result in loss of habitat and foraging sites for shorebirds. Changes to coastal vegetation as a result of increased temperatures and changed rainfall patterns will have an impact on wildlife habitat. Changed rainfall patterns will also result in changes to freshwater flows, which will have implications for estuarine species.

In coastal waters the southern extension of warmer waters will cause a southward shift in species distributions. Warmer ocean temperatures in Tasmania now support species that were not previously viable due to cold water temperatures in winter. Ecosystems usually found in more temperate regions are shifting southward, and many of Tasmania's endemic species have a limited capacity to adapt to such change (DPIPWE 2010).

It is more important than ever to minimise human impacts on native wildlife and marine life, to afford these species the best possible chance of adapting to the effects of climate change.

To mitigate the impact of climate change, it is essential to conserve natural terrestrial, freshwater and marine ecosystems and restore degraded ecosystems, protecting existing ecosystems and a diversity of habitats. In view of uncertainty about the specific impacts of climate change, maintaining diversity of habitats will act as an insurance policy (DPIPWE 2010).



10.7 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in **Appendix 5.**

Threatened species

Coastal Values

Vegetation, species habitat and geomorphic values data for a 100m-wide coastal strip of the northern, southern and north-western Tasmania Natural Resource Management Regions. Available on the LIST.

www.thelist.tas.gov.au

Consultant's brief

A consultant's guide providing the minimum requirements for information needed to assess the potential impact/s of proposed activities on biodiversity and geodiversity

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/SSKA-7UM4AN?open

Environment Australia Biodiversity website

A range of information on biodiversity, the EPBC Act and lists of species protected under the Act.

http://www.environment.gov.au/biodiversity/index.html

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. To access, download a free registration form from the website

https://www.naturalvaluesatlas.tas.gov.au

REDmap

A Tasmanian initiative inviting the community to spot, log and map marine species that are uncommon in Tasmania, or along particular parts of our coast. The information collected is mapped and displayed on the REDmap website, demonstrating how species distributions may be changing over time. Report sightings of unusual marine species on the REDmap website

www.redmap.org.au

Threatened species listing statements and recovery plans

More information on threatened species' needs and survey requirements are available within the specific listing statements and recovery plans on the DPIPWE website

http://www.dpipwe.tas.gov.au/threatenedspecieslists

Threatened Species Section, DPIPWE

Provides threatened species localities and potential habitat according to site information from a 1: 25 000 mapsheet (TASMAP series). Also provides concise information about every Tasmanian threatened animal, including information on the species' conservation status, identifying features, distribution, habitat, biology, important locations, key threats, management recommendations, and other ways to help.

ThreatenedSpecies.Enquiries@dpipwe.tas.gov.au

http://www.dpipwe.tas.gov.au

Threatened Species Strategy (Department of Primary Industries Water and Environment 2000b)

Implementing the *Threatened Species Protection Act 1995*

Outlines the approach to conserving Tasmania's threatened species to ensure: that threatened species can survive and flourish in the wild; that threatened species and their habitats retain their genetic diversity and potential for evolutionary development; and to prevent further species becoming threatened. The Strategy addresses key threatening processes and priority threatened species.

Birds

A practical guide for managing beach nesting birds in Australia (Maguire 2008)

Birds Tasmania

Advice and input in planning for shorebird protection

Co-existing with Little Penguins in the Derwent Estuary - Information and guidelines (Pryor & Wells 2009)

http://www.derwentestuary.org.au/file.php?id=309

Guidelines for works in areas of Little Penguin habitat (Marker & Wind 2008)

http://www.nrmtas.org/projects/cradle/penguinmanagement.htm

Shorebird information kit

A box of resources for education and display purposes.

Available from the Parks and Wildlife Service, Interpretation Section on request.

Understorey Network

For information on appropriate plant species for revegetation works around little penguin colonies

www.understorey-network.org.au.

Wildlife Management Branch

Advice and training for caring for injured and orphaned wildlife

Wildlife emergency contacts

Local Parks and Wildlife Service Field Centre

RSPCA 6244 3033 or 1300 139 947 (animal cruelty enquiries)

Whale Hotline

0427 WHALES or 0427 942 537

A 24-hour monitored telephone service to receive reports of all cetacean sightings and strandings.

Wildlife Management Branch of DPIPWE

6233 6556 (24 hour) – for urgent wildlife problems (other than whales)

An injured animal or orphaned animal may be taken to the Wildlife Management Branch at 134 Macquarie Street in Hobart during office hours (Monday to Friday, 9am to 5pm).



Feral animals and pests

Australian Government: National system for the prevention and management of marine pest incursions.

The Tasmanian Government is a signatory to the National System for the prevention and management of marine pest incursions. The National System aims to prevent new pests arriving, respond when a new pest does arrive and minimise the spread and impact of pests that are already established in Australia.

DPIPWE Fox Eradication Branch

www.dpipwe.tas.gov.au/fox

DPIPWE website

Information about marine pests specific to Tasmania

DPIPWE Sea Fishing & Aquaculture website has guidelines for preventing marine pests, including ballast water management requirements and boat maintenance

www.fishing.tas.gov.au

DPIPWE Marine Pest hotline 0408 380 377

To report new pests, or infestations in new areas.

Environmental guidelines for boat repair and maintenance (Department of Environment, Parks, Heritage and the Arts 2009)

Feral animals in Australia

Federal Government: Department of Environment, Water, Heritage and the Arts, Biodiversity Section website

www.environment.gov.au/biodiversity/invasive/ferals/index.html

Feral card deck

A priority list of terrestrial and freshwater feral animal species for Tasmania, in the form of a handy laminated deck of cards with photos and descriptions of feral animals to assist identification.

Contact the Tasmanian Conservation Trust for more information.

Guide to best practice management of point source pollution at boat repair and maintenance facilities (NRM South 2008b)

National Introduced Marine Pest Information System

Marine pest information sheets available online. Follow links from

www.marinepests.gov.au

National System for the Prevention and Management of Marine Pest Incursions

National best practice guidelines for all pathways at risk of transporting marine pests

http://www.marinepests.gov.au/national_system



11 Soil management and earthworks

11.1 *Soil and water management*

11.2 *Excavation and ground disturbance*

11.3 *Extraction*

11.4 *Acid sulfate soils*

11.5 *Tools and resources*

This chapter deals with controlling sediment (soil and water runoff) as part of building and construction works, minimising disturbance from earthworks, extracting materials on or near the coast, and the importance of managing the impact of acid sulfate soils (ASS).

Coastal landforms and ecosystems have many functions and values that require protection from the impacts of earthworks and excavation associated with works in the coastal zone. Coastal dunes, for instance, protect houses and other developments from tidal surges and winds, while saltmarshes and seagrass meadows are critical fish nursery areas.

Clearing of vegetation and earthmoving activities can initiate soil erosion and, if not controlled, unwanted sediments could be discharged into wetlands or estuaries. In some areas these sediments might be contaminated toxic (e.g. heavy metals from mines or refineries) or acid sulfate soils, which, if disturbed, can cause water pollution or damage to structures. Even small-scale projects involve soil disturbance and can damage the coastal environment.

To protect the coastal environment, works activities should involve minimal impact on soils, landforms and receiving waters. This is achieved by planning for protection of coastal values, minimising soil disturbance and implementing effective erosion and sediment control measures.

The *Soil and water management on building and construction sites, fact sheets* (Derwent Estuary Program 2009) provide more technical detail on some of the issues presented in this chapter.

Tab photo: Machinery being used to remove pines from dunes. © Leah Page.



11.1 Soil and water management

This section provides information to help mitigate the impacts of building and construction site activities on soils, landforms and receiving waters in coastal areas through the use of erosion and sediment control measures.

Erosion is the removal of soil by the flow of wind and water. It occurs naturally, but can be intensified by building and construction activities. When erosion occurs soil particles become suspended in water or air and are transported downstream or downwind, eventually settling out as sediment, sometimes far away from the building or construction site.

Soil erosion on building and construction sites can be a major source of sediment pollution in waterways. Considerably more soil erosion is likely to occur during the construction phase than will occur in the rest of the building's lifetime. In fact, a single building block can lose four truckloads of soil in one storm. Any sediment that moves off-site typically enters stormwater drains, clogging the stormwater system and transporting attached pollutants, including oils, heavy metals and hydrocarbons, into local waterways. Excessive sediment that enters waterways can kill fish and aquatic plants, silt up streams, and block stormwater pipes, which can lead to increased flooding.

11.1.1 Legislation and approvals

There is a range of legislation that provides for soil management during building and construction in the coastal zone. ***Appendices 1 and 2*** provide details of legislation likely to be relevant. Local councils have the power and responsibility to regulate the building and construction industry.

It is essential to have the approval of the land manager before undertaking any earthworks. On areas of public land the land manager may be the local council or DPIPWE (Crown Land Services or Parks and Wildlife Service). Because of the high level of disturbance it will also be essential to identify any potential Aboriginal or cultural heritage sites and any significant wildlife or vegetation values. Assessments and approvals may be required.

11.1.2 Appropriate soil and water management for coastal areas

Consider sediment and erosion control at the planning stage, well before any ground disturbance/construction occurs. The alternative – addressing sediment and erosion control as an additional feature after planning and design has been developed – can both limit opportunities for effective soil and water management and increase the cost of the system.

Planning should include identification of the values of the area, including potential threats such as coastal processes, toxic sediments and preparations for erosion and sediment control and rehabilitation.

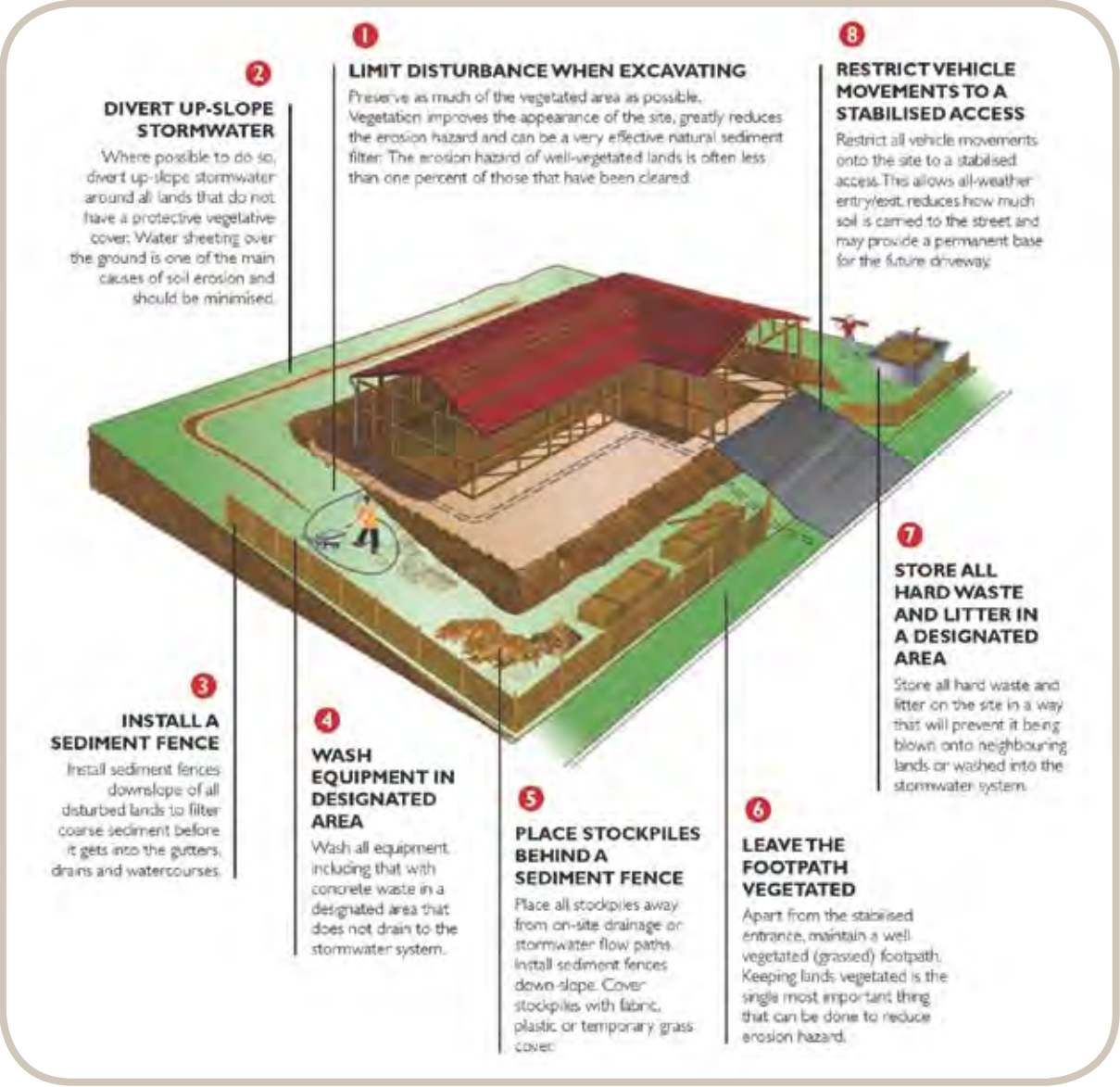
Avoid works on unstable coastal landforms such as seabeds, mobile dunes (in particular foredunes), cliffs and beaches. If such works cannot be avoided, they must be carefully managed as they can greatly increase erosion, which may lead to loss of infrastructure, danger to the public and loss of wildlife habitat.

Foredunes are especially vulnerable to erosion if the vegetation is removed or the dune is damaged by machinery during construction works. The best way to avoid damage to foredunes during works on the shore is to protect the vegetation that stabilises the sand. Repair damage as soon as possible. ***Refer to Chapter 6 Coastal landscape management and Chapter 7 Vegetation management.***

Inappropriate excavation can increase the vulnerability of beaches and other soft coastlines to erosion and flooding caused by rising sea levels.

Choose a site and methods that minimise interference with coastal processes, landforms and ecosystems. Obtain technical advice from a geomorphologist and/or engineer; and check the Geoconservation database, because some coastal landforms have

Figure 11.1 Example of sediment and erosion control measures that should be implemented on construction sites. Source: Soil and water management on building and construction sites, fact sheets (Derwent Estuary Program 2009)





important geoheritage values. Available on the internet on Tasmania's Land Information System (LIST).

Avoid impacts on coastal habitats or ecosystems. Seek specialist advice and identify all natural values, such as threatened species, significant wildlife habitat and important vegetation communities. Obtain specialist advice if working near sensitive wildlife habitat, such as shearwater rookeries or penguin colonies. Also consider providing for wildlife requirements (e.g. when revegetating an area, remember that some shorebirds require bare patches to build their nest in the sand).

It is important to identify and protect cultural heritage values, conducting surveys where necessary. Assessments, surveys and permits may be required from Aboriginal Heritage Tasmania and Heritage Tasmania. ***Refer to Chapter 5 Cultural heritage management.***

Some areas have toxic sediments (e.g. heavy metals from mines or refineries) and acid sulfate soils (ASS), which may cause water pollution or damage to structures if disturbed. Investigate the possibility of the presence of ASS prior to any development. Use the ASS information on the DPIPWE ASS web page or mapping from the LIST (***see section 11.5 Tools and resources***). Obtain specialist advice about safe methods for disposing of excavated materials that contain toxic materials (e.g. heavy metals) or ASS (***See section 11.4***).

Machinery, vehicles and vessels used during construction can introduce weeds, pests and diseases and should be cleaned off-site before travel to the work site.

11.1.3 Sediment collection structures

Sediment collection structures are designed to intercept and collect sediment in runoff before it reaches waterways. They should be designed to cope with major rainstorms of the type expected to occur in the area. Install the structures before the development begins.

Sediment collection structures require regular inspection and maintenance. After each significant rainfall event, check for damage or clogging by silt and debris.

Sediment collection structures may include, but are not necessarily limited to, the following:

- Sediment fences are usually constructed of heavy duty geotextile and must be installed parallel to the contours of the site. They can also be placed around stormwater pits.
- Fibre rolls are log-like products consisting of biodegradable fibres. They can be hessian socks filled with mulch or straw, or rolled coir (coconut fibre) placed across drainage lines or installed around stormwater pits to filter sediment from runoff.
- Stormwater pit traps are baskets or trays placed just below the entrance to the stormwater pit to prevent sediment entering the drain.

Refer to the Soil and water management on building and construction sites, fact sheets (Derwent Estuary Program 2009) for more information.



11.1.4 Soil and Water Management Plans (SWMPs)

Subdivisions or activities that create more than 250m2 of ground disturbance will typically require a Soil and Water Management Plan (SWMP) to be submitted to council with the building or development proposals, prior to any site disturbance. Once approved by council in a building or planning permit, all building and construction works need to be conducted in accordance with the SWMP.

SWMPs are specific site plans or drawings that detail sediment and erosion control measures on building and construction sites. They show the type, location, design, installation and maintenance schedule for all these measures and should be considered as the blueprint for controlling all anticipated erosion and for preventing sediment from leaving a site.

A SWMP can easily be developed by overlaying information on a copy of the engineering site drawings. The plan must detail the site development and all the systems intended to minimise erosion and trap sediment.

If one is required, submit the SWMP to council. Ensure that council approval is given before you start work or you may be in breach of your permit.

Keep a copy of the council-approved SWMP at the site at all times and ensure that all on-ground workers understand the SWMP. Implement, update and maintain the control measures shown in the SWMP.

See Soil and water management on building and construction sites fact sheet 3. Soil and water management plans (Derwent Estuary Program 2009) for further information.

11.2 Excavation and ground disturbance

This section covers excavation and ground disturbance for small-scale activities, such as access management and trench digging and larger scale activities such as the construction of coastal infrastructure. Erosion control structures and soil and water management plans will be required for construction sites. Large-scale activities will require Environmental Management Plans, which will specify measures for minimising impacts on coastal values.

Avoid works on unstable coastal landforms such as seabeds, shoreline mobile dunes (in particular, foredunes), cliffs and beaches. If unavoidable, manage such works carefully. Foredunes are especially vulnerable to erosion if the vegetation is removed or the dune is damaged by machinery during construction works. The best way to avoid damage to foredunes during works on the shore is to protect the vegetation that stabilises the sand. Repair damage as soon as possible.

Particular precautions are required with the use of machinery, particularly large machines such as excavators and bulldozers, on fragile and unstable coastal soils.

Refer to Chapter 15 Shoreline modification for particular information on shoreline protection structures, reclamation and dredging.



11.2

Excavation can be detrimental to coastal values by:

- damaging Aboriginal heritage
- damaging historic cultural heritage
- damaging sites of geoconservation significance
- disturbing landforms such as saltmarshes, tidal flats, barways and river mouths
- removing the sand supply from dunes, beaches, estuary beds or seabeds
- increasing erosion and sedimentation (locally or nearby)
- destroying terrestrial or marine vegetation
- destroying wildlife habitat (e.g. fish nurseries) or disrupting breeding (e.g. shorebirds)
- disturbing bottom sediments and releasing contaminants (e.g. heavy metals)
- disturbing acid sulfate soils
- polluting water
- producing large amounts of spoil, which may be contaminated
- spreading marine and terrestrial weeds, pests and diseases.

Figure 11.2 Construction of coastal road in southern Tasmania. © Chris Rees





11.2.1 Appropriate ground disturbance methods

Planning earthworks, including identifying values of the area as well as potential threats, is important when selecting appropriate construction equipment and methods that will minimise coastal disturbance.

Before commencing work, ensure all assessments have been done and approvals received, including approval from the land manager. Ensure that all staff and contractors have been briefed on the coastal values that need to be considered within the work area and any restrictions or conditions required to protect them. Provide appropriate supervision to ensure these conditions are met.

Keep ground disturbance to a minimum. Time construction works to minimise the duration of soil exposure (e.g. avoid works when prolonged heavy rain or strong winds are expected) and to allow planting of bare areas during late autumn and winter.

Protect surface water and groundwater quality. Take steps to minimise pollution and changes to the natural drainage patterns of the shore area. Install erosion control structures and implement erosion control strategies. These will significantly reduce the need for and the size and cost of installing sediment collection structures.

Each site is different; sediment and erosion control measures need to be designed on a site-by-site basis.

Minimise ground disturbance as far as is practicable. All earthworks should be kept to a minimum and should be closely linked with the commencement of major works. Thorough and careful planning is the best way to minimise environmental impacts. At the planning stage, consider the following:

- Avoid the need for earthworks, by working with the natural contours of the site. Limit building or construction on steep inclines. On slopes, choose a subfloor method that will minimise excavation.
- Limit the area of soil disturbance (the excavation envelope) to the minimum required, e.g. the building footprint only.
- Identify suitable sediment and erosion control measures for the excavation envelope.
- Schedule earthworks in phases throughout the project, to reduce erosion potential; rehabilitate exposed areas quickly, to reduce the amount of soil exposed at one time.
- Retain as much stripped topsoil as possible for re-use during landscaping and site rehabilitation.

Before starting site works, the following actions will help to minimise the risk of ground disturbance:

- Identify vegetation, including grass buffers, around the construction site to preserve throughout the development. Mark this as a 'no go' area on all work plans, including the Soil and Water Management Plan (if required).
- Install sediment and erosion control measures.
- Ensure the operators of earthmoving equipment are aware of the excavation envelope and where stockpiles will be located.

Once site works have commenced:

- Ensure vegetation buffers are protected.
- Carry out staged excavation and stabilisation (if applicable).
- Maintain sediment and erosion control measures.
- Stabilise soil stockpiles by placing sediment fences around their lower edges, cover with fabric, plastic or vegetation.

See Soil and water management on building and construction sites fact sheet 5. Minimise soil disturbance (Derwent Estuary Program 2009) for further information.



11.2.2 Precautions when using heavy machinery in coastal areas

On fragile and unstable coastal soils, special precautions are required with the use of machinery, particularly large machines such as excavators and bulldozers.

Ensure the type and size of heavy equipment is appropriate for the site and the works. Use smaller machines wherever possible, to reduce damage to coastal systems. Keep off foredunes and other unstable areas wherever possible.

Use soil roughening techniques to minimise impacts when using heavy machinery (i.e. non-wheeled vehicles) on exposed slopes. Don't smoothly grade slopes with compacted soils. This will increase runoff, is hard to revegetate and is highly susceptible to soil erosion.

Don't track heavy machinery across the slope. The track marks will create furrows that water will flow down when it rains.

Use erosion control measures before starting earthworks and protect excavations during construction to prevent collapse of unstable or loose earth or sand.

Ensure operators and other workers follow all occupational health and safety procedures, for their own safety and to protect the environment (refer to the Workplace Standards Tasmania website).

Where oil or other fuels are stored, develop a plan to manage accidental spills.

Stabilise and rehabilitate the site as soon as practicable. Temporary stabilisation methods may be necessary if planting cannot take place within a reasonable time.

Follow the guidelines in the Soil and water management on building and construction sites fact sheet 5. Minimise soil disturbance (Derwent Estuary Program 2009).

11.2.3 Trench digging

Trench digging for the installation of pipes and services is often part of construction projects.

Planning is critical, to minimise environmental damage and erosion, and many of the principles described for excavation in coastal areas apply to trenches. In particular, erosion control measures need to be planned for and implemented before works start.

Ensure that trenches will not be exposed to water flows, as this can create serious erosion problems. Schedule works when rain is unlikely and keep trenches open for no more than three days. Minimising the size of the trench through careful planning is the simplest way to reduce erosion and also saves work.

Deposit excavated material up-slope of the trench and install diversion measures to control soil and water flow. Diversion measures such as banks or berms need to be aligned and spaced according to the slope of the land and the potential for erosion due to soil type and rainfall. The diversion measures need to discharge any runoff into a stabilised area or a sedimentation trap and ensure that runoff will not be channelled or funnelled together, which will increase erosion.

Retain the topsoil for rehabilitation. Backfill and rehabilitate trenches as soon as possible. Ensure subsoil is filled in first, then compact soil to 95% standard compaction, add topsoil, level it, and top up as necessary should subsidence occur.

Take care while backfilling to prevent the trench operating as a subsoil drain. The backfill should

therefore be properly compacted and trench stops installed where gradients are considered steep enough to warrant them.

Dispersive soils and tunnel erosion

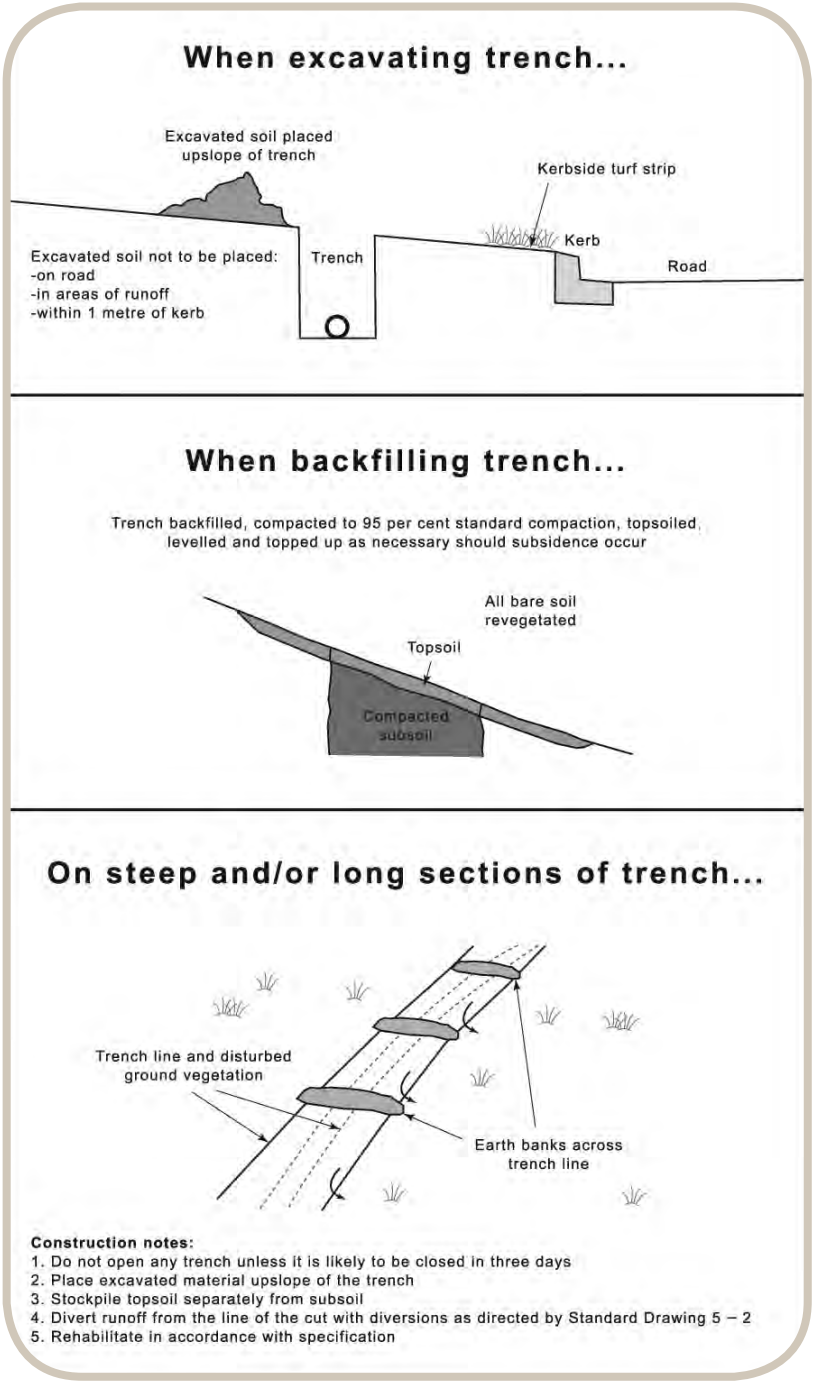
Excavation may increase the risk of soil dispersion and can result in tunnel erosion. Tunnel erosion results from the dispersion of clay soils in water (also known as dispersive or sodic soils). These clay soils collapse or disperse to form dissolved slurry when in contact with fresh water. Tunnel erosion usually occurs in the subsoil first, and drains can quickly enlarge and then collapse to form gullies.

Minimise the risk:

- Consider having the subsoil tested by a soil specialist for dispersive or sodic soils.
- Prevent ponding of water wherever possible.
- Always bury exposed subsoils with topsoil and revegetate.

Refer to Soil and water management on building and construction sites fact sheet 9. Protect service trenches and stockpiles (Derwent Estuary Program 2009).

Figure 11.3 Best practice techniques to minimise erosion when digging trenches. Source: Managing urban stormwater: Soils and construction, vol 2A (Department of Environment and Climate Change 2008a)





11.3 Extraction

This section deals with the extraction of sand and gravel for use as construction materials for buildings and roads. Coastal beaches, dunes and rivers are sometimes used as sources of these materials, but extraction can severely degrade or destroy these ecologically sensitive and dynamic landforms.

Extraction of material from the shoreline, seabed, estuary or riverbed (e.g. sand, shingle, shell) can only be sustained if the natural processes can replace that material. Determining the capacity of natural processes to replenish material requires specialist study and could be expensive.

Extracting sand or gravel from a waterway is only acceptable in rare situations where it benefits the waterway – for instance, where human activities have caused a build-up of sediment that has eroded or changed the course of a stream, or destroyed habitat. For example, at some sites sediments released from old mining operations have formed a sediment slug (a large body of sediment that gradually moves downstream).

Any extraction works should minimise the amount of sediment entering adjoining waterways or coastal waters, and use appropriate sediment traps. Rehabilitation works should be undertaken during and after mining, extraction or exploration activities. These works must be appropriate for the intended future use of the site and, as far as practicable, should be completed before the expiry of the mining lease or exploration permit.

11.3.1 Legislation and approvals for extracting materials

There is a range of legislation that could be triggered by plans for extracting minerals and resources. Refer to ***Chapter 1 and Appendices 1 and 2*** for details of general legislative requirements. In addition to these, the *Mineral Resources Development Act 1995* provides for the development of mineral resources consistent with sound economic, environmental and land use management, and applies to all land and minerals in Tasmania.

Mineral exploration is regulated by the *Mineral Resources Development Act 1995*. Mineral Resources Tasmania (MRT) is responsible for administering the Act. Most mineral exploration work is undertaken with a licence and in accordance with the *Mineral exploration code of practice* (Bacon 1999).

Mining exploration for economic mineral deposits requires the completion of an Exploration Licence Application Form, from the Registrar of Mines, Mineral Resources Tasmania. MRT officers must be consulted before on-ground exploration activities start. A rehabilitation plan may be required.

Quarrying or mining requires an application for a mining lease. Details of proposed mine and quarry developments (including planned rehabilitation practices) must be provided on an 'Environmental Impact Information – Mining Form', from Mineral Resources Tasmania.

Where the annual disturbance is less than 5000m3 for sand or stone and 1000 tonnes for metallic mines, the operation is classified as a Level 1 operation and a council planning permit and environmental approval are required. Above that level, a Development Proposal and Environmental Management Plan is also required by DPIPWE. A comprehensive plan is required by Mineral Resources Tasmania for any



necessary decontamination or rehabilitation of the site.

Where a quarry is operated by Forestry Tasmania in state forest, exclusively for constructing and maintaining roads, a certified forest practices plan (quarry) is required rather than a mining lease and a planning permit.

Extracting gravel or rock for lawful roadworks within a road reserve does not require a separate extractive industry approval from council or DPIPWE, or a mining lease from MRT.

Removing natural materials from Crown land requires a licence under the *Crown Lands Act 1976*. Most shorelines are Crown land, some private landholders have title to the high water mark or beyond. Areas below high water mark generally belong to the Crown.

11.4 Acid sulfate soils

This section covers the importance of managing acid sulfate soils in the coastal environment and the implications for coastal works and development. Acid sulfate soils (ASS) are soils that contain iron sulfides. When the iron sulfides are exposed to the air and become oxidised, sulfuric acid is released. Soils in which the sulfides have not been oxidised are often called potential acid sulfate soils (PASS).

Sediments (layers of soil) that are rich in iron sulfides occur naturally, and may underlie other soils. As sea water is a rich source of sulfates, ASS is most likely to be found in areas where marine sediments have accumulated (both recently and in the past when sea levels were higher).

ASS can be exposed to air through lowering of groundwater levels during a drought or through disturbance by excavation associated with development and land management activities such as water extraction. When ASS are exposed to oxygen, oxidation of the sulfides can occur, generating large amounts of sulfuric acid in the process. Re-wetting of these materials can flush this acid into drains and waterways.

Release of sulfuric acid from the soil can in turn release iron, aluminium and other heavy metals (particularly arsenic) from the soil. Once mobilised in this way, the acid and metals can have a variety of adverse impacts: killing vegetation, seeping into and acidifying groundwater and water bodies, killing fish and other aquatic organisms, and degrading concrete and steel structures to the point of failure.

11.4.1 Legislation and approvals

A range of legislation applies to protecting coastal environments from the impacts of acid sulfate soils. Refer to ***Appendices 1 and 2*** for a summary of the relevant legislation.

Permission to undertake works on any land with ASS or PASS must be given by the relevant landowner or land manager. On areas of public land, the land manager may be the local council or DPIPWE (Crown Land Services or Parks and Wildlife Service).

In areas under the control of the local planning scheme, councils have a responsibility to ensure any application involving ASS is assessed properly, and will advise on the appropriate approvals and whether an ASS management plan is required.

Approvals will also be required if the works are on land managed by other agencies. In some instances, the application may be referred to the Environment Protection Authority (EPA) for assessment.



11.4.2 Impacts of acid sulfate soils

Acid sulfate soils are found in coastal areas of Tasmania. These soils are generally harmless in a dormant state but, once disturbed, the soil reacts with oxygen in the air to form sulfuric acid.

Acid generated by ASS can corrode infrastructure, in particular concrete and roads. Accelerated corrosion of metals, etching of concrete and exposure of aggregate are typical early signs of attack by acidic water. The acid and heavy metals that may also be released from the soil are harmful to marine ecosystems and pose a threat to humans, livestock, wildlife and vegetation.

As long as the soils remain under the water table, oxidation cannot occur. However, once oxidised, re-wetting the soils following disturbance through excavation or water extraction can produce highly acidic leachate. To improve water quality and minimise impacts, disturbed areas may need expensive rehabilitation and/or treatment. Specialist advice will be required in these situations.

Indicators of ASS impacts include cloudy blue-green water or excessively clear water, iron stains, poor pasture, scalded soil, a yellow soil layer or a dark-grey soil layer.

ASS can be prone to subsidence and foundations or earthworks built on these soils may slowly settle or subside unevenly. Structures may require either extensive piles or the laying of an extensive load-spreading membrane. This increases construction costs.

Any development that disturbs the natural sediments, whether terrestrial, estuarine or subaqueous, has the potential to expose and oxidise ASS.

Risk activities include:

- coastal developments, such as housing, resorts, marinas and canal estates
- coastal reclamation
- infrastructure development such as roads, bridges, pipelines and residential services
- agricultural activities such as field drainage, water extraction and deep cultivation
- marine or estuarine activities such as dredging.

Black ooze

In some low-energy water environments, monosulfidic black ooze (MBO) can accumulate. These gel-like substances often occur in freshwater drains and watercourses, or on the floor of sheltered bays, coastal lagoons and estuaries. Changes to water flow or increased boat traffic up stream can result in disturbance of these sediments. Once disturbed, MBOs can lead to rapid deoxygenation of the water, which will kill fish.

MBOs are predicted to occur in parts of Pittwater, Moulting Lagoon, Georges Bay and Macquarie Harbour; disturbance could have significant adverse impacts on the aquaculture industry, residential developments and biodiversity.

Figure 11.4 Monosulfidic black ooze. © Rob Moreton



11.4.3 Acid sulfate soils in Tasmania

In Tasmania, there are extensive areas of ASS in low-lying areas along the northern and eastern coastlines, extending inland along estuaries and marshlands, and in inland back swamps and floodplains at elevations of less than 20m above mean sea level.

ASS is also found on Flinders and King Islands, and other areas. Maps prepared by DPIPWE, available on the LIST website, indicate possible areas that are likely to contain ASS.

In Tasmania , ASS is most likely to be found in areas of recent and older marine sediments associated with accumulations of organic matter and which have generally remained in a saturated state.

A survey for acid sulfate soils by Mineral Resources Tasmania (Gurung 2001) indicated that about 200km of Tasmania's coastline could have sediments that contain iron sulfides. The survey found evidence of acid drainage from disturbance of ASS in a number of locations, including intensively farmed areas in the north-west. More recent work by DPIPWE in 2008–2009 predicted that some 91 000ha of land may have a high risk of encountering potential ASS and a further 616 000ha has a low risk.

Figure 11.5 Blue-green cloudy water is evidence of acid sulfate soil. © Rob Moreton



To date, the impact of ASS in Tasmania has been limited. This probably reflects the relatively low development pressure that these areas have encountered. This pressure is set to increase in coming years with a growth in coastal development, creation or enlargement of marinas, land reclamation and dredging. However, at least one fish kill in Tasmania has been linked to ASS.

On mainland Australia, massive kills of fish, crustacean and oysters have been attributed to ASS and extensive disturbance and exposure of sulfidic sediments has resulted in millions of dollars' worth of damage to fisheries and aquaculture, infrastructure, and coastal land – a situation that can be avoided in Tasmania.

11.4.4 Reducing impacts of acid sulfate soils

Small-scale activities will not disturb very large areas of ASS but disturbance of the soils on a small scale, whilst not requiring a management plan, may have an impact on any infrastructure installed and could cause small-scale localised contamination.

Larger-scale projects in ASS areas can easily lead to environmental damage, which may be difficult and expensive to remediate. Thorough investigation is essential before starting works, to identify whether there is a probability of encountering ASS and, on that basis, determine whether the works are appropriate.

If acid sulfate soils can be avoided, by relocating or redesigning the proposed project, then this should always be the first option. Prevention of



acid discharge is better than trying to rehabilitate degraded land and water.

Careful observation of the soil material and any leachate should be maintained in case unexpected ASS materials are encountered.

Workers should be aware of the signs and indicators of ASS and work should cease immediately if such signs are observed, if ASS are encountered or if there is any suspicion that ASS are present and there is no management plan. Then specialist advice should be sought for the production of a management plan.

It is probably not always necessary to relocate small-scale works away from acid sulfate soil areas, but it is important to reduce the amount of disturbance of these sediments and undertake measures to minimise impacts.

- Cover in situ soils with clean fill, to provide adequate depth for foundations or excavations so that ASS layers are not intercepted.
- Minimise disturbance, dig small shallow holes where possible.
- Redesign the earthworks layout.
- Redesign existing drains.
- Minimise groundwater fluctuations.
- Neutralise by incorporating neutralising agents, e.g. lime, into the soil.
- Strategically re-bury PASS in deep voids below the groundwater table, and cover with either water or compacted soil to exclude oxygen.

Indicators of acid sulfate soils

- cloudy blue-green water, milky white water, crystal clear water, or yellowish brown water
- iron staining and reddish-brown deposits in creeks or drains
- poor pasture or swamp vegetation
- scalded soil
- orange or yellow soil layers or mottles
- sticky grey to bluish-grey soils with orange streaks
- gooey black sediments on bottom of drains
- rotten-egg smell from freshly exposed soils
- fish deaths and diseases
- etching of concrete and exposure of aggregate – typical early signs of attack by acidic water

11.4.5 Acid sulfate soils management plan

A management plan may be required for large-scale works that may disturb ASS or groundwater. A plan will detail the procedures to minimise and/or neutralise any impacts from the disturbance of ASS. Guidelines for the content of a management plan are presented in the Tasmanian acid sulfate soil management guidelines (DPIPWE 2009a).

Planning should include specialist advice and measures to minimise potential impacts, including problems in areas that might be drained and disposal of dredged material.

Other matters to consider:

Assess the need for supporting structures on subsidence-prone soils

Identify rehabilitation methods, including the appropriate disposal of any ASS material.

Obtain specialist advice about safe methods for disposing of excavated materials that contain toxic materials or acid sulfate soils.

11.4.6 Climate change and ASS

Potential climate change impacts on areas with ASS or PASS include sea level rise and more frequent and severe storm events, leading to inundation and erosion. Increased erosion of coastal dune systems, tidal mud flats and estuary riverbanks could lead to more acid sulfate soils being exposed.

Changes to rainfall and associated river flows may actually lead to lowering marshes and wetlands and decrease the flow of waterways in some areas, which could also result in exposing acid sulfate soils.

With increased stress on coastal systems due to climate change, it is important to minimise disturbance of acid sulfate soils to avoid adding pressure to already stressed ecosystems.



Figure 11.6 Acid damage to bridge. © Rob Moreton



11.5 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Aboriginal Heritage Tasmania

Desktop search for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Coastal Values data

Vegetation, species habitat and geomorphic values data for a 100m-wide coastal strip of the northern, southern and north-western Tasmanian NRM Regions. Available on the LIST

www.thelist.tas.gov.au

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. Download a free registration form from the website to access

https://www.naturalvaluesatlas.tas.gov.au

Planning guidelines for the Tamar Estuary and foreshore (Watchorn 2000)

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

Soil and water management on building and construction sites, fact sheets (Derwent Estuary Program 2009)

The fact sheets can be obtained as hard copies in a folder from the Derwent Estuary Program, or local councils in southern Tasmania and are available on both the Derwent Estuary Program and NRM South websites.

www.derwentestuary.org.au

http://www.nrmsouth.org.au/information/view_Publications_15130754/view_Technical_Sheets_Manuals__Reports_15130759/

The factsheets are divided into sediment control measures and erosion control measures. Erosion control measures hold the soil in place and reduce soil removal by rainfall or runoff. Sediment control measures capture the eroded soil from the runoff preventing it from leaving the building or construction site.



There are 19 fact sheets, each covering different sediment and erosion control measures. Use the fact sheets as needed. Remember: each site is different and sediment and erosion control measures need to be assessed on a site-by-site basis.

1. Soil & Water Management on Large Building & Construction Sites
2. Soil & Water Management on Standard Building & Construction Sites
3. Soil & Water Management Plans
4. Dispersive Soils – High Risk of Tunnel Erosion
5. Minimise Soil Disturbance
6. Preserve Vegetation
7. Divert Up-slope Water
8. Erosion Control Mats & Blankets
9. Protect Service Trenches & Stockpiles
10. Early Roof Drainage Connection
11. Scour Protection – Stormwater Pipe Outfalls & Check Dams
12. Stabilised Site Access
13. Wheel Wash
14. Sediment Fences & Fibre Rolls
15. Protection of Stormwater Pits
16. Manage Concrete, Brick & Tile Cutting
17. Sediment Basins
18. Dust Control
19. Site Revegetation

Transport Tasmania

Roadwork specification R92 – Underground Service Facilities.

www.transport.tas.gov.au

Tasmanian reserve management code of practice (PWS et al. 2003)

Soil conservation and land rehabilitation guidelines

Workplace Standards Tasmania

For OH&S procedures

www.wst.tas.gov.au

Extraction

Mineral Resources Tasmania

Exploration Licence Application Form, Environmental Impact Information - Mining Form

Mineral exploration code of practice (4th ed) (Bacon 1999)

Quarry Code of Practice (Department of Primary Industries, Water and Environment, and Department of Infrastructure, Energy and Resources 1999)

www.mrt.tas.gov.au



11.5

Acid sulfate soils

Acid sulfate soil information kit

Collation of resources from around Australia, includes the National Strategy and a booklet on keys to success. Available from the National Acid Sulfate Soil website

http://www.environment.gov.au/archive/coasts/cass/index.html

DPIPWE Land Conservation Branch

Instructions on how to use the maps on the LIST for ASS

Tasmanian acid sulfate soil management guidelines (DPIPWE 2009a)

Includes guidelines for the development of ASS management plan

Links to pamphlets, poster and more information on ASS are also available here www.dpipwe.tas.gov.au/acidsulfatesoils

Guidelines for sampling and analysis of lowland acid sulfate soils (ASS) in Queensland (Ahern et al.1998)

http://www.derm.qld.gov.au/land/ass/pdfs/sample_analysis_guide.pdf

National strategy for the management of coastal acid sulfate soils (NSW Agriculture 2000)

Prepared by National Working Party on Acid Sulfate Soils

http://www.mincos.gov.au/__data/assets/pdf_file/0003/316065/natass.pdf

The LIST

Predictive maps of possible acid sulfate soil occurrence

www.thelist.tas.gov.au/

Log onto www.dpipwe.tas.gov.au/acidsulfatesoils and follow the instructions on how to use the LIST database to access ASS predictive mapping.



12 Stormwater and crossings

12.1 Drainage and stormwater management

12.2 Crossings – bridges, causeways and culverts

12.3 Tools and resources

This chapter deals with managing stormwater networks and outlets that convey stormwater runoff into coastal areas, and providing crossings over coastal waterways. It is primarily concerned with activities adjacent to the immediate foreshore. Further information on natural waterways such as wetlands and saltmarshes can be found in Chapter 6 Coastal landscape management.

Tab photo: Bridge over Carlton River, south-east Tasmania.
© Leah Page.



12.1 Drainage and stormwater management

This section provides information for improving stormwater management and minimising environmental impacts when installing pipelines and stormwater infrastructure in coastal areas.

As stormwater flows over the ground it picks up a range of pollutants including oils, litter, metals and sediments, which are transported into the coastal area. Pathogens, weed seeds and nutrients can also be transported.

Increased stormwater velocity and volume, as a result of developments and hardening of surfaces (roads, paths etc.) can increase the erosion caused by water runoff and the capacity of flows to carry sediments and pollution into the coastal environment.

Properly managed, stormwater is a significant resource. Good stormwater management involves conserving water and managing pollution at the source, before it reaches waterways. This approach is better and more cost-effective than treating the effects of pollution downstream. Better quality runoff maintains healthy waterways and protects coastal ecosystems and values such as fisheries and recreational opportunities.

Water Sensitive Urban Design (WSUD) is an essential part of low-impact coastal development that is more attuned to natural hydrological and ecological processes. It gives greater emphasis to on-site collection, treatment and utilisation of stormwater flows as part of an integrated system that may be applied in addition to or in lieu of conventional stormwater measures. For more information on WSUD, ***see section 12.1.4***.

When planning developments in coastal areas, ensure that stormwater drainage is carefully designed, constructed and maintained so as to minimise impacts on the natural water cycle and coastal values. This requires responding to the constraints and opportunities of each individual site. Carefully consider site characteristics such as coastal values and processes, soil type, slope, groundwater conditions, rainfall, and the scale and density of development.

More technical detail is available in Water Sensitive Urban Design: Engineering procedures for stormwater management in southern Tasmania (Deeks & Milne 2005) and the Draft state stormwater strategy (Derwent Estuary Program in prep).

12.1.1 Legislation and policies

Common legislation and approval processes are detailed in ***Chapter 1*** and a summary of all relevant legislation is provided in ***Appendices 1 and 2***. Water management is specifically legislated under the *Water Management Act 1999* and the *State Policy on Water Quality Management (1997)*.

The *State Policy on Water Quality Management (1997)* requires local governments to prepare and implement a Stormwater Management Plan (SMP) where urban runoff threatens the values, uses and water quality of downstream waterways. The *Draft State Stormwater Strategy* (Derwent Estuary Program, in prep) and *Draft Model Urban Stormwater Management Plan* (DPIWE 2000a) were developed to assist local government to meet its stormwater management obligations under the policy.

12.1.2 Impacts of poorly managed stormwater in coastal environments

Stormwater systems can conserve water and provide a valuable alternative water supply. However poorly managed drainage and stormwater systems may have the following adverse effects in coastal areas:

- Structures may interfere with natural coastal and estuary processes, which can alter the transport of sand by tides, waves and currents and cause erosion or sediment build up.
- Loss of structures or damage to them may be caused by rising sea level (e.g. there may be increased scour around pipes due to increased wave action).
- The nutrients and pollution from drainage outlets may degrade the quality of receiving waters and damage sensitive ecosystems, such as saltmarshes, mudflats, wetlands and fish nursery areas. Nutrients may cause algal blooms and growth of nuisance algae, which can kill seagrass, degrade structures and make rocky shorelines hazardous to pedestrians.
- Pathogens (e.g. faecal bacteria) in stormwater from drainage outlets may contaminate and reduce the recreational amenity of the surrounding coast. Litter in stormwater, such as plastic bags, are visually displeasing and may strangle and starve wildlife.
- Any drainage works in coastal areas risk disturbing acid sulfate soils (ASS). Appropriate investigations

Figure 12.1 Eroded stormwater outlet associated with public access has become a hazard. © Kevin Phillips



should be undertaken to identify any possible occurrence of ASS and management plans developed to address them if disturbance is deemed to be large scale.

12.1.3 Planning for stormwater management

Appropriate stormwater treatment systems will depend on the purpose of the treatment and the characteristics of the site. Aim to use systems that are least likely to cause environmental damage and that maximise benefits to the environment.

Consider drainage and stormwater design at the planning stage, well before any ground disturbance/construction occurs. The alternative – addressing stormwater design as an additional feature after planning and design has been developed – can both limit opportunities for effective stormwater drainage and increase the cost of the system.

It is cheaper and more effective to reduce and control stormwater pollution at the source. Community education programs can persuade people to clean up litter from streets and wash their cars on lawns and understand the impacts of illegal sewer connections to stormwater systems.

Figure 12.2 Inappropriately sited pipeline on beach is hazardous and looks unsightly. © Leah Page



Coastal stormwater drainage can also be susceptible to damage by wave erosion and/or sand or sediment build-up and can be expensive to maintain. Works on the shoreline may cause increased wind or wave erosion. Structures on or near the shore are vulnerable to damage from sea level rise (Sharples 2006). Therefore planning for drainage and stormwater design is essential. Consult an environmental engineer.

Consult a coastal geomorphologist about placement and the best design and construction methods for the site, including the location of outlets into the sea or waterways, and the distance pipes extend into the water.

Identify any natural or cultural heritage values that require protection. Seek specialist advice – assessments and approvals may be required. Values include Aboriginal heritage, vegetation communities, threatened species and significant wildlife habitat. The Coastal Values data and Natural Values Atlas are helpful resources for natural values. ***Refer to 12.3 Tools and resources.***

Consider alternative stormwater treatment systems (WSUD) to reduce impacts associated with piped systems and design drains, and other stormwater management systems to meet engineering requirements (Australian Standards).

Minimise the number of outlets into the sea or estuary (e.g. rationalise outlets and/or use existing outlets).

Use a variety of methods to treat stormwater to remove a wider range of pollutants and reduce peak flows.



Site selection

When locating stormwater drainage, choose a site that minimises interference with natural systems, especially coastal processes (e.g. movement of sediment by waves and currents) and marine hydrology (seasonal patterns of tidal flushing, etc). Also consider the following issues:

- Avoid unstable or very erodible sites (e.g. dunes and slip-prone areas), natural drainage channels and stream banks.
- Assess the potential for works to mobilise contaminated sediments (e.g. heavy metals).
- Minimise impacts on natural or cultural heritage values (e.g. threatened species or Aboriginal middens).
- Avoid areas infected with phytophthora root rot (e.g. most lowland heath vegetation).
- Avoid areas that can mobilise contaminated sediments (heavy metals) or acid sulfate soils. Disturbing ASS can lead to corrosion and loss of structures.
- Avoid pipes discharging on beaches.
- Avoid obstructing public access to and along the shoreline.

Installation

Before construction works, prepare a works plan that outlines the works to be undertaken and the measures that will be used to minimise the risk of causing environmental damage.

Ensure all staff and contractors are aware of the environmental considerations and any operational constraints required to protect environmental values. Provide supervision to ensure best practice standards are met.

Pipelines

In the past, stormwater outlet pipes have been placed on beaches. This is not appropriate for public access, health and safety reasons. Pipelines crossing the seabed can harm seagrass and other important marine habitats. Installation of pipes into waterways may also need to consider navigation for boats. If pipes into the sea are required, consult an environmental engineer for effective design and seek the advice of a coastal geomorphologist.

Minimise the number of outlets into the sea or estuary. Remove pipes in favour of on-site stormwater systems (e.g. WSUD) or reconnect new networks into existing outfalls where appropriate.

Limit the impacts of existing stormwater pipe outfalls on the shore. Redesign outlets by reducing pipe length on the beach. If there is enough room, discharge the outfall into a vegetated swale for pollution treatment and flow reduction. Where space is limited, encasing the outlet with natural rock can break up concentrated flows, reduce the velocity of flows to non-erosive rates and stabilise the outflow point.

If the pipe is highly visible (e.g. along a beach), natural rock and vegetation placement can conceal the outfall. If the outfall becomes council infrastructure, appropriate design approvals are required.

Gross Pollutant Traps

Gross pollutant traps (GPTs) – structural litter and pollution collection devices – have been installed on the end of outfalls on beaches to improve water quality. Locating them in the tidal zone has caused problems with sand blocking up the GPTs. Better results can be achieved by locating them near the pollution source, e.g. the drainage networks from a shopping centre, service station or car park. Litter traps installed on individual stormwater drainage pits are suitable for smaller stormwater catchments or where there are litter hotspots.

Figure 12.3 Inappropriate siting of stormwater outfall on beach causes scouring and restricts pedestrian access. © DPIPWE



12.1.4 Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) is the design of stormwater infrastructure that aims to minimise impacts of developments on waterways and the coast. This is achieved by source control strategies that treat, store, and infiltrate stormwater runoff on-site before it can affect receiving waters. This is a change from the traditional approach, which was to get water 'piped and delivered off site' as quickly as possible.

WSUD represents best practice in Australia for water conservation and stormwater management and is ideally suited to developments on the coast incorporating specifically constructed elements including rainwater tanks, permeable pavements, vegetated swales, biofiltration systems ('raingardens'), green roofs and stormwater treatment wetlands.

Many WSUD methods are low-cost and can be retrofitted into existing catchments or incorporated at the design stage of new developments, avoiding the need for installing expensive piped stormwater networks and associated works e.g. pavements, kerbs and other infrastructure.

WSUD structures can be attractive parts of the landscape, adding aesthetic values to housing developments.



WSUD key principles:

- protecting water quality of surface and ground waters
- maintaining the natural hydrologic behaviour of catchments
- protecting natural features and ecological processes
- minimising demand on potable water supply systems
- integrating water into the landscape to enhance visual, social, cultural and ecological values
- collecting, treating and/or reusing run-off, including roof water and other stormwater
- reusing treated effluent and minimising wastewater generation
- increasing social amenity in urban areas through multipurpose green space and landscaping

A well designed WSUD system can result in significant reductions of stormwater pollutants i.e. an 80% reduction in sediments, 70% reduction in litter and substantial reductions in nutrients, heavy metals and hydrocarbon loads. In Tasmania (as in other Australian states such as Victoria and Queensland), the removal of the following key pollutants is recommended for stormwater management targets that WSUD systems need to meet:

- 80% reduction in the average annual load of total suspended solids (TSS) based on typical urban stormwater TSS concentrations.
- 45% reduction in the average annual load of total phosphorus (TP) based on typical urban stormwater TP concentrations.
- 45% reduction in the average annual load of total nitrogen (TN) based on typical urban stormwater TN concentrations.

To meet these targets, WSUD systems should conform to accepted Tasmanian and Australian practices, such as site-specific modelling of pollutant-generation against different WSUD techniques using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) proprietary software or the guidance provided in *Water sensitive urban design: Engineering procedures for stormwater management in Southern Tasmania* (Derwent Estuary Program 2005). Stormwater flow management estimates need to be prepared according to methodologies described in *Australian Rainfall and Runoff* (Engineering Australia 2004) or through catchment modelling completed by a suitable professional.

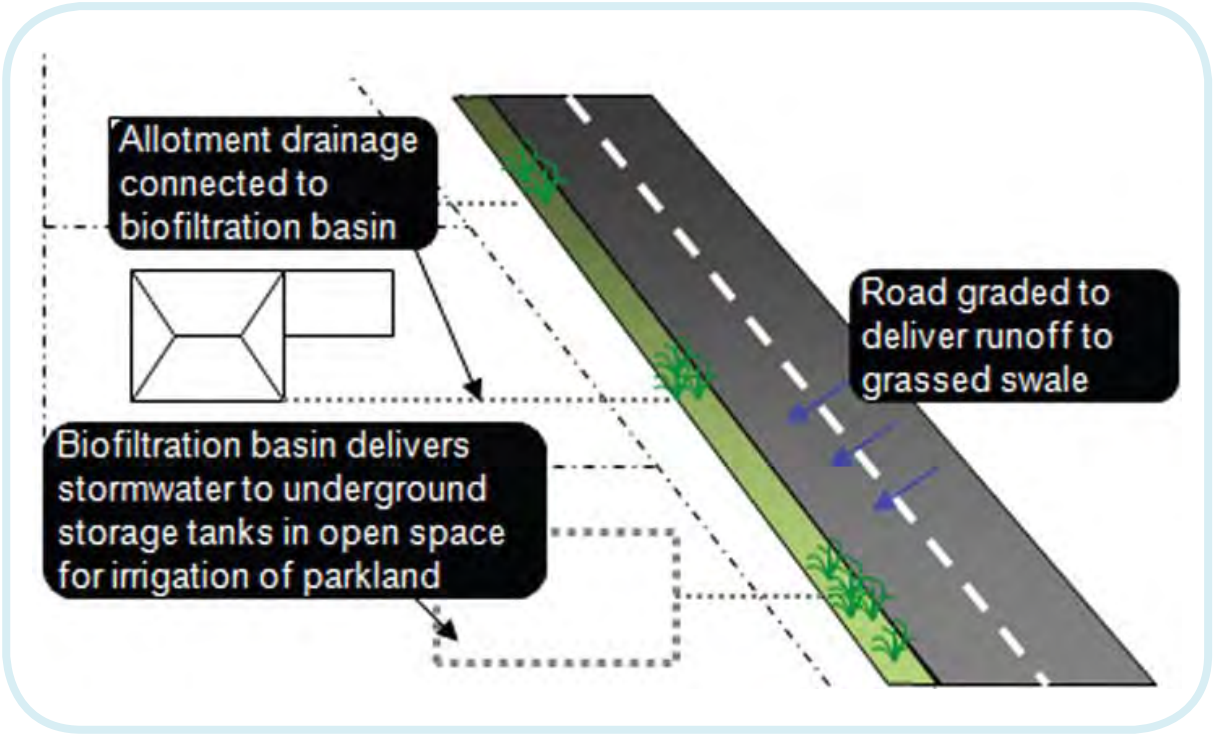
12.1.5 Treatment trains

Stormwater is best managed distributing a combination of WSUD features within a development or catchment, creating a treatment train – a series of treatment systems that complement one another to achieve clean stormwater and reduce peak flows in a catchment.

Each stormwater treatment measure operates over a particular hydraulic loading rate and pollutant size range, treating gross particulates (litter, larger organic matter, etc.) first, then coarse particulates (sediment) and finally fine, colloidal and dissolved material.

To be most effective, the selection and placement of the different WSUD systems in the treatment train should be determined during the site planning and design phase. Treatment trains can be applied at a wide range of scales within a development, such as housing layout (including design of single residential allotments and subdivisions) and streetscape layout (including road and car park design).

Figure 12.4 Example of stormwater treatment train strategy for a typical suburban street. Source: Draft state stormwater strategy (Derwent Estuary Program, in prep)



Case Study 12.1 Water Sensitive Urban Design – Cornelian Bay

Stormwater is treated by a number of WSUD methods before it enters Cornelian Bay.

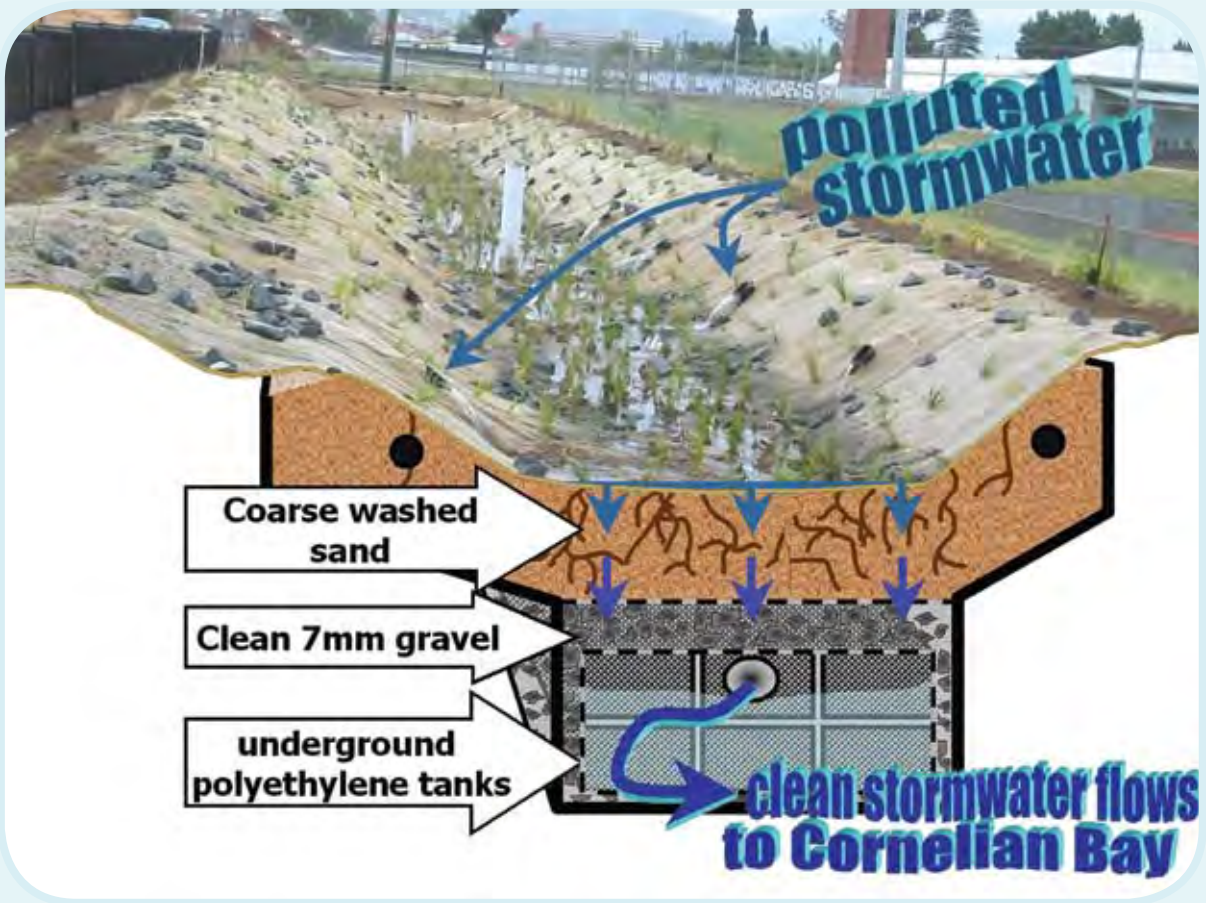
First it is filtered by an underground pollutant trap, which removes litter, oil and coarse sediment.

Water is filtered again as it passes through a vegetated channel and yet again as it percolates through sand, which removes fine sediments and their attached pollutants.

After passing through the sand, the water travels through a layer of gravel underlain by a filtering 'geofabric', before entering the subsurface tanks.

In the tanks, a biofilm (a layer of bacteria) traps remaining pollutants and breaks them down into harmless substances.

Figure 12.5 Cornelian Bay integrated stormwater treatment train, first rainfall after installation. Plants have since become more established. © Hobart City Council





Case Study 12.2 Water Sensitive Urban Design – New Town Bay

A floating litter trap was installed near the mouth of New Town Rivulet to remove gross pollutants. The trap is easily serviced and prevents litter from the urban environment being washed into the Derwent Estuary.

Refer to the Hobart City Council and Derwent Estuary websites

Figure 12.6 New Town Bay floating litter trap. © Hobart City Council



Figure 12.8 The stormwater rain garden is effective and looks great. © John Chrispijn



Case Study 12.3 Stormwater wetlands – Lauderdale

The project involved the relocation and lining of existing stormwater drains and the construction of a treatment wetland with six permanent pools and a meandering drainage channel on a 5ha site. The project's goal was to improve the quality of the residential stormwater discharged to Lauderdale Canal and Ralphs Bay – an important migratory bird habitat.

Figure 12.7 Lauderdale stormwater wetlands. © John Chrispijn



Case Study 12.4 Small bioretention basin in North Hobart

A small biofiltration system (rain garden) installed in Lefroy St, North Hobart is capturing and treating runoff from a Council owned car park 1400 m^2 in size. Natives were used, *Isolepsis nodosa* (knobby clubrush) and *Lomandra longifolia* (mat rush), to plant out the rain garden. A 100mm slotted drain pipe at the base of the rain garden directs the treated stormwater into the adjoining Providence Gully Rivulet.



12.1.6 Ongoing maintenance of stormwater structures

All structures should be maintained regularly to minimise the risk of causing erosion, and obstructing the passage of pedestrians, fish and other fauna. Debris and sediment may block narrow stormwater pipes, particularly if trash screens have been installed. Inspections and maintenance should be carried out on a regular basis and after heavy rainfall or storm events.

Inspection and maintenance should include the following.

- Check for erosion around the stormwater structure and check that structures are secure and not becoming a hazard to the public.
- Check pipe openings and litter traps, and remove debris to allow passage of fish and other animals. Gross pollutant traps will require regular removal of debris.
- Maintain the vegetation around the structure. Remove weeds and ensure vegetation is growing where it should and not interfering with the useability and function of the structure.

Vegetation maintenance around stormwater structures

Avoid as far as possible using herbicides along or in drains (as this causes pollution, kills frogs and exposes the soil to erosion). To maintain grass swales, slash the vegetation rather than using herbicides. Ensure that slashed material is removed and does not get into the waterway. Sometimes it is safe to spread slashed material on site away from the waterway, but only if it doesn't contain ripe weed seeds. ***Refer to Chapter 7 Vegetation management.***

If spraying is required near waterways, check that the appropriate chemical is used and avoid spraying in the breeding seasons of frogs and other animals. Use only herbicides registered for use near waterways. If in doubt, contact a Regional Weed Management Officer at DPIPWE.

Follow the Codes of practice, guidelines and information sheets for using herbicides, available from the DPIPWE biosecurity website.

Refer also to Transport Tasmania (2003) *Roadworks specification R34 –Drainage maintenance.*

12.1.7 Climate change and stormwater management

Climate change makes it more important than ever to employ water-sensitive urban designs in stormwater management practices. It also makes the protection of natural and cultural coastal values during coastal management works critical, as climate change places increased pressure on coastal ecosystems.

New structures on the coast need to take into account the latest Intergovernmental Panel on Climate Change (IPCC) sea level rise predictions (currently 80cm over the next 100 years). Structures will be susceptible to wave action and storm surges if not sited appropriately.

Sea level rise will also result in increased inundation of low-lying coastal areas that might impact on the effectiveness of stormwater treatment facilities. King tide events already cause localised flooding when seawater is pushed back up into the stormwater systems of more urban coastal environments. It is important to seek expert advice and use the latest information and modelling when planning stormwater facilities or structures. Refer to *Indicative mapping of Tasmanian coastal vulnerability to climate change and sea-level rise: Explanatory report* (Sharples 2006).



12.2 Crossings – bridges, causeways and culverts

This section describes design and installation of waterway crossings, such as bridges, causeways and culverts in coastal areas and techniques for minimising impacts on coastal processes, values and ecosystems. Habitat, vegetation and cultural heritage values can be damaged during construction of waterway crossings. Construction can also cause significant bank and bed disturbance in waterways. These structures can create barriers to fish movement and ongoing bank erosion.

All crossings require careful design, siting and construction to cater for the special conditions and values at their location and the coastal processes such as waves, tides and sand movement. Such structures are vulnerable to damage from coastal processes; when designing them, planners and engineers need to consider projected sea level rise and increased storminess associated with climate change.

Appropriately designed causeways or culverts will maintain tidal flows and allow the passage of fish and other animals. Well-designed bridges and causeways can be attractive parts of the landscape and serve as useful viewing points and fishing places.

12.2.1 Legislation and approvals

There is a range of legislation that provides for protection of coastal values when undertaking works on the coast. In addition to legislation mentioned in ***section 12.1.1, Chapter 1*** provides an overview of common legislation and ***Appendices 1 and 2*** provide information on all the coastal legislation. Of particular relevance to crossings is the *Inland Fisheries Act 1995,* which prevents the obstruction of fish passage.

Structures on the shoreline often cross over land and water that is governed by different authorities. The Crown owns the seabed and water, regardless of whether the landowner has a high water mark title. Structures below high water mark also require DPIPWE Crown Land Services approval and a Crown Land lease. Depending on the structure's size and nature, DPIPWE may require submission of a Development Proposal and Environmental Impact Statement.

If the structure crosses land managed by the Parks and Wildlife Service (PWS), under the *National Parks and Reserves Management Act 2002,* approval of PWS will be required. This is necessary before submission of council planning applications.

Necessary approvals may include council planning and building approvals, and permits under the local planning scheme.

12.2.2 Types of crossings

The type of crossing selected will depend on its purpose and the characteristics of the site. In all cases, the type of structure used should cause the least amount of environmental damage. In descending order of preference for crossings over watercourses, choose a bridge, arched culvert, open-bottom box culvert, closed-bottom box culvert, or pipe culvert (Gallagher 2003).

Bridges

Bridges are raised structures that carry a path or a road over a waterway. Typically, they are used on estuaries or rivers with clearly defined drainage channels. Usually a bridge has few or no structures in the water, so it does not impede flows.

Bridges are the most appropriate crossings for sites with:

- actively eroding banks
- a channel too steep for a culvert
- steep banks that would need considerable infilling if a culvert was used
- threatened species, fish habitat or aquatic vegetation.

Culverts

Culverts are arched, boxed or piped conduits that allow water to pass under a road or other structure. They are usually made of concrete or galvanised corrugated steel pipe. The location and size of the culvert is determined by the stream flows and the need for it to be safe during high flows. Like bridges, some large box and arch culverts do not significantly alter the riverbed or the width of the channel.

Many aquatic animals avoid or are unable to go through culverts. Culverts channel the water flow over the smooth concrete surface and increase flow velocity. Poorly designed or poorly embedded culverts prevent upstream movement and natural mixing of aquatic species.

Wherever possible, use bridges instead of culverts. Try alternative inverted U-shaped designs or irregular shapes. If round culverts are necessary they should be fully embedded in the stream bed and ideally should have an artificial substrate provided down the mid-line of the pipe (e.g. cemented rocky gravel).

Causeways

Causeways are structures that raise the base of the river or estuary bed. There are culverts underneath to allow water to go through the causeway when flows are low, but it may be inundated during floods

Figure 12.9 The Sorell causeway bisects Pittwater-Orielton Lagoon, a Ramsar site in south-east Tasmania. © Leah Page





or by storm waves. Typically, causeways are located on waterways with intermittent flows, poorly defined drainage channels, and wide shallow estuaries where it is too expensive to construct a bridge.

12.2.3 Impacts of crossings on coastal environments

Interfering with natural coastal and estuarine processes may alter the transport of sand by tides, waves and currents. Bridge and causeway construction across estuaries and other shorelines in the past has sometimes involved filling in wetlands and destroying vegetation and intertidal habitat.

Causeways across estuaries may severely restrict tidal flows and reduce the tidal prism (the volume of water moving in and out of the estuary). This may increase the rates of siltation and deterioration in water quality, which in turn may damage seagrass beds and other habitats.

The reduced fluctuation in tide levels and velocities upstream from a causeway, together with highly reduced salinity levels, may lead to considerable changes in plant communities and animals. If they restrict flows, causeways may cause more frequent local flooding.

Loss of structures or damage may be caused by rising sea level (e.g. there may be increased scour around structures due to increased wave action).

Poorly designed bridge and causeway approaches may erode and deposit large amounts of sediment and road pollutants into the waterway or impede sediment flushing.

Bridge footings and bank armouring (e.g. rocks) may stop animals moving along the banks. This may force animals to cross nearby roads, which increases their chances of being killed.

Causeways and culverts may hamper fish migration and movement of platypus and water rats (e.g. where there are high velocities through narrow pipes, or a steep drop-off from a culvert). If several small culvert pipes are used rather than one large barrel, they might be too small or dark for fish to swim through.

Debris and sediment may block narrow culverts, particularly if trash screens or stock barriers have been installed. The accumulated debris could stop migratory species passing through by creating a physical barrier or increasing flow velocity.

12.2.4 Planning for crossings in coastal environments

Before constructing crossings, prepare a works plan that outlines the works to be undertaken and the measures that will be used to minimise the risk of causing environmental damage.

- Ensure that all planning and approvals processes have been met.
- Consult coastal geomorphologists, engineers and hydrologists about the crossing design and placement. All structures should be designed by a suitably experienced engineer in consultation with a coastal geomorphologist.
- Seek specialist advice about fauna, flora and aquatic values in the area. Design crossings to accommodate requirements of threatened or highly valued species. Time works to avoid disturbance to sensitive species such as shorebirds. Consider temporary relocation of threatened species if appropriate. ***Refer to Case Study 10.1 Protecting threatened seastars during construction works in south-east Tasmania***
- Identify any cultural heritage values that may require protection. Consult with Heritage Tasmania and Aboriginal Heritage Tasmania, who



can advise whether there are any values in the area.

- Structures should generally comply with the relevant requirements (e.g. Australian Standards, Austroads and Transport Tasmania guidelines).
- Align structures perpendicular to the direction/s of the prevailing waves and sediment movement, wherever possible. This will minimise obstruction of the movement of sediment.
- Provide for navigation, where boating occurs.
- Preserve the connectivity of the waterway by minimising any constriction of water flow and simulating natural channels and water flows.
- Plan works in watercourses and estuaries to coincide with low water flows, unless this may have adverse effects on plant communities and animals (especially threatened aquatic, estuarine and marine species).
- Avoid works in areas infected with phytophthora root rot. Implement good hygiene practices to avoid spreading weeds and diseases on machinery, tools and equipment.
- Restore the natural vegetation as soon as possible, to minimise the potential for bank erosion. It may be necessary to use geotextiles to stabilise banks.

Site selection for crossings

Choosing the appropriate site is critical for structures that extend across the shore and into the sea. The structures are susceptible to damage by wave erosion and/or sediment build-up and can be expensive to maintain. Works on the shoreline may also cause increased wind erosion.

- Choose a site that minimises interference with natural coastal systems and processes (including wave action and seasonal cycles of sediment accretion/erosion) and marine hydrology (seasonal patterns of tidal flushing, currents, etc.).
- Avoid unstable areas such as dunes, slip-prone areas, very erodible soils, natural drainage channels and stream banks. Avoid shoreline or marine vegetation, floodplains, wetlands and other sensitive sites, as far as possible.
- Choose sites away from significant cultural or natural heritage values as identified during planning.
- Avoid areas where the works could mobilise contaminated sediments or acid sulfate soils (ASS). Disturbing ASS may lead to environmental damage that requires remediation and also corrosion and loss of structures. ***Refer to section 11.4 Acid sulfate soils.***
- Site a causeway on a straight stretch of the waterway with a minimal gradient.
- Site a causeway on a stable substrate where there is scour-resistant material immediately downstream.

12.2.5 Installing and constructing crossings

All works crews and contractors should be briefed on the environmental standards to be met by the project and adequate supervision should be provided to ensure these standards are met.

Minimise disturbance to the shoreline or to riverbanks, bed and natural flows. Avoid deep box cuts on the approaches to bridges and causeways.

Minimise erosion by protecting estuary banks or streambanks and bridge or causeway embankments with concrete, timber, geotextiles, vegetation or rocks where appropriate. Stabilise watercourse beds (e.g. by armouring the bed with large rocks). Use energy dissipaters if there is insufficient natural protection against scouring or erosion, but only where they do

not obstruct the passage of aquatic fauna. Obtain advice from a coastal engineer about the appropriate materials and methods for the site.

Employ sediment and erosion control measures during construction, to minimise sediment flow into the waterway. Install cross-drains (at right angles to the roads) to drain water from the approach road into a sediment trap or the roadside vegetation. Place the drains at least 20m away from the crossing.

Both ends of the causeway should be 'keyed in' to the bank for 3–5m. Construct the surface of the causeway with erosion-proof material, such as interlocking angular rock or concrete or flexmat (a concrete and webbing mat).

Operate construction equipment in a manner that causes the least disturbance to the watercourse or estuarine bed and banks.

- Keep machinery out of the channel as much as possible, and minimise entry points.
- Do not dump construction materials (e.g. concrete) or push fill into the water.
- Locate surplus fill at least 10m from the shoreline, estuary or watercourse banks, separated by an effective filter strip of vegetation.

Keep water away from fresh concrete for at least seven days, where feasible. As fresh concrete is highly alkaline, it can make water uninhabitable for fish and other fauna. Some fast-drying mixes may allow a shorter curing time.

Figure 12.10 Small-scale private crossing over saltmarsh area - whilst in poor condition, it does allow the free passage of water. © Leah Page





12.2.6 Special considerations for bridges and causeways on the coast

These guidelines provide some points to consider to produce the best possible outcome for the coastal environment.

Design and construct structures to accommodate all water flow conditions. Design permanent bridges and causeways over rivers and estuaries to withstand the one-in-50-year flood level and storm surges. Consider the latest IPCC predictions for sea level rise. Specialist advice will be needed on a range of technical issues (e.g. hydrology and hydraulics).

Design and position the structure perpendicular to the waterway. Design and space the causeway openings to maximise tidal flushing.

Preserve the waterway's natural hydraulic regime (pattern of water flows) as much as possible. Place bridge piers and footings above the high water mark, to avoid constricting the channel and reducing the flow area. If bridge piers and footings must be placed in the channel, align them parallel to the flow so that the flow is not directed onto the banks. Use the minimum number of piers, shaped to minimise eddying and scouring of the waterway. Include erosion protection if scouring is likely to occur.

Consult the Inland Fisheries Service to ensure the passage of fish will be provided for. Design structures and time works to minimise disturbance to the passage of fish and other aquatic fauna. Provide enough space under the bridge for animals to walk along the riverbanks, where practicable. Seek specialist advice and refer to the design considerations in the *Policy and guidelines for fish friendly waterway crossings* (NSW Department of Primary Industries) and *Why do fish need to cross the road?* (Fairfull & Witheridge 2003).

On a multi-lane bridge, if the risk of pollution from road run-off is minimal, consider using grated decking so that light and moisture can penetrate.

If the bridge is to be used by the public and heavy vehicles, detailed design drawings should be submitted that satisfy all the relevant Australian Standards and are certified by a qualified engineer.

Design structures to look attractive and to suit the coastal landscape, as well as provide access for vehicles, bicycles and pedestrians. Wherever appropriate and affordable, allow for safe fishing places on a bridge or causeway.

12.2.7 Special considerations for culverts

These guidelines provide some points to consider, to produce the best possible outcome for the coastal environment.

When planning watercourse crossings where fish are likely to be present, consult a specialist and seek technical information on culvert design and placement. The *Forest Practices Code* (Forest Practices Board 2000) has design and installation requirements (page 15) to assist the passage of aquatic freshwater fauna, some of which will apply to estuarine species as well. Consult the Inland Fisheries Service to ensure the passage of fish will be provided for appropriately.

Ensure the culvert's capacity can accommodate peak flow volumes, so that the top of the inlet is not submerged in peak flows by more than 0.5m (in low to moderate-high erodibility class soils) or 0.1m (in high to very high erodibility class soils), unless measures are used to protect against erosion where the water discharges at the downstream end.

Open-bottom culverts with the natural streambed running through them are preferable to other culverts. Ensure they do not break up the streambed



material, and are large enough not to constrict flows or trap debris during normal flow conditions.

If an open-bottom culvert is not suitable:

- One large culvert spanning the width of the waterway is preferable to two or more small culverts, as it is usually more hydraulically efficient.
- Use culvert pipes of sufficient strength (e.g. reinforced concrete pipes) to handle anticipated bearing loads. The minimum diameter of culvert pipes should be 300mm (or 375mm in areas with high or very high erodibility class soils, where the risk of culvert blockage or failure is high).
- If multiple culverts are needed to span the riverbed, one or more should be slightly lower than the others to concentrate low flows and allow fish to swim through.
- Place the culvert perpendicular to the flow, to minimise the length needed (less than 4m) and to allow fish to swim through.
- Ensure the culvert gradient is gently sloping, similar to the stream gradient. To allow fish passage, avoid using culverts on a waterway with a gradient of more than 2% (1:50). The gradient immediately downstream of the culvert should be less than 5% (1:20), so fish can approach the culvert outlet.
- If possible, design the culvert so that its hydraulics (water flows) are similar to those of the stream, and the weakest fish species can swim through. The water depth should allow the largest fish species to remain submerged.
- Ensure the culvert has at least 600mm of space above the typical base flows (low flows of the stream), so that it is light enough inside to encourage fish to enter and swim through.
- Ensure that water velocities in the culvert are similar to those at the site before the culvert was constructed. There should also be no differences in the flow rates upstream, inside the culvert, and downstream.
- Cementing baffles or large angular rocks (typical of the area) along the base of longer concrete culverts will reduce flow velocities and allow aquatic animals to pass through.
- Lining the base of the culvert with a rough concrete finish and/or natural substrate will increase turbulence and make it easier for fish to swim through. Velocities of less than 0.3m per second will allow most native fish to swim through a 5m culvert.

Figure 12.11 Inappropriate culvert is sited poorly and does not allow passage of fish at low flows. Source: Wetlands and waterways manual (Gallagher 2003)



- To control erosion at the outlet, place a rip-rap apron (V-shaped to allow fish passage at low water levels) at a distance of up to six times the culvert diameter beyond the outlet, particularly if the slope of the riverbed is greater than 2% (1 in 50).
- Ensure the capacity is large enough to accommodate the anticipated debris and sediment load.

12.2.8 Ongoing maintenance of crossings

All crossings should be maintained regularly to minimise the risk of causing erosion and flooding, or obstructing the passage of fish and other animals. Regular inspections and maintenance should be carried out on new crossings, after storms and periods of high flow, and before fish and other animals begin migrating.

Minimise disturbance to the passage of fish and other aquatic fauna during maintenance works.

Refer to Transport Tasmania's *Roadworks specification R34 – Drainage maintenance* and *Austroads AP-127/97: Concrete structures durability, inspection and maintenance procedures –Position paper.*

Figure 12.12 Wherever possible box culverts are best as they can accommodate high flows and are open at the bottom to allow for natural sediment beds. © Leah Page





Inspection and maintenance should include the following:

- Clear debris from the crossing's surface, entrance and exit.
- Remove debris and sediment from culverts, if more than a third of the entrance is blocked, to allow passage of fish and other animals.
- Check erosion is not a problem.
- Check structures are secure and not becoming a hazard to the public.

12.3 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Drainage and stormwater

A model stormwater management plan for Hobart Regional Councils – a focus on the New Town Rivulet Catchment (Derwent Estuary Program 2004)

www.derwentestuary.org.au

Aboriginal Heritage Tasmania

Desktop search for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Australian Runoff Quality (ARQ) (Institution of Engineers, Australia 1987, reprinted 1998)

A broad design guideline produced by the National Committee on Water Engineering. Provides an overview of good practice in managing urban stormwater in Australia and contains:

- procedures for estimating stormwater contaminants
- design guidelines for stormwater quantity and quality management improvement methods (e.g. gross pollutant traps, vegetated swales and buffer strips and other aspects of water sensitive urban design)
- procedures for estimating the performance of these practices
- advice about developing integrated urban water cycle management practices
- advice about hydrocarbon management



Coastal Values data

Vegetation, species habitat and geomorphic values data for a 100m wide coastal strip of the northern, southern and north western Tasmania Natural Resource Management regions. Available on the LIST.

www.thelist.tas.gov.au

Draft State Stormwater Strategy (Derwent Estuary Program in prep)

Herbicide use

DPIPWE Codes of practice, guidelines and information sheets for using herbicides

- Code of practice for ground spraying
- Code of practice for spraying in public spaces
- Rivercare guideline for the use of herbicides near waterways and wetlands

www.dpipwe.tas.gov.au (Go to Biosecurity > Agricultural & veterinary chemicals > Codes of practice & guidelines)

Hobart City Council website

www.hobartcity.com.au

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

Model for urban stormwater improvement conceptualisation (MUSIC)

A proprietary software product. MUSIC is a user-friendly tool designed to meet the needs of urban stormwater engineers, planners, policy staff and managers in consultancies and state, regional and local government agencies.

Natural Values Atlas

The Natural Values Atlas provides authoritative, comprehensive information on Tasmania's natural values. Download a free registration form from the website to access

https://www.naturalvaluesatlas.tas.gov.au

Planning guidelines for the Tamar Estuary and foreshore (Watchorn 2000)

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

Transport Tasmania

- Roadwork specification R92 – Underground service facilities
- Roadworks specification R 32 Drainage: Culverts, pipelines and structures
- Roadworks specification R34 – Drainage maintenance

www.transport.tas.gov.au

- Bridgeworks specifications (whole series) http://www.transport.tas.gov.au/road/specifications/bridgeworks_specifications



12.3

Water sensitive urban design: Engineering procedures for stormwater management in southern Tasmania (Deeks & Milne 2005)

Waterways and wetlands works manual: Environmental best practice guidelines for undertaking works in waterways and wetlands in Tasmania. (Gallagher 2003)

Crossings

Aboriginal Heritage Tasmania

Desktop search for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Austroads

Austroads 1997, AP-127/97: Concrete structures durability, inspection and maintenance procedures – Position paper

Available for download from the Austroads website. Registration is required for download. Registration and products are free.

http://www.onlinepublications.austroads.com.au

Fish passage at culverts: A review, with possible solutions for New Zealand indigenous species (Boubée et al. 1999)

http://www.doc.govt.nz/upload/documents/science-and-technical/culverts01.pdf

Forest Practices Code (Forest Practices Board 2000)

Section B6

Policy and guidelines for fish friendly waterway crossings (New South Wales, Department of Primary Industries, n.d.)

Waterways and wetlands works manual: Environmental best practice guidelines for undertaking works in waterways and wetlands in Tasmania. (Gallagher 2003)

Why do fish need to cross the road? Fish passage requirements for waterway crossings (Fairfull & Witheridge 2003)

http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/202693/Why-do-fish-need-to-cross-the-road_booklet.pdf



13 Access management

13.1 Roads, vehicle tracks and car parks

13.2 Walking tracks and trails

13.3 Boardwalks, steps, sand ladders and viewing platforms

13.4 Fences and other access control measures

13.5 Signage

13.6 Tools and resources

This chapter deals with design principles and site selection to minimise environmental damage when constructing roads, tracks and access control structures on coastal land near the shoreline.

Providing public access to the coast is important but controlling access is often necessary to protect coastal landforms and to maintain public safety. It is important to plan road and track development, and to control illegal tracks, particularly in sensitive locations such as actively mobile sand dunes, Aboriginal places, and penguin and shearwater colonies. Proper planning, design, construction and maintenance of structures will help to increase their life span, save money and minimise impacts on coastal values. Promoting environmentally responsible practices to the public (e.g. with signs and education programs) will encourage people to respect access control measures and stay on defined tracks.

Constructing roads, tracks, paths and fences on unstable landforms, such as sand dunes, requires good technical advice, to ensure effort and money is not wasted. Inappropriately designed or sited access management works can easily be destroyed by wind, waves or overuse, or lead to degradation.

Tab photo: Near Four Mile Creek on east coast of Tasmania. © DPIPWE.



13.1 Roads, vehicle tracks and car parks

This section only addresses the special considerations involved with constructing and maintaining roads and vehicle access in coastal areas. Other resources provide more detailed information and specifications for road works. ***Refer to section 13.6 Tools and resources.***

Before works start, thorough investigation and planning is essential. Assessments, approvals and an Environmental Management Plan (EMP) may be required. Small projects with no EMP require a works plan, which should outline the works to be undertaken and the measures that will be used to minimise the risk of causing damage to coastal values.

Choosing the appropriate site and construction methods is important for works near the shoreline, as inappropriate locations or methods can destabilise or damage coastal areas and result in increased maintenance expenses.

Extra care is required to minimise impacts when working on sandy soils, especially dunes, which can be erodible or highly erodible. Even on hind-dunes that appear stable, exposing loose sand underlying the generally thin topsoils may significantly increase the risk of severe erosion or destabilisation.

The coast has a diverse range of values and uses, and space is in high demand. Planning may need to manage conflicting or competing uses. Tracks, roads and car parks will increase visitor use in a particular area; new accessways need to be sited carefully to ensure they will not create unmanageable impacts on natural values or conflict with other coastal uses.

Figure 13.1 A coastal road in south-east Tasmania maintained by the local council. © Leah Page





13.1.1 Legislation and approvals for roads and car parks

The *Roads and Jetties Act 1935* covers the legislative requirements of road planning and construction, in addition to legislation set out in ***Appendices 1 and 2*** covering coastal planning, environmental management, and natural and cultural values. The *Land Use Planning and Approvals Act 1993* specifies that approval from the land manager is required before works can proceed.

Much of the planning for roads and car parks needs professional services and, depending on the scale, an Environmental Management Plan (EMP) may be required. An EMP will assess values such as natural and cultural heritage and the potential impacts of a proposed activity.

All roads need to meet Australian Standards. The Department of Infrastructure, Energy and Resources (DIER) is responsible for the provision and management of infrastructure associated with the state road system. All roadwork adjacent to the state road system require the approval of DIER, who may stipulate that a Traffic Management Plan (TMP) be designed and implemented.

Works cannot be undertaken on municipal, reserve or Crown land without authority. Many coastal roads come under the authority of Crown Land and assessments and approvals from Crown Land Services will be required.

All tracks and roads that are planned to cross land managed by the Parks and Wildlife Service (PWS), under the *National Parks and Reserves Management Act 2002*, will require an assessment of values and other matters before they can be considered for approval by the PWS (Reserve Activity Assessment). This is necessary before submission of council planning applications. Environmental and heritage assessments can take some time, so forward planning is essential.

The following approval processes may apply:

- Obtain written approval from DIER for the construction of new road access or major upgrading of existing road access onto state roads.
- Consult the local council where construction of new, or substantial upgrading of, existing access onto municipal roads is required.
- Obtain approvals from the adjoining authority when a new road connects with an existing road owned by another authority.
- Any gravel or rock that is extracted as part of lawful earthworks/construction of the road alignment from within a road reserve is considered to be part of a road construction activity. It does not require a separate extractive industry approval from council, PWS or the Department of Primary Industries, Parks, Water and Environment (DPIPWE), or a mining lease from Mineral Resources Tasmania.
- Approvals from Aboriginal Heritage Tasmania, Heritage Tasmania and/or the Environment Protection Authority may be needed.

13.1.2 Site selection for roads and car parks

Guidelines for selecting sites for new roads, tracks or car parks:

Minimise interference with natural coastal processes.

Avoid significant natural or cultural heritage values (e.g. high conservation value vegetation, threatened species and significant fauna populations such as penguins).

Consider sea level rise and coastal vulnerability to



erosion, recession and flooding. Ensure that new roads or raising roads will not create barriers to tidal flows, or landward retreat of significant vegetation communities. Bridges and culverts may be necessary.

Avoid unstable areas such as beaches, dunes, wetlands, slip-prone areas, highly erodible soils, natural drainage channels and stream banks.

Avoid works in areas infected with or vulnerable to *Phytophthora cinnamomi* (root rot) and follow protocols to reduce the risk of spreading the disease.

Avoid works in acid sulfate soils (ASS). Many ASS are prone to subsidence and roads built on these soils may settle slowly or subside unevenly. Vibration from passing traffic tends to make settling problems worse.

Avoid landslip areas. Potential landslip zones include slopes that are steep, have soaks or springs, or show evidence of ground movement (e.g. slumping, subsidence, landslips, natural terracing caused by soil creep, or bent tree trunks). Consult an appropriate specialist (e.g. a coastal geomorphologist) if there is any doubt about slope stability.

Limit access to the shoreline by focusing it into single points that serve groups of structures or are multi-purpose.

Locate roads and access tracks on existing informal access lines, if appropriate, to minimise their impact.

13.1.3 Constructing roads and vehicle tracks on the coast

Ensure all planning has been undertaken and approvals acquired. Consultation with specialists is essential to identify and protect all natural and cultural values. Surveys are often necessary and formal assessment procedures, such as Environmental Impact Assessments, may be required for some activities in some locations.

Many coastal areas contain important natural and cultural values. The Tasmanian coastline is rich in Aboriginal heritage values. Some dunes and other sandy landforms have geoheritage values. Other natural values such as threatened species or important vegetation communities may also be present.

Community groups are often interested in access management and it is important to consult with them when planning vehicle access work. Their local knowledge about visitor use and particular problems is often valuable.

Consultation with the broader community is an important way to increase awareness of coastal issues and encourage compliance with road alterations and access control. Roads are a community facility and community consultation will be necessary if planning new vehicle tracks or closing old ones.

All staff and contractors should be briefed about environmental considerations for the site and any restrictions or specific work practices that are required. Provide appropriate supervision to ensure environmental standards are being met.

Ensure all machinery and vehicles are free from weeds and diseases prior to bringing them on site. If weeds and disease are present at the site then ensure that tools, boots, vehicles and machinery are cleaned at a suitable location before leaving the site. Only import material from sites that are free from disease and weeds. ***Refer to Chapter 8 Weed and disease management.***

Minimise the potential for causing sedimentation of watercourses in road design, construction and maintenance. The *Transport Tasmania: Roadworks specification—Environmental protection* covers erosion control measures such as sediment traps, silt traps and protection fencing. Investigate and, if necessary,

take precautions to minimise disturbance to acid sulfate soils. Predictive maps of potential acid sulfate soils are available on the LIST. ***Refer to Chapter 11 Soil management and earthworks.***

Provide regular cross-culverts to reduce longitudinal drainage flows in side drains. Roads should be fully drained with culverts, table drains, or other drainage structures as required. Minimise the number of watercourse crossings. To help the passage of fish and other aquatic animals, ensure that culverts are designed and installed appropriately. ***Refer to Chapter 12 Stormwater and crossings.***

Ensure that new roads and road upgrades take into account the latest sea level rise predictions from the Intergovernmental Panel on Climate Change (IPCC) into account. It is important that roads do not interrupt tidal flows. Raising roads to protect them against sea level rise impacts can create tidal barriers, which will change the flushing regime and lead to degradation or destruction of waterways. Avoid creating tidal barriers by installing appropriate culverts or bridges. Consider moving roads landward to allow for the retreat of natural coastal areas, in particular coastal wetlands and saltmarsh vegetation communities, as low-lying areas become inundated.

Use local materials where available to minimise construction traffic. Minimise the area cleared for construction to reduce the extent of soil disturbance. Fit the road to the topography to minimise cuttings and embankments. Take extra care on very erodible (sandy) soils.

Retain topsoil for rehabilitation at the site. If there is surplus soil, use it at nearby sites requiring rehabilitation or dump it in a planned, suitably located soil dump. This is particularly important in catchments that provide drinking water.

Protect aesthetic values as far as possible. Minimise visual impacts by taking account of existing vegetation and the effects of vegetation removal. Safety considerations will require the removal of sufficient trees to allow the road to dry after heavy rain, and to provide adequate lines of sight on frequently used roads.

Where practicable, remove all vegetation debris from the roadside and dispose of appropriately (e.g. avoid dropping weed seeds on disturbed soil or in native vegetation). Otherwise, stockpile vegetation debris for mulching at revegetation sites or burning at a suitable location and time.

The construction process can result in road edges being excavated and material being deposited on the roadside. Minimise deposits and excavations in areas where penguins and other wildlife cross the road as blocking their access can lead to roadside deaths.

Figure 13.2 Cleaning soil and plant material off vehicles before entering and leaving sites will minimise spread of weeds and diseases. © Forestry Tasmania





For sealed roads, minimise excavation and the use of imported material in the foundation (pavement preparation) where practicable, by stabilising the natural material that is sub-grade. Depending on the soil type, methods can include the use of crushed rock or polymers, geotextile and chemical stabilisation by use of lime in clays and cement for sands.

13.1.4 Special considerations for minor roads and vehicle access tracks on erodible soils

It is sometimes necessary to provide vehicle access on erodible soils (e.g. within sand dune systems), for purposes such as access to the coast or fire breaks. Highly erodible soils in coastal environments include loam and sand with sparse vegetation cover. Very highly erodible soils include sand and fine gravel with very sparse vegetation.

In addition to the guidelines in ***section 13.1.3,*** extra care is required to minimise damage to vegetation and soil exposure on erodible soils, particularly on crests and upper slopes of dunes where the potential for erosion is greatest.

Minimise tracks on coastal dunes and take extra precautions to protect unstable soils and vegetation. Often vegetation is all that is holding the dune together and anything that causes vegetation death will decrease stability. Where possible, locate tracks in swales between dunes, preferably in hind-dune areas (except where drainage is poor). Only build tracks with steep gradients when the soil structure will permit positive and steady traction.

Tracks that cut through the dune system to the beach must not be aligned perpendicular to the beach. This will expose the track to onshore winds and increase erosion and sand loss. Align tracks at an angle to the direction/s of the prevailing winds, wherever possible. This will minimise loss of sand from the beach and reduce maintenance costs.

Prevent or at least minimise side-cuts into the dunes. Protect side-cuts with a layer of brush placed over the exposed sand or use jute matting, or revegetation.

Protect heavily used tracks on steep dunes by laying a board-and-chain track or sand ladder from the crest to the bottom. Protect the track edges with scrub, jute mesh or similar materials, and fence the sides of the track. Specifications for vehicle board-and-chain ladders are available in *Coastal dune management: a manual of coastal dune management and rehabilitation techniques* (Department of Land and Water Conservation 2001).

Protect drainage lines and mid- and lower slopes, as these areas are the most prone to erosion and sedimentation. Refer to the *Forest practices code* (Forest Practices Board 2000). Construct cross-drains at approximately right angles to the water flow, with an outlet for water to discharge into the surrounding vegetation. Take advantage of natural drainage points. Follow drainage guidelines for tracks in Table 6, 'Maximum spacing between cross-drains on snig tracks' in the *Forest practices code*. Install culverts or bridges where needed to protect conservation values, such as tidal flushing of wetland areas and passage of fish. ***Refer to Chapter 12 Stormwater and crossings.***

Avoid building tracks in wet conditions (except in emergency situations), as ruts can form, causing water to bypass culverts, cross-drains and natural drains.

Repair boggy sections with rock, matting (bark or brush), or cording (small logs) to prevent further damage and allow vehicle or pedestrian access. Drain and backfill any standing puddles with suitable material. Where boggy sections and/or puddles have been bypassed causing multiple tracks, rehabilitate the bypasses after repairing the main track. Restore rutted



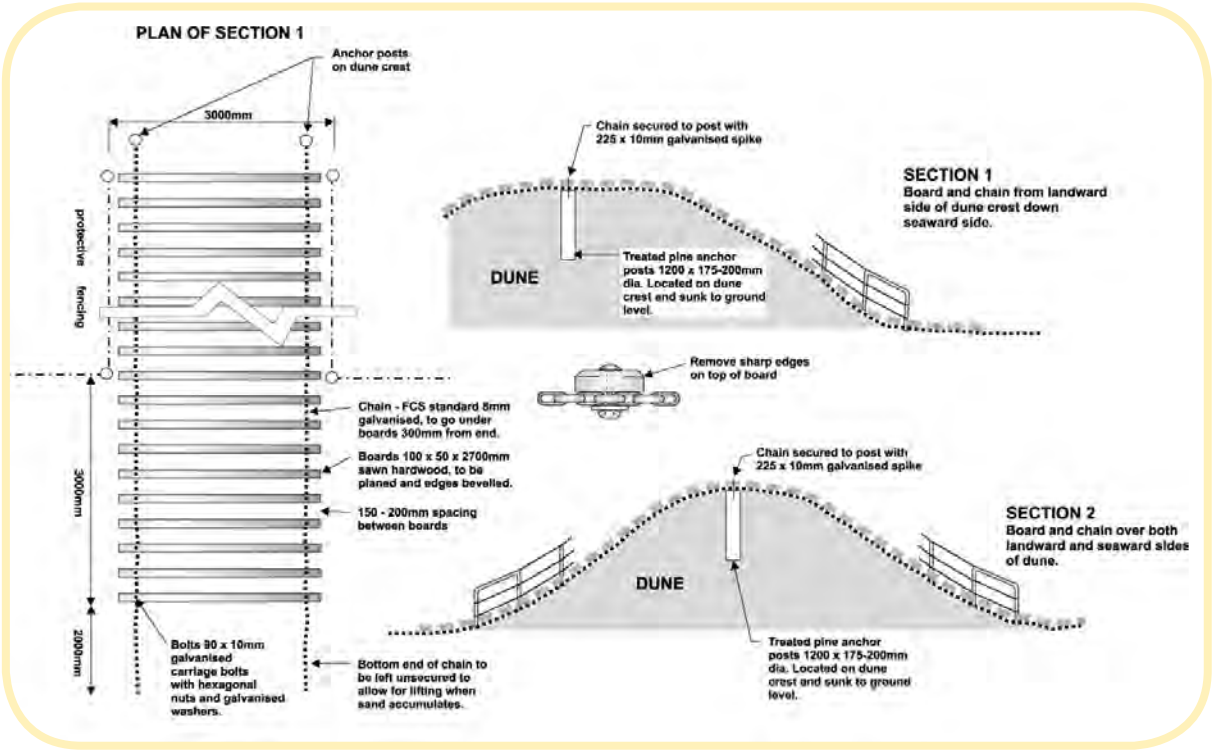
tracks with backfilling, but provide adequate drainage to prevent scour recurring. Regularly inspect roads and tracks so that problems can be quickly (and more easily) managed.

13.1.5 Special considerations for car parks

In addition to the guidelines in section 13.1.3, special consideration and planning is required for car parks, to ensure that they are located and constructed in a way that minimises impacts on the coastal environment.

Detailed technical drawings for car parks are available in the Coastal management specification manual (Green Skills Inc 2010).

Figure 13.3 Erosion due to vehicle access across sandy areas can be managed with board-and-chain installations (sand ladders). Source: © Coastal dune management: a manual of coastal dune management and rehabilitation techniques (Department of Land and Water Conservation 2001)



- Avoid placing car parks in sensitive sites. Do not excavate foredunes and other unstable sands. Wherever possible, concentrate facilities and access in particular areas.
- Consider changes to recreational usage and the associated impacts that may result from new or upgraded access and car parking.
- Allow sufficient room for boat-towing cars to turn, where necessary.
- Allow for expansion or changes to future use.
- Mark boundaries with bollards, rocks or other structures.
- Provide walkways from the car park to the coastal location, to avoid widespread impacts.
- Plan for managing runoff from large hardened surface areas. Provide adequate stormwater drainage – otherwise water could channel down beach accessways, leading to erosion and costly maintenance.
- Treat stormwater from car parks to remove sediments and hydrocarbons before the stormwater enters natural waterways. Water sensitive urban design features, such as vegetated dispersal or filtration fields or settling ponds, can be used. ***Refer to Chapter 12 Stormwater and crossings***.
- Consider placing oil and silt arrestor pits on lines draining parking areas. An oil and silt arrestor pit is typically a formed concrete pit that contains baffles to slow the flow, to allow silt to settle, and also trap oils by forcing the flow of water through a submerged outlet, keeping the oil on top of the stilled water.

Figure 13.4 Car park at Sandy Bay's Long Beach incorporating bollards, large rocks and landscaping with native vegetation, is both functional and attractive. © Leah Page



13.1.6 Controlling off-road vehicle access

Vehicle access to beaches needs to be very carefully managed and in many areas it is illegal or should be prevented. Vehicles are a hazard to other beach users and can harm the coastal environment in a number of ways, including destruction of shorebird nesting sites, compaction of sand which impacts on animals living in the sand (meiofauna), erosion of fragile dune areas, destruction of wetlands and introduction of weeds and diseases.

Where vehicle access is permitted, encourage visitors to use designated access tracks through the use of markers, signs and fencing and by working with recreational vehicle groups and tourism operators to increase awareness of coastal values and threats.

Figure 13.5 Damage to sand dunes at Sandy Cape on Tasmania's west coast. © Shaun Thurstans



Where 4WD vehicles are crossing sand dunes indiscriminately, encourage drivers to use one main track. This might be achieved by upgrading and stabilising the main track, as most drivers prefer good tracks. The other tracks can then be rehabilitated.

Manage public access to reduce the potential for damage by off-road vehicles. Consider road barriers such as very big rocks or bollards for protecting values where other measures, such as signs, have failed to prevent illegal activities.

Very big rocks can be used as a barrier. Landscaping them into the ground makes them harder to move and less confrontational in appearance. A line of rocks in the open can be seen as a challenge by users who feel disenfranchised or aggrieved by the barriers.

Regular inspections and maintenance will be required, to ensure that barriers remain in place and are working effectively.

13.1.7 Ongoing maintenance of roads and car parks

To remain in good condition, all roads and vehicle tracks require regular maintenance. It is important to maintain a stable surface and a functional drainage system, particularly in steep terrain or on very erodible soils. This will minimise erosion and sediment entering watercourses from roads.

Carry out inspection and maintenance at regular intervals or more often, as required.

Roads and tracks in coastal areas are highly susceptible to coastal processes and the harsh coastal environment. Some roads and vehicle tracks on soft sediment shorelines are currently under threat of erosion due to shoreline recession. Inspect roads



and vehicle tracks after extreme storms and coastal inundation events such as king tides.

Detailed guidelines for maintaining roads and access tracks are contained in the *Tasmanian reserve management code of practice* (PWS et al. 2003) and include the following:

- In steep terrain and high and very high erodibility class soils, patrols should be carried out regularly and after heavy rain. As a minimum, inspect roads at least twice a year (in autumn and winter).
- Assess condition using knowledge of user types, expected standard of road and Australian Standard risk assessment procedures.
- Inspect and maintain silt traps and sumps.
- Regularly and systematically monitor and maintain crossing structures (e.g. bridges and fords) particularly wooden structures. This should be done by qualified persons e.g. engineers for elevated structures.
- Clear table drains and culverts.
- Protect culvert outlets to prevent scouring.
- Fill settlement cracks.
- Replace drainage structures before failure.
- Replace or remove crossing structures prior to their physical collapse, to avoid impeding water flow.
- Restore the road structure and/or construct water bars to prevent erosion.
- Clean or replace guideposts and traffic warning signs.
- Identify tracks or roads that are only used infrequently or not at all and consider closing them.

13.2 Walking tracks and trails

This section deals predominantly with walking tracks along the coastline. However, some tracks are shared by a variety of user groups and land managers are increasingly recognising the importance of catering for these multiple uses.

Coastal tracks and trails provide access to foreshore areas, linkages between coastal sites and, in some instances, recreational opportunities for various user groups such as mountain-bike riders and horseriders. The design of coastal tracks needs to consider the purpose of the track, the user groups, the local coastal processes and the natural and cultural values of the area.

Careful planning and quality construction by skilled and trained track workers are the keys to success and can greatly reduce the cost and amount of future maintenance. Planning for ongoing maintenance is essential. Before approving new tracks, consider the capacity and resources available to maintain the existing ones.

13.2.1 Legislation and approvals for tracks and trails

In addition to legislation set out in ***Appendices 1 and 2*** covering coastal planning, environmental management and natural and cultural values, the *Civil Liability Act 2002* reduces the likelihood of public liability issues on Crown Land.

Tracks cannot be constructed on public land without the authority of the land manager. The land manager may be the local council or DPIPWE (Crown Land Services or Parks and Wildlife Service). Assessments and approvals may be required to protect natural and cultural values. Land managers should commit to ongoing maintenance and allocate the appropriate resources.



13.2.2 Planning new tracks and upgrading existing tracks

Before considering the creation of a new track or trail it is important to review the existing track network with the local community. It might be possible to improve existing tracks first. New tracks should not be constructed if there is not the capacity to maintain the new track – or even existing tracks.

Consider the need for and purpose of the track.

- Is the track to provide access to the foreshore or coastal features?
- Is it a linear track to allow travel from one location to another?
- Is it a multi-purpose track?

Answering these questions will help identify the expected usage of the track, the type of track required and the potential funding required for ongoing maintenance.

It is important to identify and consult the intended user groups to ensure the track's suitability for those users. Consider track sharing, to suit multiple user groups, access for the mobility impaired and the protection of the attractiveness of the area. Consultation with the local community is essential to identify local values and issues and to ensure support for new tracks and approaches to providing access, especially if planning new tracks or closing old ones. Consider upgrading existing tracks for multi-use or disabled access.

Community groups such as Coastcare groups are often interested in access management and it is important to consult them when planning track work. They often have valuable local knowledge about visitor use and particular problems.

Design tracks so that they are visually pleasing and suit the natural environment, and are easy for visitors to find (e.g. use poles to mark where paths enter beaches).

Consult specialists, to identify and protect all natural and cultural values. Many coastal areas contain important Aboriginal heritage relics and sites. Some dunes and other sandy landforms have geoheritage values. Other natural values such as threatened species or important vegetation communities may be present.

Contact Aboriginal Heritage Tasmania, a desktop search will determine if an assessment and/or permit is required. Aboriginal heritage officers will be able to guide your work activities to minimise any damage to Aboriginal heritage.

Investigate the incidence of acid sulfate soils (ASS) and if necessary take precautions to minimise their disturbance. ***Refer to Chapter 11 Soil management and earthworks, section 11.4.***

Consider the impacts of potential climate change such as increased inundation levels due to sea level rise and extreme storms. New tracks in coastal foreshore areas need to consider the latest IPCC predictions for sea level rise and incorporate these into the design or site selection. It is important that tracks do not destabilise coastal areas through removal of vegetation, channelling of water or increased wind erosion.

The *Trails Tasmania strategy* (Inspiring Place Pty Ltd 2007) provides primary and secondary criteria to assist with assessment and approval of new track proposals.

Thorough planning is the only way to ensure sustainability of the track and the coastal environment and will help establish partnerships; provide information that could be used for funding



applications or sponsorship proposals; and may help identify strengths and weaknesses.

Site selection

Careful planning and choosing the appropriate site will minimise impacts and future maintenance needs.

- Accessways and tracks through sand dunes should be sited in natural gullies. Avoid creating tracks on dune crests. Unvegetated dunes, cliff tops, wetland edges and potential landslip zones are unstable areas and may be unsuitable.
- Avoid works on or near beaches and foredunes, unless they are required to provide access to the shoreline.
- Avoid or minimise interference with the natural coastal processes and reduce exposure to severe wave action.
- Avoid disturbing significant natural or cultural heritage values.
- Choose already disturbed sites where people want to go (e.g. where people usually cross dunes), wherever possible. This will lead to greater public acceptance and use of these tracks. Aim to reduce the number of access points through dune systems.
- Follow the contours of the land where appropriate. This will often be more cost-effective and have less impact on the landscape than other options.

Figure 13.6 Coastal path at Bellerive designed for multi-use. © Leah Page





13.2.3 Guidelines for track construction in coastal areas

Design

It is important that structures comply with Australian Standards and with the requirements of relevant land use zoning, management plans and track management strategies.

Tracks and structures that provide access for mobility impaired people should be considered where required or appropriate, particularly for features such as viewing points and beaches.

Classify tracks according to recognised track classification schemes, using the six classes detailed in *AS 2156 Australian Standards: AS 2156 Part 1 Walking tracks. Classification and signage.*

Do not create infrastructure unless absolutely necessary. Minimise the construction of bridges and walls. This will make the track cheaper to construct and cheaper and easier to maintain.

Avoid creating new tracks in areas infected with *P. cinnamomi* (root rot) or uninfected areas if the vegetation type is highly susceptible to the disease (such as coastal heath vegetation) or there are threatened plants or communities that require protection. Washdown stations will be required on existing tracks that move from infected areas to uninfected areas. Consider re-routing such tracks if possible.

For multi-use tracks, vehicle barriers should be wide enough for bike riders to pass through the opening without having to dismount. For horse trails, provide step-over barriers to prevent vehicle access. Consider overhead clearance under trees and install signs at a height that can be read by horseriders.

Technique

All staff and contractors should be briefed on the environmental considerations for the site and any restrictions or specific work practices that must be implemented. Provide appropriate supervision to ensure that environmental standards are being met.

Ensure that all machinery and vehicles are free from weeds and diseases prior to bringing them on site. If weeds and disease are present at the site then ensure that tools, boots, vehicles and machinery are cleaned at a suitable location before leaving the site. Only import material from sites that are free from disease and weeds. ***Refer to Chapter 8 Weed and disease management.***

Take precautions to minimise disturbance to acid sulfate soils (ASS). A rotten-egg smell or yellow deposits when digging are likely indicators of ASS. Minimise the potential for causing sedimentation of watercourses in track design, construction and maintenance. ***Refer to Chapter 11 Soil management and earthworks.***

Use staff trained and skilled in designing, auditing, maintaining and constructing tracks. Poor design or construction will lead to high ongoing maintenance costs. There are highly skilled and experienced contractors that can be engaged to construct coastal access and tracks. In addition, organisations like Conservation Volunteers Australia can provide a valuable labour force when supervised by an experienced track worker.

For construction work, use hand tools in preference to machinery as this will minimise the impact on the site and reduce the risk of introducing weeds and diseases. Take precautions to prevent the spread of weeds and diseases by cleaning hand tools and work wear.



13.2

Make the most of natural features and use natural, local materials wherever possible. These will provide a more attractive result and will often be more durable.

Tracks that cut through the dune system to the beach must not be aligned perpendicular to the beach. This will expose the track to onshore winds and increase erosion and sand loss. Align tracks at an angle to the direction/s of the prevailing winds, wherever possible. This will minimise loss of sand from the beach and reduce maintenance costs.

Align tracks on the uphill side of large trees to minimise damage to tree root systems.

In well-protected dunes with little foot traffic, no additional track surface is required. A natural sandy path is the most attractive surface, if it is not exposed to excessive wind erosion.

In busier or windy sites, a protective surface is often necessary to reduce wind and water erosion, and to improve public safety. Choose local materials such as stone, gravel or bush timber to create a more natural appearance, wherever possible. If using sawn timber, try to construct the track with gentle curves.

Figure 13.7 Laying geotextile protects Aboriginal heritage material by minimising future disturbance to the midden. © Aboriginal Heritage Tasmania



Gravel is generally most suitable on fairly level paths. Gravel paths should be about 100mm high to allow rainwater to run off. Define the edges with free-draining crushed rock and boulders. Sometimes it is necessary to retain the edges of tracks. This is best done with drystone walls using local materials wherever possible.

Minimise water crossings whenever possible as they create the most potential to affect water quality, through erosion and washing of sediments into the waterway. Hardened track structures may be required, such as culverts and bridges. Seek engineering advice for the construction of bridges. In some instances, the use of rock may be all that is required to harden the trail over boggy or soft terrain. ***Refer to Chapter 12 Stormwater and crossings.***

Controlling the movement of water on the track through good design is paramount for minimising erosion and reducing track maintenance. Running water will erode the track, whilst pooling water will create boggy areas and rot structures. Divert water and encourage it to sheet across the track not flow along it. Create regular grade reversals (zigzags) or grade dips (undulations) to ensure water will flow across and not along the track. A slope of fall of 3–5° will encourage water to sheet and not channel across the track.

Water bars (wood or rock across the track at angles to divert water) can be used to assist track drainage but are not ideal as they require maintenance to keep them working well and can be a tripping hazard.

Consult with the Aboriginal community and seek advice and permission where it is not possible to avoid the cultural site. A permit to conceal sites can be issued by Aboriginal Heritage Tasmania where appropriate. Generally, middens can be protected



by the laying of geotextile material on top of them and then laying the track gravel or rock over the top. This creates a semi-permeable layer that prevents the track material mixing with the Aboriginal relic material. Regular maintenance will identify when the geotextile material is becoming exposed and the track material needs to be topped up. If any new sites or artefacts are discovered, stop work and contact Aboriginal Heritage Tasmania.

13.2.4 Walking track classifications

The Australian Standards (AS2156.1-2001) provide information to guide the design of tracks and suitable facilities and management. Six classes of walking tracks are defined in the Standards. Generally these classify the tracks from easy to advanced or severe. Mountain-bike and horseriding tracks have different classification systems to reflect their specialised use.

Table 13.1 Track classifications for Australian tracks. Adapted from Australian Standards: AS 2156 Part 1 Walking tracks. Classification and signage

Track Classification	Description	Inspection interval	Management considerations
Class 1	High numbers of visitors incl. those with impaired mobility.	30 days or less	Facilities such as toilets and car parking, signage. Steps must be accompanied by ramps.
Class 2	High numbers of visitors.	90 days or less	Facilities such as toilets and car parking, signage. Minimal use of steps.
Class 3	Slightly modified natural environment.	6 months or less	May have facilities such as toilets. Steps may be common. Limited interpretation signage
Class 4	Undisturbed natural environments with defined and distinct tracks.	6-12 months and after storm events	Minimal signage, minimal facilities.
Class 5	Indistinct tracks, remote locations.	6-18 months	Signage only for management purposes.
Class 6	Unmanaged tracks. Users responsible for public safety.	Not managed for public risk.	Facilities and signage generally not provided.

There are also standards for mountain-bike trails, produced by the International Mountain Bike Association (IMBA) which could be considered for multi-use tracks.



CS 13.1

Case Study 13.1: Track redevelopment at Alum Cliffs, Kingborough, southern Tasmania

The Alum Cliffs track near Kingston is a high-profile community asset managed by Kingborough Council. By 2007 large sections of the track were closed because it was unsafe and causing damage to coastal values, including Aboriginal heritage sites. It was very steep in some places, with inappropriate water crossings over gullies.

Timber steps and structures were very old and in need of maintenance, and in some places the track was dangerously close to unstable cliffs. Sections of the track were suffering erosion due to poor design, and sand loss on Kingston Beach was making access to the shoreline difficult in places.

Kingborough Council was committed to reopening the track and undertook an assessment/audit in 2007 which recorded all major features, issues and boundaries with a GPS, and deemed that many of issues could be managed with realignment of the track and replacement of old structures.

The council received input from a tracks and trails advisory group with representatives from key community groups such as dog walkers, walking clubs and Coastcare groups.

Work was undertaken by experienced track workers, rerouting sections of the track to avoid the Aboriginal heritage sites and to take the track away from the cliff edge. Steep sections were improved by following the gullies and this enabled water crossings to be relocated more appropriately. Water crossings were also improved with the installation of bridges so that water flow was no longer inhibited. Track gradients and alignments were modified to address drainage and erosion concerns.

The track is a Class 3 with all-natural surfaces except for a midden area that could not be avoided. A permit from Aboriginal Heritage Tasmania was issued to conceal the midden and geotextile was laid underneath a gravel surface to protect the heritage material.

The track has been reopened and the modifications have protected vegetation, cultural heritage and waterways; reduced erosion; improved safety; increased ease of maintenance; and even resolved some conflicting user issues.

Ongoing work will involve improving drainage where required and realignment of some sections that are impacting on sensitive vegetation or unstable foreshores.



Figure 13.8 Crossing upgrade on Alum Cliffs track. The old water crossing was steep and hazardous. The new water crossing is further up the slope and improves the gradient of the track but, most importantly, the bridge does not impede water flows and protects the banks from erosion.
© Johannes May





13.2.5 Audits and maintenance of tracks and trails in coastal areas

Existing tracks and trails should be audited before new tracks are considered. Auditing enables an inventory of tracks to be created and identification of any hazards or maintenance required.

Auditing also enables tracks to be classified according to the Australian Standards. These classifications provide guidance for maintenance schedules and may also provide a mechanism for land managers to prioritise maintenance of their track network.

Create and implement an audit and maintenance plan, which should ensure that all issues identified during an audit are addressed before the next audit.

Before constructing new tracks, develop a maintenance plan. Do not create new tracks unless the plan indicates that there will be sufficient resources to maintain them.

Maintenance plans should ideally be part of a broader management plan that identifies a risk management process, hazard inspection guidelines, annual maintenance program and clarifies management roles and responsibilities.

Many coastal tracks cross over multiple land tenures. It is important that land managers work together to map and determine which sections of the track they are responsible for, and to establish clear and consistent management guidelines.

Alternatively a lease or licence agreement will enable one management authority to take on management and public liability for the entire track so that a consistent management approach is applied.

Identify areas where one well-constructed track could replace numerous poorly constructed (or not maintained) tracks. Rehabilitate or close tracks that are hazardous, or where the landform or vegetation is being damaged. Identify areas under pressure from overuse or creation of illegal tracks.

Tracks in coastal areas are highly susceptible to the impacts of coastal processes and the harsh coastal environment. Some tracks on soft sediment shorelines are currently under threat of erosion due to shoreline recession. Inspect tracks after extreme storms and coastal inundation events such as king tides.

Inspect the track for hazards, checking the condition of the track against the elements of classification in AS2156.1-2001. These include assessments of the condition of the track surface including the height of trip hazards (such as tree roots), track width, structures and signage, erosion or damage, obstructions, and the condition of vegetation along the edge of the track – in particular, overhanging limbs or overgrown vegetation.

Techniques include photopoints, recording GPS points of hazards and areas requiring maintenance, and making observations about level of use and potential for increased pressure (such as new local subdivisions).



13.3 Boardwalks, steps, sand ladders and viewing platforms

This section deals with the installation of hard structures on coastal tracks to provide access to beaches and coastal areas or to protect sensitive coastal values.

Hard access structures such as boardwalks and steps can provide for improved access to coastal areas and enhanced recreational experiences. They can also provide protection for sensitive areas and landscapes whilst allowing visitors access to enjoy these environments.

Hard structures can be made from variety of materials, with new products (such as recycled plastics) being developed all the time. All are expensive to install and must satisfy building approvals to meet Australian Standards and require a high level of ongoing maintenance. Do not consider new structures unless there is the capacity and resources to maintain them. Plan for their replacement in approximately 20 to 25 years and prepare an asset management plan and asset replacement plan for all structures on tracks.

In high-use coastal areas and adjacent coastal facilities, such structures are often necessary to provide access whilst minimising impacts such as destabilisation of dunes.

Special care will be required during construction to prevent and control erosion as sandy shorelines are often unstable and subject to erosion. Structures that extend across the shore must be appropriately designed and placed to minimise damage from salt water and wave action.

Figure 13.9 Boardwalk at Windermere Bay protecting fragile coastal vegetation. © Derwent Estuary Program





13.3.1 Legislation and approvals for hard access structures

In addition to legislation set out in ***Appendices 1 and 2*** covering coastal planning, environmental management, and natural and cultural values, the *Civil Liability Act 2002* reduces the likelihood of public liability issues on Crown land.

Track structures on public land require the authority of the land manager. The land manager may be the local council or DPIPWE (Crown Land Services or Parks and Wildlife Service). Assessments and approvals may be required to protect natural and cultural values. Land managers should commit to ongoing maintenance and allocate the appropriate resources.

Structures must comply with the *Building Act 2000* and *Building Regulations 2000.*

13.3.2 Guidelines for boardwalks, steps and sand ladders

In addition to the considerations detailed in ***section 13.2.2 and 13.2.3*** the following guidelines are specific to hard access structures in coastal areas.

Aim to minimise infrastructure in the coastal zone. Consolidate access structures in areas that are less susceptible to storm surges and general coastal processes. Take into account the latest IPCC predictions for sea level rise and plan structures to withstand these within their lifetime. Steps and boardwalks are relatively expensive to construct and maintain. It is preferable to locate them at the more protected ends of beaches where severe wave erosion is less likely.

Structures that provide access for the mobility impaired should be considered where required or

Figure 13.10 Steps encroached on by erosion were becoming unsafe and have since been removed. © Chris Sharples





appropriate, particularly for features such as viewing points and beaches.

It is important that structures comply with Australian Standards. Steps or other structures crossing Crown land, which includes all land below high water mark, require formal assessment and approval.

Adapt the design and placement to suit the site conditions. Avoid perching structures on top of dunes. Use existing blowouts and gullies for structures and avoid attempting to provide access over the foredune, as it is subject to movement and variability.

Timber is a commonly used material but new products, such as prefabricated recycled plastics are available. If using timber ensure it is durable and environmentally responsible. Hardwood boards are expensive but will outlast pine in some circumstances (depending on exposure to moisture) and are less inclined to warp and become hazardous. However quality hardwood can be hard to source; oversized pine is usually used and can last about 15 years. The durability of the timber is improved by treatment with preservative followed by surface coating.

Plan for ongoing future maintenance by establishing a maintenance regime to ensure structures are inspected regularly.

Boardwalks and steps

Boardwalks are useful for controlling access and protecting highly sensitive or fragile areas. Steps are useful for providing access through foredunes or down steep coastal foreshores. Steps can be completely elevated timber structures or a timber

Figure 13.11 Steps require regular maintenance to keep them looking good and working well. © Leah Page



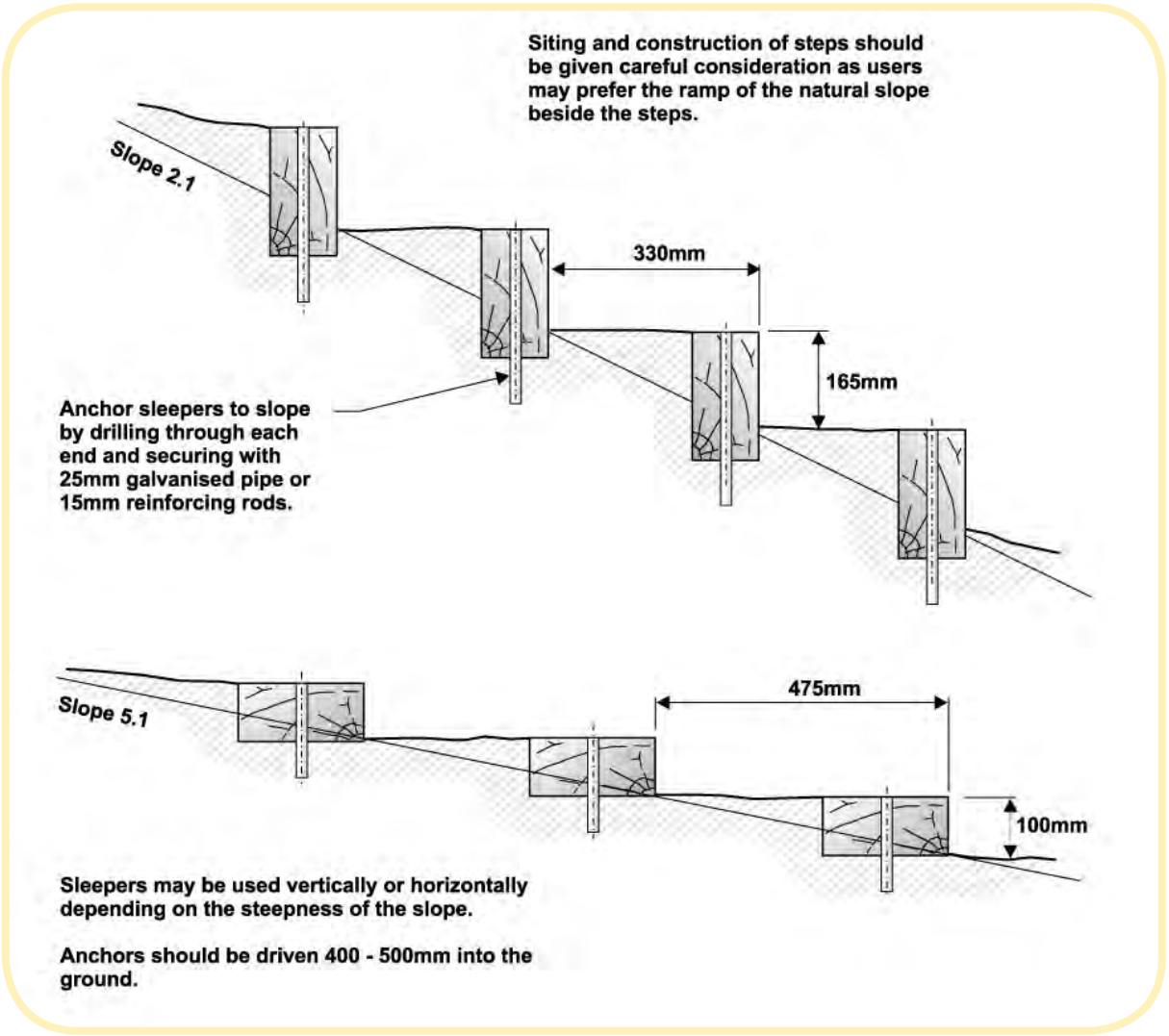


and gravel combination built into the contour of the land. Whilst the installation of boardwalks and steps will involve some disturbance, they minimise ongoing disturbance and erosion due to foot traffic, making them useful in high-use areas.

In areas with high visitor numbers, the boardwalk width should allow for two-way flow and have step runners (guides along the edges of the steps) to discourage walkers from deviating around the steps and causing erosion.

Protect the edges of boardwalks with scrub, jute mesh or similar materials and consider fencing alongside to encourage people to stay on the track.

Figure 13.12 Gravel and timber step design. Source: Coastal dune management: a manual of coastal dune management and rehabilitation techniques (Department of Land and Water Conservation 2001)





The risers (the vertical part of a step) can be constructed with treated timber logs or railway sleepers, with sand placed behind the timber to provide a step. Geotextile can be used to reduce potential loss of fill around steps. Anchor the risers firmly (e.g. by driving reinforcing rod or galvanized pipe through them into the ground (see Figure 13.12).

Potential sea level rise and eroding beaches can create costly maintenance problems. A 'sacrificial' lower section on timber steps will save money, as only the lower part of the structure will be damaged by storm surges. The lower section is separate from the upper section and can be replaced. Refer to the technical drawings for steps and stairs in the *Coastal management specification manual* (Green Skills Inc 2010).

Sand ladders (board-and-chain)

Sand ladders are better than steps on some steep dune faces (e.g. on eroding beaches). Ladders work best if erosion is caused mainly by walkers or wind rather than waves.

Ensure board-and-chain slats are a suitable distance apart for easy walking (e.g. 150–200mm between 100mm-wide boards). As a general guide, increase the spacing on steeper slopes (e.g. on sand ladders) to make them safer to climb. Refer to the *Coastal dune management: a manual of coastal dune management and rehabilitation techniques* (Department of Land and Water Conservation 2001).

Sand ladders on sand-dune faces need to be flexible, so they can adjust (or be adjusted) to the changing dune profile (e.g. after storm waves). Inspect boards regularly to see whether they need lifting or replacing.

Figure 13.13 Pedestrian sand ladder minimises erosion of the dune. © Leah Page



Sand ladders may not be suitable in high-use areas or where access needs to cater for a broad cross-section of the community. For example, some elderly people find it hard to walk on sand ladders and the rungs can be a trip hazard if the sand does not build up around them.

Sand ladders are suitable in situations where the level of use is causing erosion but is not high enough to warrant a more expensive structure, and in highly dynamic coastal environments where the risk of loss or damage to hard structures is too high to warrant more expensive steps or boardwalks.

13.3.3 Viewing platforms

Viewing platforms can be built to provide safe viewing places, while at the same time protecting sites from overuse. They can be interesting and attractive structures if they are well designed to suit the site. It is best to integrate them with existing structures such as steps and boardwalks.

Viewing platforms must be designed by engineers and constructed to the Australian safety standards so that they are not a hazard to users, and checked by an engineer after construction. They should be designed to be aesthetically pleasing, blend into the landscape, and be easy for visitors to find.

The *Coastal management specification manual* (Green Skills Inc 2010) has detailed drawings and specifications for constructing viewing platforms.

Figure 13.14 A lookout platform of stone and gravel was built to protect a shell midden at Redbill Point, Bicheno. Source: Community Coastcare handbook (Thorp 2005).





CS 13.2

Figure 13.15 The viewing platform at Turners Beach incorporates mesh flooring to allow water, air, sand and light to penetrate to the vegetation below. Its location on the foreshore required the installation of rock to protect the structure from wave action. Geotextile sand containers or local rock material are other options. © Justin Smith

Case Study 13.2 Minimal impact viewing platform design

Conventional beach access construction methods can cause extensive disturbance to dune systems and the surrounding environment. In the past, heavy machinery has been used to ram poles and dig large holes for footings.

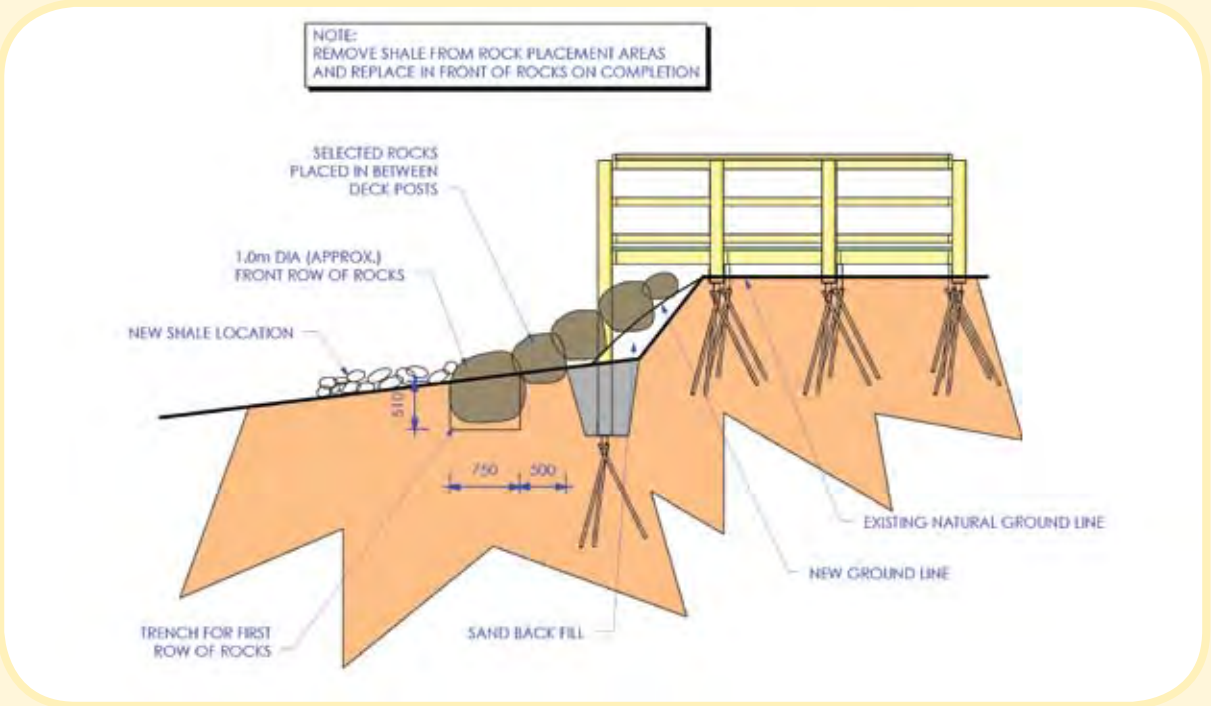
When Central Coast Council collaborated with Turners Beach Coastcare group to undertake the installation of a viewing platform at Turners Beach, environmental considerations were paramount.

They ensured that the design and installation of the structure had minimal impact on the environment and integrity of the natural dune system. This was largely due to the new innovative Mega Anchor System that enabled anchors to be driven into the sand with minimal disturbance and without the need for heavy machinery.

They also incorporated fibreglass-reinforced plastic for the decking. This type of decking allows for natural movement of water, air, sunlight and sand through the structure, enabling plants to re-establish underneath, which will maintain the stability of the dune.

The platform has also been modified to cater for mobility impaired people, affording them the opportunity to view the beach.

Figure 13.16 The Mega Anchor design minimised disturbance of the dune during installation. © Justin Smith





13.3.4 Ongoing maintenance of hard access structures

Structures require regular auditing and maintenance to make sure they are in good condition. They are very susceptible to damage from wind and waves and can easily become a hazard to the public.

Carry out regular safety inspections in accordance with Australian Standards specifications. Inspect structures regularly and after heavy rain, wind, unusually high tides and storm events.

Check:

- the condition of structures
- the condition of vegetation beside the track (including weeds and diseases)
- the extent of erosion (depth and width).

Remember that structures subject to sand burial (e.g. on foredunes) will need regular lifting and adjustments to compensate for shifting sands.

Identify structures that are only used infrequently or no longer used, and consider removing them. Consult the local community and assess cultural significance before closing structures. Detailed guidelines for maintaining and closing tracks are in the *Tasmanian reserve management code of practice* (PWS et al. 2003).

13.4 Fences and other access control measures

This section deals with fences and other access control measures in coastal foreshore areas. Specialised fences can also be used to assist in dune stabilisation and this is covered in ***Chapter 6 Coastal landscape management.***

Fences and other measures are often necessary to control access and protect unstable or fragile coastal soils, vegetation and wetlands from damage by people, vehicles or livestock.

Fences and other barriers such as bollards, may be installed to protect dunes, saltmarshes or wildlife habitats from pedestrians, or to confine foot and vehicular traffic to defined tracks and to stop people forming new tracks in sensitive areas. Barriers are useful to delineate car parks.

13.4.1 Legislation and approvals for fencing and access control

In addition to legislation set out in ***Appendices 1 and 2*** – covering coastal planning, environmental management, and natural and cultural values – assessments and approvals may be required to protect natural and cultural values.

Fences and other access control structures cannot be erected on public land without the authority of the land manager. The land manager may be the local council or DPIPWE (Crown Land Services or Parks and Wildlife Service). Land managers should commit to ongoing maintenance and allocate the appropriate resources.



13.4.2 Types of access control

The types of works selected will depend on the purpose, budget and the site conditions and may include any or all of the following:

Logs, bush timber or bollards can be used to delineate areas.

Track markers made from treated pine posts with an identifying colour and/or symbol can be used along beach access tracks and may be all that is required to control access. They are much cheaper to install and maintain than fencing and have minimal visual impact. ***Refer to Case Study 13.1.***

Very big rocks can be used to block vehicle access. Large rocks and bollards are useful for restricting vehicle access, but 4WD users have been known to remove them.

Fences can be used to control access (e.g. plain wire, wire mesh and post and rail; see Table 13.2).

Signs may be used strategically to complement other access control measures and foster sustainable behaviour. ***See section 13.5 Signage.***

13.4.3 Bollards

Bollards can be used to manage public access by providing access for pedestrians and excluding vehicles. Consider making bollards an attractive feature by decorating them with coastal themes.

Bollards can be expensive and are most appropriate for urban or high-use areas. A simple cheaper alternative is a treated pine post.

Very big rocks are useful in less urban environments,

Figure 13.17 Large rocks and bollards can be used to stop vehicle access onto a walking track. Source: Community Coastcare handbook (Thorp 2005)





to prevent vehicle access. ***Refer to section 13.1.6 Controlling off-road vehicle access.***

Maintain visual amenity by landscaping around bollards and other barriers.

Regular inspections and maintenance will be required to ensure barriers remain in place and are working effectively.

13.4.4 When to use fencing in coastal areas

Fencing can be expensive both to install and maintain. Regular maintenance is essential to ensure that damaged fences do not become a public hazard. Before installing fencing in coastal areas it is important to clearly identify the problem to be managed and consider whether fencing is the best option. There are other access control measures that may be less expensive and more effective.

Fencing is a useful way to keep livestock and vehicles off dunes and out of wetland and saltmarsh areas, where they can be very destructive.

It can delineate public spaces, control human access to the foreshore and keep people off sand dunes or out of vegetation.

Temporary fencing can protect shorebird nests or recently planted vegetation. It could also be used to prevent access to hazards such as eroded shorelines – in particular, steep dune faces or cliff faces changed as a result of storms. (The type of fencing required will depend on the severity of the risk.)

13.4.5 Guidelines for fencing in coastal foreshores

Fencing is a specialised task and there a number of qualified and experienced fencing contractors around. It is important to choose good quality materials and experienced contractors or staff to get the best result. Many different techniques and materials are available; the appropriate choice will be determined by the reason for the fence and budgetary constraints. Some fencing contractors offer workshops to train staff and community groups.

Planning

Ensure that land tenures have been correctly identified and, where there is more than one land manager, that agreement has been reached on the type of fence and the responsibilities for ongoing maintenance.

The installation of fencing will involve disturbance to vegetation and soil: consult specialists and identify natural and cultural values before works commence. When selecting the site, consider Aboriginal heritage values and natural values such as penguin rookeries.

Adapt the design and placement to the site conditions. Avoid unstable areas such as unvegetated dunes, cliff tops, wetland edges and potential landslip zones, unless the structures are built to protect public safety or sensitive sites. Avoid visually prominent locations (e.g. dune tops and beaches), as far as possible.

Consider the latest IPCC predictions for sea level rise when planning fencing projects and determine the level of risk of failure for the expected life span of the fence. Consider not just sea level rise but also increased frequency of storms.



Whenever possible, locate fences on the sea front well back from the highest waves; otherwise they are likely to be washed away by storms. Only fence on the seaward side of the dunes if absolutely necessary. It is important to keep people off the foredunes but fences on receding beaches will require very high levels of maintenance as they become dislodged and damaged by high tides and storm events.

It is important to allow for wildlife movement by raising the fence above the ground and using widely spaced mesh at the base of the fence. Consider also the placement of the fence to minimise impacts on wildlife movement. There are specific fencing techniques for protecting wildlife such as penguins. ***Refer to Chapter 10 Wildlife and pest management.***

Design

Select the appropriate structure for the conditions. Plain wire fences are relatively cheap and easy to construct and maintain. Fencing suppliers will supply designs and costings for little or no cost. The advantages and disadvantages of fencing types used on dunes are compared in Table 13.2.

A simple drip-line fence (Figure 13.18) or even a string fence provides a psychological barrier rather than a physical barrier and can be used to protect sensitive sites. A drip-line fence is just a single wire covered in black polypipe tubing looped between low treated pine posts (75-100mm) and fastened by stapling.

Table 13.2 Comparison of dune fence types (Adapted from NSW Department of Land and Water Conservation 2001, Coastal dune management: A manual of coastal dune management and rehabilitation techniques)

Fence type	Recommended location	Advantages	Disadvantages
Drip line	Along seaward side of dunes.	Simple and cheap. Easy to maintain.	Psychological barrier only.
Plain wire	Along access tracks where wave damage or sand burial unlikely.	Cheap. Simple to erect. Easy to maintain.	Less of a deterrent. Rusts.
Galvanised wire	As above.	Does not rust.	Slightly more costly. Easy to vandalise.
Wire mesh	Landward sides and along access tracks on medium- to high-use beaches where there is little risk of damage.	Height is a greater deterrent. Strong.	Expensive. High maintenance. Rusts. Difficult to lift.
Post and rail	On high- to medium-use beaches where there is little risk of wave damage or burial. Around public amenities.	Looks good. Strong, durable. Low maintenance.	Very high initial cost.

A simple temporary fence built from garden stakes and bailing twine or hazard tape is suitable for delineating temporary exclusion zones such as around nesting shorebirds or areas that have recently been revegetated.

Installation

All staff and contractors should be briefed on environmental considerations for the site and any restrictions or specific work practices that are required to protect coastal values. Provide appropriate supervision to ensure environmental standards are being met.

Ensure all machinery and vehicles are free from weeds and diseases prior to bringing them on site. If weeds and disease are present at the site then ensure that tools, boots, vehicles and machinery are cleaned at a suitable location before leaving the site. ***Refer to Chapter 8 Weed and disease management.***

Take precautions to minimise disturbance to acid sulfate soils (ASS). A rotten-egg smell or yellow deposits when digging are likely indicators of ASS. Minimise the potential for causing sedimentation of watercourses in track design, construction and maintenance. ***Refer to Chapter 11 Soil management and earthworks.***

Time works to avoid significant wildlife events such as shorebird and penguin breeding season where appropriate.

Figure 13.18 A simple dripline fence can act as a psychological barrier to keep people off fragile dune areas. © Peter Lingard.





Figure 13.19 This poorly maintained coastal fencing looks unsightly and has become a hazard to the public. A simple, cheaper fencing alternative such as a dripline fence on the seaward side would be more appropriate. © Leah Page



Plant native vegetation adjacent to the fence to make it look more attractive. Over time the vegetation might provide enough of a barrier and allow for the removal of the fence.

Do not attach geotextiles to access control fences; otherwise sand will accumulate in the accessway.

If fencing in conjunction with board-and-chain accessways (sand ladders), ensure enough space is left between the ends of the boards and the fence to allow for regular lifting of the boards when they are covered in sand.



Figure 13.20 Some skilled and experienced fencing contractors offer fencing workshops to land managers and community groups. Volunteers from Wildcare Deslacs at Clifton Beach getting tips from John Easton. © Leah Page



Case Study 13.3: Non-fencing access control using trail markers at Southern Beaches

The Southern Beaches Landcare/Coastcare group in south-east Tasmania was frustrated with the degradation of the foreshore due to informal tracks and encroachments affecting the dunes, headlands and cultural and natural heritage.

The group consulted broadly with the local community and worked closely with the local council to develop a passive approach to access management. Rather than fencing off areas of the dunes, they used bollards painted in different colours and with different bird images (painted by a local artist) to denote the different tracks.

The attractive track-marking has made it easy for people to 'stick to the track', protecting the dunes without the need for fencing, thereby minimising infrastructure and ongoing maintenance. This low-impact solution does not interrupt peoples' enjoyment of the beach or impede the free movement of native animals and the dynamic movement of sand.

The group wanted to give something back to the community and make it easy for people to do the right thing. The local community has embraced the track marking and appreciate the convenience of being able to find 'their' track home through the dunes.

The implementation of this project has reduced the ad-hoc development of tracks through the foreshore and enabled the natural regeneration of degraded areas.

Figure 13.21 Each track marker is colour coded to make it easy for users to identify the track they want.
© Leah Page





13.4.6 Ongoing maintenance of fences and access control structures

Fences and other access control structures require regular maintenance to ensure they are in good condition. This is important to protect public safety and to minimise erosion and damage to vegetation. Structures should be subject to regular safety inspections in accordance with Australian Standards specifications.

- Inspect fences regularly and after unusually high tides or storm events.
- Check structures are in place and secure and not a hazard to the public.
- Fences may need to be re-strained.
- Wire fences on foredunes will usually need to be replaced in time, due to sand blasting and corrosion. Posts will be undermined and dislodged on receding beaches, due to wave action
- Where more than one land manager/owner is involved it is important to reach an agreement for ongoing fence maintenance.

13.5 Signage

This section provides tips and guidelines for installing signs with minimal impact on coastal environments and for creating signage that conveys messages to visitors about coastal values and areas (interpretative signage). Hazard and safety signs must meet Australian Standards; their design is not covered in this manual.

Signs are valuable tools for communicating messages to visitors. A well-designed sign can persuade visitors to understand and appreciate an area and to behave in an environmentally responsible manner. Involving the local community can assist with providing local content for the sign, and may reduce vandalism.

Temporary signs are useful to help keep people off sites while work is in progress, or vegetation is being regenerated. Signs are often used in addition to fences and other structures to control access to certain sites.

When the cost of signs is spread over their expected life, they are relatively cheap compared with other forms of communication, such as brochures and face-to-face communication. However, signs do require some maintenance and will need replacing after some years.

13.5.1 Legislation and approvals for signage

Permission from the land manager will be required before installing any signs. Most local councils have a sign policy and may require formal approval before installation. Land managers should commit to ongoing maintenance and allocate the appropriate resources.

Due to the disturbance required to install signage, assessments and approvals may be required to protect natural and cultural values such as Aboriginal heritage sites. Seek specialist advice about wildlife and vegetation values and consult Aboriginal Heritage Tasmania.



Before designing a sign:

- identify the message (e.g. keep dogs away from penguin habitat)
- identify the target audience (e.g. dog owners)
- consider whether a sign is the best means of communicating your message: would other ways be better (e.g. a community meeting or distributing brochures)?

13.5.2 Uses of signs

Signs are used in coastal areas to provide instruction or direction, convey hazard or safety information and to provide information on the coastal values or interesting features in the area.

Interpretation signs are used to convey information and messages in a way that engages people's interest. They can help people understand what is special or interesting about an area and motivate them to modify their activities for the protection of coastal vegetation, wildlife or heritage.

All interpretive, educational and information signs should be of a high quality and follow principles of good graphic design (e.g. clear, attractive layout) and readability (e.g. the size and style of the print).

Develop signs in partnership with the land manager/s to help meet their goals and to conform to their standards.

Figure 13.22 Signs can provide important information and look great at the same time, like the recreational fishing limit information signs at boat ramps and popular fishing spots. © Leah Page



Use a sign to:

- manage access and protect coastal vegetation, wildlife or cultural heritage
- inform people about facilities, regulations and hazards
- inform people about the special features of the local area, so they come to appreciate its values
- raise community awareness and understanding about conservation projects such as rehabilitating eroded areas, and protecting nesting shorebirds
- raise the profile of agencies, and gain support for projects



13.5.3 Sign installation

Ensure all planning has been done and approvals acquired. Consultation with specialists is essential to identify and protect all natural and cultural values. Many coastal areas contain important Aboriginal heritage places. Some dunes and other sandy landforms have geoheritage values. Other natural values such as threatened species or important vegetation communities, may be present.

Community groups are often interested in signage in their local area and it is important to consult with them when planning new signs. The local knowledge of local values, visitor use and particular problems can be valuable.

All staff and contractors should be briefed on environmental considerations for the site and any restrictions or specific work practices that should be implemented. Provide appropriate supervision to ensure environmental standards are being met.

Ensure all tools are free from weeds and diseases prior to bringing them on site. If weeds and disease are present at the site then ensure that tools, and work wear are cleaned at a suitable location before leaving the site. ***Refer to Chapter 8 Weed and disease management.***

Take precautions to minimise disturbance to acid sulfate soils (ASS). A rotten-egg smell or yellow deposits are likely indicators of ASS. ***Refer to Chapter 11 Soil management and earthworks.***

Site selection

Consider other existing signs and the overall quantity of signage in the area. Too much signage can look unattractive and puts people off reading their messages.

Where possible, place signs on existing structures (e.g. walls and poles). Before attaching signs to historic buildings, check whether this is appropriate and seek permission.

Place directional signs and warning signs where they are easily noticed (e.g. near car parks and at the start of tracks to the beach). A car park is often a good place for signs as the traffic may discourage vandalism.

Place signs about 4m away from the far side of a fence or out of reach of cars, to discourage vandalism.

Avoid placing signs above eye level, as far as possible. Signs that project above the skyline are unsightly and detract from the aesthetic qualities of natural areas. Consider the neighbours when deciding where to put the sign – if it irritates residents (e.g. by spoiling their view) they might not be respect it.

Interpretation signs do not need to be as highly visible as warning or directional signs. As a rule, place the middle of interpretation signs at the average adult hip height.

Orientation

Wherever possible place signs so that they are not facing due north, as sunlight will shorten their life.

If there is a map on the sign, orient it in a way that relates to the surrounding landscape and will make sense to viewers.



13.5.4 Sign manufacture

When planning signs, consider their design, construction, materials, durability, maintenance and compatibility with the landscape. Follow the land management authority's requirements for sign design, materials and construction. Refer to the *Tasmanian reserve management code of practice* (PWS et al. 2003).

If they are well made and properly installed, signs should not require much maintenance over their lifetime. Consider the level of vandalism in the area and the level of exposure to the elements, and choose materials that will require minimal maintenance. Various materials are available – consult sign manufacturers, as technological advances are constantly providing new products.

Many manufacturers now use a combination of materials (including UV-protective coating and vandal-proof surfaces) and some offer five-year guarantees. It is often worth paying for more expensive materials of higher quality if they will last longer and need less maintenance.

Figure 13.23 Some coastal facilities such as boat ramps require important information to be available to the public, but too many signs can look cluttered.
© Leah Page



Many smaller warning and directional signs are prefabricated in recycled plastic or aluminium. Routed treated timber is cheap, attractive and suitable for simple directional signs.

Signs need a durable finish or cover, backing, stand and posts. To protect the sign from wind vibration and other damage, firmly attach the panel to a rigid back-plate or other flat surface. Gluing or framing the panel is better than drilling holes for bolts, because this can cause corrosion.

The best sign supports are posts made from galvanised pipe, which can be powder-coated. Sturdy treated pine posts are suitable for timber and some metal signs. Set the supports well into the ground – to a depth of a third or more of the post height.

Marine grade aluminium is best for interpretation signs near the coast. Anodised aluminium signs, which can incorporate detailed photos and images, are very attractive. They are expensive but long-lasting, and scratches don't destroy the picture. Screen-printed signs and printed vinyl are cheaper options.

A scratch-resistant top, which can be removed and replaced if damaged, is useful if vandalism is likely to be an issue. Inspect signs regularly for damage. Unless visible damage is repaired promptly, it is likely to encourage further vandalism.

A simple design for a sign and sign shelter is available in the *Coastal management specifications manual* (Green Skills Inc 2010).



13.5.5 Sign design

Use colours and materials that are attractive and sympathetic to the surroundings. The old saying that a picture is worth a thousand words is especially true for signs. Attract readers by incorporating images (e.g. local photos and illustrations) that reflect their interests – surfing, fishing, boating, weather – or make the sign a work of art.

Minimise the amount of information on the sign; use the fewest possible words to convey the message. The text should be easy to read from a distance of about 5m.

The most effective messages are positive and non-threatening. If people know why they are being requested to do or not do something, they are more likely to cooperate.

Consider colour-blind people, particularly when designing maps (e.g. do not use red text on brown/green backgrounds).

Figure 13.24 A sign at Park Beach encourages people to respect the area. The sign incorporates work by local artists and is placed so as not to obstruct the view of the surf from the car park. © Leah Page



Signs about management issues (e.g. no driving on the beach, no camping, day use only, no fires) should be short, simple and easy to understand. The widely understood international pictograms are useful for conveying these messages to non-readers.

Ensure roadside signs comply with the state-wide *Integrated visitor information system.* (Graham & Associates and HMT Planning 1999).

13.5.6 Ongoing maintenance of signs

Create an inspection and maintenance schedule for all signs.

Check structures are secure and not becoming a hazard to the public. Signs that are damaged or no longer needed should be removed, unless they have historic value.

Clean up vandalism and contact the manufacturer if replacement parts or cover plates are required.

Figure 13.25 Signs can be a work of art like this bird sign at Medeas Cove in St Helens. Source: Community Coastcare handbook (Thorp 2005)





13.6 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Aboriginal Heritage Tasmania

Desktop searches for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Coastal Values data

Vegetation, species habitat and geomorphic values data for a 100m-wide coastal strip of the northern, southern and north-western Tasmania NRM Regions. Available on the LIST

www.thelist.tas.gov.au

Foreshore values mapping

Provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. Available on the LIST

www.thelist.tas.gov.au

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. To access, download a free registration form from the website

https://www.naturalvaluesatlas.tas.gov.au

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au



13.5

Roads, vehicle tracks and car parks

Acid sulfate soils

Predictive maps of possible acid sulfate soil occurrence

www.thelist.tas.gov.au/

Austroad publications

Available for download from the Austroads website. Registration is required to download these products. Registration and products are free.

http://www.onlinepublications.austroads.com.au

- *Austroads 2003, AP-G1/03: Rural road design—A guide to the geometric design of rural roads (8th edn).*
- *Austroads 2003, AP-R217/03: Environmental considerations for planning and design of roads + reference CD ROM.*
- *Austroads 2003, AP-R180/00: Road runoff & drainage: Environmental impacts and management*
- *Austroads 2003, AP-R185/01: Environmental risk management guidelines and tools for road projects*
- *Austroads 2003, AP-R232/03: Guidelines for treatment of stormwater runoff from the road infrastructure*

Forest practices code (Forest Practices Board 2000)

Road classifications, geometric designs and maintenance standards for low volume roads (Guimmarra 2001)

Transport Tasmania

Roadworks specifications, Road hazard management guide, and Technical advice sheets

- Roadworks specification R75 – Environmental protection
- Roadworks specification R76 – Roadside maintenance
- Roadworks specification R34 – Drainage maintenance (August 2003)

www.transport.tas.gov.au

Tracks and trails

Australian Standards

- AS 2156 Part 1 Walking tracks. Classification and signage
- AS 2156 Part 2 Walking tracks. Infrastructure design
- AS 1428.1 – 1428.2 Design for access and mobility
- AS/NZS ISO 31000:2009, Risk management - Principles and guidelines

Replaces AS 4360-2004 Risk management as the leading resource for risk management.

Austroads

AGRD06A/09 Guide to traffic engineering practice Part 6A - Pedestrian and cyclist paths

Available for download from the Austroads website. Registration is required to download these products. Registration and products are free.

http://www.onlinepublications.austroads.com.au



International Mountain Bicycling Association trail difficulty rating system

http://www.imba.com/resources/freeriding/trail-difficulty-rating-system

Tasmanian reserve management code of practice (Parks and Wildlife Service et al. 2003)

Track infrastructure design manual (Hobart City Council, in prep)

Track maintenance manual (Hobart City Council, in prep)

Trail planning guidelines: Guidelines to assist with the planning, design, construction and maintenance of sustainable recreational trails in Tasmania (Sport and Recreation Tasmania, in prep)

Trails Tasmania strategy (Inspiring Place Pty Ltd 2007)

Improving recreational trail opportunities and preparing inventory of existing trails

Walking track management manual (Parks and Wildlife Service 2003)

Hard access structures, fencing and access control

Coastal dune management: A manual of coastal dune management and rehabilitation techniques (NSW Department of Land and Water Conservation 2001)

Coastal management specification manual (Green Skills Inc 2010)

Tasmanian reserve management code of practice (PWS et al. 2003)

Wallaby proof fencing: A planning guide for Tasmanian primary producers Statham & Statham 2010)

Guidelines for excluding wildlife with fencing, but also includes features such as wombat gates for allowing wildlife access.

Signage

Australian Standards

- *AS 2156 Part 1 Walking tracks. Classification and signage*
- *AS 2899.1-1986 Public information symbol signs – General information signs*

Draft sign manual (Parks and Wildlife Service 2000)

Sign manual (Angel & McArthur 1995)





14 Structures and facilities

14.1 Legislation and approvals

14.2 Construction work in coastal areas

14.3 Launching ramps and other boating facilities

14.4 Buildings, toilets and other amenities

14.5 Tools and resources

This chapter deals with how to minimise environmental damage when constructing and maintaining buildings and other public amenities in coastal areas. Proper planning, design and maintenance of structures will improve longevity, minimise maintenance and save money.

Thorough investigation and planning before building is important to protect sensitive coastal or marine environments such as foredunes, wetlands and saltmarshes. Many coastal areas, especially soft or sandy sites, are prone to erosion, and low-lying areas are vulnerable to sea level rise. Structures may be at risk of damage from wind, waves or currents and erosion, and sedimentation can be a problem in marine areas.

The visual appearance of coastal structures and the needs of the community and users of the area must be considered in planning and design. When planning new facilities, upgrades or removal of old facilities, community consultation is essential, and is most effective when done in collaboration with local community groups.

The types of structures that are commonly built on shoreline areas include picnic facilities, toilets, shore-based aquaculture facilities, boating and surf club facilities. In some urban areas, coastal environments are dominated by ports and industry, whilst in other urban areas the coast is modified for recreational facilities and access. Often there are few spaces left where natural processes and systems can persist. ***Refer to Chapter 13 Access Management*** for information on access structures such as boardwalks and steps.

Tab photo: Built up foreshore of the Tamar Estuary, northern Tasmania. © Chris Rees.



14.1 Legislation and approvals

In addition to the legislation and approvals set out in ***Chapter 1 and Appendices 1 and 2***, the following may apply.

Structures on the shoreline often cross over land and water that is governed by different authorities. The Crown owns the seabed and water, regardless of whether the landowner has a high water mark title. Structures below high water mark also require DPIPWE Crown Land Services approval and a Crown Land lease. Depending on the structure's size and nature, DPIPWE may require submission of a Development Proposal and Environmental Impact Statement.

Developments must comply with the *Tasmanian Building Act 2002* and the *Building Code of Australia* (Australian Building Codes Board) as well as council planning schemes. Obtain a building or plumbing permit (usually from the local council) for all building and plumbing before work is commenced. The *Building Code of Australia* includes requirements for access to buildings for people with disabilities.

Approvals may require appropriate site rehabilitation works.

14.2 Construction work in coastal areas

Designing coastal structures is not an exact science and innovative designs may be more appropriate than traditional approaches. The information in this manual does not preclude other approaches, as long as they are supported by specialist advice and a sound maintenance program, to ensure that structures have minimal impact on the coastal environment and are kept in good condition.

Specialist advice is essential to assess whether the design and placement of structures is suitable for the local conditions. Building structures on unstable landforms and in coastal waters is often not appropriate but is sometimes necessary for the provision of important services and access.

Structures will be more effective if their design, siting and construction are based on good technical advice from a coastal engineer and a coastal geomorphologist. Inappropriately designed or sited coastal structures can easily be destroyed by wind or waves or become a danger to the public. They can also damage coastal values such as important wildlife habitat and cause serious erosion or sand build-up in adjacent areas.

Construction work in coastal areas must minimise impacts on coastal processes such as sand movement; cultural values such as Aboriginal heritage sites; wildlife and vegetation values such as threatened species; wildlife habitat and important coastal vegetation communities. Consult with specialists and undertake any necessary assessments. ***Refer to Chapter 1 Working in coastal environments.***

It is essential to ensure all works staff and contractors are briefed on minimising environmental impacts during construction work and that adequate supervision is provided to ensure best practice



environmental standards are being implemented.

Refer also to Chapter 11 Soil Management and earthworks.

14.2.1 Climate change and coastal infrastructure

Constructions in marine and estuarine waters and on or near the shoreline are highly susceptible to the impacts of sea level rise and coastal inundation.

Design and construction of structures (or upgrading existing facilities) should take into account such changes to the coastline within the life span of the structure, employing the best construction methods and materials for the situation and intended life span of the asset, and ensuring that maintenance over the structure's life span is feasible and affordable. Specialist advice from engineers will be needed.

Appropriate building setbacks, minimum floor levels, appropriate engineering assessments and appropriate construction techniques will all be part of adapting to predicted sea level rise and coastal inundation.

In view of predicted climate change and sea level rise, existing infrastructure that is low-lying or built on erodible shorelines should be assessed for the risk of erosion or inundation.

Coastal vulnerability maps are available on the LIST as part of *Indicative mapping of Tasmanian coastal vulnerability to climate change and sea-level rise* (Sharples 2006). Specialist advice from a coastal geomorphogist will help with decisions about the best place to site structures.

The *Coastal risk management plan* (DPIW 2009) can assist in determining the likely risks to a structure and strategies to reduce risk. ***Refer to Chapter 3 Coastal hazards.***

It might be that the asset planned is itself an adaptive management structure, such as a seawall or groyne. ***Refer to Chapter 15 Shoreline modification.***

14.2.2 Designing and planning coastal infrastructure

Before works start, thorough investigation and planning are essential. This may take some time.

Obtain technical advice from an experienced coastal geomorphologist and an engineer before works are planned. Proposed works and structures that would extend below high water mark or on unstable coastal landforms should be checked by a suitably qualified person (e.g. engineer, building surveyor, architect, landscape architect or environmental health officer).

Obtain all relevant planning and building approvals for the works. Structures below high water mark or on other Crown lands require approval under the *Crown Lands Act 1975*.

Have designs and plans for built structures assessed and approved by a qualified building surveyor. Adhere to all relevant Australian and Tasmanian Acts, regulations, codes, strategies, management plans and standards including occupational health and safety standards.

When considering the location of coastal structures, take into account:

- the level of hazard or risk for the site or for adjoining or nearby properties or infrastructure – ensure it is not increased by the new structure
- the risk of water pollution from inundation of any materials, substances or wastes on the site – avoid or minimise
- the need for minimising future engineering or remediation works to ensure likely costs do not exceed the public benefit of the development.



14.2

Aim to minimise infrastructure in the coastal zone. Consolidate structures in high-use areas with existing facilities wherever possible.

Structures that provide access for disabled people should be considered where required or appropriate, particularly at coastal access points such as viewing points and beaches.

Assess the environmental damage that could result from the construction works and develop measures to minimise the damage. An Environmental Management Plan may be required for larger projects. For smaller projects, prepare a specific site plan for all works, outlining the works to be conducted and measures to reduce environmental damage.

Identify all natural coastal and marine values and develop procedures to protect and minimise disturbance of these values. Seek specialist advice.

Minimising environmental damage might include procedures like controlling sediment and erosion; avoiding works near shorebird breeding sites during the nesting season (September to March); developing an oil spill plan or ensuring that all machinery, vehicles and vessels are free from weeds, pests and diseases before and after works; conserving soil and rehabilitating disturbance to the site as soon as practicable. ***Refer to Chapter 11 Soil management and earthworks.***

Seek advice from Aboriginal Heritage Tasmania about the potential to disturb Aboriginal heritage sites. An Aboriginal Heritage Assessment and permits may be required.

Seek public input to proposals for new developments and upgrades of existing facilities. Consult with local Coastcare groups even for very small projects. Local volunteers have a strong connection to the coast they have been caring for and should be included in coastal management decisions. Notify all neighbours and users likely to be affected by the works. Keep in mind that, if they are not consulted, annoyed beach-users may remove unwanted structures.

Provide facilities that look attractive, with a quality of design and materials that complement adjacent structures and landscapes and does not detract from the character of the area. Even a toilet building can

Figure 14.1 Structures in recreational areas of coastal landscapes are a necessary part of providing services and their visual appearance can be improved by the use of murals. This is also a great way to involve the local community.
© Leah Page







have aesthetic appeal. The colours should generally fit with the colours of the landscape and vegetation, but brightly coloured structures may be appropriate in some situations (e.g. to make facilities easier to find among vegetation).

Position and design structures so that they will not cause nuisance or hazard from excessive noise, odours, overlooking or overshadowing, visual intrusion or an altered microclimate.

Buildings should be consistent with the scale of the built character of the surrounding area, unless the existing development detracts from the natural setting. Confine developments, as far as practicable, to areas that have already been disturbed. Establish a limited site disturbance zone (e.g. to 1m) beyond the wall of the structure.

Ensure the building design and location includes measures to survive bushfires. Refer to *Building in bushfire prone areas* (Ramsay & Dawkins 1993) and *Landscape and building design for bushfire areas* (Ramsay & Rudolph 2003).

Design structures to minimise maintenance requirements for the duration of their service life. Where the life span of a structure is likely to be less than 25 years, plan for its eventual removal. Favour design and construction methods that allow the removal of the structure without major new impacts on environmental and conservation values.

14.2.3 Works guidelines for maintaining coastal infrastructure

Coastal structures and facilities must be inspected regularly to identify any hazards or maintenance required. Small-scale works to undertake minor repairs often do not require approval processes but still have the potential to impact on coastal values.

It is important to identify and protect coastal values during all work activities. Specialist advice may be required.

Any works or modifications outside of the original footprint of the site will require consultation with Aboriginal Heritage Tasmania.

Assess existing structures for susceptibility to climate change impacts such as erosion and inundation caused by sea level rise. Use the latest Intergovernmental Panel on Climate Change (IPCC) projections of sea level rise and coastal vulnerability maps (Sharples 2006) to identify vulnerable locations. Use the *Coastal risk assessment tool* (DPIW 2009)to assess likelihood of risk and to establish mitigation or adaptation processes for particular assets.

All staff and contractors should be briefed on the environmental considerations of the site and any restrictions or specific work practices that must be implemented to meet those considerations. Appropriate supervision is required to ensure environmental standards are being met.

Ensure all machinery and vehicles are free from weeds and diseases prior to bringing them on site; if weeds and disease are present at the site then ensure that tools, boots, vehicles and machinery are cleaned at a suitable location before leaving the site. Only import material from sites that are free from disease and weeds. ***Refer to Chapter 8 Weed and disease management.***

Control sediment and erosion from work sites by applying sound soil management.

Investigate the incidence of acid sulfate soils (ASS) and if necessary take precautions to minimise their disturbance. A rotten-egg smell or yellow deposits when digging are likely indicators of ASS. Minimise the potential for causing sedimentation of watercourses



in track design, construction and maintenance. ***Refer to Chapter 11 Soil management and earthworks.***

Identify coastal values such as important wildlife habitat, vegetation communities and threatened species. Consult specialists and undertake any necessary assessments. Put practices in place to minimise impacts on these values, such as timing the construction works to avoid bird breeding seasons in areas where shorebirds, penguins or seabirds are present. ***Refer to Chapter 7 Vegetation management and Chapter 10 Wildlife and pest management.***

Plan for ongoing future maintenance by establishing a maintenance regime to ensure structures are inspected regularly.

14.2.4 Ongoing maintenance of structures and facilities on the coast

All buildings should be maintained regularly to minimise the risk of them becoming a public hazard. Conduct regular safety inspections as specified in the Australian Standards and after heavy rain, storms or unusually high tides.

Boating facilities require regular maintenance to make sure they are safe and in good condition and to monitor any erosion or sedimentation associated with the structure.

Inspection and maintenance should include the following.

Figure 14.2 The boat ramp at Ulverstone has a floating pontoon to minimise impacts on the sea floor and interference with sand transport along the shoreline. © Jocelyn Phillips



- Check structures are secure and not becoming hazardous to the public.
- Check that surface- and groundwaters are not being polluted.
- Make sure erosion is not a problem.

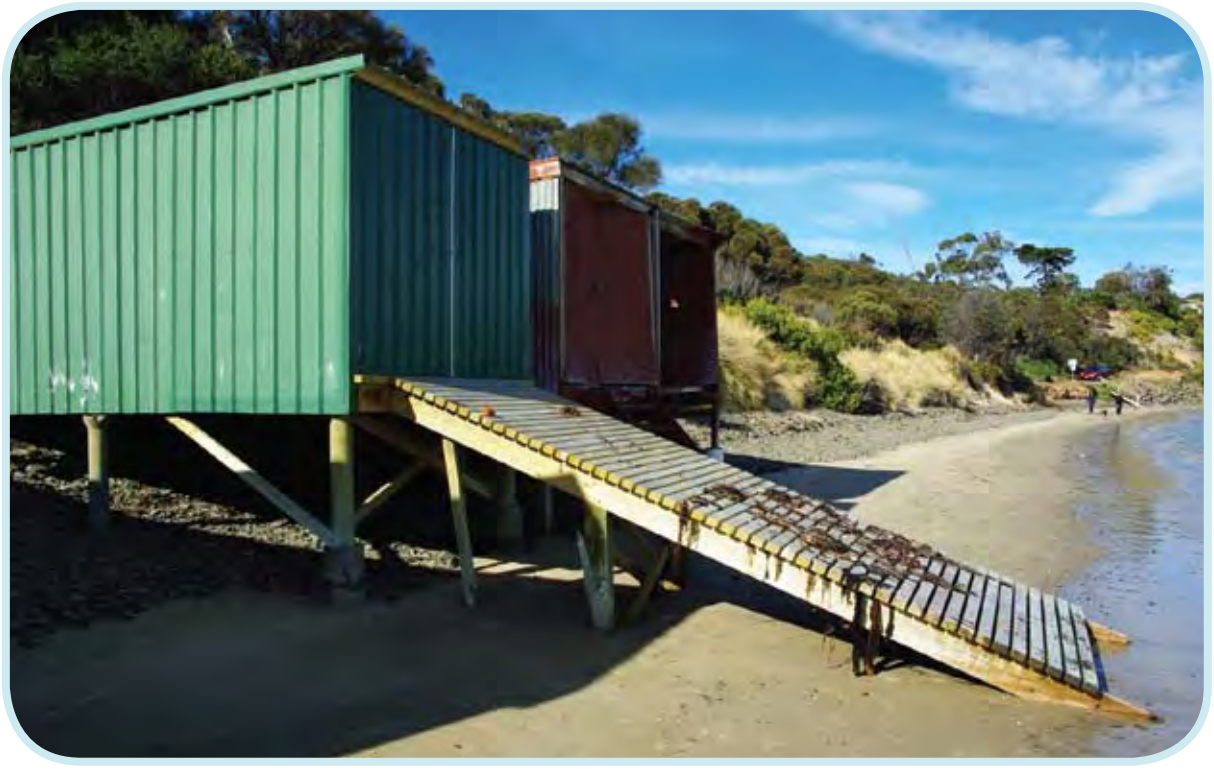
All built structures require maintenance regularly, and immediately after storms, to ensure they remain serviceable. They can be quickly damaged or destroyed by wind and waves and result in broken timbers, missing steps, sharp edges, dislodged nails and fastenings, and debris that can become a hazard to the public.

Structures built on sandy coasts are subject to the problem of sand accumulation at certain times of the year. It is not possible to keep them continually clear without major works (which disrupt the natural coastal processes) or by installing an expensive permanent sand bypass system (e.g. trapping the sand and pumping it elsewhere, as used at the Tweed River entrance in Queensland).

Carry out preventative maintenance at regular intervals or as required, to minimise further impacts.

- Prepare an inspection and maintenance plan.
- Ensure regular preventative or necessary maintenance is carried out.

Figure 14.3 Small private skids and boat sheds are common on many of Tasmania's beaches. Whilst some are well cared for, others are in need of repair and could be considered hazardous. © Leah Page





14.3 Launching ramps and other boating facilities

Piers, jetties and other boating facilities provide for recreational boating and fishing and commercial fishing operations. Marine structures can obstruct currents and waves and are likely to affect the transportation of sediment. Structures may be susceptible to wave erosion, loss of beach sand or sand build-up and managing these impacts can become expensive.

Detailed site investigations are an essential part of planning and designing marine structures. Site investigations should include an examination of the geotechnical characteristics of the proposed site and the likely effects of structures on coastal and marine ecosystems.

Choosing the appropriate site and design is critical for launching ramps and other boating facilities that extend across the shore and into the water. It is also important to investigate the likely effects of wind and storm surge on the structure and its use, particularly in light of climate change and sea level rise predictions. This will ensure that the structure will stand up to the local conditions and be safe to use during all weather and tide conditions.

Matters of public safety and the location of existing support infrastructure, such as road or rail access and channel depth, may sometimes override other considerations, making it necessary to place structures in locations where they will interfere with coastal processes (e.g. to provide a safe harbour). In such cases aim to keep interference with coastal processes and values to the minimum required for the desired effect and plan for ongoing management of adverse environmental impacts (e.g. by replenishing lost beach sand).

14.3.1 Types of boating facilities

A **boat launching ramp** is designed mainly for launching trailer-borne recreational vessels and small commercial vessels and includes associated car parking facilities.

A **jetty** or **pier** is a horizontal decked walkway, built on piers or piles, which provides access from the shore to a waterway.

A **pontoon** is a floating structure used for access to the water or a vessel.

A **skid** is an inclined ramp used for the manual launching of small craft but does not include a slipway. Skids permit small boats to be drawn out of the water without the use of winches, trolleys or cradles. A skid may also be used for rigging and launching small vessels and providing access to a boatshed.

A **small slipway** is a structure (usually two supported parallel rails on which a wheeled cradle is run) to draw a vessel out of the water for maintenance and repair. A larger slipway is part of a boating industry facility or a commercial marina.

14.3.2 Approvals for marine structures

Structures on the shoreline often cross over land and water that is governed by different authorities.

Structures below high water mark require Crown Land Services approval and a Crown Land lease. Depending on the structure's size and nature, submission of a Development Proposal and Environmental Impact Statement may also be required. Local council planning approvals and building approvals and permits are also necessary.

If the works cross land managed by the Parks and Wildlife Service (PWS) under the *National Parks and Reserves Management Act 2002*, then approval



of PWS will be required. This is necessary before submission of council planning applications.

All structures should comply with the *Building Act 2000* and *AS4997-2005 Guidelines for maritime structures* and the design and engineering guidelines in *AS3962-2001, Guidelines for design of marinas and ramp construction.*

These guidelines cover the design of near shore coastal and estuarine structures such as jetties, wharves, berthing dolphins, floating berths, seawalls, breakwaters, boat ramps laterally restrained, floating structures and building substructures over water. These standards can be used to determine the desirable position of structures within a harbour, based on the predominant wave conditions.

14.3.3 Role of Marine and Safety Tasmania (MAST)

Major commercial ports are owned and managed by Tasmanian Ports Corporation Pty Ltd. Marine and Safety Tasmania (MAST) manages some commercial and recreational facilities, but the majority of facilities are owned and managed by local councils, PWS, Hydro Tasmania and Crown Land Services. Details regarding ownership of marine facilities are available on the MAST website.

MAST oversees the construction process for its structures and also oversees some construction of facilities not owned by MAST through the Recreational Boating Fund (RBF). In these cases, after completion of a project and MAST managing for a warranty period of 12 months, the management is transferred to the owner.

When a facility is being constructed and it is not owned by MAST or has not occurred under the RBF process, then the only time MAST will be required to comment on the construction is if the new structure interferes with safe navigation or moorings in the area. This is picked up in the planning process, with the council forwarding a referral letter to MAST.

In sensitive ecosystems, engineering and design criteria that meet Australian Standards may not be enough to minimise environmental impacts. As a result, in some situations and environments (e.g. offshore from national parks and near marine reserves) stricter, novel or more 'environmentally friendly' alternative designs may be required. The criteria for such developments should be evaluated case by case.

14.3.4 Potential impacts of ramps and marine facilities

Structures that extend into the water can interfere with the transport of sand by tides, waves and currents. All marine structures, especially solid structures such as launching ramps, should be designed and suitably sited to avoid redirecting waves and sand where they are not wanted. This can lead to erosion or deposition of sand and erosion of soft-sediment cliffs nearby. Even a well-designed structure put in the wrong place can be damaged by wind or waves.

The installation of these structures can impact on coastal vegetation, wildlife habitat and values, and marine communities. Construction activity can disturb toxic sediments or expose acid sulfate soils. ***Refer to Chapter 11 Soil management and excavation.***

Changes to drainage patterns on the shoreline can create or exacerbate shoreline erosion. The use of certain materials can be toxic to aquatic organisms.

Boat ramps and jetties can cause shadowing of marine plants and result in loss of biodiversity in the vicinity of the structure. Marine facilities can be sources of



pollution from fishing debris and chemical and oil spills.

Structures on soft and sandy shorelines are particularly vulnerable to rising sea level and increasing frequency of storm surges associated with global changes in climate. Refer to the maps of vulnerability to rising sea levels in *Indicative mapping of Tasmanian coastal vulnerability to climate change and sea-level rise* (Sharples 2006), and the *Guidelines for responding to the effects of climate change in coastal and ocean engineering* (National Committee on Coastal and Ocean Engineering 2004).

14.3.5 Planning for marine structures

Careful design and site selection of coastal structures is very important. New shore-based and marine structures should only be built where the structures meet a demonstrated need. Many structures on the coast were built long ago using methods and placed at sites that are now recognised as detrimental to coastal and marine environments. If community usage is established, it may be appropriate to maintain or improve existing facilities to best manage the impacts of human activities in the area.

Siting, design, construction and maintenance of structures should be sensitive to the natural, cultural and aesthetic qualities of the local coastal environment. As far as possible, structures should be concentrated at certain locations to reduce the visual and environmental impacts on the general area.

In more natural areas, structures should blend in as far as possible with the surrounding landscape (viewed from both the shore and the water). Locate the facilities where activities will have the least impact on existing amenities or views. Of course, public safety is also important (e.g. a breakwater may be needed to provide a safe harbour for fishing boats taking refuge from a heavy swell).

Minimise impact on: coastal processes such as sand movement; cultural values such as Aboriginal heritage sites; wildlife and vegetation values such as threatened species; wildlife habitat and important coastal vegetation communities. Consult specialists and undertake any necessary assessments.

Consult with local Coastcare groups and the community, who have useful local knowledge. Coastcare volunteers have a strong connection to the coast they have been caring for and should be included in coastal management decisions.

Site selection

If a new structure is needed and there is a choice of site, select a location that complies with the following requirements.

- Choose a safe site that minimises interference with natural ecosystems and the movement of water and sand, as far as possible.
- Avoid or minimise disturbance to sites with cultural heritage, geoconservation or other heritage values. A survey may be required to identify these values.
- Choose a site with no threatened species or ecosystems of high conservation value. Other habitat values should also be protected, wherever possible.
- Avoid areas where the works could mobilise contaminated sediments.
- Minimise visual and ecological disturbance by choosing less sensitive sites for these works and integrating them with other uses. Locate the facilities where boating activities will complement the area's existing amenities (e.g. roads) and where adequate car parking is available.
- Choose waters with adequate navigation depth and existing vehicular access.



- Avoid interfering with pedestrian access to and along the shoreline.
- Position marine structures to enable access at all tide levels.
- Consider the latest IPCC sea level rise predictions and the vulnerability of the site to erosion and inundation.

14.3.6 Design of marine structures

Obtain technical advice from an experienced geomorphologist and/or marine engineer before works are planned. Specialist advice is essential to identify the possible effects of marine structures on the natural coastal processes. This will include the factors that drive seasonal patterns of wind speeds, wind directions and tide and wave action.

Choose structures and materials that can survive the local conditions, such as saltwater, strong winds and wave action. In areas where there is a marked variation in tides, floating pontoon-style structures are a preferred option. Use non-slip surfaces for marine structures, to minimise hazards to pedestrians or vehicles.

Structures that are resilient or permeable (non-solid) may be preferable to rigid and impermeable structures that resist wind and wave and/or impede sediment movement. Permeable materials (e.g. slats or mesh) are preferable where solid materials will stop light reaching marine vegetation.

Marine structures built on piers are preferable to solid structures. The use of piers avoids altering water movement patterns and minimises changes in the natural patterns of erosion and deposition. Align marine structures to minimise changes to the patterns of movement and supply of marine sediment. It is critical to allow for full tidal flushing and passage of fish wherever possible. Piers will allow for the free movement of tides, and aquatic and terrestrial animals. ***Refer to Chapter 6 Coastal landscape management and Chapter 12 Stormwater and crossings.***

The IPCC Fourth Assessment Report (IPCC 2007) conservatively estimated a sea level rise of up to 79cm by 2100; ongoing research is predicting that sea level rise of over 1m and as high as 1.5m is possible, and sea levels will continue to rise long after 2100. It is anticipated that these higher projections will be reflected in the next IPCC report expected in 2014. Check the latest IPCC sea level rise predictions and use the most up-to-date estimates to ensure the works will function as intended for their life span.

14.3.7 Constructing and maintaining marine structures

Before constructing any boating facilities, approvals are required, which will probably specify any environmental management constraints. Maintenance of existing structures will most likely not require approvals but can still be very damaging to coastal values if not planned with those values in mind.

Before maintenance is undertaken a works plan should be prepared. It should outline the works to be undertaken and the measures that will be used to minimise the risk of causing environmental damage.

The following measures should be required of all contractors and others working in coastal areas.

- When using machinery, take particular care to avoid environmental damage, especially with large machines such as excavators and bulldozers operating on fragile and unstable coastal soils and in or near sensitive marine habitats, such as seagrass beds.



- Ensure that machinery does not introduce weeds or diseases into coastal areas, by cleaning soil and plant material from machinery before and after works.
- Maintain coastal structures to keep them in place and in good repair. This is a significant cost in areas that are unstable or vulnerable to strong winds and waves.
- Minimise excavation of shorelines and avoid works in important ecosystems and habitats, to reduce the impact of marine structures on the coastal environment.
- Ensure works are properly supervised by qualified people and that follow-up surveys are done. Ensure all site personnel are aware of operational constraints required to meet environmental standards and conditions.
- Minimise damage to nearby areas during works and rehabilitate the site soon after works are completed. Ensure follow-up surveys and monitoring are undertaken.
- Avoid fish nursery areas, seagrass beds, saltmarshes, intertidal flats, wetlands and other important ecosystems. Obtain specialist advice on the potential impacts on fisheries and wildlife, including threatened species (some migratory birds, spotted handfish, etc.).
- Time works to avoid the breeding seasons of nearby fish, birds or other wildlife.

Maintenance at slipways

For large slipways, additional maintenance may be required as recommended in *Environmental guidelines for boat repair and maintenance* (DEPHA 2009), which includes the following recommendations:

- Before slipping and during boat cleaning activities, inspect the waste management system sumps, filters, grates and grids and remove trapped solids.
- Clean and maintain oil/water separators and holding tanks/pits.

14.3.8 Design guidelines for small slipways and skids

Ensure all relevant assessments for natural and cultural values and all approvals have been undertaken.

Consult engineers and coastal geomorphologists before designing marine infrastructure.

For skid construction follow the natural shoreline profile.

The recommended slope is not steeper than 1: 2.7. Where the slope is more than 1:8 provide a safe foothold with spaced decking or cleats.

For skids, a slatted, mesh or perforated structure is preferable as this will allow light to penetrate to marine vegetation below.

For slipway construction, follow the natural shoreline profile. Do not cut or excavate the natural intertidal rock. Extend the slipway to allow storage of the vessel wholly above mean high water mark on the land.

Place work areas above the intertidal zone (at least 1m above the mean sea level or Australian Height Datum (AHD).

Use impervious work surfaces or other means to



minimise the amount of waste materials (including untreated washwater and biological material) entering the water. For instance, install traps at the lower end to collect wastes and regularly clean out the traps.

14.3.9 Design guidelines for moorings

Avoid moorings in seagrass beds or other sensitive habitat, wherever possible. Traditional chain-anchored moorings can disturb the bottom and damage seagrass when dragged across the sea floor during storms and at changes of tide. Moorings with a flexible connection between the mooring and the vessel are preferable.

A mooring must not be laid without a permit from Marine and Safety Tasmania (MAST). MAST requires that moorings are lifted and inspected every two years, more often in some areas.

Seagrass friendly mooring systems use a moveable arm raised off the sea floor which is attached to a fixed anchor. After a small amount of disturbance during installation, these moorings allow seagrasses and other marine plants, and soft-sediment animals to remain, live and grow uninhibited.

Seagrass Friendly Mooring System

Made of galvanised steel, the Seagrass Friendly Mooring System incorporates an anchor pole tipped with a screw helix (or auger). The pole is either 1500mm long (small 'marker buoy' version) or 3800mm long (mooring version). Fixed to the top of the screw-in anchor is a 280mm load spreader that sits underneath the seabed and can rotate about the screw-in pole, ensuring the anchor does not pull into the sea bed sideways under horizontal strain.

A 400mm swivel head on a nylon bearing is attached to the top of the screw anchor, to allow for easy 360° movement of a 1100mm seawater-driven spring-loaded shock absorber that gives 1m of shock absorption, chiefly from seawater being forced out of small gaps in the cylinder body (rather like a piston) but also from the spring itself. Future incarnations of this shock absorber for boats larger than 40ft would have a two spring.

A length of 24mm 'Aquatec' marine-grade rope is attached to the shock absorber and the surface buoy. This rope is buoyant, which keeps the shock absorber off the seabed even under extreme low tide conditions.

The Seagrass Friendly Mooring is installed and maintained from a boat fitted with a hydraulic auger drive. The moorings are currently being tested in several locations on coastal New South Wales and Queensland with encouraging results.



14.3.10 Design guidelines for launching ramps, jetties and pontoons

Ensure all relevant assessments for natural and cultural values have been undertaken and approvals obtained. Consult engineers and coastal geomorphologists before designing marine infrastructure.

Minimise the construction of protective structures, such as breakwaters, as these may affect natural patterns of coastal erosion and sediment movement in adjacent shoreline areas, and may look unattractive and detract from the visual and recreational values of the area.

To minimise shoreline alterations, consider using marine ways (dollies) or hoists (straddle carriers) instead of very large ramps. Hoists require a pier or quay. At sites with a gradual submarine slope, a marine way prevents the need for a pier, quay or dredging and allows vegetation to be preserved.

Jetties should be built only where excessive exposure to waves makes ramps and pontoons unacceptable. Jetties or wharves on piles are usually more appropriate than solid fill, to allow water to flow beneath the structure. Pile driven piles are preferred as they create less disturbance of the seabed. When piers made from solid fill are replaced, the material should be disposed of at an approved landfill site.

Design should consider the following:

- Provide sufficient area for car parking and turning for vehicles towing boat trailers onto the structure.
- Restrict size and length of structures to the minimum needed, yet ensure planning for future use.
- Use structures made with slats or mesh to allow light to penetrate to marine vegetation where practicable.
- Leave surfaces untreated, or stain or paint them in colours compatible with the character of the area (except as required for safety reasons).
- Use floating pontoons in preference to fixed ones, which require disturbance of the seabed during installation.

Protect public safety:

- Provide non-mountable kerbs on jetties and wharves in areas generally used by wheeled vehicles, including wheelchairs, where practicable. Handrails are recommended where this does not interfere with access to the water or boats.
- Provide a safety ladder on jetties and wharves where it would be difficult for someone who falls from the structure to get safely to shore.

14.3.11 Design guidelines for large slipways

Large slipways will be designed by an engineer and subject to a suite of approvals. Design should consider the following:

- Allow for pedestrian and boat access at all tides. Alteration of the shoreline may be reduced through using a boat lifting facility instead of rails.
- Ensure the paving design allows for very high loads (e.g. under fork lift trucks and hardstand cradles for boats).
- Provide collection and disposal facilities for solid and liquid wastes, including hazardous wastes (e.g. fuel, oil, cleaners, used sump oil, hull scrapings and paints) to prevent pollution of the ground and water. Provide pump-out or other facilities for wastewater disposal from boats.
- Construct a permanent catch drain above the high water level to collect and direct residues,

waste liquids and solids from the boat work area to a collection pit via a silt trap. Make the work areas slope slightly so wastewater will flow into the pit. Make the collection pit large enough to hold the first flush of contaminated stormwater and/or the expected volume of wastewater from wet cleaning processes.

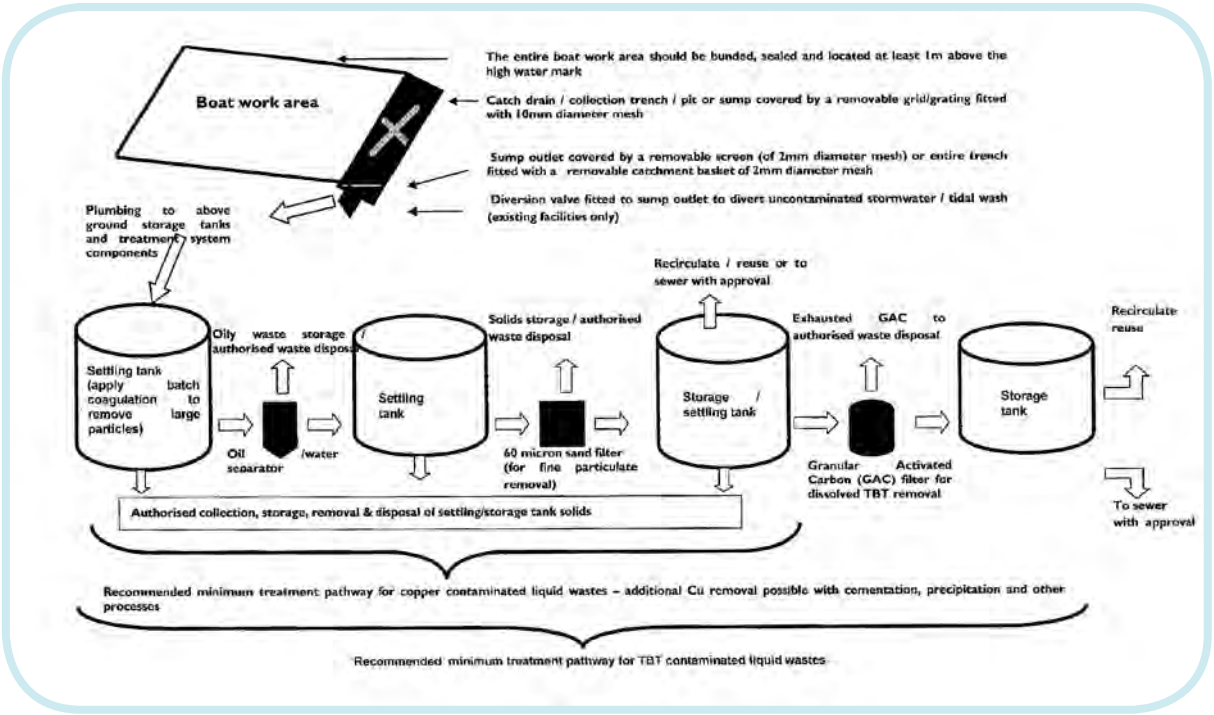
14.3.12 Waste management at slipways

Point source pollution generated during vessel maintenance can contaminate coastal waters and sediments, leading to negative impacts on the local community, the fishing and aquaculture industry, recreational users and the ecosystem itself. Maintaining good water and sediment quality is vital for all these uses and values (NRM South 2008b).

There are important measures that can be incorporated into slipway design to minimise impacts of waste pollution on the coastal and marine environment:

- Cover the work area, where possible, to minimise entry of rainwater and reduce contamination of stormwater.

Figure 14.4 Waste management and treatment of liquid wastes from slipways. Source: Environmental Guidelines for Boat Repair and Maintenance (Department of Environment, Parks, Heritage and the Arts 2009).





- Bund the boat work area and hardstand, where practicable, and construct drains to divert uncontaminated stormwater around the slipway site, contain the runoff from the boat work area and minimise the amount of stormwater requiring treatment.
- Regularly clean and maintain work areas and ensure that no litter or wastewater from cleaning or maintenance work falls or drains into stormwater.
- Do not allow water to run off or be released from the work areas without first being treated to remove toxic substances, turbidity and discolouration.
- Collect any contaminated stormwater in a holding tank and either dispose of it via a licensed waste transporter, or treat it on-site to an appropriate standard for discharge or reuse.

Encourage responsible boat maintenance.

- Slipway work (e.g. hull blasting) should be done above the catch drain so that any wastes drain into it.
- Hulls should not be cleaned within 50m of the shoreline, wherever possible, if the hardstand is not sealed and bunded, and the washdown waters and other wastes could enter estuarine or marine waters.
- Oil filtration devices should be fitted to bilge pumps; commercial oil absorption materials should be placed in bilges; and contaminated bilge water and other wastes should be discharged responsibly.

14.4 Buildings, toilets and other amenities

This section outlines considerations for building new structures and maintaining existing structures in the immediate coastal zone, including change rooms, huts, picnic shelters, outdoor furniture and rubbish bins.

As a general rule, buildings and amenities such as outdoor furniture and rubbish bins should be placed away from the shoreline wherever possible. The shoreline is a sensitive area, where unstable soils and sediments are prone to erosion and landslip and vulnerable to sea level rise. Consider not just the impact of installation but the ongoing impacts of accessing the facility for servicing (e.g. emptying rubbish bins) or maintenance. Some buildings and amenities, however, will need to be provided on or near the shoreline for recreation, work or safety purposes.

A new built structure should only be considered where the need for it can be clearly demonstrated, and its construction and use avoids or minimises damage to coastal processes (e.g. movement of sand between the dune-beach-shore system) and ecosystems.

Where possible, consolidate structures into areas of high use or existing facilities. Promote community use of shared structures such as public ramps rather than private boat sheds.

Choosing the appropriate site is critical for structures on or near the shore. These structures are susceptible to damage by wave erosion or sand or sediment build up. They can be expensive to maintain and can cause problems in adjacent shoreline areas by changing the sediment budget. Works in coastal sand dunes can funnel wind and increase wind erosion causing blowouts and mobility of the dune system.



Choose a site that avoids or minimises interference with coastal processes (e.g. wave actions, wind and cyclic beach sediment budgets).

Identify and protect natural and cultural values during construction and for the life of the structure.

The use of creative design, form, colour and siting will make buildings and amenities more attractive and this can deter vandalism. The style of the building design should be appropriate to its setting, e.g. in urban areas the style may be formal in character whereas in more natural settings the style may be informal.

Involve the local community wherever possible, as they are often the reason for the facility being provided. Work in collaboration with the local Coastcare or community group. Members often have valuable local knowledge and their own aspirations for the area they have been caring for.

14.4.1 Site selection

If a new structure is needed and there is a choice of site, select a site that complies with the following requirements.

- Avoid unstable areas such as dunes, slip-prone areas, very erodible soils, natural drainage channels and stream banks.
- Protect aesthetic values by concentrating structures at certain locations to reduce the visual and environmental impacts on the general area.
- Choose sites away from significant natural or cultural heritage values. Avoid building on natural vegetation, floodplains, wetlands and other ecologically sensitive sites.
- Avoid works in areas infected with phytophthora root rot.
- Avoid works in acid sulfate soils (ASS) wherever possible, as disturbing ASS can lead to environmental damage and corrosion and loss of structures.
- Consider the latest sea level rise predictions from the IPCC and the vulnerability of the site to inundation and erosion due to sea level rise.

14.4.2 Special considerations for outdoor furniture and amenities

Design outdoor furniture and amenities to be functional, suit the needs of the user and be adequate for the expected use levels. They should be safe, solid and constructed from durable materials that will stand up to salt spray, high winds, storms and sun. New, innovative designs may be more effective and attractive than conventional designs.

Use non-abrasive, non-splintering materials with all edges and corners rounded and avoid protruding bolts, screws, nails and similar items that might injure users.

Stainless steel can be substituted for galvanised fittings and fixings to greatly improve the life of these items. Stainless steel fittings (brackets etc.) will require stainless steel fixing, to avoid galvanic corrosion where metals come into contact.

Provide a range of table sizes and seating arrangements to cater for disabled visitors and various group sizes and ages. Sloping seat surfaces will allow water to run off.

Provide rubbish bins with secure lids (to prevent scavenging by possums or dogs) and ensure they are emptied regularly.

Consider the types of rubbish bins to be provided and ensure that their size and design are adequate to handle the amount and type of waste. Land managers should provide separate bins for waste/rubbish and recyclables. Consider where the bins are located and



how often they will be emptied.

The use of CCA (copper, chromium, arsenic) treated timber for seating and tables and other areas with which humans come into contact is no longer permitted. New treated timbers are being developed and there is a large range of prefabricated tables and seating that are made from recycled plastic.

Shelters provide shade and a focal point for recreational activities. In exposed locations it may be necessary to choose shelters with walls that provide protection against prevailing winds. In determining wind breaks, site aesthetics may need to be considered as well as the potential for making the most of views. Curved roofs can be used to soften the visual impact of structures.

14.4.3 Special considerations for toilets

Toilets and facilities to treat and dispose of wastewater require careful design and siting. Effluent from poorly designed toilets can travel a long way (down-slope and sideways and into the water table) and may pollute wetlands or sand where children play.

The appropriate type of toilet and wastewater treatment system will depend on the soil and other site conditions, water supply and costs (including maintenance) and projected public demand.

Details of approved commercially available wastewater treatment systems are available from councils and from the Building Standards and Regulation Section, Workplace Standards Tasmania, Department of Infrastructure, Energy and Resources.

Protect nearby soil and water from contaminated effluent discharge. Seek advice from an engineer about the appropriate type of toilet, wastewater

Figure 14.5 An unsightly concrete toilet has become a mosaic work of art thanks to a local artist working with the local school community. © Leah Page





treatment and disposal systems to install.

Ensure that qualified professionals design and install all structures, including on-site wastewater treatment plants, rising mains and associated sewerage reticulation. The design plans for wastewater treatment systems should provide full details of the treatment system to be used.

The design and installation of on-site wastewater disposal systems (including absorption trenches, absorption beds, evapo-transpiration-assisted beds, absorption/seepage trenches or mounds and sub-surface irrigation areas) must be done in accordance with the relevant statutory requirements and Australian Standards.

Ensure sites for wastewater disposal are evaluated by a qualified geotechnical engineer or environmental health officer experienced in this field. A site evaluation report must be completed in accordance with the Australian Standard *AS/NZS 1547:2000 On-site domestic-wastewater management and the Code of Practice for On-Site Wastewater Disposal* (Australian Institute of Environmental Health, Tasmanian Division) and the *Tasmanian Plumbing Code* (DIER 1994).

Any on-site wastewater disposal must not create an unreasonable risk to public health or local surface- or groundwater quality. Systems should be designed to cater for peak flow conditions and should fully treat wastewater within the boundaries of the designated treatment site.

Avoid installing septic tanks on sandy sites. Where toilets are required, install systems that will not pollute groundwater (e.g. pump-out toilets) and arrange for disposal of sewage at approved facilities off-site.

Sewage generated from pump-out facilities must be disposed of by a licensed waste transport business, approved to collect, transport and dispose of waste at an approved facility.

Maintain all toilets regularly to minimise the risk of them causing pollution or becoming a health hazard or eyesore.

Types of toilet

Toilets are of three types:

Wet toilets are flush toilets connected to sewers, or to septic tanks. Flush toilets are preferred by users, but discharge larger volumes of effluent and are expensive to maintain.

Dry toilets include pit or composting toilets. These use much less water than conventional flush toilets, but require more regular maintenance.

Vault toilets have a holding tank that requires pumping out from time to time. Vault toilets avoid pollution on-site but require more site disturbance to install, and are expensive to pump out. They can be visually intrusive if the holding tank sits above the ground.



14.5 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Aboriginal Heritage Tasmania

Desktop searches for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Australian Standards

Available from ASI Global

phone 1300 654 646

www.standards.com.au

- *AS3962-2001 Guidelines for design of marinas*
- *AS4997-2005 Guidelines for design of maritime structures*
- *AS/NZS ISO 31000:2009 Risk management - Principles and guidelines*

  Replaces *AS 4360-2004 Risk management* as the leading resource for risk management.

Climate change and coastal risk assessment project.

A suite of tools and documents including:

- *Coastal risk management plan: Template and guidelines* (DPIW 2009)
- *Coastal hazards in Tasmania: General information paper* (DPIW 2008c)
- *Climate change and coastal asset vulnerability: An audit of Tasmania's coastal assets potentially vulnerable to flooding and sea-level rise* (DPIW 2008b)
- *Sea-level extremes in Tasmania: Summary and practical guide for planners and managers* (DPIW 2008e)
- *Historical and projected sea-level extremes for Hobart and Burnie, Tasmania* (Hunter 2008)
- *Background report: Coastal flooding - Review of the use of exceedence statistics in Tasmania* (DPIW 2008a)

www.dpiw.tas.gov.au/climatechange

Coastal management specification manual: a guide for the construction of coastal management infrastructure (Green Skills Inc 2010)

Coastal Values data

Vegetation, species habitat and geomorphic values data for a 100m wide coastal strip of the northern, southern and north-western Tasmania NRM Regions. Available on the LIST

www.thelist.tas.gov.au



Environmental guidelines for boat repair and maintenance (Department of Environment, Parks, Heritage and the Arts 2009)

Environmental guidelines for marinas in the Great Barrier Reef Marine Park (Bugler 1994)

Foreshore values mapping

Provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. Available on the LIST.

www.thelist.tas.gov.au

Guide to best practice management of point source pollution at boat repair and maintenance facilities (NRM South 2008b)

Guidelines for responding to the effects of climate change in coastal engineering design (National Committee on Coastal and Ocean Engineering 2004)

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

MAST Mooring Factsheet

http://www.mast.tas.gov.au

Natural Values Atlas

The Natural Values Atlas provides authoritative, comprehensive information on Tasmania's natural values. Download a free registration form from the website to access.

https://www.naturalvaluesatlas.tas.gov.au

Occupational Health and Safety

www.wst.tas.gov.au

Seagrass friendly Mooring System

http://www.seagrassmooring.com.au/

Siting and design guidelines for structures on the Victorian coast (Victorian Coastal Council, 1998)

Smartline or coastal vulnerability maps

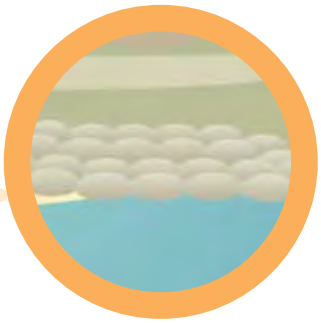
Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

Tasmanian reserve management code of practice (Parks and Wildlife Service et al. 2003)





15 Shoreline modification

15.1 Shoreline protection works

15.2 Reclamation and dredging

15.3 Climate change and shoreline modification

15.4 Tools and resources

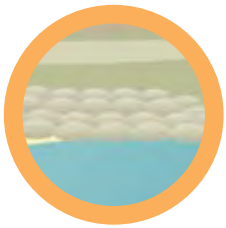
This chapter provides an overview of shoreline protection works and special considerations to minimise the impacts of such works and structures on the coastal environment.

Often shorelines are modified with seawalls and revetments in urban areas to prevent coastal recession and provide stable foreshore areas. Revetments are sometimes used in less urban situations as an erosion control measure. Beaches in areas subject to erosion are sometimes replenished ('nourished') with sand dredged from other areas.

Coastal landforms and ecosystems, especially dunes, beaches, sand spits, saltmarshes, tidal flats and seagrass beds, can be destroyed or seriously degraded by modifications of the shoreline, reclamation or dredging. These works can also alter the movement of sediment, leading to changes in nearby beaches and other soft sandy or silty landforms on the coast. Dredging may disturb toxic sediments and affect water quality.

As a result, a precautionary approach should be followed. All these works should be avoided if they are likely to cause significant damage to the coastal or marine environment. If the works will result in substantial benefits and there is minimal damage to the coastal landforms and ecosystems, such works may be acceptable. However, sites must be carefully selected and the works done with great care; including a geomorphological assessment, professional engineering design and independent review.

Seawall at Sandy Bay near Hobart.
© Leah Page.



15.1 Shoreline protection works

This section describes a number of structures and methods that can be used to mitigate shoreline erosion. Shoreline stabilisation can be expensive, will require ongoing maintenance and, even with careful planning and research, may lead to unforseen impacts on the coastal ecosystem that potentially require ongoing management. It is difficult to control sand being moved by storm surges, waves and high tides in the long term.

Marine structures such as groynes and breakwaters can be used to trap sand on beaches. However, to do this they interrupt the flow of sand along beaches and can result in increased erosion elsewhere, and even loss of beaches in adjacent foreshore areas. Collect quality data on local coastal processes wherever possible.

It is often necessary, for safety reasons, to build structures such as groynes and breakwaters to provide shelter for moorings, jetties and other facilities for boats.

Building shoreline structures such as rock walls to stop erosion in one place can transfer erosion problems along the coast. The damage and the costs can be huge. Coastal protection works should only be done if expensive infrastructure, such as roads or buildings, or public safety are at risk. Structures should be properly designed by a suitably qualified person, such as a coastal engineer in consultation with an experienced geomorphologist, and subject to independent review.

15.1.1 Legislation and approvals

Shoreline modification is complex and must meet a number of legislative requirements. Refer to ***Appendices 1 and 2*** for details of the legislation most likely to apply.

All shoreline modification works will require approval of the land manager and will almost certainly require assessments and approvals. Identify the land manager, they will be responsible for ensuring all appropriate assessments and approvals are undertaken.

Structures on the shoreline often cross over land and water that is governed by different authorities. The Crown owns the seabed and water, regardless of whether the landowner has a high water mark title. Structures below high water mark also require DPIPWE Crown Land Services approval and a Crown Land Lease. Depending on the structure's size and nature, DPIPWE may require submission of a Development Proposal and Environmental Impact Statement.

The Environment Protection Authority (EPA) of DPIPWE is responsible for assessing applications for level 2 activities as classified under the *Environmental Management and Pollution Control Act 1994*.

15.1.2 Types of shoreline protection works

The type of works selected will depend on the purpose, budget and site conditions. They will require assessment and approval and should be consistent with the local planning scheme and local management plans.

Suitable works may include:

- groynes
- breakwaters
- seawalls
- revetments (soft and hard)
- training walls and levees
- beach nourishment

These techniques have been used with varying success. Some have been successful while others require expensive ongoing maintenance, and even replacement, after being broken up by storm waves. Some have caused further problems, such as directing erosion to sites nearby.

Success is heavily dependent on understanding the interaction between coastal geomorphology and hydrodynamic processes, then choosing the appropriate protection measure for the particular site.

Seawalls, groynes and breakwaters are likely to affect the natural processes of coastal erosion and deposition.

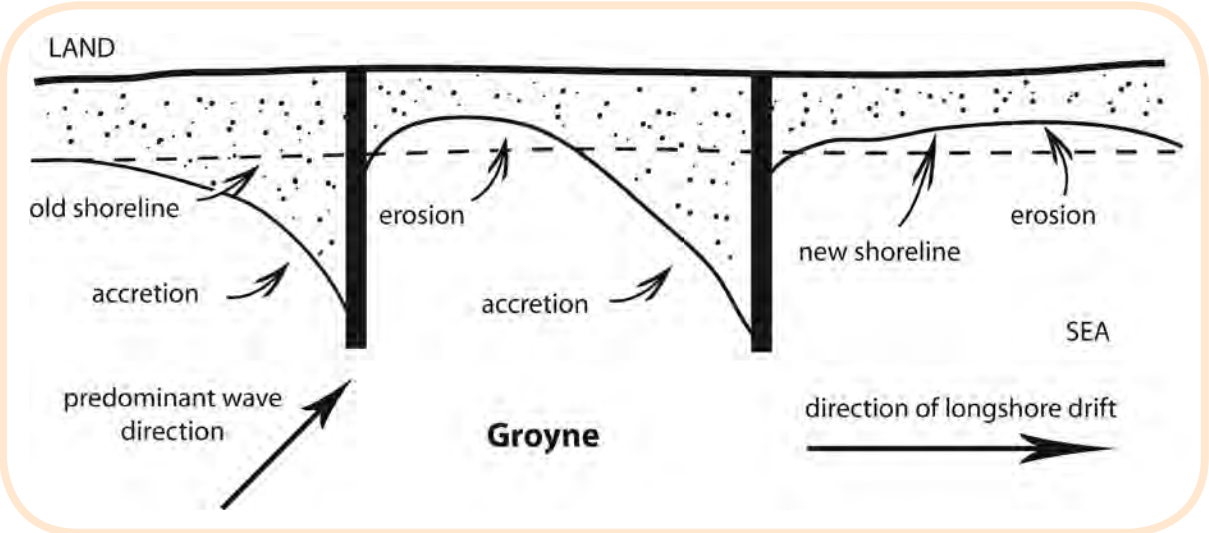
Seek expert advice and consider the advantages and disadvantages of each type of protection works before investing in planning them. Consider also combined treatments and allowing the shoreline to retreat.

15.1.3 Groynes

Groynes are barriers built across or perpendicular to the beach and into the water, to trap sand. They can be used to provide sheltered waterways and to increase the width of the beach. They are traditionally built from rock, concrete or timber but are now also being constructed with geotextile sandbags.

Groynes are built at right angles to the beach, to trap sand moving offshore along the beach (longshore drift). Sand typically becomes trapped on the updrift side of the groyne, and is eroded on the downdrift side. The groyne will continue to trap sand until

Figure 15.1 The effects of a groyne on sediment flow, deposition and erosion. Adapted from Sediment Budgeting (O'Keeffe 1978)



its storage capacity is reached. Once this happens, sometimes sand will bypass the groyne and be deposited on the downdrift side.

Groynes are not always successful and can sometimes contribute to further erosion.

15.1.4 Breakwaters

Breakwaters are built more or less parallel to the beach but some distance offshore, with similar construction methods to groynes. They may or may not be connected to the shore. Their purpose is to reduce the intensity of wave action and so reduce coastal erosion and/or to provide a safe harbour. Offshore breakwaters can be used to reduce erosion on a beach that has no net longshore transport of sand and can therefore not trap sand with groynes.

Breakwaters are traditionally built from rock, concrete or timber but are now also being constructed with geotextile sandbags.

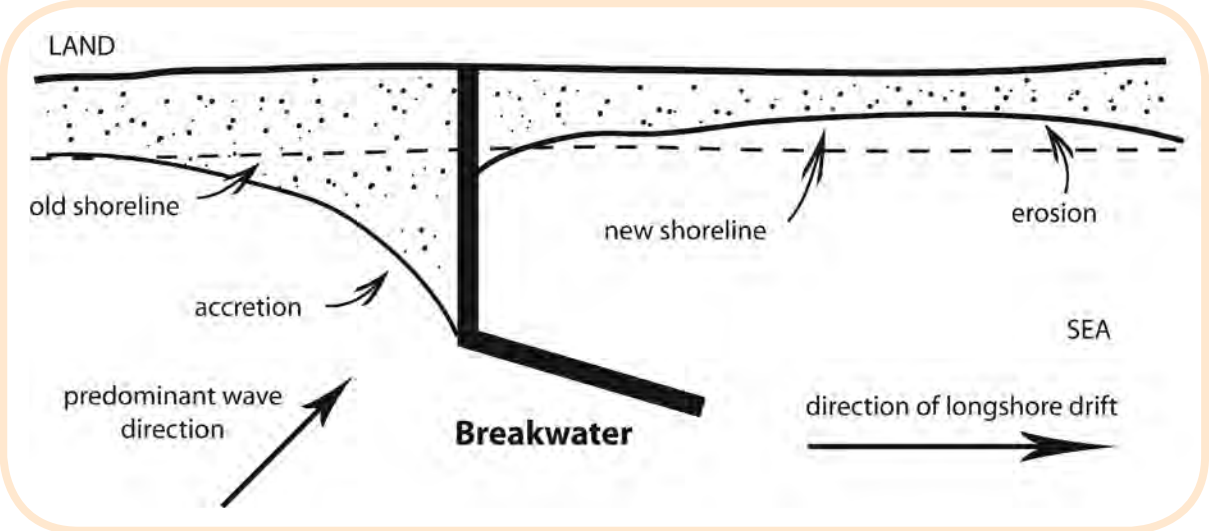
All breakwaters are costly to construct and maintain, and their use is generally limited to providing sheltered areas that are not exposed to full wave attack. They have high maintenance costs due to scouring around the ends and the eventual weakening of the structure. A low breakwater is less expensive than a high one, and allows waves to overtop it; a low breakwater can be hidden by storm waves and may therefore be more hazardous for watercraft.

Breakwaters can influence sand movement and result in significant erosion or unwanted deposition on the protected inshore side of the structure. Dredging is usually required to keep navigation channels open.

If sand is deposited on the inshore side of the breakwater and the breakwater is sufficiently close to the beach, then the deposited sand will build up and may eventually extend out to the offshore breakwater.

Fully submerged breakwaters, consisting of underwater mounds or artificial reefs made of sand and small rocks, have been used in other countries

Figure 15.2 The effects of a breakwater on sediment flow, deposition and shoreline erosion. Adapted from Sediment Budgeting (O'Keeffe 1978)



for coastal protection. In calm conditions, the waves change little as they pass over the breakwater. Under storm conditions, however, the larger waves break on the structure, dissipating wave energy and reducing shoreline erosion.

15.1.5 Guidelines for planning and installing groynes and breakwaters

Thorough planning and specialist advice are essential. Managing problems after construction is more expensive than dealing with them in the planning stage. Before planning, ask if there is an alternative method to provide the outcome. Marine structures with a minimal footprint on the sea floor are always preferable, as they have less impact during construction and less impact on coastal ecosystems.

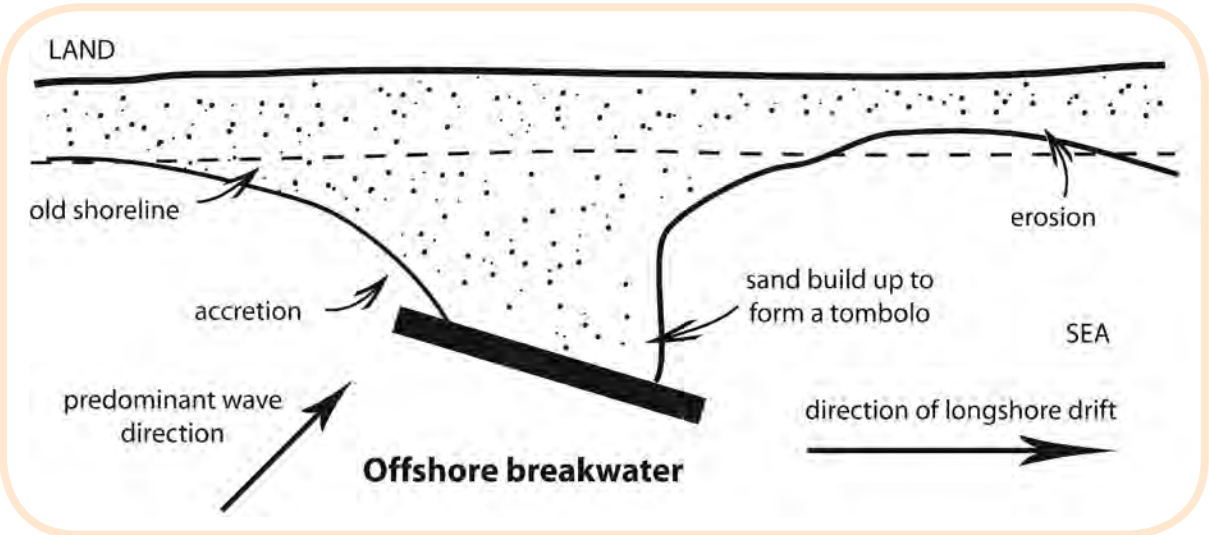
Obtain specialist advice to identify the interactions between coastal processes and hydrodynamics including wave approach(es) and drift currents, before deciding to install a groyne. There must be a supply of sand from longshore drift (or from artificial beach replenishment) for a groyne to be successful.

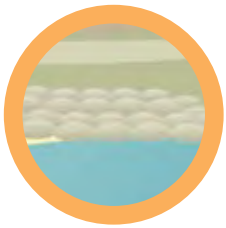
Identify any natural or cultural values in the area, including threatened species, important coastal and marine habitat and Aboriginal and maritime heritage. Consult specialists and seek any necessary assessments and approvals.

Choose a suitable site that minimises interference with the seasonal patterns of waves, currents, tidal flushing, sediment movement and other natural coastal processes. Design the groyne/s to suit the direction/s of the prevailing waves, currents and sediment movement at the specific location.

Align the structure to ensure that only the desired interference of sand transport will occur, and to minimise unwanted changes to the wave patterns and the supply of marine sediment in adjacent areas. Take into account the effects of coastal landforms such as headlands on these factors.

Figure 15.3 An offshore breakwater encourages deposition on the beach. Sometimes sediment is deposited all the way out to the breakwater, forming a coastal feature known as a tombolo. Adapted from Sediment Budgeting (O'Keeffe 1978)





A series of groynes can trap sand and build small beaches between them. But the first groyne can starve the beach (and other groynes) further along the shore of sand, or cause erosion. Design each groyne to allow some sand to spill around the structure; or regularly import sand (beach replenishment) if this is a viable option.

Minimise excavation of sensitive areas such as the shoreline and seabed and avoid works in important ecosystems and wildlife habitats, wherever possible.

Avoid interfering with pedestrian access to and along the shoreline. Minimise visual disturbance by choosing less sensitive sites for structures and/or integrating them with other uses. With careful design, they can become viewing areas with steps built in for access.

Breakwaters and groynes are traditionally built from rocks, timber or concrete but other materials are available, such as gabions and geotextile sandbags. Gabions are heavy wire or mesh baskets placed next to each other and filled with shingle or broken rock, then the tops are wired down. Gabion mattresses are larger baskets, much longer than they are deep, that are divided into compartments. Gabions and gabion mattresses can shift and settle to fit the substrate. Geotextile sandbags are prefabricated textile containers filled with sand that are laid like bricks. ***Refer to 15.1.11 Sandbag revetments or geotextile sand containers.***

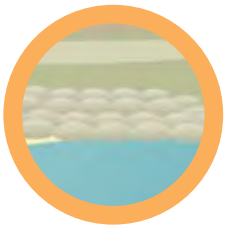
15.1.6 Seawalls

Seawalls are rigid structures (traditionally vertical concrete or rock walls) erected on the shoreline to combat shoreline erosion and recession and prevent inundation of low-lying areas. River training walls are included in ***Chapter 6***.

Seawalls are often used in urban coastal areas in a bid to protect foreshore infrastructure. The demand for these coastal structures may increase with the need to mitigate the impacts of climate change and sea level rise. Traditional vertical seawalls have limited potential to provide marine habitat and are poor replacements for natural shorelines. Preferable options are curved, stepped or sloping walls, to allow the wave energy to dissipate rather than assault the wall. ***Refer to 15.1.9 Revetments.***

Seawalls are often constructed at the back of high-use beaches in urban areas to stop the shoreline retreating and to protect infrastructure and recreational facilities. Seawalls may reflect or even amplify wave action and often lead to increased erosion of beaches. Where seawalls are used at the back of a beach, ongoing beach nourishment may be required to maintain the beach profile. For this reason seawalls are commonly used in conjunction with other beach protection measures such as groynes and beach replenishment.

Where seawalls are determined to be the most appropriate management tool for foreshores, they should be built to minimise environmental impacts and more closely mimic natural foreshores to provide greater environmental value (NSW Department of Environment, Climate Change and Water and the Sydney Metropolitan Catchment Management Authority 2009).



15.1.7 Impacts of seawalls

The construction of the seawall will most likely involve significant disturbance to the intertidal zone and may disturb toxic materials such as heavy metals or introduce sediments into the estuary or coastal waterway.

Seawalls may increase erosion of the beach in front of the wall and accelerate erosion at the end of the wall. Subsequent beach replenishment or other beach protection measures are usually required. Vertical concrete walls cause the most serious erosion of beaches. When waves hit the wall they are reflected back, and scour sand from the beach. As the beach becomes lower and flatter, the waves become larger, the scouring increases, and the beach is eventually lost. By this time, the wall itself may be undermined if not anchored adequately.

Seawalls can disrupt the natural flow of sand across the beach. They are unsuitable for non-urban environments as they interfere with dune formation and beach replenishment by cutting off the sand in the dunes from the beach system. This reduces the amount of sand available for movement on and off the beach and dunes.

Timber seawalls very seldom control erosion of sandy coasts except for a fairly short period. When waves pound the wall, water pushes through narrow spaces and erodes the sand behind the wall. Eventually the wall is undermined and becomes ineffective.

In estuarine areas, horizontal seawalls result in a loss of intertidal habitats and impact on marine species such as juvenile fish, birds and entire invertebrate communities.

Seawalls can result in a build up of seagrass wrack floating on the surface, which would normally be washed up on the shoreline, where it provides habitat and food for invertebrates. The floating wrack shades the sea floor, which kills off the seagrass and severely degrades the habitat.

Seawalls are not suitable for river-mouth environments. River mouths are highly dynamic environments. Water and sediment flows fluctuate and respond to changes in coastal processes and the river mouth needs some freedom to adjust in response to these changes. In some circumstances, where shipping and boating requirements are significant, training walls are erected to maintain navigation channels. ***Refer to Chapter 6 Coastal landscape management.***

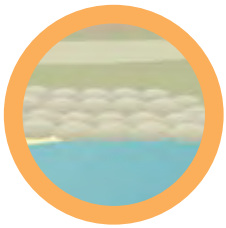
15.1.8 Guidelines for planning and installing seawalls

Thorough planning and the development of an Environmental Management Plan are essential. Managing problems after construction is more expensive than dealing with them in the planning stage. Seek all necessary approvals and assessments. ***Refer also to section 15.2 Reclamation and dredging.***

Seek specialist advice from coastal geomorphologists and coastal engineers. Design the structure to take account of coastal processes (including the direction of prevailing currents and winds and wave action), rising sea level, public safety, and natural and cultural heritage values (including marine life).

Consider the movement of sand along the shoreline and possible effects further along the shoreline. Minimise the deposition of sediment into the estuary or coastal waterway.

Recent research recommends incorporating artificial rock pools into the design of seawalls to provide intertidal habitat where it has been removed. This will help to maintain the biodiversity of intertidal marine communities.



15.1

Design the seawall as a continuous structure over the full length of coastline to be protected. Otherwise, erosion around the ends of a short wall can lead to collapse.

Avoid use of rigid concrete or rock seawalls, which are more compact in size but can fail catastrophically from freak waves or erosion at the base.

Make the wall curved or with a backward slope, to dissipate wave energy (even though it will be larger and more costly).

Add a relatively impermeable blanket (rock, clay, etc) along the crest of the wall, to reduce the risk of scour caused by wave overtopping. Alternatively, place a curved wave deflection barrier (a wave return wall) along the crest, which significantly reduces wave overtopping and allows the wall to be lower.

Ensure the design of seawalls and similar solid structures on the shore allows adequate filtered drainage. Many impermeable structures have collapsed in the seaward direction because of soil and water pressures behind them, or failed due to seepage loss of fine fill.

Sea level rise predictions must be considered. If waves regularly break over the seawall the structure will be undermined. Refer to maps of vulnerability to sea level rise (Sharples 2006) to see if the site is appropriate for the works. Use the latest IPCC (Intergovernmental Panel on Climate Change) sea level rise projections to determine the minimum height allowance required for the life of the structure.

Allow for the effects of long-term erosion or increases in sea level on the design wave height (the height designed to cope with the maximum expected wave height). The mass of the armour (e.g. rocks) required to protect flexible structures is proportional to the cube of the design wave height. A doubling of the design wave height would require an eight-fold increase in armour mass to provide the same level of protection.

Construction method and materials

The range of construction options includes concrete,walls built with caissons (concrete boxes), and brick or block walls.

Concrete armour units, such as Seabees are hexagonal concrete blocks with a hole in the centre. The holes in the blocks help to dissipate wave energy. The blocks are placed over an underlayer of secondary rock armour and a geotextile filter.

Seabees are designed to be interlocked for maximum strength, but if they are interlocked, the seawall may behave like a rigid rather than a semi-rigid structure. Placing armour units in a stepped pattern provides a rough surface that increases turbulence on the wall, which helps absorb wave energy.

Improving environmental outcomes of existing seawalls

Traditional vertical seawall structures can be improved by placing rock in front of the wall to provide intertidal habitat. Alternatively, structures that increase the surface area of the wall and provide crevices or pools can be retrofitted to existing vertical walls to create habitat for intertidal marine species such as seastars.

15.1.9 Revetments

Revetments are common along the New South Wales coast. They provide more opportunities to create habitat for marine and coastal wildlife and vegetation than vertical seawalls. They cause less wave reflection than seawalls and survive storms for longer, but generally require regular maintenance to keep their structural integrity. Revetments can sustain considerable damage without totally failing, but take up more foreshore space than vertical seawalls.

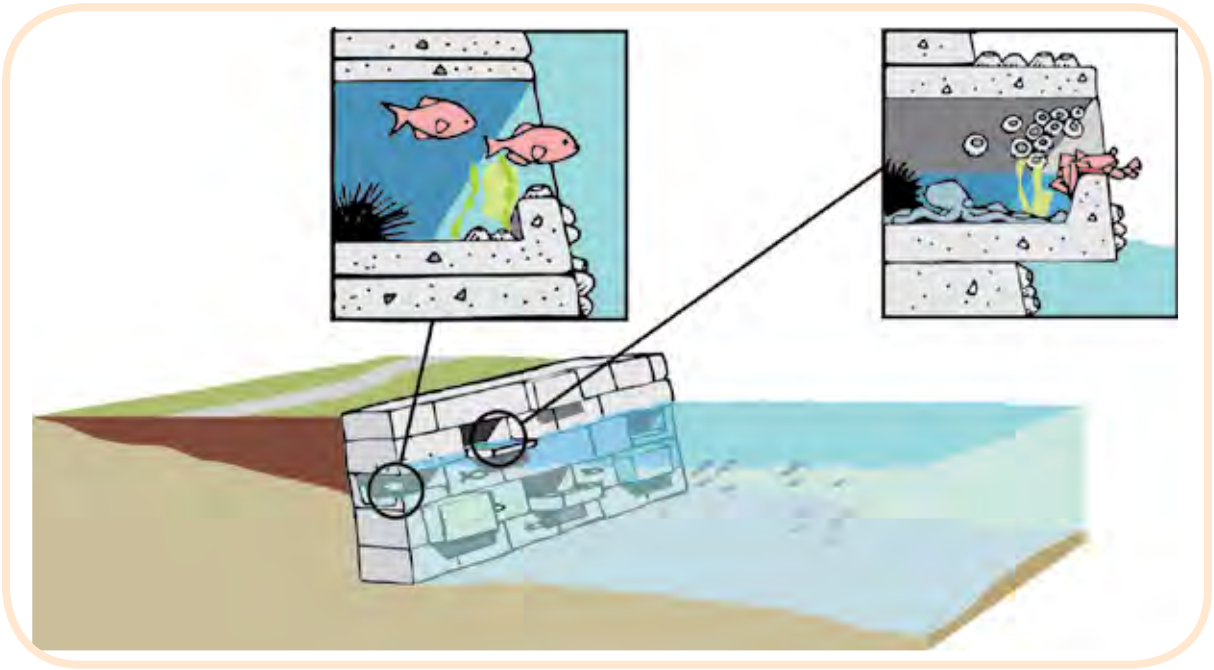
Because revetments are permeable, they can become susceptible to scouring behind the wall caused by poor seepage control and/or waves surging over the top. If extreme, this can lead to the collapse of the revetment. Good design and careful consideration of coastal processes including sea level rise can overcome this risk.

Revetments are constructed from materials such as rock or shingle, manufactured concrete armour units such as gabions, or manufactured geotextile products. Geotextile revetments tend to be more compact than those made of rock, and may be less susceptible to total failure than more solid structures.

Design must consider a thorough analysis of the site and the coastal processes in the context of the expected life and maintenance regime of the structure. The coastal processes that need to be considered include the types of wave action, i.e. swells or wind driven waves; the water levels (taking into account sea level rise, storm surges and king tides); and speeds of currents. Water flows from the land may also be an important consideration.

Climate change and sea level rise predictions based on Intergovernmental Panel on Climate Change

Figure 15.4 A seawall with blocks that extend outwards to create a varied surface, and cavities to provide sheltered intertidal-pool and subtidal-cave habitats for a variety of organisms. © NSW DECCW and the SMCMA.



(IPCC) predictions must be incorporated into the design. Consider not just elevated water levels but inundation, and increased wave energy and storminess.

15.1.10 Rock revetments

Rock revetments are used to increase the stability of eroding foreshores. They are costly to install and require regular maintenance. They must be designed by a coastal engineer in consultation with a coastal geomorphologist; otherwise they may be subject to failure or create erosion problems further along the foreshore.

Rock revetments have some advantages over vertical seawalls: they provide more opportunities to create habitat for marine and coastal wildlife and vegetation; cause less wave reflection and survive storms for longer and can sustain considerable damage without total failure. However, they do take up more foreshore space.

Thorough planning and specialist advice are essential. Managing problems after construction is more expensive than dealing with them in the planning stage. All revetment works must meet legislative requirements and may require approval from a number of agencies. An assessment of the proposed activity will determine the potential for environmental harm.

When to use rock revetments

Rock revetments can be suitable for high wave energy environments, but the potential for scouring in the upper reaches should be considered carefully.

Figure 15.5 Best practice rock revetment that is aesthetically pleasing and provides intertidal habitat at Bobbin Head, Cowan Creek, Hawkesbury River, NSW. © Daniel Wiecek, DECCW



They should not be used when erosion is due to interruption of sediment transport such as a poorly sited groyne (Swan River Trust 2009).

Because of the degree of back preparation required and their large footprint, they should not be used in sensitive coastal environments where there will be an unacceptable loss of natural or cultural values. Before planning and construction, it is important to identify all natural and cultural values that may be affected by the works. Consider threatened species, Aboriginal heritage, wildlife habitat and marine habitat.

Design of rock revetments

Revetments can be visually intrusive and reduce enjoyment of recreational spaces if poorly designed or sited.

Because rock revetments are permeable structures, seepage may result in the removal of material from behind the structure, and eventual failure by collapse landwards. Install correctly designed soil filters or geotextiles to avoid damage by seepage. Protect geotextiles from light, e.g. put a gravel layer behind the rock or other armour material.

Consider the scale of the back preparation, as some vegetation may be lost.

Revetments must be designed by an experienced coastal engineer. Design must consider a thorough analysis of the site and the coastal processes in the context of the expected life and maintenance regime of the structure. The coastal processes that need to be considered include the types of wave action (i.e. swells or wind waves); the water levels (taking into account sea level rise, storm surges and king tides);

Figure 15.6 Revetment degradation due to either scour by overtopping waves or seepage loss of fill. © Jocelyn Phillips



and speeds of currents. Water flows from the land may also be an important consideration.

In sandy environments, revetments constructed from much smaller rocks (200–350mm diameter) are a more natural design than conventional seawalls (with rocks over 500mm in diameter). Provided a sufficient volume of rock is placed appropriately, a stable beach profile develops naturally during storm conditions. The main drawback is that the beach is a mixture of rocks and sand.

Identify existing bank conditions, seek local knowledge and expert advice. Ensure the toe is well founded to minimise the risk of undermining. Ensure the revetment has an appropriate crest height to reduce the risk of scouring from waves regularly overtopping the revetment.

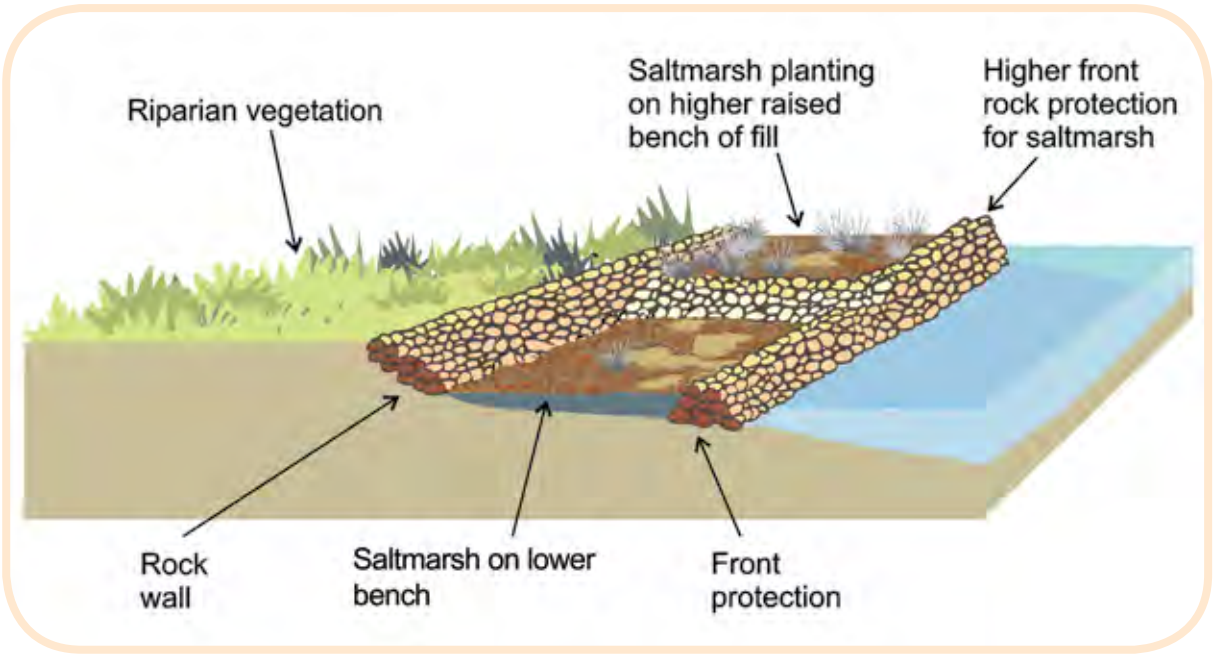
Climate change and sea level rise predictions based on IPCC predictions must be incorporated into the design. Consider not just elevated water levels but inundation, and increased wave energy and storminess.

Incorporate features such as rock pools and crevices into the design to provide habitat for marine life. Revetments can be designed to have a step profile with a bench for saltmarsh or coastal vegetation, thereby providing an intertidal environment. This type of design is often more attractive and maintains access.

Materials

Use local rock, where available, or match the rock as closely to the surrounds as possible. This improves

Figure 15.7 Rock revetment incorporating bench for saltmarsh and tidepool area. Adapted from Environmentally Friendly Seawalls: A guide to Improving the Environmental Values of Seawalls and Seawall-lined Foreshores in Estuaries
© NSW DECCW and the SMCMA.



habitat values and visual amenity.

Choose rocks and materials that will minimise the presence of fine materials that can easily become suspended.

Installation

Ensure all works staff and contractors are briefed on minimising environmental impacts. Provide adequate supervision to ensure best practice environmental standards are being implemented.

Minimise impacts on coastal values during installation. Time works to avoid significant wildlife events such as times when shorebirds and penguins breed or fish spawn.

It is important during construction to minimise the amount of sediment disturbance. Choose high-quality rock material that has minimal fine sediment. It may be necessary to install sediment traps or other sediment containment techniques (e.g. curtains or walls) to contain plumes created during construction. Consider wave and flow dynamics and undertake the work during appropriate tides and weather conditions to minimise sediment flows. Schedule works for times when tides, currents and waves will be most favourable for minimising disturbance and spread of sediments and disturbed materials.

Minimise the amount of excavation of the shoreline and the impacts on the coastal vegetation. Rehabilitate disturbed areas as soon as possible.

Follow-up surveys and ongoing monitoring are essential, to detect any adverse impacts from the construction works and any consequent changes to coastal processes. Monitoring is also required to assess the integrity of the structure and the need for maintenance.

Figure 15.8 Rock revetment with bench in Claydon Reserve, Kogarah Bay, Georges River, NSW. © Daniel Wiecek, DECCW



Case Study 15.1: Raspins Beach revetment

Raspins Beach on Tasmania's east coast had been actively eroding for more than three decades, with a loss of several hundred metres of sandy shoreline. This erosion is thought to be partly attributable to a change in the flooding regime of the Prosser River due to dam construction. Fewer peak flood events caused the main channel to migrate along Raspins Beach. The river's location, when combined with south-easterly storms and more water flowing down the river, caused massive erosion events. Infrastructure, including a main highway, was at risk. A rough rock revetment was built in the 1990s in an attempt to halt erosion and, despite being poorly constructed, it helped to slow down the erosion process.

In 2001, in an attempt to slow the erosion, the mouth of the Prosser River was relocated to the south to reduce the scour along the beach. As a result, there was a noticeable build-up of sand at the southern end of the beach (closest to the relocated river mouth), but erosion continued at the northern end, with storms continuing to threaten infrastructure. It was proposed that a low rock revetment be constructed along the entire length of the beach to provide protection. Part of the original revetment would be rebuilt.

Figure 15.9 The rock revetment at Raspins Beach on the east coast has trapped sand and is stabilised by vegetation. © Leah Page



As this is reserved land, the Parks and Wildlife Service assumed the project management role. The local council and the Department of Infrastructure, Energy and Resources provided funding and were involved in the early stages of project planning. The local progress association, immediate neighbours, local industries and the wider community were notified via local newspaper articles, letters, road warning signs, council newsletter and shop-window notices. The project involved a full activity assessment to ensure that values (including shorebirds and Aboriginal heritage) were protected.

Combined with the river mouth relocation, which allowed the significant off-shore sand reservoirs to migrate back to the beach, the actions have succeeded in arresting erosion and have seen the formation of a significant sand dune at the southern end of the beach. The rock revetment is no longer obvious as it is now covered by sand. Having a gentle slope (less than 1:1.5), the rock revetment, if exposed to wave action in the future, is not subject to wave wash. The weak point, which has been subject to wave overtopping, is the section of 1990s rock revetment which was not rebuilt, as this section juts out and is lower than the rest of the revetment.

Photos have been taken of the beach at intervals to assess the success of the revetment.

15.1.11 Sandbag revetments or geotextile sand containers

Sandbag revetments or geotextile sand containers have been used in many locations in other Australian states to stabilise foreshores against erosion. They provide an alternative to traditional seawalls and hard, rocky revetment structures. They can be used in much the same way as other prefabricated armour units.

Geotextile revetment structures should be designed by experienced coastal engineers. It is particularly important to specify the crest and toe elevation of the wall and the required slope in the design. Geotextile manufacturers provide generic construction details (Figure 15.11) to guide the engineering design.

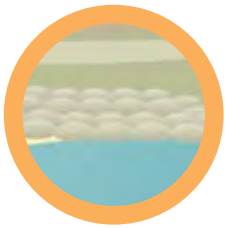
Manufacturers indicate a life span of 10–15 years, but this most likely relates to the degradation of the fabric and not the integrity of the structure, whose life will vary depending on its application. As for all foreshore protection structures, an appropriate maintenance regime is required. Removal of structures is relatively straightforward, although complete recovery of all the geotextile material can be difficult (Swan River Trust 2009).

The materials for sandbag revetments are usually supplied by geotextile manufacturers. Construction requires the hire of specialised filling frames and lifting devices. Some earthworks contractors may already have the appropriate machinery; otherwise, hired plant could be used by the land manager's works crews.

To fill the bags, sand is required and water is pumped into the filling frame to create a slurry. Sand should generally be sourced off-site. Ensure that the sand is appropriately specified and tested (coarse fragments

Figure 15.10 Geotextile sand container revetment at Blythe Heads in north-west Tasmania. © Jocelyn Phillips





can be abrasive, fines can leach). The manufacturer will generally supply any other equipment needed to fill and seal the bags. Smaller bags require sewing equipment, while large bags are sealed by rope and a marine sealant (Swan River Trust 2009).

15.1.12 Beach nourishment

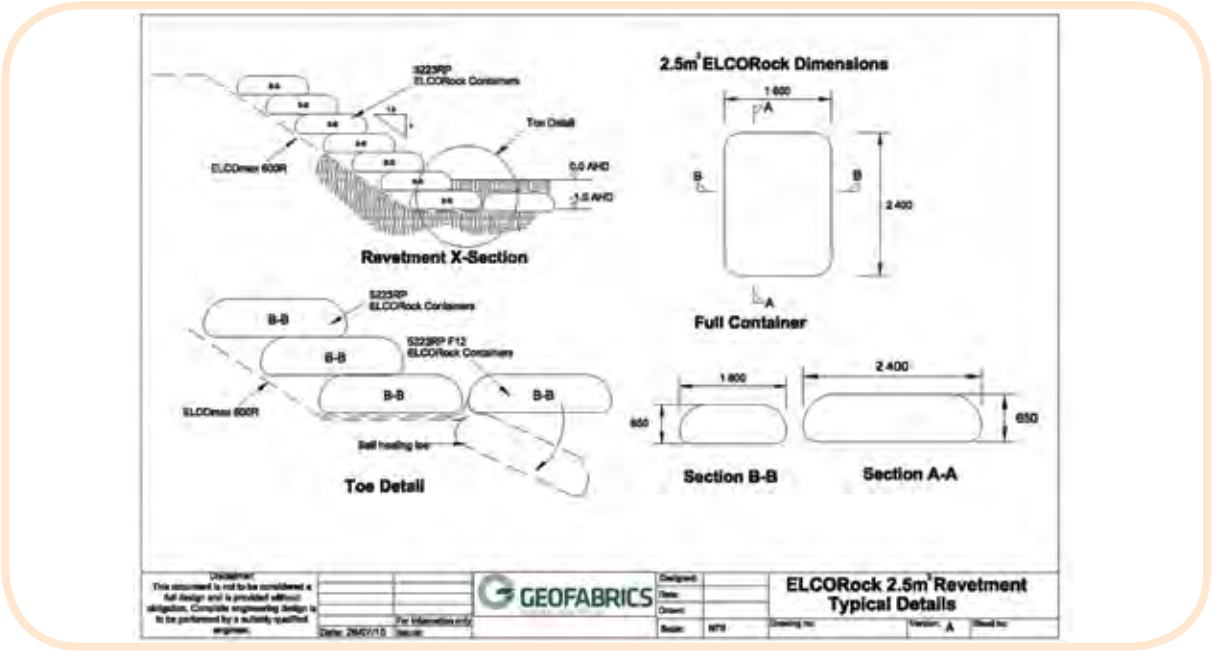
Beach nourishment or replenishment is the process of bringing sand in from another source to replace the sand being lost from the beach. Other techniques include scraping sand from the subtidal zone back up onto the beach, pumping sand from offshore and using geotextiles and other dune rehabilitation techniques to trap more wind-blown sand. Beach nourishment in other states is often combined with other foreshore stabilising techniques such as hardening of the foreshore and groynes to help trap the sand.

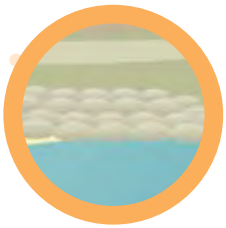
Any decision to undertake beach nourishment requires careful and costly scientific research of the existing coastal processes unique to the site. Beach nourishment will be expensive, will require ongoing maintenance and, even with careful planning and research, can lead to unforseen impacts on the coastal ecosystem that create a need for additional ongoing management. Impacts on coastal wildlife such as feeding and nesting shorebirds also need to be assessed.

It is important to identify as clearly as possible the reasons for the coastal recession and to understand the movement of the sand (sand budget). Identify any other land management or human causes for the loss of sand, such as foreshore hardening or sand control works further along the shoreline.

If sand must be brought in from elsewhere, consider the best source. Proximity to the site will reduce

Figure 15.11 An example of construction details provided by the manufacturer for a geotextile sand container revetment. © Geofabrics Australia





transport costs and assist ongoing maintenance. If sand is to be acquired via pumping or dredging from offshore then a whole suite of other environmental impacts associated with those activies must be taken into account.

The acquired sand must be clean and match the existing sand as closely as possible, with grains the same size or coarser. If the imported material has a finer grain, the sand will be less anchored and will erode away more quickly.

Beach scraping requires a sufficient supply of sand in the subtidal zone. Work out how much sand is returned to the subtidal zone with longshore drift and calculate how much can be removed with minimal impact. Sand scraping will damage the sea floor and the tiny animals that live within the sand, which support other coastal wildlife such as shorebirds.

Identify any Aboriginal heritage sites and ensure that damage to Aboriginal heritage values are minimised and managed accordingly, in consultation with the Aboriginal community. Contact Aboriginal Heritage Tasmania.

15.1.13 Ongoing maintenance of shoreline protection works

Structures built on sandy coasts may suffer from an accumulation of sand or erosion, or fail suddenly after storms, and become a hazard to the public. All structures require regular maintenance to ensure that they remain serviceable. Inspections and maintenance are very important during and after stormy periods.

Prepare an inspection and maintenance plan that requires inspections to be done regularly and after major storm events.

Inspection and maintenance should check that structures are in place, in good condition and not becoming a hazard to the public.

Monitoring of geotextile revetments includes assessing the success of the structure. It is best achieved with before-and-after photos; and visual inspections of the structure for damage. Damaged geotextile bags can be repaired and patch kits are often available from the manufacturer. Individual bags can often be replaced, if necessary.

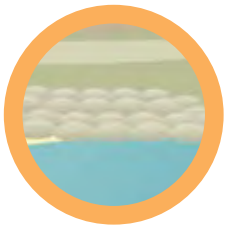
15.2 Reclamation and dredging

This section describes works involving reclamation and dredging and ways to minimise impacts on the coastal environment if these activities cannot be avoided. Such works include reclaiming extra land for recreation, modifying river channels for navigation and keeping river entrances and approaches to boat ramps clear.

In the past, reclamation was commonly used to gain extra flat land for urban development. As a result, many of Tasmania's important wetlands, seagrass beds, saltmarshes and tidal flats have been lost. Unfortunately, these are the most biologically productive coastal ecosystems, the most critical habitats for wildlife, and the basis of most of our fisheries.

Reclamation works are still occasionally done to provide land for recreation or development, to improve public access to or along the foreshore and in intertidal areas, and to modify navigation channels.

Dredging is the removal of underwater sediments usually by excavation or suction. It is often used to enlarge, deepen or create a navigable channel; to dig a trench for pipes or cables; to obtain sand for beach replenishment; or to remove unsuitable or unwanted



materials. Ongoing dredging may be required to maintain shipping channels or safe access in estuaries and at river mouths.

At the sites of dredging and disposal of dredged material, the seabed and associated communities are disturbed. For some distance, suspended sediments may cause turbidity in water and increased deposition on the seabed and in the surrounding area. Plan operations carefully to minimise turbidity from disturbed fine sediments and consider the disposal of dredged material, particularly if it is contaminated. If necessary, use sediment settling systems.

The information in this section has been largely sourced from the Derwent Estuary Program's *Dredging and Land Reclamation in the Derwent* (Eriksen in prep.).

15.2.1 Legislation and approvals for reclamation and dredging

Reclamation and dredging are complex operations and will involve a broad spectrum of legislative requirements. Refer to ***Appendices 1 and 2*** for details of the legislation most likely to apply.

All reclamation and dredging works will require approval. There are no discretionary or minimum work limits in any legislation.

Reclamation works are generally only allowed where the land is leased or purchased from the Crown (Department of Primary Industry, Parks, Water and Environment – DPIPWE) or where the Crown grants a licence. Works on Crown land, which includes all land below high water mark, require approval from DPIPWE Crown Land Services.

Proposed reclamations are subject to comprehensive assessment of the terrestrial and marine values of the site and likely impacts, (including cultural heritage, wildlife, threatened species, marine and coastal vegetation). If they are approved, strict conditions usually apply. Land created through reclamation is automatically public land administered under the *Crown Lands Act 1976.*

A licence to dredge must be obtained from DPIPWE Crown Land Services. It requires an environmental assessment, which may include sampling of flora and fauna before and after dredging, including videos of the seabed.

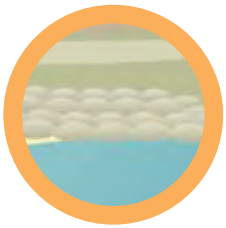
A planning permit from the local council may be required. The council must determine if the land use that depends on the reclamation is permitted.

Applications for Level 2 activities are assessed by the Environment Protection Authority (EPA). If waste is to be disposed of in marine waters it will be considered a Level 2 activity.

Advice and/or authorisation from Environment Protection Authority (EPA) is needed if the activity is likely to degrade the marine environment (e.g. disturbing or depositing material on the seabed, or interfering with fish, animals or plants on the seabed).

The disposal of dredge spoil on land will require the approval of the local planning authority. There are constraints on how and where dredge spoil can be disposed of, especially if it is contaminated in any way.

Dredging of channels and barways for navigation purposes must be approved and supervised by Marine and Safety Tasmania (MAST).



15.2.3 Planning for reclamation and dredging

Thorough planning and the development of an Environmental Management Plan are essential. Managing problems after construction is more expensive than dealing with them in the planning stage. Before planning, consider whether there is an alternative method to provide the outcome, such as the construction of a jetty instead of a wharf.

Structures with a minimal footprint on the sea floor are always preferable, as they have less impact during construction and less impact on coastal process such as sand movement. Always design to minimise the amount of reclamation undertaken or the amount of dredge spoil produced.

Planning should consider:

- the purpose of the reclamation or dredging
- alternatives to undertaking reclamation or dredging
- significant natural and cultural values of the site
- the physical constraints of the site (such as susceptibility to storm surge, reclamation extent, erosion and siltation, sediment type, water depth)
- movement of sand and coastal processes at the site
- the source of material used in the reclamation
- the most appropriate dredging technique
- environmental impacts of the project on surrounding air, soil and water quality
- environmental threats such as marine pests, acid sulfate soils and sea level rise
- waste prevention from dredging, potential use of dredged material and waste disposal of dredge spoil
- mitigation or remediation measures to be put in place, and methods for monitoring the effectiveness of those measures through a monitoring program.

The Environmental Management Plan must provide all the information required by government agencies to undertake a comprehensive assessment of the proposal. Always seek specialist advice. For large projects a considerable level of effort and technical input will be required.

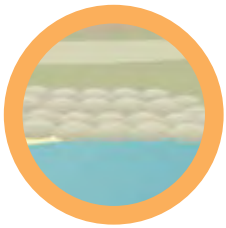
The level of detail is proportional to the degree of perceived risk and likelihood of environmental harm. The plan should detail monitoring requirements and best practice environmental management principles to ensure impacts from the proposed development are minimal or insignificant.

Generally there will be a requirement to conduct a marine flora and fauna survey if the proposed development is located within 5km of a known location of a threatened species. Online searches to determine if a marine survey is required can be undertaken by DPIPWE. The survey must be undertaken by a suitably qualified professional, and will need a permit if the survey work has the potential to disturb listed threatened species. Video transects may also be required. Further details can be obtained from DPIPWE.

15.2.4 Impacts of reclamation

Reclamation should be done only when absolutely necessary because it can severely damage ecosystems and may degrade nearby marine and estuarine environments. It is always best to leave the natural shoreline intact. Modification of the profile or shape of the shoreline can increase erosion at the site or further along the coast.

Reclamation may directly disturb or damage



Aboriginal heritage, historic or maritime heritage or geoconservation values. The subsequent changes to the shape of the shoreline may also increase the susceptibility of these sites to the impacts of sea level rise.

Reclamation works can release fine suspended sediments in estuaries and on some sandy shorelines underlain by fine sediments. Controlling turbidity from disturbed fine sediments is often a significant problem requiring careful operational planning and the use of sediment control or settling systems. Seagrass beds are particularly susceptible to increases in turbidity.

Disturbance to landforms such as saltmarshes, tidal flats, barways, and river mouths can destroy wildlife habitat such as fish nursery areas and breeding sites for shorebirds, and can completely alter these fragile environments. Wetlands are especially vulnerable to impacts from disturbance of acid sulphate soils, particularly if water levels and flows change significantly. ***Refer to Chapter 6 Coastal landscape management.***

The use of machinery and subsequent disturbance of coastal areas can result in the spread of marine and terrestrial weeds such as rice grass, or other pests and diseases.

15.2.5 Works guidelines for reclamation

There are two main methods of reclamation:

- progressively infilling from the shoreline towards the sea
- erecting structures and then draining and backfilling the area contained by the structures.

The following points provide an idea of the scope of considerations when undertaking reclamation. Comprehensive information on reclamation can be found in the Derwent Estuary Program's *Dredging and Land Reclamation in the Derwent: a guidance document to support best practice management.* (Eriksen in prep.).

Before works are planned, obtain technical advice from an experienced coastal geomorphologist and an engineer. Undertake all of the necessary planning and seek approvals – all reclamation works will require approval; none of the legislation specifies discretionary or minimum work limits.

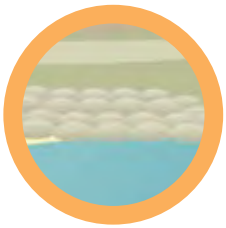
If proposing substantial reclamation or draining of the shoreline or seabed, seek public input. Consult local Coastcare groups even for very small projects. Local volunteers have a strong connection to the coast they have been caring for and should be included in coastal management decisions.

Minimise impact on coastal processes such as sand movement, cultural values such as Aboriginal heritage sites, wildlife and vegetation values such as threatened species, wildlife habitat and important coastal vegetation communities. Consult specialists and do any necessary assessments.

Avoid fish nursery areas, seagrass beds, saltmarshes, tidal flats, wetlands and other important ecosystems. Obtain specialist advice on the potential impacts on fisheries and wildlife, including threatened species (some migratory birds, spotted handfish, etc.). Time works to avoid breeding periods for nearby fish, birds or other wildlife.

Use the most up-to-date estimates of sea level rise to ensure the works will function as intended for their life span. The design must take the latest IPCC sea level rise projections into account.

Avoid allowing reclamation to be used as a means of disposing of materials, such as domestic and industrial waste. Fill must be clean and should generally be purchased from an approved source. Reclamation materials must be solid, inert, uncontaminated,



non-hazardous, and should not be waste of any kind. Avoid disturbing toxic materials such as metals, organochlorines (e.g. pesticides), algae (dinoflagellates) or sulfidic sediments (acid sulfate soils).

Avoid substantial reclamation unless there are exceptional circumstances (e.g. the benefits far outweigh the adverse effects). Avoid reclamation for private developments such as roads, walkways, housing developments and beach improvement, or for public developments where there are feasible alternatives (e.g. bridges, floating structures and wharves) for public access.

Ensure the reclamation does not detract from the natural character of an area. Do not use building rubble as facing materials (the outer layer). Building rubble includes old concrete beams, pieces of iron and steel, concrete, bricks and topsoil removed from building sites.

Ensure works are properly supervised by qualified people and that follow-up surveys are done. Ensure all site personnel are aware of operational constraints required to meet environmental standards and conditions.

Minimise damage to nearby areas during works and rehabilitate the site soon after works are completed. Ensure follow-up surveys and monitoring are undertaken.

15.2.6 Impacts of dredging

Dredging can disturb important marine ecosystems and disrupt coastal processes by altering the supply of sand to beaches. Removal of material from the intertidal area or seabed (e.g. sand for beach replenishment) can only be sustained if the natural coastal processes can replace that material. Seek specialist advice from a coastal geomorphologist.

The sediment disturbance can smother seagrass beds and harm other sensitive marine life.

Dredging can disturb toxic sediments, and release contaminants into the water that affect marine life. Toxic substances can accumulate in fish and shellfish and, in some species, may exceed food safety standards.

Nutrients, particularly nitrogen and phosphorus (which increase the rate of growth of marine plants), might also be released from sediments during dredging. This can trigger algal blooms, including toxic algae.

Dredging equipment can transport species from one port (or even country) to another, leading to new exotic marine pest invasions. All equipment should be inspected and cleaned before transport to a new area.

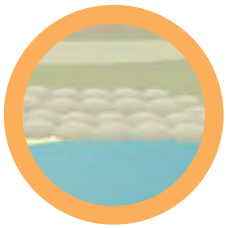
Dredging may produce large amounts of spoil that may be contaminated, including the exposure of subaqueous acid sulfate soils, and will require specialist disposal. Disposal of contaminated waste is tightly regulated, and clean-up of contaminated material may be required before it can be accepted by a waste-handling facility.

15.2.7 Works guidelines for dredging

All dredging works will require approval. There are no discretionary or minimum work limits in any legislation. Dredging requires an environmental assessment, which may include sampling of flora and fauna before and after dredging. Video sampling of the seabed may be needed, and core sampling of the sediment may be required to test for heavy metals and other potential pollutants as well as fauna living in the sediment.

Dredging should only be undertaken for the purposes of obtaining sediment for environmental rehabilitation or dredging of channels and barways for navigation purposes, requiring approval from MAST.

Dredging for obtaining sediment (e.g. for beach



15.2

nourishment) should only be undertaken in areas of rapid accretion of sediments or on unvegetated sand or mud. Seek specialist advice and technical assessments to determine the most appropriate site.

Identify any natural values that require protection, including threatened species and important marine habitats. Seek specialist advice. Dredging may not be appropriate or approved if it is likely to have an impact on these values.

Some marine areas contain subaqueous acid sulfate soils (ASS) and any dredging spoil placed on land will oxidise and release acid into waterways. Avoid dredging sediments containing metals, organochlorines (e.g. pesticides), toxic algae or acid sulfate soils, if possible. This should be investigated prior to dredging. Check ASS maps on the LIST. Test sediments before dredging, if there is any chance of disturbing contaminated material.

Use dredging methods that cause the least environmental damage for the particular site or situation. Dredging operations must employ control measures for limiting escape of sediments, such as silt curtains or screens hung vertically from a floating support to reduce transport of silt and suspended solids from the site. Avoid smothering seagrass beds and other sensitive habitat with sediment, wherever possible. These measures will not control dissolved contaminants such as nutrients or heavy metals.

Time dredging works to coincide with weather and tidal conditions that will minimise the transport of suspended material and to avoid sensitive ecological windows, e.g. breeding, spawning or larval stages of threatened or vulnerable species.

Take care with machinery and vessels to avoid transferring marine pests to a new environment.

The disposal of dredge spoil on land will require the approval of the local planning authority. Do not allow disposal of dredged material where it will cause environmental damage (e.g. degrade water quality, or modify riverbanks and create sites prone to landslip). Do not dispose of dredge spoil on the shoreline, seabed or at sea when there are practicable alternatives. Refer to the *Planning Guidelines for the Tamar Estuary and Foreshore* (Watchorn 2000).

When dredge spoil is deposited on land, refer to the Australian Standards for sampling potentially contaminated soil *(AS 4482.1 – 1997 and AS 4482.2 – 1999)* and the *DPIPWE Information Bulletin 105 Classification and management of contaminated soil disposal* (DPIPWE 2009b).

If deposition of contaminated material is approved on the shoreline or seabed, it must be decontaminated beforehand, capped with a coarser material to prevent leaching of contaminants and movement after extreme natural hazards and events or diluted to minimise adverse effects on marine animals and plants.

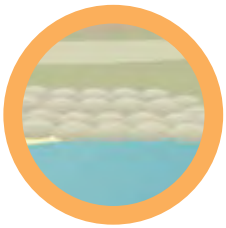
Consult local boat users and MAST before changing navigation channels.

Ensure works are properly supervised by qualified people and that follow-up surveys are done. Ensure all site personnel are aware of operational constraints required to meet environmental standards and conditions.

Instigate effective monitoring during and after construction to demonstrate performance criteria have been met.

Channels through rice grass

Rice grass (*Spartina anglica*) is a vigorous weed that was introduced to Tasmanian estuaries to reclaim land and stabilise mudflats. The grass quickly spreads, destroying fish habitat, smothering native plants and



changing flow regimes of waterways.

It is currently established in at least seven coastal regions in Tasmania, including Australia's two largest infestations, the River Tamar (420 ha) and the Rubicon estuary (135ha). These figures were obtained from a survey in 2000. (DPIPWE website accessed 7th Oct 2010)

Ensure dredging practices minimise the risk of spreading rice grass pieces. Do not dispose of rice grass in the water as it spreads readily from pieces of rhizome.

15.2.8 Dredging techniques

Most dredging in Australia is carried out using a trailer hopper dredge (THD) or cutter suction dredge (CSD).

Trailer hopper dredge (THD)

A trailer hopper dredge is a self-propelled ship with a large hopper to contain the dredge spoil. A draghead attached to a suction pipe is lowered to the seafloor and slurry of sediment and water is pumped into the hopper. THDs are used primarily in maintenance dredging where sufficient navigable depth exists and large volumes are to be removed.

The dredged material can be disposed of back into the marine environment or discharged through a floating pipeline back to shore. THDs create turbid plumes of sediment and therefore dredging of fine-grained sediments is a concern with this method.

Cutter suction dredge (CSD)

CSDs are usually mounted on a barge and consist of a rotating cutter head that collects a slurry of sediment and water that is pumped through a discharge pipeline. Some loss of sediment can occur.

CSDs are advantageous where stiff soils and rocks are to be removed, principally in capital dredging projects. The dredged material is usually discharged directly into the marine environment.

Other dredges

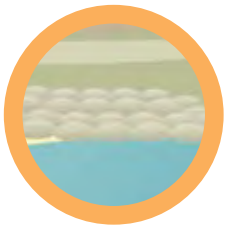
Suction dredges are suitable for smaller projects, such as removal of sand for beach replenishment, where no cutting is required. A grab dredge can be used in situations where there is not enough depth for a trailer or cutter suction dredge, but these can produce a lot of sediment disturbance.

15.2.9 Ongoing maintenance for reclamation and dredging

Follow-up surveys and monitoring may be required, to check whether the reclamation and dredging project affects water quality, marine vegetation or wildlife. These requirements may be specified by the local council or by DPIPWE. Revegetation works associated with reclamation may require ongoing maintenance.

Dredging works require regular inspections to make sure they are effective (e.g. allowing safe navigation). The movement of sand can change unexpectedly with changes in currents and tides.

- Inspect dredged areas regularly and after heavy wave action.
- Inspect rice grass channeling operations regularly to ensure the rice grass meadows do not slump and release sediments into an estuary.
- Monitor levels of toxic substances in bottom-dwelling fish in areas where toxic sediments are disturbed.



15.3 Climate change and shoreline modification

This section discusses the implications for climate change when consider shoreline modification.

Whilst there is likely to be an increased demand for shoreline protection, it is important to ensure that any plans for protection or reclamation work carefully consider the complex coastal issues involved.

For many locations in Tasmania, a 50cm sea level rise would result in the present one-in-100-year storm surge event becoming annual or even more frequent by the end of the 21st century (Church et al. 2008).

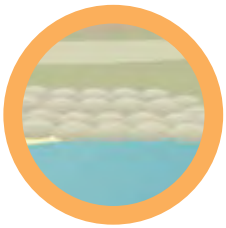
The IPCC Fourth Assessment Report (IPCC 2007) conservatively estimated a sea level rise of up to 79cm by 2100; ongoing research is predicting that sea level rise of over 1m and as high as 1.5m is possible, and sea levels will continue to rise long after 2100. It is anticipated that these higher projections will be reflected in the next IPCC report expected in 2014. Check the latest IPCC sea level rise predictions and use the most up-to-date estimates to ensure the works will function as intended for their life span.

The IPCC predictions and rising awareness of climate change are resulting in increased community concern about shoreline stability and receding coastlines. Coastal communities and many industries and economies rely on coastal infrastructure and access to the coast. In some cases works will be required in order to maintain access and services.

All shoreline protection works and reclamation must be designed to minimise impacts on coastal processes and values and be designed to cope with the predicted sea level rise for their expected life span. Any modifications to the shoreline require ongoing maintenance and this can be very expensive, especially if dredging is required to maintain changes to sand movement.

It some cases it will make more sense to retreat and let the coast settle to a new equilibrium and this will present challenges for land managers.

It is increasingly important to protect the natural and cultural values in coastal areas from human impacts and existing stress factors. The added pressure of climate change and sea level rise will result in increased stress on these environments and it is more important than ever to ensure that works in coastal areas and modifications to the shoreline consider and protect coastal values.



15.4 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in ***Appendix 5***.

Aboriginal Heritage Tasmania

Desktop searches for Aboriginal heritage sites

www.aboriginalheritage.tas.gov.au

Acid sulfate soils

Tasmanian acid sulfate soil management guidelines (DPIPWE 2009a)

Includes guidelines for the development of ASS management plan

Predictive maps of possible acid sulfate soil occurrence

www.thelist.tas.gov.au/

Log onto www.dpipwe.tas.gov.au/acidsulfatesoils and follow the instructions on how to use the LIST database to access ASS predictive mapping.

Australian Standards

- *AS 4482.1—1997 Guide to the sampling and investigation of potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds*
- *AS 4482.2—1999 Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances*

Best management practices for foreshore stabilisation: Approaches and decision support framework (Swan River Trust 2009)

Coastal engineering guidelines for working with the Australian coast in an ecologically sustainable way (Gourley et al. 2004)

http://www.engineersaustralia.org.au/shadomx/apps/fms/fmsdownload.cfm?file_uuid=3879135B-B37F-5284-CB7B-DF97CDD2AB61&siteName=ieaust

Coastal engineering manual (United States Army Corps of Engineers 2002)

Part V, Chapter 3: Shore Protection

http://chl.erdc.usace.army.mil/cemtoc

Coastal Values data

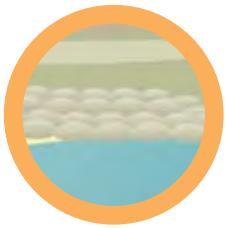
Vegetation, species habitat and geomorphic values data for a 100m-wide coastal strip of the northern, southern and north-western Tasmania NRM Regions. Available on the LIST

www.thelist.tas.gov.au

DPIPWE Information Bulletin 105: Classification and management of contaminated soil disposal (DPIPWE 2009b)

Dredging and land reclamation in the Derwent: A guidance document to support best practice management (Eriksen in prep)

Environmentally friendly seawalls: A guide to improving the environmental values of seawalls and seawall-lined foreshores in estuaries (Department of Environment, Climate Change and Water 2009)



15.4

Foreshore values mapping

Provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. Available on the LIST

www.thelist.tas.gov.au

Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise (Sharples 2006)

Information on Seabees construction in NSW: Wamberal Environmental Impact Statement

www.gosford.nsw.gov.au/Information/Documents/postings/eis_wamberal.htm

Marine habitat mapping

Data collected for south and east coasts of Tasmania depicting a range of marine habitats. From the coastline to the 40m depth contour. The data set is intended to be used to fulfil coastal management objectives according to the *Living Marine Resources Act 1995*.

Contact NRM South for more information

National assessment guidelines for dredging (Department of the Environment, Water Heritage and the Arts 2009)

http://www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html

National environment protection (assessment of site contamination) measure (Environment Protection and Heritage Council 1999)

http://www.nepc.gov.au/sites/default/files/ASC_NEPM__ASC_NEPM_1999I2.pdf

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. To access, download a free registration form from the website

https://www.naturalvaluesatlas.tas.gov.au

Planning guidelines for the Tamar Estuary and foreshore (Watchorn 2000)

Smartline or coastal vulnerability maps

Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas.

www.thelist.tas.gov.au

www.ozcoasts.org.au

Appendix 1: Summary of legislation

The following list is a summary of the main legislation governing coastal management activities in Tasmania. There are also statutory plans and approval processes that need to be considered when undertaking works in coastal areas. **Appendix 2** organises the legislation into topic areas covered in the Manual.

Legislation	Principle/scope
Tasmanian Legislation	
Aboriginal Relics Act 1975	Protection of the physical remains of Aboriginal occupation in Tasmania.
Crown Lands Act 1976	Management, sale, and disposal of Crown lands, including the granting of leases and licences for activities on Crown Land.
Environmental Management and Pollution Control Act 1994	Primary environmental protection legislation dealing with environmental harm from pollution and waste management, and avoiding environmental impacts. Regulation of pollution and emission controls in the marine environment.
Environmental Management and Pollution Control (Waste Management) Regulations 2000	The disposal of controlled waste to prevent direct or indirect environmental harm, for recreational, commercial, domestic, agricultural or industrial processes.
Fire Service Act 1979	All landowners/occupiers have a responsibility to maintain their properties to reduce fire hazard.
Historic Cultural Heritage Act 1995	Protection of heritage with respect to places of archaeological, architectural, cultural, historical, scientific, social and technical significance.
Land Use Planning and Approvals Act 1993	Provides framework for strategic and statutory land use planning and development. Regulates land use and development through planning schemes.
Living Marine Resources Management Act 1995	Regulation and protection of the living marine environment, provision of sustainable fisheries management plans.
Local Government Act 1993	Provides for the creation of council by-laws, issuing of abatement notices for environmental nuisance, and managing and owning public land.
Local Government (Building and Miscellaneous Provisions) Act 2003	Requires creation of a littoral or riparian reserve with subdivision.
Marine and Safety Authority Act 1997	Establishes MAST, responsible for ensuring safe operations of vessels, provides for the development and management of marine facilities, and manages environmental issues relating to vessels.
Marine Farming Planning Act 1995	Regulation of planning and management for marine farming.

Mineral Resources Development Act 1995	Provides for the development of mineral resources consistent with sound economic, environmental and land use management, and applies to all land and minerals in Tasmania
National Parks and Reserves Management Act 2002	Management of parks and reserves based on management objectives of each class of reserve, declaration and management of Marine Protected Areas (marine reserves). Administered through Parks and Wildlife.
Nature Conservation Act 2002	Management and protection of some estuarine/marine species & communities.
Plant Quarantine Act 1997	Provides for the quarantine of plants and the control of pests and diseases
Roads and Jetties Act 1935	Relates to roads, highways and the control and management of certain jetties and marine facilities.
State Coastal Policy 1996	Protection of natural and cultural values of the coast, sustainable development of the coast, and integrated management and protection of the coastal zone.
State Coastal Policy Validation Act 2003	Validates the State Coastal Policy 1996 and amends the coastal zone to include State waters and all land to a distance of one kilometre inland from the high-water mark.
State Policies and Projects Act 1993	Deals with the making of Tasmanian Sustainable Development Policies, the integrated assessment of Projects of State Significance, the State of the Environment Reporting and for related purposes.
State Policy on Water Quality Management 1997	Protection and enhancement of water quality, including monitoring of water bodies, facilitating integrated catchment management, through the application of the precautionary principle.
Tasmanian Building Act 2002	Regulates the construction and maintenance of buildings and building and plumbing matters and to provide for permits, enforcement matters and resolution of disputes.
Tasmanian Planning Commission Act 1997	Establishes the Tasmanian Planning Commission (TPC), assessment of planning schemes, State Policies and Projects of State Significance.
Tasmanian Ports Corporation Act 2005	Provides for matters relating to the control of the Tasmanian Ports Corporation Pty Ltd and its assets.
Threatened Species Protection Act 1995	Classification and listing of threatened flora and fauna, protection of threatened marine species.
Water Management Act 1999	Provides for the control and eradication of declared weeds and the promotion of a strategic and sustainable approach to weed management
Whales Protection Act 1988	Protection for whales in Tasmanian waters. The Commonwealth Whale Protection Act 1980 was replaced by the EPBC Act.
Weed Management Act 1999	Provides for the control and eradication of declared weeds and the promotion of a strategic and sustainable approach to weed management.

Commonwealth Legislation	
Environment Protection (Sea Dumping Act) 1981	Protect & preserve the marine environment with respect to pollution related to dumping at sea. Assessment and permitting of proposals to load and dump wastes in accordance with the National Ocean Disposal Guidelines for Dredged Material 2002.
Environment Protection and Biodiversity Conservation Act 1999	Provides a framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, including World Heritage properties, Ramsar wetlands, listed threatened species and ecological communities, listed migratory species, Commonwealth marine areas, and National heritage places.
National Environment Protection Council Act 1994	Establishes the National Environment Protection Council for protection from air, water, soil, or noise pollution. Under this Act measures (NEPMs) have been developed for a range of environmental issues, and these are adopted as State Policies.
National Environment Protection (Assessment of Site Contamination) Measure 1999	Under the NEPC Act, this NEPM has now become a Tasmanian State Policy. It establishes a nationally consistent approach to the assessment of site contamination and provides adequate protection of human health and the environment, where site contamination has occurred.
International Legislation	
Convention on the Prevention of Marine Pollution by Dumping of Wastes or other Matter (London Convention 1972)	Prevent pollution of the sea through the dumping of waste and other matter liable to create hazards to human health, harm living resources and marine life, damage amenities or interfere with other legitimate uses of the sea.

Appendix 2: Legislation and policy requirements for activities

The following information table is intended to assist those undertaking small-scale activities in coastal areas with a list of the relevant legislation, codes of practice or other guidelines that apply to works on the coast. Local council planning schemes will cover nearly all the requirements.

The list is not complete as it does not include the regulations and amendments to the Acts (refer to www.thelaw.tas.gov.au).

The following table is categorised by the area of interest (environment, cultural heritage etc.) and the nature of works activities within each category. The appropriate contact points and phone numbers for obtaining information and approvals are listed in ***Appendix 3 Where to obtain more information.***

Activity Environmental Management	Legislation, codes, policies, guidelines and key strategies
Sand dune modification and stabilisation	*Environmental Management & Pollution Control Act 1994* *National Parks & Reserves Management Act 2002* Quarry Code of Practice Local Council planning scheme
Fences	*National Parks & Reserves Management Act 2002* Local Council planning scheme Tasmanian Reserve Management Code of Practice
Modifying geoheritage	*Nature Conservation Act 2002*
Shoreline modification—groynes, rocks, sea walls	*Nature Conservation Act 2002* Local Council planning scheme *Crown Lands Act 1976* *Environmental Management and Pollution Control Act 1994*
Pontoons	Local Council planning scheme
Stock grazing	State Policy on Protection of Agricultural Land Local NRM Plans Local Council planning scheme
Excavation of land	Local Council planning scheme *Land Use Planning and Approvals Act 1993* *Mineral Resources Development Act 1995* *Crown Lands Act 1976* (lease over seabed and/or shoreline) Quarry Code of Practice

Weed management	*Weed Management Act 1999* State Weed Management Plan Tasmanian Beach Weed Strategy Regional Weed Management Plan Local weed management plans Pocket Guide for Safe Herbicide Use in the Bush Tasmanian Reserve Management Code of Practice
Spraying weeds	*Agricultural & Veterinary Chemicals (Control of Use) Act 1996* Regulations & Orders Code of Practice for Spraying in Public Places Pocket Guide for Safe Herbicide Use in the Bush Tasmanian Reserve Management Code of Practice
Revegetation	*Nature Conservation Act 2002* *National Parks & Reserves Management Act 2002* Tasmanian Reserve Management Code of Practice
Native animal management	*Tasmanian Threatened Species Protection Act 1995* *Environment Protection and Biodiversity Conservation Act 1999* *Nature Conservation Act 2002* *Animal Farming (Registration) Act 1994* Wildlife Regulations
Pet/feral animal control	*Animal Welfare Act 1993* *Animal Health Act 1995* Tasmanian Reserve Management Code of Practice
Reclamation, excavation	Local Council planning scheme *Crown Lands Act 1976*
Dredging	*Environmental Management & Pollution Control Act 1994* *Crown Lands Act 1976* *Environment Protection (Sea Dumping) Act 1981* *National Environment Protection Council Act 1994* National Environment Protection (Assessment of Site Contamination) Measure 1999 Local Council planning scheme
Marine farms	*Marine Farming Planning Act 1995*
Works to protect marine habitats	*Living Marine Resources Management Act 1995*
Mowing and other vegetation management works	*National Parks & Reserves Management Act 2002* Tasmanian Reserve Management Code of Practice
Controlling introduced marine pests	*Living Marine Resources Management Act 1995*

Cultural values	
Aboriginal heritage	*Aboriginal Relics Act 1975* Local Council planning scheme
Works affecting historic heritage Any works in a place listed on the Tasmanian heritage register	*Historic Cultural Heritage Act 1995* Local Council planning scheme
Works affecting visual quality	Local Council planning scheme Tasmanian Reserve Management Code of Practice Siting & Design Guidelines—Victorian Coastal Council
Public Access & Services	
Construction of buildings (toilets, change rooms etc)	Local Council planning scheme
Construction of jetties, marinas, slips and boat launch ramps	*Land Use Planning & Approvals Act 1939* *Crown Lands Act 1976* Local Council planning scheme Tasmanian Reserve Management Code of Practice
Reclamation	*Environmental Management & Pollution Control Act 1994* *Crown Lands Act 1976* National Environment Protection (Assessment of Site Contamination) Measure 1999 Local Council planning scheme
Signs	Local Council planning scheme Tasmanian Reserve Management Code of Practice
Use of heavy machinery	Tasmanian Reserve Management Code of Practice
Road and track construction	Local Council planning scheme Tasmanian Reserve Management Code of Practice Track Planning Guidelines
Off-road vehicle access	Tasmanian Reserve Management Code of Practice
Recreational fishing	*Living Marine Resources Management Act 1995*
Construction of bridges	Waterways and Wetlands Works Manual
Use of large rocks and other barriers	Tasmanian Reserve Management Code of Practice
Moorings	Marine and Safety Tasmania (MAST) regulations
Installation of pipes (sewer, stormwater etc)	Local Council planning scheme
Fire hazard reduction work	Tasmanian Reserve Management Code of Practice
Beach nourishment	Tasmanian Reserve Management Code of Practice *Crown Lands Act 1976* Local Council planning scheme *Environmental Management & Pollution Control Act 1994*

Water quality control	*Public Health Act 1997* *Water Management Act 1999* State Policy on Water Quality Management 1997 Water Management Plan National Action Plan for Water Quality & Salinity
Septic tanks and other forms of on-site waste treatment	*Public Health Act 1997* Tasmanian Plumbing Code 1994 Local Council health regulations Tasmanian Reserve Management Code of Practice
Development in hazardous areas	Local Council planning scheme

Appendix 3: Where to obtain more information

The following contact information is intended to provide a primary source of information and directions for where to go for further assistance. The following list is not exhaustive. Land managers and NRM regional bodies can provide more information on where to seek advice. Key contacts for community and non government organisations (NGO's) are detailed in **Appendix 4**.

The table below is categorised by the area of interest (environment, cultural heritage etc.) and the nature of works activities within each category. For each activity the appropriate contact point and telephone number is listed. Correct at time of publication.

Activity	Contact point	Phone
Environment		
Acid sulfate soils	DPIPWE: Land Conservation Branch www.dpipwe.tas.gov.au	6336 5441
Climate change	Tasmanian climate change office www.dpac.tas.gov.au/divisions/climatechange	6270 5485
Excavation and soil management	DPIPWE: Land Conservation Branch www.dpipwe.tas.gov.au	1300 368 550
Feral animal control	DPIPWE: Wildlife Management Branch www.dpipwe.tas.gov.au Tasmanian Conservation Trust www.tct.org.au	1300 368 550 6234 3552
Fire hazard management and protection	Tasmania Fire Service www.fire.tas.gov.au Parks & Wildlife Service: Fire Management www.dpipwe.tas.gov.au	6230 8600 1800 000 699 6233 6767
Introduced marine pests	DPIPWE: Marine Environment www.dpipwe.tas.gov.au	6233 3370 0408 380 377

Shoreline modification and stabilisation works (e.g. sea walls, dredging, reclamation)	DPIPWE: Crown Land Services www.dpipwe.tas.gov.au DPIPWE: Land Conservation Branch www.dpipwe.tas.gov.au DPIPWE: Marine Environment (dredging, reclamation) www.dpipwe.tas.gov.au Marine & Safety Tasmania (dredging navigation channels) www.mast.tas.gov.au	6233 6413 1300 368 550 6233 6587 6233 8801
Stormwater	Derwent Estuary Program DPIPWE Stormwater Management Officer	6233 3742 6233 3595
Vegetation management	DPIPWE: Biodiversity Conservation Branch www.dpipwe.tas.gov.au Greening Australia www.greeningaustralia.org.au Understorey Network www.understorey-network.org.au	1300 368 550 6223 6377 6234 4286 0407 352 479
Waste management services (e.g. septic tanks)	DPIPWE: Crown Land Services www.dpipwe.tas.gov.au Environmental Health Department of the relevant Local Council	6233 6413
Water quality	DPIPWE: EPA Division www.dpipwe.tas.gov.au	6233 6518
Weed management	DPIPWE: Land Conservation Branch Regional Weed officers www.dpipwe.tas.gov.au	1300 368 550
Wetlands management	DPIPWE: Biodiversity Conservation Branch www.dpipwe.tas.gov.au	1300 368 550
Wildlife protection	DPIPWE: Wildlife Management Branch www.dpipwe.tas.gov.au Wildlife emergencies (24 hours) DPIPWE: Threatened Species Unit www.dpipwe.tas.gov.au Derwent Estuary Program (penguins) www.derwentestuary.org.au Birds Tasmania (shorebirds) www.birdsaustralia.com.au	1300 368 550 6233 6556 1300 368 550 6233 3742 0419 138 054

Heritage		
Aboriginal places	DPIPWE: Aboriginal Heritage Tasmania www.aboriginalheritage.tas.gov.au Tasmanian Aboriginal Land and Sea Council www.talsc.net.au	6233 6613 6231 0288
Historic sites	DPIPWE: Heritage Tasmania www.heritage.tas.gov.au Parks and Wildlife Service: Heritage section www.parks.tas.gov.au	6233 2037 1300 850 332 6233 2387
Geoheritage sites	DPIPWE: Land Conservation Branch www.dpipwe.tas.gov.au	1300 368 550
Access and facilities		
Fencing	TAFE Tasmania www.tafe-college.org/tafe-tasmania Conservation Volunteers Australia www.conservationvolunteers.com.au	 6231 1779
Moorings	Marine & Safety Tasmania www.mast.tas.gov.au	6233 8801
Off road vehicle access	Department of Primary Industries, Parks, Water & the Environment: Crown Land Services www.dpipwe.tas.gov.au Parks and Wildlife Service www.parks.tas.gov.au	6233 6413 1300 135 513
Public facilities (e.g. picnic tables, change rooms, toilets barbeques)	DPIPWE: Crown Land Services www.dpipwe.tas.gov.au Parks and Reserves Department of the relevant Council	6233 6413
Road and bridge construction	DPIPWE: Crown Land Services www.dpipwe.tas.gov.au Engineering Department of the relevant Local Council	6233 6413
Signs	DPIPWE: Crown Land Services www.dpipwe.tas.gov.au Parks and Wildlife Service: Interpretation Section www.parks.tas.gov.au Parks and Reserves Department of the relevant Local Council	6233 6413 6233 2184
Slips, marinas, launching ramps	DPIPWE: Crown Land Services www.dpipwe.tas.gov.au DPIPWE: Land Conservation Branch www.dpipwe.tas.gov.au Marine & Safety Tasmania www.mast.tas.gov.au	6233 6413 1300 368 550 6233 8801

Tracks and trails	Sport and Recreation Tasmania www.development.tas.gov.au Parks and Wildlife Service www.parks.tas.gov.au Parks and Reserves Department of the relevant Local Council	6233 5888
Recreation		
Fishing and boating	DPIPWE: Wild Fisheries Branch www.fishing.tas.gov.au Marine & Safety Tasmania www.mast.tas.gov.au	1300 135 513 6233 8801
Horse riding and dog walking	Local Council	
General recreation	Sport and Recreation Tasmania www.development.tas.gov.au	6233 5888

Appendix 4: Community Organisations

Community involvement is central to achieving the protection and conservation of natural and cultural heritage along Tasmania's coastline. It is essential to consult with community groups before planning coastal management works. The following is a list of key community support organisations within Tasmania.

Useful organisations

Organisation	Purpose	Contact information
Birds Tasmania	Birds Tasmania is a volunteer organisation committed to raising awareness of bird values in Tasmania and is the Tasmanian branch of Birds Australia. Birds Tasmania volunteers actively participate in the management of bird species and habitat through bird counts and surveys and involvement in steering committees and working groups.	GPO Box 68 Hobart TAS 7001 Phone: 0419 138 054 www.birdsaustralia.com.au/the-organisation/tasmania
Conservation Volunteers Australia	Conservation Volunteers Australia (CVA) partners with individuals, businesses and governments to involve local and international volunteers in work on environmental conservation projects. They provide teams of volunteers with an experienced leader for a fee to undertake a range of environmental activities from weeding, revegetation, track work and monitoring. They are also a registered training organisation and deliver accredited training and capacity building workshops.	63 Melville Street, Hobart TAS 7000 Box 4675 Hobart TAS 7000 Phone: (03) 6231 1779 Fax: (03) 6231 1794 www.conservationvolunteers.com.au
Derwent Estuary Program	The Derwent Estuary Program (DEP) is a regional partnership between local governments, the Tasmanian state government, commercial and industrial enterprises, and community-based groups to restore and promote the Derwent Estuary.	7 Franklin Wharf, Hobart TAS 7000 GPO Box 1751, Hobart TAS 7001 Phone: (03) 6233 3742 Fax: (03) 6233 3800 www.derwentestuary.org.au

Green Corps	Green Corps is an Australian Government youth development and environmental training program administered by the Department of Education, Employment and Workplace Relations (DEEWR) in consultation with other Australian Government departments. Green Corps works in consultation with CVA to provide teams of job seekers, with a team leader, who can undertake natural resource management tasks.	Contact through Conservation Volunteers Australia, or call 13 17 64 or visit www.deewr.gov.au/jobservicesaustralia
Greening Australia	Develops projects to engage the community in vegetation management to protect and restore the health, diversity and productivity of Australian landscapes.	GPO Box 1191, Hobart TAS 7001 Industry House, 30 Burnett St, North Hobart Phone: 03 6223 6377 Fax: 03 6223 6392 www.greeningaustralia.org.au
Natural Resource Management (NRM) Regional Bodies	Tasmania has three regional Natural Resource Management (NRM) regional bodies. Each play a role in connecting volunteers in their region to environmental planning and on-ground activities. The NRM regional bodies will also be able to provide you with up to date information on Federal, State Government and other funding opportunities available to volunteer organisations and land managers.	**Cradle Coast NRM** (approx Port Davey to Devonport) PO Box 338, Burnie TAS 7320 Phone: 03 6431 6285 www.cradlecoastnrm.com **NRM North** (approx Devonport to Bicheno) PO Box 1224, Launceston TAS 7250 Phone: 03 6333 7777 www.nrmnorth.org.au **NRM South** (approx Bicheno to Port Davey) PO Box 425, South Hobart TAS 7004 Phone: 03 6221 6111 www.nrmsouth.org.au
Ocean Planet	Ocean Planet is a branch of Environment Tasmania, a not-for-profit conservation council advocating for protection, conservation and rehabilitation of Tasmania's natural environment. Ocean Planet promotes a sustainable future for Tasmania's marine environment and all that relies on it, our unique wildlife, our idyllic Tasmanian lifestyle and a secure fishing industry for generations to come.	PO Box 1073 Hobart TAS 7001 www.oceanplanet.org.au

Southern Coastcare Association of Tasmania (SCAT)	The Southern Coastcare Association of Tasmania (SCAT) represents approx 40 Coastcare groups in southern Tasmania from Dover to Swansea to Port Arthur. SCAT can put volunteers and coastal stakeholders in touch with member groups. SCAT coordinates training and networking opportunities for Coastcare groups and coastal management stakeholders, and provides small grants for on-ground works.	GPO Box 632, Hobart TAS 7001 Phone: 0447 003 540 www.scat.org.au
Sustainable Living Tasmania	Sustainable Living Tasmania is a community resource and education centre working to provide a direct, local, realistic and accessible contribution to the protection and restoration of the natural environment, and the development of homes and cities for a sustainable future.	1st floor, 71 Murray St, Hobart TAS 7000 Phone: (03) 6234 5566 Fax: (03) 6234 5543 www.sustainablelivingtasmania.org.au
Tasmanian Conservation Trust	The Tasmanian Conservation Trust (TCT) aims to foster and assist the conservation of flora, fauna and important natural values. The TCT works with other environmental and community groups by providing advice and project coordination where required and representing community and groups on steering committees and submissions for planning and land management decisions.	2nd fl, 191-193 Liverpool St, Hobart TAS 7000 Phone: (03) 6234 3552 Fax: (03) 6231 2491 www.tct.org.au
Tasmanian Landcare Association (TLCA)	The Tasmanian Landcare Association (TLCA) is a statewide umbrella organisation for Landcare, Coastcare, Waterwatch and 'Friends of' groups. The TLCA can provide contact and other information regarding their member groups. The TLCA assists groups with strategic planning and provides funding for administrative costs and on-ground works.	PO Box 21, South Hobart TAS 7004 Phone: (03) 6234 7117 www.taslandcare.org.au
Tasmanian Parks and Wildlife Service Volunteer Facilitators	The Tasmanian Parks and Wildlife Service (PWS) has a number of staff whose role is to facilitate the effective involvement of volunteers in reserve management activities and to provide support for local environmental groups working on PWS land. PWS Volunteer Facilitators operate out of local PWS field offices around Tasmania.	www.parks.tas.gov.au
Understorey Network	The Understorey Network is a group of individuals from all walks of life around Tasmania, who believe that the understorey is important. They promote the protection of existing native vegetation, and the use of local native understorey in revegetation, are an independent and not-for-profit community organisation.	PO Box 4535, Bathurst Street Hobart TAS 7000 Phone: (03) 6234 4286 Mobile: 0407 352 479 www.understorey-network.org.au

Volunteering Tasmania	Volunteering Tasmania is the state's peak body on volunteering. It provides information and support to volunteers and those who would like to volunteer and also resources, information and advice to organisations that work with volunteers. Volunteering Tasmania forms partnerships with government, business and the community to enhance and develop volunteering in Tasmania.	57D Brisbane Street, Hobart TAS 7000 Phone: 1800 677 895 www.volunteeringtas.org.au
Wildcare Inc	WILDCARE has around 3,000 individual members undertaking environmental volunteer work on PWS and privately managed land throughout Tasmania. WILDCARE provides $40,000 each year to support the volunteer activity that their members undertake. WILDCARE provides insurance and other administrative support for individuals wanting to be involved in on-ground works.	GPO Box 1751 Hobart TAS 7001 Phone: (03) 6233 2852 www.wildcaretas.org.au

Funding opportunities

Funding opportunities for volunteer organisations and their project partners change all the time depending on government programs, current priorities and emerging issues. Funds are available to help community volunteers engage with land management organisations in the planning and undertaking of on-ground works.

Sources of funding include the Tasmanian, Australian and local governments, umbrella organisations, private companies, trusts, and Natural Resource Management (NRM) regional bodies. The organisations listed above will be able to provide up to date information on the current opportunities available.

Appendix 5: Tools and key resources

These resources are websites, tools and kits. All publications referred to in the tools and resources section at the end of each chapter can be found in the references list.

Activity	Resource
Environment	
Acid sulfate soils	**Acid sulfate soil information kit** Collation of resources from around Australia, includes the National Strategy and a booklet on keys to success. Available from the National Acid Sulfate Soil website http://www.environment.gov.au/archive/coasts/cass/index.html **DPIPWE Land Conservation Branch** Instructions on how to use the maps on the LIST for ASS. Links to the guidelines, pamphlets, poster and more information on ASS are also available here www.dpipwe.tas.gov.au/acidsulfatesoils **The LIST** Predictive maps of possible acid sulfate soil occurrence www.thelist.tas.gov.au/ Log onto www.dpipwe.tas.gov.au/acidsulfatesoils and follow the instructions on how to use the LIST database to access ASS predictive mapping.
Biodiversity	**Environment Australia Biodiversity website** A range of information on biodiversity, the EPBC Act and lists of species protected under the Act. http://www.environment.gov.au/biodiversity/index.html **REDmap** A Tasmanian initiative inviting the community to spot, log and map marine species that are uncommon in Tasmania, or along particular parts of our coast. The information collected is mapped and displayed on the REDmap website, demonstrating how species distributions may be changing over time. Report sightings of unusual marine species on the REDmap website www.redmap.org.au

Coastal values identification	**Coastal values data** Vegetation, species habitat and geomorphic values data for a 100m wide coastal strip of the northern, southern and north western Tasmania NRM Regions. Available on the LIST. www.thelist.tas.gov.au **Foreshore Values Mapping** Provides baseline information on the condition of foreshores and identifies pressures for measuring impacts on key marine and coastal ecosystems. Available on the LIST or by request from DPIPWE. www.thelist.tas.gov.au coastal.enquiries@environment.tas.gov.au **Marine habitat mapping** Data collected for south and east coasts of Tasmania depicting a range of marine habitats. From the coastline to the 40m depth contour. Contact NRM South for more information. **Natural Values Atlas** The Natural Values Atlas is Tasmania's comprehensive database for flora and fauna information including threatened species. Registration is free and is required to use the service. www.naturalvaluesatlas.tas.gov.au **Seamap** Mapping seabed habitat types across the NRM regions. Series of independently funded projects. Useful for identifying marine and estuarine habitat types. http://www.utas.edu.au/tafi/seamap/
Feral animal control	**DPIPWE Fox Eradication Branch** www.dpipwe.tas.gov.au/fox **Feral animals in Australia** Federal Government: Department of Environment, Water, Heritage and the Arts, Biodiversity Section website. www.environment.gov.au/biodiversity/invasive/ferals/index.html **Feral card deck** Handy laminated deck of cards with photos and descriptions of feral animals to assist identification. Contact the Tasmanian Conservation Trust for more information. **DPIPWE: Introduced Animals of Tasmania & Know your ferals information on the website** www.dpipwe.tas.gov.au

Fire management	**Bureau of Meteorology** Up-to-date weather forecasts and some climate change predictions http://www.bom.gov.au/tas/ **Emergency Services** Phone 000 **Tasmania Fire Service (TFS)** Local advice and permits Includes bushfire information and publications about hazard reduction and planned burning. Phone 1800 000 699 www.fire.tas.gov.au
Introduced marine pests	**DPIPWE website** Information about marine pests specific to Tasmania DPIPWE Sea Fishing & Aquaculture website has guidelines for preventing marine pests, including ballast water management requirements and boat maintenance. www.fishing.tas.gov.au **DPIPWE Marine Pest hotline** 0408 380 377 To report new pests, or infestations in new areas. **National Introduced Marine Pest Information System** Marine pest information sheets available online. Follow links from www.marinepests.gov.au **National System for the Prevention and Management of Marine Pest Incursions** National best practice guidelines for all pathways at risk of transporting marine pests http://www.marinepests.gov.au/national_system
Landscaping	**Urban forest biodiversity program** Information on establishing native plants and making gardens wildlife-friendly. www.backyards4wildlife.com.au
Plant and vegetation identification	**A key to Tasmanian vascular plants** University of Tasmania Based on pictures and perhaps the easiest to use of the keys. http://www.utas.edu.au/dicotkey/dicotkey/key.htm **Herbarium: Tasmanian Museum and Art Gallery** Advice about identification and natural distribution of species. http://www.tmag.tas.gov.au/Herbarium

Plant Propagation	**FloraBank Model** Code of practice for community-based collectors and suppliers and other guidelines on the website www.florabank.org.au **Royal Tasmanian Botanical Gardens** Provides advice on seed propagation http://www.rtbg.tas.gov.au/index.aspx?base=227 Information on the germination and dormancy of wild seed can be found at Tasmanian Seed Conservation Centre web pages. *http://www.rtbg.tas.gov.au/index.aspx?base=224* **Understorey Network** Plant database provides information on the identification, habitat and propagation of most Tasmanian native species. www.understorey-network.org.au
Shorebirds	**Birds Tasmania** Advice and input in planning for shorebird protection. **Shorebird information kit** A box of resources for education and display purposes. Available from the Parks and Wildlife Service, Interpretation Section on request.
Threatened species	**Consultant's brief** A consultant's guide providing the minimum requirements for information needed to assess the potential impact/s of proposed activities on biodiversity and geodiversity. http://www.dpiw.tas.gov.au/inter.nsf/WebPages/SSKA-7UM4AN?open **Environment Australia Biodiversity website** A range of information on biodiversity the EPBC Act and lists of species protected under the Act. http://www.environment.gov.au/biodiversity/index.html **Threatened Communities listing** http://www.dpipwe.tas.gov.au Go to native plants and animals > threatened species > list of threatened species **Threatened species listing statements and recovery plans** More information on threatened species' needs and survey requirements are available within the specific listing statements and recovery plans on the DPIPWE website. http://www.dpipwe.tas.gov.au/threatenedspecieslists
Vegetation monitoring	**Introduction to Enviromark, A system for managing roadside and corridor vegetation** www.greeningaustralia.org.au **TASVEG metadata notes and on-line maps available through the LIST website, under Vegetation** http://www.thelist.tas.gov.au/

Weed and disease management	**Alert List for Environmental Weeds** http://www.weeds.gov.au/publications/guidelines/alert/index.html **DPIPWE Codes of practice and guidelines** Information for using herbicides on the website. www.dpipwe.tas.gov.au Go to Biosecurity > Agricultural & veterinary chemicals > Codes of practice and Guidelines • Code of practice for ground spraying • Code of practice for spraying in public spaces • Guidelines for disposing of washings and rinsates • Rivercare guideline for the use of herbicides near waterways and wetlands • Guidelines for interpreting labels **DPIPWE weed control guides** Control guides for specific weeds replace the former weed service sheets and are available online. www.dpipwe.tas.gov.au Go to > Weeds, Pests & Diseases > Weeds > Weeds Index **Management areas *P. cinnamomi* and maps of infected areas** www.dpipwe.tas.gov.au Go to Weeds, Pests and Diseases > Plant Diseases > Phytophthora > Distribution of P. cinnamomi **Tasmanian Institute of Agricultural Research (TIAR) Biological Control Program** A joint venture between the University of Tasmania and DPIPWE. http://www.tiar.tas.edu.au/extensive/biological-control-of-weeds **Tasmanian Skills Institute. Chemical Handling Training** Contact Loretta Satterly on (03) 6434 5846. **WeedDeck** Handy pocket sized ID cards of the major weeds of Australia. http://www.sainty.com.au/
Wildlife	**Local Parks and Wildlife Service Field Centre** 1300 368 550 **RSPCA** 6244 3033 or 1300 139 947 (animal cruelty enquiries) **Whale Hotline** 0427 WHALES or 0427 942 537 A 24-hour monitored telephone service to receive reports of all cetacean sightings and strandings. **Wildlife Management Branch of DPIPWE** 6233 6556 (24 hour) – for urgent wildlife problems (other than whales)

Climate change and hazards	
Climate change and sea level rise	**Antarctic Climate Ecosystems Cooperative Research Centre (ACE CRC) web tool** This web based tool is based on the history of sea levels mapped at 29 ports around Australia provided by the Australian National Tidal Centre. www.sealevelrise.info **Climate change and coastal risk assessment project.** A suite of tools and documents including: • Coastal risk management plan: Template and guidelines (DPIW 2009) • Coastal hazards in Tasmania: General information paper (DPIW 2008c) • Climate change and coastal asset vulnerability: An audit of Tasmania's coastal assets potentially vulnerable to flooding and sea-level rise (DPIW 2008b) • Sea-level extremes in Tasmania: Summary and practical guide for planners and managers (DPIW 2008e) • Historical and projected sea-level extremes for Hobart and Burnie, Tasmania (Hunter 2008) • Background report: Coastal flooding - Review of the use of exceedence statistics in Tasmania (DPIW 2008a) www.dpiw.tas.gov.au/climatechange **CSIRO GIS layer: Wave height direction and period in the Australian region.** A compilation of essential wave statistics. Although the map appears very coarse each pixel is attributed with locally relevant data obtained from satellite instruments. http://www.marine.csiro.au/marq/edd_search.Browse_Citation?txtSession=8083 **LiDAR** Laser light instrument flown in aircraft to provide detailed height data to generate topographic maps of Tasmania's coastline with 25cm contours up to 10 m above sea level. Useful for identifying coastal areas vulnerable to sea level rise. www.thelist.tas.gov.au **Smartline or coastal vulnerability maps** Maps of coastal landform types and their vulnerability to sea level rise can be found under 'Climate Change' layers on the LIST and the OzCoasts website. The data is presented as a 'smart line' following the coastline, with information on the geology of the coast readily interpreted for particular coastal areas. www.thelist.tas.gov.au www.ozcoasts.org.au **Tasmarc project: monitoring shoreline erosion in Tasmania** TASMARC relies on volunteers to survey beach profiles. The network of coastal locations being monitored with TASMARC is growing, and volunteers wanting to monitor new sites are welcomed. For more information contact: nicholas.boden@acecrc.org.au

Hazard management	**Australian Standard** AS/NZS ISO 31000:2009 Risk management **Bureau of Meteorology** **Current Tasmanian weather warnings** www.bom.gov.au/weather/tas/ **Emergency Management Australia (EMA)** Australian Emergency Manual Series www.ema.gov.au **Floodplain mapping, flood data and flood timelines in Tasmania** www.dpiw.tas.gov.au/ Go to water > Tasmania's water resources > Floods **Geodata Services** Aerial photographs and mapping products. geodata.clientservices@dpipwe.tas.gov.au **Melbourne Water** Flood management information. http://www.melbournewater.com.au/content/drainage_and_stormwater/flood_management **Mineral Resources Tasmania** Landslide susceptibility maps http://www.mrt.tas.gov.au **Tasmanian Fire Service** 6230 8600 or 1800 000 699 www.fire.tas.gov.au **Tasmanian Flood Warning Centre, Bureau of Meteorology** Issues flood warnings www.bom.gov.au/hydro/flood/tas/ **Tasmania Police, Department of Police and Public Safety** www.police.tas.gov.au
Works	
Dredging and reclamation	**Australian Standards** • *AS 4482.1—1997 Guide to the sampling and investigation of potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds* • *AS 4482.2—1999 Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances*

Excavation and soil management	**Mineral Resources Tasmania** Exploration Licence Application Form, Environmental Impact Information—Mining Form www.mrt.tas.gov.au **Transport Tasmania** Roadwork specification R92 – Underground Service Facilities. www.transport.tas.gov.au **Workplace Standards Tasmania** For OH&S procedures www.wst.tas.gov.au
Shoreline modification	**Information on Seabees construction in NSW: Wamberal environmental impact statement** www.gosford.nsw.gov.au/Information/Documents/postings/eis_wamberal.htm
Stormwater	**Model for urban stormwater improvement conceptualisation (MUSIC)** A proprietary software product. MUSIC is a user-friendly tool designed to meet the needs of urban stormwater engineers, planners, policy staff and managers in consultancies and state, regional and local government agencies. **Transport Tasmania** Roadwork specification R92 – Underground service facilities Roadworks specification R 32 Drainage: Culverts, pipelines and structures Roadworks specification R34 – Drainage maintenance www.transport.tas.gov.au Bridgeworks specifications (whole series) http://www.transport.tas.gov.au/road/specifications/bridgeworks_specifications
Heritage	
Aboriginal places	**A list of Aboriginal Heritage Officers** Available from the Tasmanian Aboriginal Land and Sea Council (TALSC). http://www.talsc.net.au/ **Aboriginal Heritage Tasmania** Desktop searches for Aboriginal heritage sites Information about the importance of protecting Aboriginal heritage. http://www.aboriginalheritage.tas.gov.au
Geoheritage sites	**Tasmanian Geoconservation Database** Accessed via the LIST or the Natural Values Atlas.
Historic sites	**Australian national shipwreck database** http://www.environment.gov.au/heritage/shipwrecks/database.html **Heritage Conservation Funding Program** Aims to assist heritage property owners by providing funding. The Heritage Council operates the program on behalf of the Tasmanian Government. Places permanently entered in the Tasmanian Heritage Register are eligible. **Heritage Register** www.heritage.tas.gov.au

Access and facilities	
Moorings	**Seagrass Friendly Mooring System** **Marine & Safety Tasmania: Mooring guidelines** www.mast.tas.gov.au
Road and bridge construction	**Austroad publications** Available for download from the Austroads website. Registration is required to download these products. Registration and products are free. http://www.onlinepublications.austroads.com.au • *Austroads 1997, AP-127/97: Concrete structures durability, inspection and maintenance procedures – Position paper* • *Austroads 2003, AP-G1/03: Rural road design—A guide to the geometric design of rural roads (8th edn).* • *Austroads 2003, AP-R217/03: Environmental considerations for planning and design of roads + reference CD ROM.* • *Austroads 2003, AP-R180/00: Road dunoff & drainage: Environmental impacts and management* • *Austroads 2003, AP-R185/01: Environmental risk management guidelines and tools for road projects* • *Austroads 2003, AP-R232/03: Guidelines for treatment of stormwater runoff from the road infrastructure* **Transport Tasmania** Roadworks specifications, Road hazard management guide, and Technical advice sheets • Roadworks specification R75 – Environmental protection • Roadworks specification R76 – Roadside maintenance • Roadworks specification R34 – Drainage maintenance www.transport.tas.gov.au
Signs	**Australian Standards** • *AS 2156 Part 1 Walking tracks. Classification and signage* • *AS 2899.1-1986 Public information symbol signs – General information signs*
Slips, marinas, launching ramps	**Australian Standards** Available from ASI Global phone 1300 654 646 www.standards.com.au • *AS3962-2001 Guidelines for design of marinas* • *AS4997-2005 Guidelines for design of maritime structure* **MAST Mooring Factsheet** http://www.mast.tas.gov.au **Seagrass friendly Mooring System** http://www.seagrassmooring.com.au/

Tracks and trails	**Australian Standards** • *AS 2156 Part 1 Walking tracks. Classification and signage* • *AS 2156 Part 2 Walking tracks. Infrastructure design* • *AS 1428.1 – 1428.2 Design for access and mobility* • *AS/NZS ISO 31000:2009, Risk management - Principles and guidelines* Replaces *AS 4360-2004 Risk management* as the leading resource for risk management. **Austroads** *AGRD06A/09 Guide to traffic engineering practice Part 6A - Pedestrian and cyclist paths* Available for download from the Austroads website. Registration is required to download these products. Registration and products are free. http://www.onlinepublications.austroads.com.au **International Mountain Bicycling Association trail difficulty rating system** http://www.imba.com/resources/freeriding/trail-difficulty-rating-system
Recreation	
Fishing and boating	**Fishwatch**: Report suspected illegal fishing and fishing offences. 0427 655 557 **Recreational Sea Fishing Guide** Produced annually by DPIPWE and available on the DPIPWE website **Leave no wake: Minimal impact sea kayaking** Brochure available from Parks and Wildlife Service and information on the website www.parks.tas.gov.au **Stow it don't throw it** Guidelines for minimising risk of rubbish and pollutants for boating activities Australian Maritime Safety Authority (AMSA) http://www.amsa.gov.au/publications/Marine_Environment_Protection/Stow%20it.pdf
Horse riding and dog walking	Local Council

Glossary

Note: The definitions of terms apply specifically to this document.

Aboriginal heritage sites/values There are numerous places on the coast where there is evidence of Aboriginal life before white settlement. The Aboriginal Relics Act 1975 protects Aboriginal Relics, sites and objects. For example shell middens, rock markings, stone quarries, stone arrangements, rock shelters and fish traps.

Accretion Sand build up

Acid sulphate soils Soils containing iron sulfides, found in low-lying waterlogged areas, generally less than 5 metres above sea level. When exposed to air (e.g. when drained), the sulfides oxidise to produce sulfuric acid which corrodes infrastructure and pollutes waterways.

Aesthetic values For example (and these are entirely subjective) a beautiful sea and landscape view from a hillside viewing area with medium to long range views (eg D'Entrecasteaux Channel from Woodbridge Hill); a place where the vegetation has been protected and meets the high-water mark (e.g. Mt William National Park); and scenic drives such as the east coast highway to Swansea.

Amenity The natural or physical characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic values and cultural and recreational attributes.

Annual Exceedance Probability The probability of at least one exceedance event happening during a period of time. See exceedence event.

Armour A protective layer of rock or concrete units.

Australian Height Datum (AHD) Mean sea level reference point. A level reference point, uniform throughout Australia, based on observations of mean sea level at over 30 tide gauge stations along the coastline. Note that the AHD for Tasmania was established at the mean sea level measured in 1972 at Burnie and Hobart. The subsequent sea level rise means that the AHD at Hobart now lies 38mm below mean sea level (assuming an average linear rate of sea level rise relative to the land of 1.2 mm/year for south-east Tasmania since the late 1800s).

Average Recurrence Interval (ARI) The long-term average number of years between the occurrence of a flood as big as (or larger than) the selected event. For example, floods with a discharge at least as great as the 5-year ARI design flood will occur on average once every 5 years. The ARI expresses the average period between extreme events.

Batter	An earth slope formed from placed fill material or cut into the natural hillside (e.g. during road construction). A cut batter is an exposed sloping surface cut by excavation during earthmoving operations. A fill batter is an exposed sloping surface created by deposition of fill.
Batter drain	A reinforced drain that carries water down a batter without causing erosion.
Batter toe drain	A drain constructed at the base of a slope to direct runoff away from exposed areas.
Beach nourishment	The process of replenishing sand on a beach artificially by delivery of sediment dredged or excavated elsewhere.
Beach replenishment	The process of replenishing sand on a beach either naturally by longshore transport or artificially. See beach nourishment.
Beach Ridge	Beach ridges are linear, symmetric or asymmetric convex ridges formed of sand, gravel or shell debris. There are 2 types of beach ridges, storm built or wind built.
Berm	The nearly horizontal part of the beach, formed by wave action dumping material, finishing at the high tide mark.
Biodiversity	The variety of life forms: different species of plants, animals and micro-organisms, the genes they contain and the ecosystems they form.
Black water	Wastewater containing faecal matter and urine.
Blowout	Bare sand on a sand dune subject to wind erosion and prone to movement. Results when vegetation has been disturbed on a sand dune and sand becomes mobile.
Boat launching ramp	(Boat ramp) A structure designed for launching trailer-borne recreational vessels.
Box culvert	A culvert of rectangular cross-section.
Breakwater	A structure aligned parallel to shore, sometimes connected to the shore, to provide protection from waves.
Bund	A low barrier to divert water off a slipway or similar structure.
Burra Charter	Defines the basic principles and procedures to be followed in the conservation of Australian Heritage Places. It was adopted at a meeting in the town of Burra, South Australia in 1979.

Caisson	A concrete box-type structure used for structural purposes such as retaining walls.
Catch drain	A diversion channel constructed above a road or batter to intercept runoff water and divert it to a stable water disposal area or channel before it reaches the road or batter.
Catchment	The area of land from which water drains to form creeks, rivers, lakes, wetlands and aquifers.
Causeway	A natural or constructed crossing that enables vehicles to ford a drainage feature. The pavement may be of concrete, gravel, bitumen, rock, logs or the natural surface.
Climate Change	An increase in the average temperature of the air and oceans due to burning of fossil fuels and deforestation. Also known as global warming. Greenhouse gases such as carbon dioxide trap solar radiation causing an increase in temperature.
Coast	As defined in the *State Coastal Policy 1996* 'coastal area' means: a) the area of land and state waters identified in a planning scheme or any other instrument required to manage or control use or development, which encompasses the coastal assets, values and processes which are to be conserved, used or developed; or, in the absence of an area so identified; b) all land to a distance of one kilometre inland from high water mark and State waters.
Coastal landforms	In earth science or geology fields, a landform is a distinct physical feature. They are defined by their location in the landscape and their terrain. For example a beach, cliff, estuary, lagoon, sand spit, dune, tombolo, barrier island, bay, cove, gulf, wave cut platform, headland, peninsula etc.
Coastal processes	The action of natural forces (wind, waves, tides, currents) on the shoreline and near-shore seabed. These include the effects of storms, erosion and deposition, movement of dunes, longshore drift and inundation.
Coastal reserve	An outdated but commonly used term for reserved land under the *National Parks and Reserves Management Act 2002* between the low water mark and approximately 30 metres inland. Now coastal reserves are reclassified into the new terms: State Reserve, Nature Reserve, Conservation Area or Nature Recreation Area depending on the values and objectives for the area.

Coastal values	A component of the coastal environment for example vegetation communities (mud flats, heath, sandy beaches), wildlife habitat (eg the endangered swift parrot prefers grassy forest dominated by Eucalyptus globulus), and coastal landform types (eg hard rock shorelines, cobble beaches).
Community engagement	The process by which community organisations and individuals build ongoing permanent relationships for the purpose of applying a collective vision for the benefit of the community.
Consolidation	The process by which sand or soil reduces in volume under load over a period of time (due to drainage of water from the pores between the grains).
Consult	A common mistake is to inform a group of people of what you are doing. Consulting means to ask advice from or refer a project idea for information and input. It means being open to changing your project to suit the needs and interests of others.
Corridor	The land area to accommodate road, rail, pipelines, services and utility infrastructure.
Critical habitat	Under the *Threatened Species Act 1995*, management options to protect listed species include declaring areas of land as critical to listed flora or fauna.
Cross-drain	A culvert, pipe or shallow channel laid diagonally across the surface of a road or track to divert water from the surface or from the roadside ditch.
Culvert	One or more adjacent pipes or enclosed channels for conveying a stream underneath a roadway or other structure.
Cultural heritage	The value that a place has in terms of its aesthetic, historic, scientific or social significance for the present community and for future generations.
Cultural heritage value	Aboriginal relics, artefacts, paintings, middens, lighthouses, buildings, ship wrecks, are examples of cultural heritage values in both Aboriginal and European cultures.
Cut or cutting	A construction produced by the removal of the natural formation of earth or rock, whether sloped or level.
Deposition	Sand build up through the action of wind and waves.
Design wave height	The wave height adopted for the purposes of designing coastal structures such as breakwaters and seawalls. It is chosen to ensure that the structures are not at undue risk of wave damage.

Diversion drain	An open channel or swale constructed to divert stormwater runoff around exposed areas.
Drainage line	A channel down which surface water naturally concentrates and flows, conveying water only during or immediately after periods of heavy rainfall.
Drainage pit	An in-ground structure, usually with a covered inspection opening, used for collection and transfer or redirection of drainage water into an underground pipe drain.
Downdrift	Direction of alongshore movement of sediments.
Dune	Hill, bank, ridge, or mound of loose, wind-blown sand. Often stabilised by vegetation.
Ecosystem	All the biological, chemical and physical entities and the inter-relationships and dependencies that occur between these entities in a specific environment, e.g. an estuary.
Ecotourism	(Ecological Tourism) responsible travel to fragile, pristine and usually protected areas that strives to be low impact and small scale. It purports to educate the traveller, provide funds for ecological conservation, and directly benefit the economic development and political empowerment of small communities and foster respect for different cultures and human rights.
Embankment	Fill material, usually earth or rock, placed with sloping sides and usually longer than it is high.
Endemic/Endemism	Not found anywhere else in the world.
Energy dissipater	A structure that slows fast-moving flows to prevent erosion of a channel.
Environmental harm	An adverse effect on the environment where the effect on the environment and humans is wide scale or high impact.
Environmental hazard	A potential source of harm, injury or difficulty.
Environmental risk	The level of risk to causing harm to the environment.
Erosion	Removal of soil particles by wind and water.
Established foredunes	A single dune or series of dunes behind the swash zone and incipient dune(s) at the back of a beach. They may be vegetated to some extent but are active landforms, i.e. not stable within a 50 year timeframe.
Estuary	The semi-enclosed tidal part of a river where salt water meets fresh water.

Exceedence event	A climatic event that exceeds a given threshold, such as a storm wave height that exceeds existing levels. Such events have the potential to be extreme weather or storm events.
Exit pad	An elevated pad of coarse gravel overlaying a geotextile fabric. A timber or metal shaker ramp is often located on top of the gravel pad. Used at road exits to reduce sediments leaving a construction site.
Filter strip	A band of closely-growing vegetation, usually grass, planted between a pollution source and a receiving waterbody.
Flood	Temporary covering of land by water in an area not normally covered by water.
Foredunes	The dunes nearest the sea in a dune system. Foredunes run parallel to the beach, they can be symmetric or asymmetric dune ridges (located at the landward edge of the beach). They are formed by windblown sand deposited within vegetation. Generally, they occur as two main types, incipient and established foredune(s).
Foredune complex	The active part of the shore-parallel coastal dune system that has a natural tendency to significant physical change within periods of less than 50 years (i.e. is unstable within planning timeframes) given the existing and predictable geomorphic context (landform processes). The foredune complex includes the incipient dune (where it exists) and one or more established foredunes (depending on the area's geomorphic context). Established foredunes are not stable within the 50 year timeframe, but may be vegetated to some extent.
Foreshore	The area of land adjacent to a waterbody; a shoreline.
Footing	The widening at the base of a structure to spread the load to the foundation material.
Frontal dune	The most seaward ridge of sand in the dune system. The frontal dune may or may not be naturally vegetated with plants. In areas where smaller ridges of sand are forming in front of an established dune ridge, the frontal dune may include more than one ridge. It may be an incipient or established foredune. However, there can be broad morphological and ecological variations within these two types, dependant on the amount of sediment available, wind and wave conditions, bay plan form and plant species. The term should never be used to indicate stability or otherwise of a dune complex, and should not be confused with foredunes, as defined above.

Funnel fencing	Fencing designed to direct animals into a road underpass or culvert. The fences are set at a 45 degrees angle in both directions from the road (rather than parallel to it) to guide animals into the underpass. The fences stretch out to the roadside vegetation.
Gabion	A wire basket(s) usually filled with stone used for structural purposes such as retaining walls.
Gabion mattress	Gabions comprising larger baskets, much longer than they are deep, divided into compartments.
Geoconservation/geoheritage value	Some coastal dunes and other sandy landforms are protected for their values for example fossil dune forms, fossil shorelines provide evidence of old coastlines circa 125,000 years ago.
Geomorphic	Of or relating to geomorphology.
Geomorphology	The study of landforms, their forms, origins, development and processes. The shape of land surface forms and the processes producing them.
Geotextile	A thin, flexible permeable sheet of synthetic material used to allow the movement of water through the pores of the material while holding soil particles in place.
Gross Pollutant Trap	A traditional structure that intercepts and retains coarse sediment, rubbish and debris from runoff water.
Groundwater	Water stored underground in the pore spaces between soil particles or rock fractures. The water below the water table.
Groyne	Barriers that are built across or perpendicular to the beach and into the water to trap sand. They can be used to provide sheltered waterways and to increase the width of the beach.
Habitat	The place or type of site where an organism or population naturally occurs.
Hard engineering techniques	Structural techniques that use permanent concrete and rock constructions to stabilise the coastline and protect assets located behind. For example sea walls, groynes, breakwaters and revetments.
Hazard	A potential source of harm, injury or difficulty.

High conservation value	Specialist input is required to determine if land has a high conservation value for example an Aboriginal Heritage survey may provide evidence of Aboriginal artefacts. A coastal geomorphologist will survey a site for aspects of geoheritage. A vegetation specialist can identify plants and habitats where threatened, vulnerable or rare species may be present. These are all examples of high conservation values.
Hind-dune complex	Dunes lying behind the foredune complex, which have a natural tendency to stability in planning time-scales.
Hydraulic regime	Water level fluctuations in a waterbody (e.g. changes in river flows).
Hydrology	The study of the distribution and movement of water.
Hydrostatic pressure	The pressure exerted by a fluid at rest due to gravity.
Impervious	A solid surface that does not allow water to penetrate.
Incipient dune	Small ephemeral dune(s) located in front of established foredunes at the upper margin of the beach. Their duration can be seasonal, annual, or they may remain intact for long periods (e.g. more than 10 years). The durability of incipient dunes depends on a number of factors, including whether they form around seasonal, annual or perennial pioneering plant species, seaweed or flotsam.
Integrated management	A shortened version of the term Integrated Coastal Zone Management (ICZM) which means a holistic approach to looking at issues in the coastal zone. For example being inclusive of all the relevant legislation, integrating decisions across all relevant sectors to the issue and developing consistency and cooperation across government levels to achieve better outcomes for the environment.
Intertidal foreshore	Also known as the intertidal zone or foreshore, is the area exposed to the air at low tide and underwater at high tide.
Jetty	A horizontal decked walkway built on piers or piles, which provides access from the shore to a waterway.
Kelp forest	Underwater areas of high density kelp, smaller areas are called kelp beds.
King tide	On Australia's east coast the highest tides occur in summer and winter months due to the gravitational pull of the sun and moon combined. The highest of these is the king tide.

Landslip	The group of slope movements wherein shear failure occurs along a specific surface or combination of surfaces (eg rock falls, failure of slopes). Can occur in offshore, coastal and onshore environments.
Level spreader	A bank or mound constructed sideways across a slope to convert a concentrated runoff flow into a slower-moving, shallow, widespread flow (to reduce erosion).
LiDAR	Light Detection and Ranging, a remote sensing technology that uses light from a laser and measures properties of scattered light from vegetation communities, land surfaces, buildings etc. This method has also been used to accurately map the contours of land along the coastline accurate to within 25cm.
LIST	Land Information System Tasmania. Central Tasmanian Government land information (e.g. topographic mapping) data system, operated by DPIPWE.
Litter trap	A stormwater gross pollutant trap. A form of barrier such as a net or filter is placed under a street gutter or at the end of a pipe to reduce leaf litter, cigarette butts and general street litter from entering a waterway or bay.
Littoral drift	See longshore drift.
Local provenance (of plants)	Native plants that grow locally from local genetic stock.
Longshore	Parallel to and near the shoreline: the same as alongshore.
Longshore current	The movement of waves coming in to shore at a slight angle, returning down the beach and then repeating the process with the general progression of sand in one direction called longshore drift.
Longshore drift	Movement of sand along the shore, in the near-shore zone, usually resulting from alongshore currents generated by wave action. Also called littoral drift or longshore transport.
Mean High Water Mark	The mean of high water (high tide level) over a long period of time.
Meiofauna	Tiny animals living within the sand.
Migratory birds	Include shorebirds and waders migrate 26,000 km each year between their breeding grounds in the northern hemisphere (Arctic Circle) and the non-breeding areas in the southern hemisphere (Australia and New Zealand). They travel along the East-Asian - Australasian Flyway one of 8 flyways in the world. There are internationally recognised agreements to protect them such as JAMBA (Japan Australia Migratory Bird Agreement), CAMBA (China Australia Migratory Bird Agreement) and ROKAMBA (Republic of Korea Australia Migratory Bird Agreement).

Mooring	A wire, chain, or other structure placed in or on the shoreline or seabed for securing a vessel, excluding an anchor.
National environmental significance	Under the Environment Protection Biodiversity Conservation Act 1999, actions that are likely to have a significant impact on matters of national environmental significance require approval from the Australian Government Minister for the Environment. The Minister will decide whether approval is required under the Act. The 8 matters of national environmental significance protected under the Act are: world heritage properties, national heritage places, wetlands of international importance, listed threatened species and ecological communities, migratory species, Commonwealth marine areas, the Great Barrier Reef Marine Park, nuclear actions.
Natural values	The variety of different plant communities, animal habitats and coastal landforms, land and seascapes, water quality and quantity. Also called natural resources.
Nearshore currents	Currents created by winds, waves, tides and river flows.
Natural Resource Management (NRM)	The management of natural resources such as land, water, soil, plants and animals.
NRM regions	Natural resource management regions are based on catchments or bioregions. The Australian Government, in association with state and territory governments, has identified 56 regions covering all of Australia. Tasmania has 3 NRM regions: NRM North, NRM South and Cradle Coast NRM.
Parabolic dune	U-shaped dunes with elongated arms pointing downwind because they have been fixed by vegetation and their crests point upwind.
Parallel ridge/Parallel dunes	Also known as longitudinal dunes. Some dunes elongate parallel to the prevailing wind, possibly caused by a larger dune having its sides blown away.
Pavement	The portion of the road, excluding shoulders, placed above the design sub-grade level for the support of, and to form a running surface for, vehicular traffic.
Perched culvert	A culvert where the inlet or outlet is above the waterway. This can obstruct fish passage because it requires a fish migrating upstream to leap into the culvert.
Permeable	Porous material that allows the passage of water.
Permian	A geological period of time from 299 to 251 million years before present. The time when all land masses formed a single continent - Pangea.

Photopoints	An established (defined) point from which a series of photos can be taken over time to illustrate change.
Physical processes	On the coast, these are the wind, waves, currents and tides that all influence the shape of the coast.
Pier	(1) An intermediate support in a bridge or jetty. (2) A structure to which a vessel is secured for loading and unloading cargo.
Pile	A long, heavy section of timber, concrete or metal driven into the earth or seabed as a support or protection.
Pontoon	A floating structure used for access to the water or a vessel.
Progradation	The process of sand accumulation on a beach and shoreline build up or growth seawards.
Protected object	The specific relic to which a Ministerial order declaring a protected site relates.
Protected site	Land where a relic is situated which the Minister has declared ought to be protected and preserved.
Provenance	Source (e.g. of plant seeds or cuttings).
Quay	A docking area built for loading/unloading of vessels. Docks are parallel allowing loading/unloading from one side of the ship.
Ramsar site	The Ramsar list of wetlands of international importance now includes 1,888 sites. The Ramsar Convention is an international treaty for the conservation and sustainable use of wetlands. The first meeting of nations involved was at Ramsar, a town in Iran in 1971 and came into force in 1975.
Recession	Ongoing erosion with no sediment replenishing the shoreline resulting in the landward retreat of the shoreline.
Refraction (of waves)	(1) Process by which the direction of a wave moving in shallow water at an angle to the seabed contours is changed. Part of the wave advancing in shallower water moves more slowly than the part still advancing in deeper water, causing the wave crest to bend toward alignment with the underwater contours. (2) Bending of wave crests by currents.

Relic	The *Aboriginal Relics Act 1975* protects Aboriginal relics, protected sites and protected objects in Tasmania. Relic is defined to mean any artefact, painting, carving, engraving, arrangement of stones, midden or other object made or created by any of the original inhabitants of Australia or their descendants before 1876; any object site or place that bears signs of the activities of the original inhabitants; or the remains of the body of an original inhabitant or of a descendant who died before the year 1876 that are not buried in a marked grave or cemetery.
Resident shorebird	Year round resident birds who breed and feed in one area for example pied oyster catchers, terns and gulls.
Reserve Activity Assessment	An assessment undertaken by PWS for reserves managed under the Tasmanian *National Parks and Reserves Management Act 2002*.
Revetment	A facing of stone, concrete, etc., built to protect an embankment or shore structure against erosion by waves or currents.
Retaining wall	A wall constructed to maintain in position a mass of earth or to resist sideways pressure from the adjoining ground.
Riparian vegetation	Riverside vegetation.
Rip current	Also known as riptide, a strong channel of water flowing seaward from near the shore through the surf line. Typical flow is 0.5 metres per second up to 2.5 metres per second.
Rip rap	A layer, facing, or protective mound of stones, randomly placed to prevent erosion or scour at a structure or embankment; also the stone so used.
Riser	The vertical portion of a step, between two steps.
Risk assessment	Understanding the hazard or threat, the likelihood of occurrence, vulnerability to that hazard and the likely consequence or impact.
Rock armour	A protective layer of rock.
Rookery	A penguin or shearwater rookery is a colony of breeding birds where there are nests, burrows, chicks etc.
Rubble	Rough, irregular fragments of broken rock or concrete.
Rubble-mound structure	A mound of stones (randomly placed) protected with a cover layer of selected stones or specially shaped concrete armour units (e.g. a breakwater).

Rumble strip	A series of small ridges placed across the lane of a road to warn the driver to slow down (e.g. if a stop sign is ahead).
Runoff	Water from rain or other water that flows over the land surface. See stormwater.
Sand blow	Or blowouts are caused when protective dune vegetation is damaged (by vehicles, livestock and pedestrian traffic, burning and grazing) and sand becomes mobile.
Saltmarsh	An intertidal vegetation community where the waves are subdued and sediments accumulate in estuaries and inlets. Where the water is highly saline at the mouth of a river the saltmarsh is dominated by succulent herbs and shrubs such as glasswort. Where inflowing rivers and streams make the water less saline, tussock rushes, tussock sedges, tussock grasses and non-succulent herbs are more prominent.
Scour	Removal of material under water (e.g. by waves or currents at the base or toe of a shore structure).
Sea Level Rise	Current sea level rise is due significantly to global warming and in Tasmania recent analysis from CSIRO and the Antarctic Climate and Ecosystems Cooperative Research Centre shows current observed sea level rise of around 3mm per year (this is consistent with the upper level of projected sea level rise. As temperatures increase from global warming, there will be further sea level rise from thermal expansion of the oceans, melting of ice caps, glaciers and ice sheets. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007) projections for sea level rise for the twenty first century is 18-59cm with a potential addition of 10-20cm depending on the ice melt from Greenland and Antarctica. Ordinarily, average local sea level (where tide and wave influence is smoothed out) is influenced by atmospheric pressure, ocean currents and local ocean temperature. Short term changes to sea level include astronomical tides, storm surges and atmospheric pressure, El Nino/Southern Oscillation, seasonal variations such as salinity and flooding, and earthquakes and tsunamis.
Seawall	A structure separating land and water areas, mainly to prevent erosion and other damage by wave action.
Sediment budget	The amount of sediment available in both onshore and offshore landforms for movement onshore and offshore by coastal processes.

Sediment trap	A structure (or vegetative barrier) designed to intercept contaminated run-off from disturbed areas and retain the sediment so it does not enter stormwater pipes or waterways.
Sedimentation	Deposition of eroded sediments, usually by wind or water.
Sedimentation basin	An area where run-off water is detained to allow the settling of sediment particles.
Sediments	Particles (mineral and organic) of varying size that are being moved (or have been moved) by the action of wind, water or gravity, which come to rest on the Earth's surface (either on land or in water).
Shorebird	Also referred to as migrant shorebirds, nesting shorebirds and breeding shorebirds. Includes species such as plovers, sandpipers, snipe and curlews. They often nest just above high water and are vulnerable to human use of the beach.
Shoreline	The area of land adjacent to a waterbody; foreshore.
Slipway	A structure with parallel rails for drawing a vessel out of the water for maintenance and repair.
Skid	A small inclined ramp used for the launching of boats, which does not include a slipway.
Soft engineering techniques	Building with natural processes and relying on natural elements such as sand, dunes and vegetation or brush to prevent erosive forces from reaching the backshore. These techniques include beach nourishment and sand dune stabilisation.
Sponge garden	A group of marine animals occurring in large, complex plant-like colonies (phylum *Porifera*) and have a porous structure and a silica or calcium based skeleton.
Spring tide	The highest tide occurring approximately every 14 days when the gravitational pull of the sun and moon are combined at the new and full moon
Stakeholder	Someone from community, business, industry or government who has an interest or an investment in a project
Storm surge	An area of elevated sea level at the coast caused by a low pressure system and intense winds from offshore storms. There is a temporary rise in sea level of about 10mm per hectopascal due to a fall in atmospheric pressure.

Storm tide	The final water level resulting from a combination of storm surge, wave set up and wave run up.
Stormwater	Water that runs off land, frequently carrying various forms of pollution, such as rubbish, animal droppings and dissolved chemicals. It is carried in stormwater channels and discharged directly into creeks, rivers, the harbour and the ocean.
Stormwater detention	Temporary storage of stormwater, with controlled release into the drainage system.
Straddle carrier	A vehicle specially constructed to lift and move a boat in a dock area.
Sub-grade	The trimmed or prepared portion of the formation on which a road pavement is constructed.
Sustainable development	A pattern or resource use that aims to meet human needs for generations to come while preserving the environment. Coined by the Brundtland Commission as meeting the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable management	The application of sustainable practices in the areas of business/industry, society/community and the environment by managing activities in each area so that they will benefit current and future generations.
Swale	(1) A grassed open drainage channel designed to intercept and convey surface runoff to a drainage network inlet and to promote infiltration of water and interception of sediment by the vegetation. (2) A depression between two coastal dunes.
Swell	Wind-generated waves travelling out of their generating area.
Table drain	The drain beside and parallel to a road, with its lowest portion below the pavement base. It is part of the road formation.
Threatened species	A plant or animal listed as endangered (Schedule 3), vulnerable (Schedule 4) or rare (Schedule 5) of the Tasmanian *Threatened Species Protection Act 1995*. Endangered listings mean the species is in danger of extinction and long term survival is unlikely unless the factors causing it to be so are corrected. Vulnerable listings are likely to become endangered while the factors causing it to be vulnerable continue operating. A species is listed as rare if it has a small population in Tasmania that is at risk.
Tidal inundation	Flooding at high, spring or king tide with sea water moving up through the stormwater systems.

Tidal prism	The volume of water moving in and out of an estuary.
Transgressive dune	Principally unvegetated sand dune or sand sheet moving landward (ie transgressing a former landscape).
Treatment train	A series of treatment systems that together remove a variety of pollutants from stormwater and reduce peak flows in a catchment.
Tsunami	A series of ocean waves with very long wave lengths caused by large-scale disturbances of the ocean (eg earthquakes, landslides, volcanic eruptions, explosions, meteorites).
Turbidity	Cloudiness in water caused by suspended sediments.
Visual Amenity	People visually relate to and place value on their surroundings and then derive a benefit from how it looks. The enjoyment of the coast can be from within a car driving through or between coastal towns or on a beach as much as from a viewing platform.
View field	The siting and design of structures or removal of trees can alter a perspective that many people have built a relationship with over time. For example, a development application to change a two story building to a five story building may alter the view field of the coastline and estuary that has been available to people who live in or have visited the area for many years.
Vegetated swale	Open shallow channels with vegetation used to filter and convey stormwater run-off.
Water bar	A water diversion device (e.g. a log) used on constructed trails to divert water off the trail and prevent erosion.
Water Sensitive Urban Design	Stormwater management systems that conserve water and remove sediments and pollutants.
Wave return wall	A wave located at the top of a seawall, designed to throw back the waves.
Wave run up	When a wave breaks it can also run up the shoreline to an even greater height depending on the size of the wave and slope of the shore.
Wave setup	Where seawater is pushed up into bays and estuaries and piles up against shores due to wind blowing across water creating waves and currents.
Wetland	A permanently or intermittently wet area, shallow water or land/water margin that supports a natural ecosystem of plants and animals adapted to wet conditions.

Wharf	A structure (including quays, piers and jetties) from which passengers or goods may be taken on board or landed from vessels.
Wrack	Seaweed/seagrass or other vegetation cast onto the shore by wave action.

Acronyms

ACECRC	Antarctic Climate Ecosystems Cooperative Research Centre
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AHT	Aboriginal Heritage Tasmania (unit of DPIPWE)
AHO	Aboriginal Heritage Officer (endorsed by TALSC)
ARI	Average Recurrence Interval
ARQ	Australian Runoff Quality (guidelines)
ASS	Acid Sulfate Soils
CAMBA	China–Australia Migratory Bird Agreement
CLS	Crown Land Services
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEP	Derwent Estuary Program
DIER	Department of Infrastructure, Energy and Resources
DPIPWE	Department of Primary Industries, Parks, Water and Environment
EEMSS	Estuary Entrance Management Support System
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPCA	*Environmental Management and Pollution Control Act 1994*
EPA	Environment Protection Authority (Tasmania)
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
GPS	Global Positioning System

GPT	Gross Pollutant Trap
IMBA	International Mountain Bike Association
IPCC	Intergovernmental Panel for Climate Change
JAMBA	Japan–Australia Migratory Bird Agreement
LiDAR	Light Detection And Ranging
LIST	Land Information System Tasmania
LUPAA	*Land Use Planning and Approvals Act 1993*
MAST	Marine and Safety Tasmania
MBO	Monosulfidic Black Ooze
MRT	Mineral Resources Tasmania
NRM	Natural Resource Management
OH&S	Occupational Health and Safety
PASS	Potential Acid Sulfate Soil
PCAB	Policy and Conservation Assessment Branch (DPIPWE)
PEV	Protected Environmental Value
PPE	Personal Protective Equipment
PWS	Parks and Wildlife Service
RAA	Reserve Activity Assessment (PWS assessment process)
RBF	Recreational Boating Fund
RMPAT	Resource Management and Planning Appeal Tribunal
RMPS	Resource Management and Planning System
ROKAMBA	Republic of Korea-Australia Migratory Birds Agreement
SCAT	Southern Coastcare Association of Tasmania
SMP	Stormwater Management Plan
SPRATS	Sea Spurge Remote Area Teams

SWMP	Statutory Weed Management Plans
SWMP	Soil and Water Management Plan
TALSC	Tasmanian Aboriginal Land and Sea Council
TASI	Tasmanian Aboriginal Site Index
TASMARC	Tasmanian shoreline monitoring and archiving project
TASVEG	A Tasmanian-wide vegetation map
TCCO	Tasmanian Climate Change Office
TCT	Tasmanian Conservation Trust
TFS	Tasmania Fire Service
TLCA	Tasmanian Landcare Association
TMP	Traffic Management Plan
TPC	Tasmanian Planning Commission
TVMMP	Tasmanian Vegetation Mapping and Monitoring Program
VCA	Vegetation Condition Assessment
WMP	Weed Management Plan
WoNS	Weeds of National Significance
WSUD	Water Sensitive Urban Design

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Southern Tasmania Regional Land Use Strategy

2010–2035



Southern Tasmania
REGIONAL PLANNING PROJECT

Amended 24 November 2021

Declaration of the Southern Tasmania Regional Land Use Strategy

24 November 2021

I, Roger Charles Jaensch, Minister for Local Government and Planning, declare this amended Regional Land Use Strategy in accordance with section 5A of the *Land Use Planning and Approvals Act 1993.*



..... Hon Roger Jaensch MP

15/11/2021 Date

This Southern Tasmania Regional Land Use Strategy, as amended, came into operation on **24** November 2021 as notified in the Gazette.

Amendments comprise an adjustment to the Urban Growth Boundary in Map 10 at 69 Brighton Road, Brighton to include the part of the property within the Urban Growth Boundary.

Southern Tasmania Regional Land Use Strategy

Implementation Statement

The *Land Use Planning and Approvals Act 1993* (the Act) sets out how the Strategy is to be implemented through planning schemes, which includes the following:

- amendments made to planning schemes approved under section 29 of the former provisions of the Act;
- amendments made to interim planning schemes declared or made under the former provisions of the Act; and
- Local Provisions Schedules prepared under Part 3A of the Act, and amendments to approved Local Provisions Schedules made under Part 3B of the Act.

This Strategy applies to Local Provisions Schedules, excluding the Regional Policies contained in sections 5.5, 6.5, 7.5, 8.4, 9.3, 10.5, 11.5, 12.5, 13.5, 14.5, 15.3, 16.5, 17.5, 18.6 and 19.7 in Part C of this Strategy. These Regional Policies are substituted by the Regional Policies contained in the Tasmanian Planning Scheme Addendum for:

- Local Provisions Schedules prepared under Part 3A of the Act; and
- amendments to approved Local Provisions Schedules made under Part 3B of the Act

In the event of a conflict or inconsistency between the State Planning Provisions and any substantially similar policy statements in this Strategy, the State Planning Provisions prevail.

The Regional Policies contained in the Tasmanian Planning Scheme Addendum do not apply to:

- amendments made to planning schemes approved under section 29 of the former provisions of the Act; and
- amendments made to interim planning schemes declared or made under the former provisions of the Act.

Regional Policy SRD 2.12 in the Tasmanian Planning Scheme Addendum does not apply to draft Local Provisions Schedules prepared and submitted to the Tasmanian Planning Commission under Part 3A of the Act prior to this amended Strategy taking effect. This does not preclude the inclusion in a draft Local Provisions Schedule, or a Local Provisions Schedule approved under Part 3A of the Act, of provisions relating to:

- an amendment made to planning schemes approved under section 29 of the former provisions of the Act; or
- an amendment made to an interim planning scheme declared or made under the former provisions of the Act.

The Southern Tasmania Regional Land Use Strategy 2010-2035 was originally declared in October 2011. During 2013 a minor review was undertaken resulting in this amended document.

Implementation of the Strategy is to be guided by the associated document 'The Process Forward: Implementing and Monitoring the Regional Land Use Strategy for Southern Tasmania', Southern Tasmanian Councils Authority, Hobart).

While every responsible effort has been made to ensure that this document is correct at the time of printing, the State of Tasmania, the Southern Tasmanian Councils Authority, the 12 Southern Councils and the Sullivans Cove Waterfront Authority, their agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance or upon the whole or any part of this document.

Please visit www.stca.tas.gov.au or telephone the Southern Tasmanian Councils Authority on 61 3 6270 2242 with any queries.

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MINISTER'S VISION

Reforming the State's land use planning system so that it is fit to meet the challenges of the 21st Century is an important and challenging task for both State and Local Government.

The introduction of comprehensive and coordinated strategic land use planning is a significant and very necessary component of this reform.

Our society is increasingly impacted by broader challenges; rising energy costs, peak oil, climate change & sea level rise, competition for resources, the need for greater social inclusion and improved environmental sustainability. Reorientating our cities and towns, and the infrastructure linkages between them, towards a more sustainable pattern of development is critical in addressing these challenges and ensuring our long-term prosperity.

As the Capital City region, Southern Tasmania, with its unique set of natural and cultural assets, living environment and nationally & internationally competitive industry sectors, needs a robust strategic land use planning system to proactively facilitate sustainable development, protect and improve our amenity and quality of life and provide greater certainty and direction to the community and development industry. In addition, this Strategy will form the foundation upon which a suite of contemporary and consistent planning schemes will be developed.

The Southern Tasmania Regional Land Use Strategy will play a significant role in recognising the region's natural competitive advantages and defining its future within the national and global economy. The region is a major player in aquaculture and wild fisheries, its agricultural sector exports high value produce around the world, it has unique specialty timbers and skilled craftspeople, a deep water port well placed to serve Australia and the world's growing interests in the Southern Ocean and Antarctica, a clean, green environment in which to live and a World Heritage Wilderness Area the likes of which simply does not exist in most developed countries. The region's future prosperity lies in making the most of these competitive advantages.

Yet this Strategy is just the beginning: the first iteration. Both State and Local Government have recognised that the work cannot stop here and I intend to put in place a regional planning system that will continue on, thereby ensuring that our regional strategies are living instruments responsive to future changes and challenges.

I look forward to a brighter future for Southern Tasmania, one in which our future land use planning directions are set through the evidence-based, rational decision-making approach encapsulated within the regional strategic planning process.

The Hon Bryan Green MP
Minister for Planning
State of Tasmania

FOREWORD

The Southern Tasmania Regional Planning Project Steering Committee is pleased to provide the Southern Tasmania Regional Land Use Strategy to the Minister for Planning, the Hon. Bryan Green, M.P.

This document constitutes the culmination of a substantial body of analysis encapsulated within a suite of background reports and the first major public output for the Regional Planning Project – which itself is the first significant regional planning exercise in the region for over three decades.

Regional strategic land use planning is absolutely necessary, and the advent of this project is long overdue. It is at the regional level that strategic land use planning can be undertaken most effectively, combining local initiative with statewide direction. We no longer have the luxury of abiding the ad hoc and uncoordinated land use planning decision-making of the past. We are all increasingly aware that our resources are not limitless and the environment not endlessly capable of absorbing our impacts.

We can also reduce adversarial public debate and angst that currently occurs in the planning system through strategic land use planning. Far better results may be achieved when debate over 'what should happen where' is conducted within a strategic planning process, in an atmosphere where there are no specific development proposals on the table and where reason, not emotion, is free to drive the outcomes.

This Strategy acknowledges that Greater Hobart is one settlement and that major land use planning decisions in one part of Greater Hobart have consequences that reverberate across the whole metropolitan area and often across the entire Southern region. Planning on a 'whole of region' basis is necessary as many challenges and opportunities can't be adequately addressed by individual planning authorities, or State agencies, acting alone. There are significant opportunities at this level of planning to better integrate land use and infrastructure planning (both social and physical). Without coordinated regional planning, we may find that living and working in our towns and cities is more expensive than it needs to be and as a broader community we are likely to fail in providing the best outcomes for future generations.

Regional planning also allows us to recognise and develop the advantages of each municipal area. Each locality has its own strengths to build upon, its own place within the region. Together we can form a complimentary network that is far greater than the sum of its parts.

We commend this document to the people of Southern Tasmania - The first iteration of an on-going process of regional strategic planning.

Alderman Rob Valentine
Steering Committee Chairman
Southern Tasmania Regional Planning Project

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Part A



Introduction and Context

1. INTRODUCTION

1.1 PURPOSE OF THE LAND USE STRATEGY

"This Regional Land Use Strategy is intended to be a broad policy document that will facilitate and manage change, growth, and development within Southern Tasmania over the next 25 years."

This Regional Land Use Strategy is a broad policy document that will facilitate and manage change, growth, and development within Southern Tasmania over the next 25 years. It provides comprehensive land use policies and strategies for the region based upon:

- The vision for the State as outlined by Tasmania *Together*;
- A more defined regional vision;
- Overarching strategic directions; and
- A comprehensive set of regional planning policies addressing the underlying social, economic, and environmental issues in Southern Tasmania.

Whilst this Land Use Strategy arises from a joint initiative between State and Local Government (the Regional Planning Initiative), it is intended that it be a permanent feature of the planning system, monitored, maintained and reviewed into the future. In other words, this document is the first iteration in an ongoing process of regional land use planning across the State that will ensure the policies and strategies remain relevant and responsive.

It is also important to recognise that the development of this Strategy within the timing and budgetary constraints of the regional planning initiative has meant the scope and detail of analysis supporting this document will need to be further progressed in the future.

1.2 DEFINING SOUTHERN TASMANIA & METROPOLITAN HOBART

Southern Tasmania encompasses the twelve local government areas of: Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan Spring-Bay, Glenorchy, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands and Tasman (see Map 1).

Southern Tasmania is a regional planning unit for the purposes of the Land Use Planning and Approvals Act 1993.

At the heart of the region is the metropolitan area of Greater Hobart which extends over all or part of the local government areas of: Brighton, Clarence, Glenorchy, Hobart, Kingborough & Sorell. Greater Hobart is the centre of all major social and economic facilities for the region as well as being the capital city and administrative and political centre for Tasmania. As the most populous urban area within the State and region, its social and economic interactions significantly influence the remainder of the region, its towns, and settlements.

1.3 THE REGIONAL LAND USE PLANNING FRAMEWORK

This strategy document is one of three elements within the Southern Tasmania Regional Land Use Planning Framework. As indicated by Figure 1, the Strategy is supported by a series of Background Reports providing detailed analysis and discussion on a range of topics as outlined below. The Regional Land Use Strategy should be read in conjunction with these documents:

- Background Report No. 1 - The Project Background;
- Background Report No. 2 - The Regional Profile;
- Background Report No. 3 - A Changing Climate;
- Background Report No. 4 - Social Infrastructure;
- Background Report No. 5 - Natural Values;

- Background Report No. 6 - Land Hazards;
- Background Report No. 7 - Productive Resources;
- Background Report No. 8 - Regional Transport System;
- Background Report No. 9 - Infrastructure;
- Background Report No. 10 - Tourism and Land Use Planning;
- Background Report No. 11 - Activity Centre Analysis;
- Background Report No. 12 - Industrial Activity;
- Background Report No. 13 - Dwelling Yield Analysis;
- Background Report No. 14 - Providing for Housing Needs

The Strategy is also supported by a suite of implementation and monitoring recommendations which are detailed in the document '*The Process Forward: Implementing and Monitoring the Regional Land Use Strategy for Southern Tasmania 2010 – 2035*'.

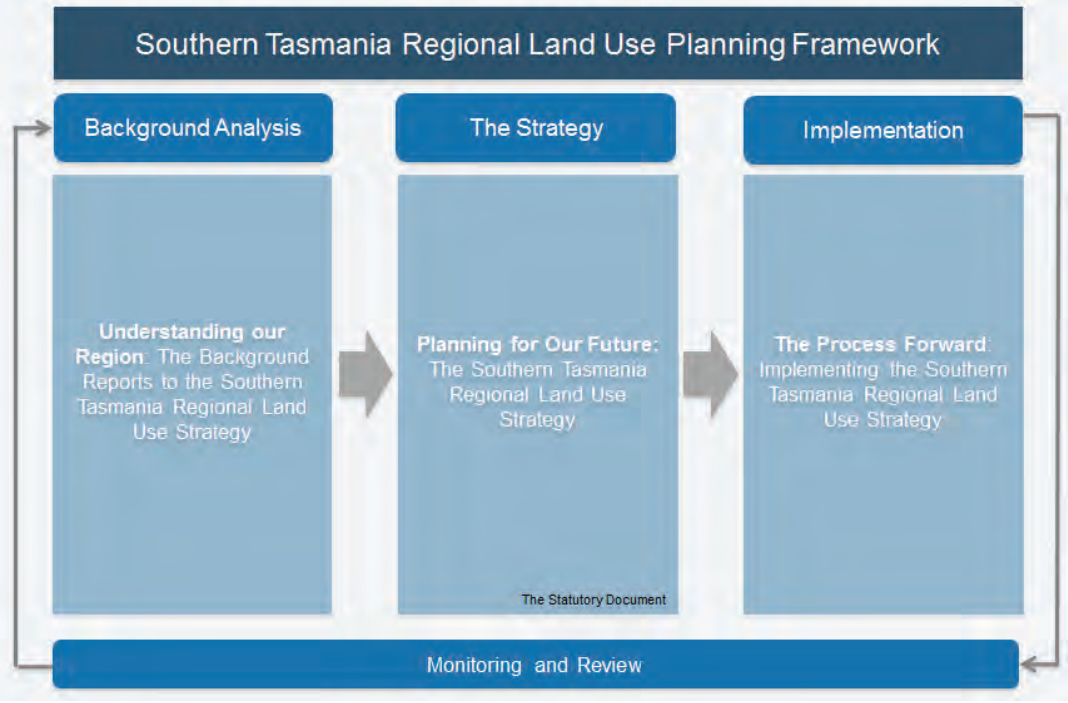
1.4 HOW TO USE THIS DOCUMENT

This Regional Land Use Strategy has been prepared as the central document within the Land Use Planning Framework for Southern Tasmania. The Strategy is intended to guide land use, development, and infrastructure investment decision across the region by State and Local Government, and infrastructure providers (see Figure 3).

The Strategy comprises three key components: The Vision, The Strategic Directions, and the Regional Policies (see Figure 2). In essence, the Regional Policies outline how the Strategic Directions will be achieved, and the Strategic Directions, being the broad policy statements outline how the Vision will be attained.

Part A provides a summary of the context in which the Strategy has been prepared including its linkages with the Resource Management and Planning System of Tasmania, existing policy documents at the state, regional and local level and broader

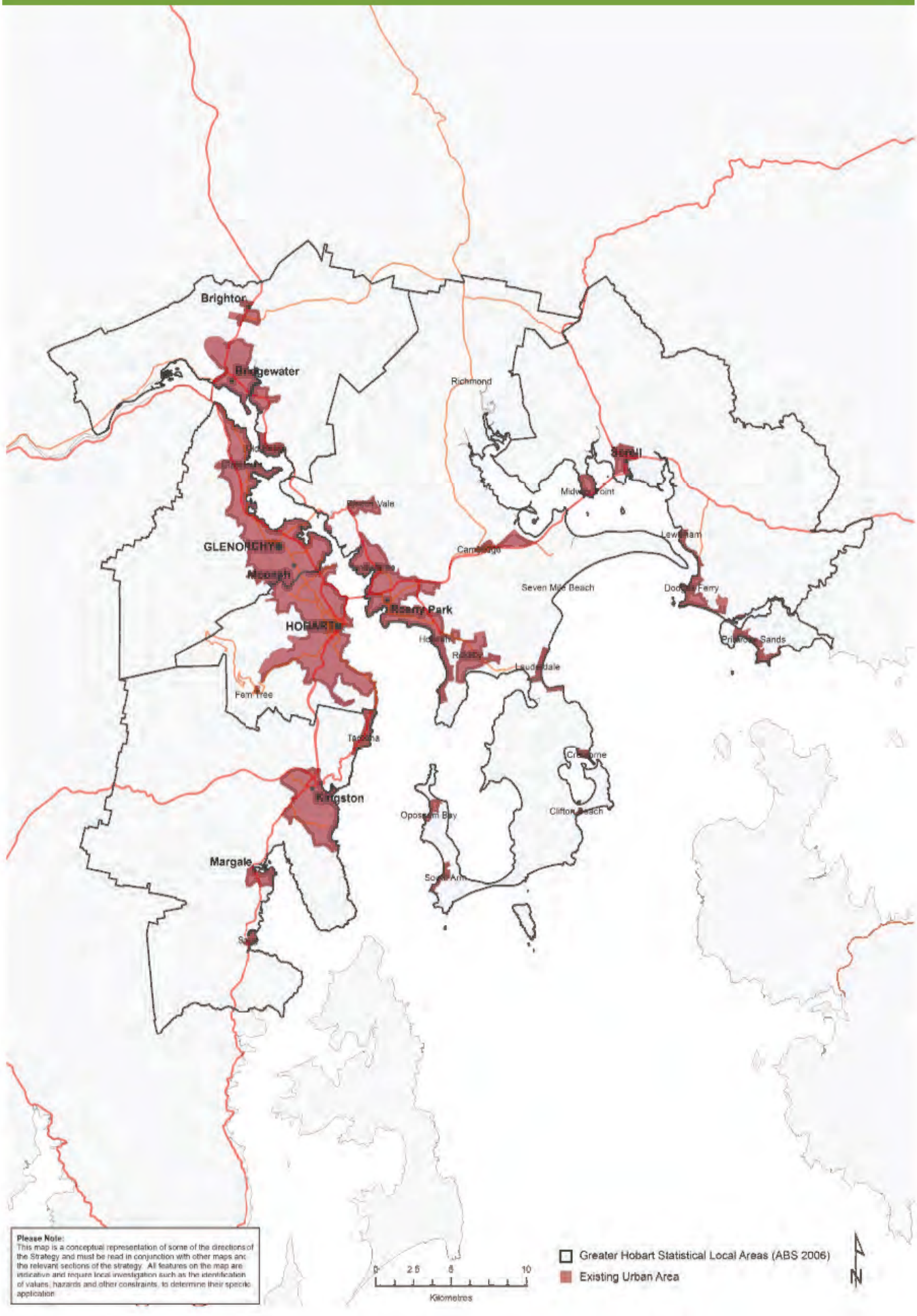
Figure 1: The Regional Land Use Framework for Southern Tasmania



MAP 1: THE SOUTHERN TASMANIA REGION



MAP 2: THE GREATER HOBART AREA



national and global imperatives, as well as a summary of the characteristics of the region.

The strategic foundations are the regional vision and strategic directions. These are provided in Part B. The specific policies by which the strategic directions and therefore the vision will be achieved are outlined in Part C: Regional Policies. Each regional policy is supported by sub-policies. Compliance with the sub-policies is not intended to imply achievement of the overall policy. The sub-policies are intended to highlight critical matters to be achieved in the near future.

The Regional Land Use Strategy should be read in conjunction with the series of Background Reports listed under section 1.3, along with the implementation and monitoring report 'The Process Forward: Implementing and Monitoring the Regional Land Use Strategy for Southern Tasmania 2010 – 2035'.

1.5 IMPLEMENTATION, MONITORING & REVIEW

As indicated by Figure 1, the Strategy is supported by implementation and monitoring recommendations detailed in the report 'The Process Forward: Implementing and Monitoring the Regional

Figure 2: Structure of the Regional Land Use Strategy



Land Use Strategy for Southern Tasmania 2010 – 2035'. Implementation of the Strategy either through statutory land use planning process or other processes is to be guided by this document.

While the land use policies and strategies suggest a range of town planning controls, it is important to acknowledge that successful implementation of the Strategy will also require a range of other non statutory planning implementation tools including economic development or urban improvement strategies, infrastructure provision and pricing regimes, and facilitation and capacity building (such as land and site assembly by Government, redevelopment through public private partnership and specific infill development programs).

1.6 CONSULTATION

During this period 18 different information sessions were held across the region for stakeholders and the general public. The public consultation period was in addition to 18 months of detailed consultation with individual Project Sponsors, infrastructure providers and key stakeholders.

A total of 114 submissions were received from members of the public, stakeholder organisations, Councils and State Government agencies. A detailed consultation report has been released and is available from the STCA website (www.stca.tas.gov.au/rpp).

2. CONTEXT

"Realising good planning outcomes ... requires the integration of land use planning with the delivery of infrastructure and services, and other social, economic, and environmental policies."

The context in which this Regional Land Use Strategy has been prepared is important in understanding why the document has addressed the issues that it has and why some matters have not been addressed and the logic behind its structure and presentation. A comprehensive and detailed analysis of the specific contextual elements has been provided in Background Reports Nos. 1, 2 & 3:

2.1 EXISTING PLANNING FRAMEWORK

More often than not, the community sees land use planning as merely 'development control': a reactionary and restrictive mechanism controlling the use and development of land. This perception has become entrenched in the Tasmanian community due to the general lack of strategic land use planning at the sub-regional, regional and State level, which has persisted even after the inception of the Resource Management and Planning System in 1994. Beneath the very broad 'sustainable development' objectives of the RMPS the State has remained essentially devoid of land use planning direction, with the exception of only one or two areas - notably the protection of agricultural land.

Land use planning should be more than just 'regulatory' in nature. It should be foremost about the creation of an agreed vision, associated strategic objectives and then Policy formulation. This Strategy document will partially fill the existing strategy and policy void.

It is important to recognise that this strategy addresses matters of regional importance only. Local and/or sub-regional planning strategies prepared at the local government level, consistent with this strategy (and the objectives of the RMPS and relevant State Policies), are necessary in order to take into account local issues and circumstances that need to be expressed in individual planning schemes.

Where there is an inconsistency between local strategic planning and this regional strategy, the latter should prevail.

Realising good planning outcomes also requires the integration of land use planning with the delivery of infrastructure and services, and other social, economic, and environmental policies. Implementation mechanisms beyond 'regulation' are essential in delivering the strategic outcomes of this Strategy.

Figure 3, page 9, illustrates the context of this document, and regional land use planning generally, in light of strategy & policy development at the State, regional and local level. The development of the land use planning policies and strategies within this document has not just been a top-down process. For example, the starting point for their preparation was an analysis of existing local and sub-regional strategies to identify existing consistencies and possible conflicting policies across the region. In turn, the Strategy will assist in defining and informing the development of State-level strategies and delivery plans, such as those for community health and educational facilities.

2.2 A CHANGING CLIMATE

In a theme consistent with the directions of governments across Australia, this Strategy has been prepared with the need to address the challenges of a changing climate as an overarching consideration. Some of the likely impacts on Tasmania over the next 50 to 100 years resulting from climate change are:

- Sea level rise, resulting in erosion of coastal land forms and inundation of some areas.
- Increased extreme weather events such as storms and bushfires
- Increased temperatures
- Changes in rainfall patterns with seasonal, spatial and intensity changes
- Extinction and/or migration of plant and animal species resulting from changes to habitat conditions
- Challenges to infrastructure lifespan and capacity from changed weather conditions
- Challenges to agriculture and other forms of resource production
- Increased immigration from climate-stressed mainland centres.

Inefficient urban transport systems, unsustainable settlement patterns, inappropriate land use change, underutilised infrastructure and poorly performing buildings are all major contributors to global greenhouse emissions, a major causation of climate change. As evident from the Strategic Directions in Chapter 4, this Strategy and associated policies are aimed at assisting in the reduction of emissions and supporting the transition to a low carbon economy and a more sustainable pattern of settlement.

In addition land use planning can help the community prepare and adapt for the hazards and risks that climate change pose to our natural and built environments, particularly in terms of risk from sea level rise and storm surge and increased extreme events such as bushfires and flooding.

A more detailed analysis of climate change, relevant projects and their relationship to land use and infrastructure planning is provided in the background paper on climate change.

Figure 3:
The context of the Regional Land Use Framework under the RMPS



3. ABOUT THE REGION

Population in 2008:	**246,162**
Indicative planning population in 2035:	**327,036**
Dwellings in 2008:	**102,700**
Forecast additional dwellings by 2035:	**36,000 (for the region)** **26,500 (for Greater Hobart)**
Major urban areas:	**Greater Hobart**
Major Regional Centres:	**Brighton Huonville, New Norfolk, and Sorell**
Main Employment areas:	**Hobart, Glenorchy, and Clarence Local Government Areas**
Identified Growth Areas:	**Prior to this Strategy there were no identified growth areas at the regional level**

Southern Tasmania is the largest region of Tasmania in area and population. It constitutes 38% of the State's total physical area (23,377km2) with 48% of the total population, which was 502,600 as of 30 June 2009. Settlement within the region is heavily focussed on the metropolitan area of Greater Hobart, which accounts for nearly 86% of the region's population.

The remainder of the population is focused in smaller settlements across coastal areas in the east and south, agricultural & highlands districts to the north, and the lower-middle Derwent Valley to the west. The two largest settlements outside of Greater Hobart are Huonville and New Norfolk, which are set within more traditional rural landscapes.

Southern Tasmania is defined by a diverse landscape. The western half of the region is virtually unpopulated and is defined by the Tasmanian Wilderness World Heritage Area, a rugged landscape of exceptional natural, cultural, and aesthetic value. The vegetated landscape extends out into the remainder of the region with significant proportions of the region retaining high ecological value. Excluding the extensively cleared farming areas around the Midlands, a defining feature of the regional landscape is the vegetated skylines and hilltops, reflecting the significant impact that the topography has had on shaping urban development and settlements. To the east of the region is a landscape defined by its coastal environs while the northern part of the region, the Midlands, is characterised by extensive dryland farming and grazing areas. .

Across the region a long established history of Aboriginal settlement is also evident, with many sites and landscapes of great significance.

The region is also the site of the second oldest European settlement in Australia, after Sydney Cove. Originally formed at Risdon Cove on the eastern shore of the Derwent River in 1803, the first Tasmanian settlement was then relocated to the area now known as Sullivans Cove in 1804. Established as a penal settlement for British convicts, the region has many sites of European cultural significance.

The natural and cultural assets of the region together with the benefits of a major city and surrounding settlements in close proximity to those assets is a key factor in the quality of life and sense of

"Residential growth is currently not managed on a regional, or in the context of Greater Hobart, on a 'whole of settlement' basis due to the absence of any strategic planning framework."

place for the region's residents, as well as underpinning the region as an attractive place to visit.

A full regional profile has been prepared with socio-economic, demographic and building activity data for the region analysed in detail (see Background Report No. 2: The Regional Profile). Some of the key trends to note are:

3.1 POPULATION AND DEMOGRAPHICS

- Relatively low historic population growth: From 2001 to 2008 the region experienced an average growth of 0.9% per year, a small rate compared to mainland centres.
- A range of possible population projection (low, medium and high): based upon different assumptions relating to fertility, mortality, interstate migration and overseas migration. The high population projection scenario is the most unlikely based upon current trends.
- Significant uncertainties apply to population projections beyond a short term timeframe: Population growth in a particular location can be strongly influenced by: availability and cost of residential development opportunities; planning constraints; new or declining employment opportunities; and the relative attractiveness of locations associated with lifestyle, physical setting and social status.
- An ageing population: In 1996 the median age was 34.1 years, while in 2006 this had increased to 39.6 years. While this trend is consistent with national trends, the force of ageing in the region is more pronounced (particularly in rural areas) due to low levels of immigration, the relocation of younger people and families to the mainland and proportionally higher capture of tree and sea changers of the baby boomer generation.
- A decreasing household size: The average household size across the region currently stands at 2.4 people per dwelling, which is projected to decrease to 2.0 - 2.1 by 2026. Household size varies within the region however, with the Central Highlands, Glamorgan Spring Bay and Tasman areas experiencing the highest percentages of their population in 1-2 person households with Brighton, Huon Valley and Southern Midlands experiencing the highest percentages of their population in 5+ person households.

3.2 RESIDENTIAL GROWTH

- Residential growth is currently not managed on a regional or, in the context of Greater Hobart, on a 'whole of settlement' basis due to the absence of a strategic planning framework.
- As would be expected due to the distribution of population, the majority of the region's residential building activity in the last 10 years has occurred in Greater Hobart. 78% of all new dwellings approved have been in Greater Hobart, in which Kingborough followed by Clarence have seen the greatest growth.
- There is also evidence of the changing nature of some existing residential settlements within the region from shack/holiday settlements to permanent settlements. This is particularly evident in Sorell and Glamorgan Spring Bay where the percentage of 'unoccupied' dwellings have decreased in favour of 'occupied' dwellings.

3.3 ECONOMY AND EMPLOYMENT

- The region contains economic drivers of regional, state and national importance.
- Of the nearly 94,000 jobs within the region, 92% are within Greater Hobart. The higher proportion of jobs to population indicates the importance of Greater Hobart to the economic health of the whole region.
- 47% of jobs within the region are within the Hobart LGA alone. The greatest numbers of jobs outside of Hobart are within Glenorchy and Clarence LGAs with 18.5% and 12% respectively.
- Outside of Greater Hobart the highest proportion of jobs are in the Agriculture, Forestry and Fishing industries.
- The fishing industry in the region, and in particular aquaculture is of national significance. The region is the highest value producer in Australia of farmed Salmonoids.
- The forest industry has been a major economic driver within the region as well. Although due to global market conditions and the value of the Australia dollar, the current high volume, low value production of woodchips is likely to have a lessening role with greater emphasis placed on lower volume, higher value specialty timbers in the future. The fate of the proposed pulp mill in northern Tasmania, along with the possible transition to a woodchip industry based on plantations, will be significant factors affecting this sector into the future.
- Agricultural production within the region is also trending towards lower volumes, higher value products. Boutique value adding through downstream processing is a key factor in increasing the value of agricultural production.
- The tourism sector provides a range of both direct and indirect employment opportunities. With growth forecast in visitor numbers and expenditure, tourism will continue to be an important economic diver for the region.
- There are significant opportunities for furthering economic activity within the Southern Ocean and Antarctica research and protection sector.

3.4 ABOUT GREATER HOBART

Greater Hobart is the social and economic heart of the region, with 86% of the regional population. The capital city of Tasmania and with a population just over 200,000 people, Greater Hobart is now the 11th largest city in Australia.

Greater Hobart is now the most aged major city in Australia and the degree of ageing is pronounced. With low levels of migration focussed on older and more affluent migrants, the city's age profile is unlikely to change in the foreseeable future. However, with increasing sustainability issues in large mainland centres there may be active intervention in the population growth projections arising from a possible future national policy on settlement redirecting national growth into smaller cities.

"Greater Hobart is the social and economic heart of the region, with 86% of the regional population."

Greater Hobart is also one of the least densely settled of the major cities in Australia with one of the highest proportions of single detached dwellings. Larger houses on larger allotments on the urban fringe have over the past 10 years been a significant component of residential dwelling growth. However in 20 to 25 years the preferred housing stock is expected to be smaller houses on smaller allotments in close proximity to services and facilities .

Previously a mono-centric city with the Hobart CBD the only major centre, Greater Hobart has evolved into a polycentric city, although its transportation network remains radial. Notwithstanding its polycentric structure, economic activity in Greater Hobart is strongly focussed on the western shore between Hobart and Glenorchy. Taking into account all commercial and industrial areas, approximately two thirds of all jobs within the region are located across the Hobart and Glenorchy local government areas.

Part B



The Vision and Strategic Directions

4. THE STRATEGIC FRAMEWORK

4.1 THE VISION

The Tasmanian Government has framed a 2020 vision for the State under its community strategic plan, *Tasmania Together*: The Tasmania Together goals underpinning the vision of particular relevance to the Regional Land Use Strategy are:

- A reasonable lifestyle and standard of living for all
- Confident, friendly and safe communities
- Active, healthy Tasmanians with access to quality and affordable health care services
- Vibrant, inclusive and growing communities where people feel valued and connected
- Thriving and innovative industries driven by a high level of business confidence
- Built and natural heritage that is valued and protected
- Sustainable management of our natural resources.

The regional vision augments the Tasmania Together vision and goals. The regional vision for Southern Tasmania is:

"a vibrant, growing, liveable and attractive region, providing a sustainable lifestyle and development opportunities that build upon our unique natural and heritage assets and our advantages as Australia's southern most region."

4.2 PLANNING PRINCIPLES

The Strategy has been prepared in the context of the RMPS, which is strategically underpinned by the concept of 'Sustainable Development' and guided by the following planning principles:

- Inter-generational equity;
- The precautionary approach;
- Social Equity;
- Efficiency;
- Conservation of biodiversity; and
- Community participation.

4.3 STRATEGIC DIRECTIONS

The strategic directions outline how the Vision will be achieved through the Regional Land Use Strategy. They are a broad policy framework to guide what we plan and decide and how we do it.

SD1: Adopting a more Integrated Approach to Planning and Infrastructure

Land use planning identifies where different uses are and ought to be located: houses, shopping centres, industrial areas, schools and hospitals. Different land uses generate different demands on both social and physical infrastructure systems and their relative locations are a key component in managing infrastructure supply and demand.

By better integrating land use and infrastructure planning, we can ensure that new development makes use of excess capacity in existing infrastructure, rather than creating demand for new infrastructure in un-serviced areas. Many infrastructure related problems could be

avoided or minimised by locating new development so as to maximise the use of existing infrastructure in the short-medium term, and new infrastructure in the longer term.

SD2: Holistically Managing Residential Growth

The Strategy presents a timely opportunity to plan for residential growth on a regional basis. Planning for residential growth at this level is critical to ensuring a sustainable pattern of development and land release, protection of productive resources and natural and cultural values, as well as providing the opportunity for infrastructure providers to identify future infrastructure needs.

The residential strategies have been constructed in a manner that will maximise existing infrastructure systems, provide for improved opportunities for the community to access services, assist in responsiveness to climate change impacts and minimise impacts on environmental and cultural values. They are intended to ensure that residential land supply considers affordability and locational options. The aim is to provide the strategic planning environment needed to create a less dispersed settlement with a greater diversity of housing types and densities.

SD3: Creating a Network of Vibrant and Attractive Activity Centres

Activity centres are places where we work, shop, meet, relax and live. The recognition, protection and strengthening of a network of interconnected activity centres across the region aims to:

- Provide a strong basis for economic growth;
- Create opportunities for the more efficient and balanced concentration of goods and services;
- Increase the potential for the exchange of ideas and other synergies among businesses, and for new job creation;
- Provide an important focus for communities by increasing opportunities for social interaction;
- Make the most of the community's investment in physical and social infrastructure; and
- Provide greater opportunities for integrating land use with transport, particularly public transport, and walking/cycling.

The Activity Centre Network demonstrates how activity centres can logically form a complementary network providing the population with reasonable access to necessary facilities and services.

SD4: Improving our Economic Infrastructure

Southern Tasmania is highly dependent upon the State's three northern ports for exports and imports and Hobart airport for movements of passengers and time sensitive products. Maintaining a strong strategic approach to industrial land with efficient and cost effective intrastate road and rail linkages to and from the sea and airports are vitally important, particularly in this modern era of 24 hour 7 days a week freight logistics.

Also critical to our long term economic future is developing a strong Intelligent Communication Technology network, an essential element being the roll-out of the National Broadband Network. This network will support greater connectivity for rural communities and increased opportunities for telecommuting and 'new economy' employment.

SD5: Supporting our Productive Resources

While Southern Tasmania's contribution to the State's and nation's primary production value is limited to a few key areas: aquaculture, forestry and niche agricultural commodities, all forms of primary production are critical to the economic and social health of our regional towns and villages, assisting in creating employment opportunities and economic self-sufficiency.

Supporting productive industries through appropriate land use planning responses is important for maintaining the vitality of these individual communities as well as protecting those landscape characteristics, which make Southern Tasmania an attractive place to live and visit.

SD6: Increasing Responsiveness to our Natural Environment

As urban development has expanded, there has been increasing evidence of conflict between residential uses and natural values and hazards. Settlement planning should factor in the presence of natural values and underlying natural hazards in the process of identifying suitable areas for further development, a process that has been difficult to date, due to the lack of regional strategic planning. It should nevertheless be recognised that, because of the region's physical characteristics, it will not always be possible to avoid natural values and hazards. A strong risk management approach therefore needs to be built into the planning system.

An essential element in increasing the responsiveness to the natural environment is accurate and consistent spatial information at the appropriate resolution, something which is currently lacking and needs improvement.

SD7: Improving Management of our Water Resources

The region's water resources are the lifeblood of our economy and our community's well being. Access to clean water for human consumption is critical in the health and well being of our communities and ensuring that our towns and cities continue to be attractive places to live. Water is also at the heart of our productive resources and industries within the region.

While the region as a whole does not suffer from an intrinsic lack of water, the efficient and cost effective distribution, re-use and management of our water resources,resources remains a challenge, particularly in light of changing climatic conditions.

SD8: Supporting Strong and Healthy Communities

The complex relationship between the built environment, land use, delivery of community and social infrastructure, improving quality of life and providing for a more socially inclusive society is increasingly recognised.

While much of the population are able to enjoy our advantages and assets, there are still some community sectors facing social and locational disadvantage. Ensuring opportunities for affordable housing in locations which, have good access to community services and education and health facilities is not the only consideration: Promoting a less car-dependent environment, integrating land use and social infrastructure planning, creating opportunities to improve the long term health of the community through better urban design, as well as providing

equal opportunity to access high quality open spaces and recreational facilities, are also important.

SD9: Making the Region Nationally and Internationally Competitive

Ensuring that Southern Tasmania remains competitive for national and international investment is a significant element in strengthening our long term economic health and increasing gross regional product. Southern Tasmania has clear comparative and competitive advantages in terms of:

- Our geographic position of Australia's southern most region;
- Our clean, green and liveable image;
- Relative abundance of water;
- Temperate climate;
- The landscape and cultural heritage; and
- The coastline and surrounding marine environment.

The identification of key land use opportunities for the region based upon these advantages is critical. For example there are significant opportunities to build upon our Antarctic and Marine Research activities in key locations.

SD10: Creating Liveable Communities

Increasingly across Australia, liveability is acknowledged as an important element for cities and regions and a focus of decision making and policy development.

Liveability refers to the degree to which a place supports quality of life, health and wellbeing for the people who live, work or visit. While it can depend upon individual circumstances, liveable environments are generally characterised by areas which are attractive, safe, accessible to people with disabilities and provide a high standard of amenity through such things as public transport, well designed open spaces, access to education and health services, recreational opportunities, air and water quality. The unique identity of a community defined by cultural development, landmarks, urban design, the developing local economy and the natural landscape are also important to how liveable a place is.

Ensuring that our land use planning responses contribute to making the region 'liveable' will be a key competitive strength for Southern Tasmania into the future in increasing migration, visitation, trade and investment.

Part C



Regional Policies

5 BIODIVERSITY AND GEODIVERSITY

5.1 OVERVIEW

"Decreasing vegetation cover arising from changing land uses and urban development affects the region's capacity to adapt and mitigate the effects of climate change and can also affect broader landscape values..."

Southern Tasmania has a high quality natural environment that is recognised throughout Australia and is a distinct characteristic of the region's 'sense of place'. The region has very diverse habitats created by large variations in altitude, water availability and soil types that reflect an east to west change in climatic and topographic conditions. There is a range of vegetation communities across the region including alpine communities, temperate rainforest, wet and dry sclerophyll forests and woodlands, heathlands, wetlands, grasslands, moorlands and coastal complexes and saltmarsh communities.

Many of the region's biodiversity values are protected through the Tasmanian Reserve Estate that comprises of State, Local and private reserves. Indeed the western part of the region is predominantly within the Tasmanian Reserve Estate and is a significant contributor to the extent of native vegetation cover in the region and in the State more generally. The remainder of the region, while retaining high levels of native vegetation cover is under considerable pressure from land use changes and urban development. Native vegetation cover is often fragmented and degraded, restricting ecosystem connectivity, biodiversity and habitat. Decreasing vegetation cover arising from changing land uses and urban development affects the region's capacity to adapt and mitigate the effects of climate change and can also affect broader landscape values, which contribute to the region's desirability as a place to live and visit. Moreover, where inappropriate land use and development is allowed adjacent to the Reserve Estate it can affect its capacity to maintain the reserve's values.

The region also has expansive natural fauna and flora resources some of which are significant at a State or national level such as species listed under the Threatened Species Protection Act 1995 (Tas), the Nature Conservation Act 2002 (Tas) or Environment Protection and Biodiversity Conservation Act 1999 (C'wlth).

With the lack of strategic land use and growth management planning in the past, consideration of the values of our native vegetation has often been left to the development assessment stage of the planning process. Notwithstanding the protection of some threatened values through existing legislation, this approach has often resulted in ad-hoc conservation of natural values a well as uncertainty and costs for land owners and developers. Establishing a standard strategy and approach to deliver consistency at the regional level is important. However, the approach must also recognise that various local communities might hold different local values that may legitimately be reflected within planning schemes.

A pro-active planning approach to the recognition and protection of biodiversity values, habitat, and native vegetation is needed. This will only occur if recognised natural values such as threatened vegetation communities, threatened species sites and habitat, EPBC listed ecological communities and biodiversity vegetation corridors are taken into account in the planning of urban growth and land use zoning. While some Councils have undertaken specific projects to provide more spatially detailed data than currently available TasVeg and NVA data and data held with the Forest Practices

Authority and Forestry Tasmania, this is not consistent across the region and is sometimes beyond the resources of particular local governments. While the Conservation Information System currently being developed by DPIPWE will assist with the consideration and identification of biodiversity values, there is still a need to develop consistent and accurate spatial data for use in the land use planning process.

Moreover, there is a need for policy clarifiation on a statewide basis on the division of responsibilities between State and Local Government in the statutory recognition and protection of biodiversity values.

Geodiversity can be impacted upon by some developments and it is important to ensure representative features are conserved or appropriately managed to avoid detracting from the features' integrity. A range of sites have developed under climatic or geological conditions that are now inactive. Impacts on them can be irreversible, meaning that careful management is essential. Major pressures on the region's geodiversity include tourism, mining and land use. Human activities, such as urbanisation, agricultural practices, water exploitation, and deforestation, can negatively impact karst areas, resulting in subsidence and ground-water contamination. While the majority of areas of higher geodiversity significance are already contained within protected and conserved areas (in particular the TWWHA), there is still a need to develop a comprehensive inventory. A process needs to be put in place to ensure that geodiversity values are recognised and protected according to their level of significance (state or local).

5.2 RELEVANT STRATEGIC DIRECTION

- SD2: Holistically Managing Residential Growth
- SD6: Increasing Responsiveness to our Natural Environment
- SD9: Making the Region Nationally and Internationally Competitive
- Creating Liveable Communities.

5.3 RELEVANT STATE AND REGIONAL POLICIES

- State Policy on Water Quality Management
- State Coastal Policy
- State Economic Development Strategy (under preparation)
- NRM Strategy for Southern Tasmania
- Permanent Native Forest Estate Policy for Tasmania.

5.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 5 – Natural Values.

5.5 REGIONAL POLICIES

BNV 1 *Maintain and manage the region's biodiversity and ecosystems and their resilience to the impacts of climate change.*

BNV 1.1 *Manage and protect significant native vegetation at the earliest possible stage of the land use planning process. Where possible, ensure zones that provide for intensive use or development are not applied to areas that retain biodiversity values that are to be recognised and protected by Planning Schemes.*

BNV 1.2 *Recognise and protect biodiversity values deemed significant at the local level and ensure that planning schemes:*

a. *specify the spatial area in which biodiversity values are to be recognised and protected (either by textural description or map overlay); and*
b. *implement an 'avoid, minimise, mitigate' hierarchy of actions with respect to development that may impact on recognised and protected biodiversity values.*

BNV 1.3 *Provide for the use of biodiversity offsets if, at the local level, it is considered appropriate to compensate for the loss of biodiversity values where that loss is unable to be avoided, minimised or mitigated.*

Biodiversity offsets:

a. *are to be used only as a 'last resort';*
b. *should provide for a net conservation benefit and security of the offset in perpetuity;*
c. *are to be based upon 'like for like' wherever possible.*

BNV 1.4 *Manage clearance of native vegetation arising from use and development in a manner that is generally consistent across the region but allowing for variances in local values.*

BNV 1.5 *Ensure vegetation clearance and/or soil disturbance is undertaken in accordance with construction management plans that minimise further loss of values and encourages rehabilitation of native vegetation.*

BNV 1.6 *Include in planning schemes preserving climate refugia where there is scientifically accepted spatial data.*

BNV 2 ***Protect threatened vegetation communities, flora and fauna species, habitat for threatened species and places important for building resilience and adaptation to climate change for these.***

BNV 2.1 ***Avoid the clearance of threatened vegetation communities except:***

a. ***where the long-term social and economic benefit arising from the use and developmetn facilitated by the clearance outweigh the environmental benefit of retentiont; and***
b. ***where the clearance will not significantly detract from the conservation of that native vegetation community.***

BNV 2.2 ***Minimise clearance of native vegetation communities that provide habitat for threatened species.***

BNV 2.3 ***Ensure potential applicants are advised of the requirements of the Threatened Species Protection Act 1995.and their responsibilities under the Environmental Protection and Biodiversity Conservation Act 1999.***

BNV 3 ***Protect the biodiversity and conservation values of the Reserve Estate.***

BNV 3.1 ***Include within Planning Schemes requirements to setback use and development from boundaries with reserved land***

BNV 4 ***Recognise the importance of non land use planning based organisations and their strategies and policies in managing, protecting and enhancing natural values.***

BNV 4.1 ***Consult NRM-based organisations as part of the review and monitoring of the Regional Land Use Strategy***

BNV 5 ***Prevent the spread of declared weeds under the Weed Management Act 1999 and assist in their removal.***

BNV 5.1 ***Ensure development that includes vegetation clearance and/or soil disturbance is undertaken in accordance with construction management plans that include weed management actions where the site is known, or suspected, to contain declared weeds.***

BNV 6 ***Geodiversity:***

BNV 6.1 ***Improve knowledge of sites and landscapes with geological, geomorphological, soil or karst features and the value they hold at state or local level.***

BNV 6.2 ***Progress appropriate actions to recognise and protect those values, through means commensurate with their level of significance (state or local)***

6 WATER RESOURCES

6.1 OVERVIEW

"Water quality is important for the maintenance of healthy ecosystems and human consumption. Land use changes and urban development affect water quality through a range of complex factors..."

The region's river systems support terrestrial, estuarine and marine biodiversity, and are integral to the social and economic health of the region, providing:

- potable water for human consumption;
- water supply for irrigation;
- a resource for energy production; and
- opportunities for economic development, tourism and recreation.

Within Southern Tasmania, there are 13 major water catchments. Three major river and estuarine systems extend across these catchments: the Derwent, Gordon-Franklin, and Huon Rivers. Most rivers within the region begin in the Central Highlands or the South-West wilderness area. The most prominent river within Southern Tasmania is the River Derwent, which drains much of the Central Highlands, reaching the coast at Hobart.

Water quality is important for the maintenance of healthy ecosystems and human consumption. Land use changes and urban development can affect water quality through a range of complex factors including alterations to flows, inadequately maintained on-site wastewater systems, contaminated stormwater runoff, sedimentation, clearance of riparian vegetation, soil erosion, chemical and toxic runoff (from fertilisers, pesticides, herbicides, household and garden chemicals, and industrial processes) and dumping of solid waste.

Within the region, there are also high priority wetlands and waterways, some of which are protected in the Reserve Estate or have been listed under the Ramsar Convention as wetlands of international significant. The Ramsar wetlands are Pitt Water-Orielton Lagoon, Moulting Lagoon, Apsley Marshes and the northwest corner of Lake Crescent. Some of these Ramsar listed wetlands, or sections of them, are also protected by the State reserve system.

A less researched and understood water resource within the region is groundwater resources. Groundwater resources not only contribute to base flows in stream and rivers but also provide a source of fresh water for agricultural and domestic use.

6.2 RELEVANT STRATEGIC DIRECTION

- SD2: Holistically Managing Residential Growth
- SD6: Increasing Responsiveness to our Natural Environment
- SD7: Improving Management of our Water Resources
- SD9: Making the Region Nationally and Internationally Competitive
- SD10: Creating Liveable Communities.

6.3 RELEVANT STATE AND REGIONAL POLICIES

- State Policy on Water Quality Management
- State Economic Development Strategy (under preparation)
- NRM Strategy for Southern Tasmania.

6.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 5 – Natural Values.

6.5 REGIONAL POLICIES

WR 1 *Protect and manage the ecological health, environmental values and water quality of surface and groundwater, including waterways, wetlands and estuaries*

- **WR 1.1** *Ensure use and development is undertaken in accordance with the State Policy on Water Quality Management*
- **WR 1.2** *Incorporate total water cycle management and water sensitive urban design principles in land use and infrastructure planning to minimise stormwater discharge to rivers, (particularly subdivision)*
- **WR 1.3** *Include setback requirements in planning schemes to protect riparian areas relevant to their classification under the Forest Practices System.*
- **WR 1.4** *Ensure development that includes vegetation clearance and/or soil disturbance is undertaken in accordance with construction management plans to minimise soil loss and associated sedimentation of waterways and wetlands.*

WR 2 *Manage wetlands and waterways for their water quality, scenic, biodiversity, tourism and recreational values.*

- **WR 2.1** *Manage use and development adjacent to Hydro Lakes in accordance with their classification: Remote Wilderness Lake, Recreational Activity Lake or Multiple Use Lakes*
- **WR 2.2** *Provide public access along waterways via tracks and trails where land tenure allows, where there is management capacity and where impacts on biodiversity, native vegetation and geology can be kept to acceptable levels*
- **WR 2.3** *Minimise clearance of native riparian vegetation.*
- **WR 2.4** *Allow recreation and tourism developments adjacent to waterways where impacts on biodiversity and native vegetation can be kept to acceptable levels.*

WR 3 *Encourage the sustainable use of water to decrease pressure on water supplies and reduce long term cost of infrastructure provision*

- **WR 3.1** *Reduce barriers in the planning system for the use of rainwater tanks in residential areas.*

7 THE COAST

7.1 OVERVIEW

"The coastal environment is particularly sensitive to potentially damaging uses including: ribbon development, removal of native vegetation, septic leachate..."

The coastal environment within the Southern region is vast with over 3263 km of shoreline and numerous offshore islands. It is a highly diverse environment, with a variety of shoreline types, ecological systems, and coastal processes. The coast and surrounding environment has the highest concentration of settlement for the region as well as containing large numbers of places of cultural heritage significance. It also provides significant habitat for native fauna species, including specifically listed threatened species, although with very few coastal based vegetation communities being specifically identified and protected.

The coastal environment is the most dynamic and changeable of all landforms and is particularly sensitive to potentially damaging use and development including: ribbon development, removal of native vegetation, invasive weeds, certain recreational activities, wastewater disposal, septic leachate, and rubbish dumping. It is also under enormous pressure from a range of competing interests including tourism, recreation, residential development, farming, aquaculture and forestry.

Loss of coastal values is not just occurring on private land. Protected areas, conservation areas and nature reserves are also experiencing coastal degradation arising from increases in vehicle usage, access paths, camping, illegal activity and tourism activity.

At the same time the coast is the environment most exposed to the effects of climate change. Sea level rise, inundation and shoreline recession are significant issues not only for, buildings, and infrastructure, but for biodiversity, native vegetation, and native fauna. Greater responsiveness to this hazard is essential to ensure that prospective development opportunities are carefully considered against these issues. The impacts of rising sea levels on existing communities cannot be fully addressed in this Strategy and requires the setting of policy at the State level. Spatial data to support policy decision making is now starting to be available. The Clarence Coastal Climate Change Project provides a useful pilot project for the region, with the Tasmanian Coastal Vulnerability Project another important step in providing the necessary information.

Land use planning is nevertheless an important tool in managing competing interests within the coastal environment and assisting in managing risk arising from climate change. The State Coastal Policy 1996 provides a broad brush framework for the management of the coastal environment through the land use planning system. The realisation of the policy at a regional level will require consolidation of residential development and prevention of any further residential development outside of established settlements, particularly ribbon development. The number of existing small coastal settlements within the region that are un-serviced (no reticulated water and sewerage) in low-lying exposed areas is large. Further development within these settlements will need to be minimised in order to reduce further impact upon the natural values of the coast (such as loss of native vegetation, erosion, septic leachate) and to reduce the long-term social and economic risks arising from climate change.

7.2 RELEVANT STRATEGIC DIRECTION

- SD2: Holistically Managing Residential Growth
- SD6: Increasing Responsiveness to our Natural Environment
- SD9: Making the Region Nationally and Internationally Competitive
- SD10: Creating Liveable Communities.

7.3 RELEVANT STATE AND REGIONAL POLICIES

- State Coastal Policy 1996
- State Economic Development Strategy (under preparation)
- NRM Strategy for Southern Tasmania.

7.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 5 – Natural Values.

7.5 REGIONAL POLICIES

C 1 ***Maintain, protect and enhance the biodiversity, landscape, scenic and cultural values of the region's coast.***

C 1.1 ***Ensure use and development avoids clearance of coastal native vegetation.***

C 1.2 ***Maximise growth within existing settlement boundaries through local area or structure planning for settlements in coastal areas.***

C 1.3 ***Prevent development on mobile landforms and coastal mudflats unless for the purposes of public access or facilities or for minor infrastructure that requires access to the coast.***

C 1.4 ***Zone existing undeveloped land within the coastal area, Environmental Management, Recreation or Open Space unless:***

- ***a. The land is utilised for rural resource purposes; or***
- ***b. It is land identified for urban expansion through a strategic planning exercise consistent with this Regional Land Use Strategy.***

C 2 ***Ensure use and development in coastal areas is responsive to effects of climate change including sea level rise, coastal inundation and shoreline recession***

C 2.1 ***Include provisions in planning schemes relating to minimising risk from sea level rise, storm surge inundation and shoreline recession and identify those areas at high risk through the use of overlays.***

C 2.2 ***Ensure growth is located in areas that avoid exacerbating current risk to the community through local area or structure planning for settlements and the Urban Growth Boundary for metropolitan area of Greater Hobart .***

C 2.3 ***Identify and protect areas that are likely to provide for the landward retreat of coastal habitats at risk from predicted sea level rise.***

8 MANAGING RISKS AND HAZARDS

8.1 OVERVIEW

"Land use planning, which takes into account hazards and risks, has been identified as the single most important mitigation measure in preventing future disaster losses in areas of new development."

This issue addresses a range of hazards that have the potential to render land unsustainable for living, unable to be developed, unproductive or which can result in loss or harm to the community and the environment. It is acknowledged that natural hazards are unpredictable in nature, however past records, existing trends and site characteristics can provide valuable insight into the likelihood of a natural hazards impacting on people or the environment. Natural hazards are essentially meteorological and/or geological phenomena that have the potential to create emergency or disaster situations for communities and the environment. Land hazards also include those of anthropogenic origin, such as contaminated land.

While the circumstances that give rise to extreme natural phenomena are often beyond human control, contemporary approaches to emergency management in Australia consider measures to reduce the impact of natural disasters in terms of prevention and mitigation of, preparation for, response to and recovery from, natural disasters.

Land use planning, which takes into account hazards and risks, has been identified as the single most important mitigation measure in preventing future disaster losses in areas of new development. Effective land use planning is therefore a critical component of any strategy to reduce exposure to natural disasters in the medium to long term.

The key land hazards to take into account are:

- Sea level rise and storm surge (see 'The Coast')
- Bushfire
- Land Instability
- Flooding
- Soil Erosion & Dispersive Soils
- Contaminated Land
- Salinity
- Acid Sulphate Soils.

8.2 RELEVANT STRATEGIC DIRECTIONS

- SD2: Holistically Managing Residential Growth
- SD6: Increasing Responsiveness to our Natural Environment
- SD10: Creating Liveable Communities

8.3 RELEVANT BACKGROUND REPORTS

- Background Report No. 6 – Land Hazards
- Background Report No. 7 – Infrastructure.

8.4 REGIONAL POLICIES

MRH 1 *Minimise the risk of loss of life and property from bushfires.*

MRH 1.1 *Provide for the management and mitigation of bushfire risk at the earliest possible stage of the land use planning process (rezoning or if no rezoning required; subdivision) by the identification and protection (in perpetuity) of buffer distances or through the design and layout of lots.*

MRH 1.2 *Ensure subdivision road layout designs provide for safe exit points in areas subject to bushfire hazard.*

MRH 1.3 *Allow clearance of vegetation in areas adjacent to dwellings existing at the time that planning schemes based on this Strategy come into effect, in order to implement bushfire management plans. Where such vegetation is subject to a biodiversity code, the extent of clearing allowable is to be the minimum necessary to provide adequate bushfire hazard protection.*

MRH 1.4 *Include provisions in planning schemes for use and development in bushfire prone areas based upon best practice bushfire risk mitigation and management.*

MRH 1.5 *Allow new development (at either the rezoning or development application stage) in bushfire prone areas only where any necessary vegetation clearance for bushfire risk reduction is in accordance with the policies on biodiversity and native vegetation.*

MRH 1.6 *Develop and fund a program for regular compliance checks on the maintenance of bushfire management plans by individual landowners.*

MRH 2 *Minimise the risk of loss of life and property from flooding*

MRH 2.1 *Provide for the mitigation of flooding risk at the earliest possible stage of the land use planning process (rezoning or if no rezoning required; subdivision) by avoiding locating sensitive uses in flood prone areas.*

MRH 2.2 *Include provisions in planning schemes for use and development in flood prone areas based upon best practice in order to manage residual risk.*

MRH 3 *Protect life and property from possible effects of land instability.*

MRH 3.1 *Prevent further development in declared landslip zones*

MRH 3.2 *Require the design and layout of development to be responsive to the underlying risk of land instability.*

MRH 3.3 *Allow use and development in areas at risk of land instability only where risk is managed so that it does not cause an undue risk to occupants or users of the site, their property or to the public.*

MRH 4 *Protect land and groundwater from site contamination and require progressive remediation of contaminated land where a risk to human health or the environment exists.*

MRH 4.1 *Include provisions in planning schemes requiring the consideration of site contamination issues.*

MRH 5 *Respond to the risk of soil erosion and dispersive and acid sulphate soils.*

MRH 5.1 *Prevent further subdivision or development in areas containing sodic soils unless it does not create undue risk to the occupants or users of the site, their property or to the public.*

MRH 5.2 *Wherever possible, ensure development avoid disturbance of soils identified as containing acid sulfate soils. If disturbance is unavoidable then ensure management is undertaken in accordance with the Acid Sulphate Soils Management Guidelines prepared by the Department of Primary Industries*

9 CULTURAL VALUES

9.1 OVERVIEW

"[there is] inherent conflict between the region's need to continue to develop and provide more land for urban development and infrastructure and the likely concurrence of sites of significance..."

Southern Tasmania has a rich legacy of both Aboriginal and historic cultural heritage values. Whilst such abundance is a blessing, its adequate management presents a significant challenge due fundamentally to the relatively small size of Tasmania's population and the correspondingly limited resources available. Nevertheless, our heritage values are increasingly recognised as part of our unique competitive advantage and contribute significantly to the community's sense of place, and their recognition and management needs to be set at an appropriate standard.

Our level of knowledge and understanding differs in respect to historic cultural heritage and Aboriginal heritage values.

Tasmanian Aborigines have inhabited Tasmania for at least 40,000 thousand years. There are numerous landscapes and sites of significance to the Aboriginal community throughout the Southern region, and are generally more prevalent in coastal areas and river flats.

The consideration of Aboriginal heritage values in land use planning processes is increasingly topical, and there are challenges to better integration with the system. While legislation aimed at protecting Aboriginal artefacts and relics has existed since the 1970s it is now somewhat out-dated and is not adequately integrated with the suite of legislation that comprises the State's Resource Management & Planning System. Furthermore, the level of data on the location and values of significant sites is not as extensive as that for historic cultural heritage places. Some of the information that does exist is often considered to be sensitive by the Aboriginal community and therefore not available on public registers.

Continued engagement with the Aboriginal community is necessary to improve our knowledge of heritage places and values, and to overhaul the State legislation and planning scheme provisions that manage Aboriginal heritage.

There is a relatively good level of knowledge of historic cultural heritage places. It is reasonable to conclude that many worthy sites are now formally and publicly listed, either within local planning schemes or on the Tasmanian Heritage Register. A great many listings, however, do not contain the level of information now considered necessary to adequately identify and ascribe values to heritage places. Listing processes (including updating old listings) now demand much more resourcing per listing that was the case in previous decades. This has reduced the rate at which both the Tasmanian Heritage Register and local Councils are able to update their respective registers. In practical terms, for a given amount of funding the number of listings that can be addressed is now significantly less. As a result, there are a significant number of outstanding nominations to the Tasmanian Heritage Register and many Councils would acknowledge their planning scheme lists are in need of a substantial overhaul. In recent years comprehensive surveys have been undertaken within the Hobart, Glenorchy, Kingborough and Southern Midlands municipal areas through joint projects between the local Councils and the State (through Heritage Tasmania). Both the State Government and the Councils involved need to continue to progress the outcomes of these surveys, in terms of list

"...a comprehensive analysis and documentation of landscape values is still to occur and will potentially be fraught with difficulty, arising from inherent subjectivity."

updates, and similar surveys need to be conducted in all municipal areas throughout the region.

There is now a nationally agreed approach to recognising a hierarchy of significance in regard to heritage places. Promulgation of this approach through the Tasmanian system has begun but there is a very long way to go. This needs to be progressed in order to reduce confusion and unnecessary delays in development assessment processes.

While potential impacts on known historic cultural heritage places and values is reasonably well managed through existing statutory processes, the system needs to be further developed in regard to the identification and protection of historic cultural landscapes. Many of our landscapes still enable the discernment of various layers of modification by human activity - from Aboriginal occupation to early colonisation through to the present day. This is in contrast to mainland Australia where it is difficult to find landscapes in such close proximity to major cites in which older layers have not been obliterated by post World War II development. Southern Tasmania also contains many landscapes that largely retain their natural values, and are appreciated for the scenic backdrops that they provide to many of the region's more populated areas.

The identification, recognition and protection of landscape values is not a straightforward matter, however. While there has been some local work on skylines and landscapes within some areas in Southern Tasmania (particularly around Greater Hobart), a comprehensive analysis and documentation of landscape values is still to occur. Such process can be fraught with difficulties arising from inherent subjectivity, and the fact that working landscapes evolve, particularly those that represent layer upon layer of changes wrought from evolving farming practices and market-driven agricultural imperatives. The extent to which these forces should be allowed to continue to modify our landscapes is a contentious issue. Notwithstanding this there should be progression towards understanding the region's landscapes, their importance to the community's collective sense of place and culture, as well as their contribution to economic development and ecological values.

Similarity to Aboriginal heritage and cultural & natural landscapes, the identification and protection of historic archaeological heritage is not as advanced as with historic cultural heritage generally. This situation also needs to be addressed into the future.

The issues that impact on our ability to adequately recognise and manage heritage values generally within Southern Tasmania can be summarised as follows:

- The general under-resourcing of management arising fundamentally from Tasmania's small population base endeavouring to support a very large abundance of heritage assets.
- The need to complete reviews of the Aboriginal Relics Act 1975 and the Historic Cultural Heritage Act 1995, including the assimilation of future Aboriginal heritage legislation with the suite of legislation that forms the Resource Management & Planning System.
- The need to propagate the nationally agreed approach to the recognition and associated listing of places of cultural heritage significance as being of either local, state, national or international significance. Currently, many places are listed on both the

local planning scheme heritage schedule and on the Tasmanian Heritage Register. This creates confusion as to real significance, duality in procedure, the potential for conflicting views by assessment authorities and unnecessary expense and delays in the processing of development applications.

- The inconsistent approach to heritage management across local government, which is reflective of broader inconsistencies arising from the existing assortment of planning scheme typologies.
- The poor quality and limited extent of information pertaining to many heritage listings within planning schemes.
- The limited understanding of cultural landscape values and the lack of an overarching policy with respect to determining relative significance.

9.2 RELEVANT STRATEGIC DIRECTION

- SD2: Holistically Managing Residential Growth
- SD9: Making the Region Nationally and Internationally Competitive
- SD10: Creating Liveable Communities.

9.3 REGIONAL POLICIES

CV 1 ***Recognise, retain and protect Aboriginal heritage values within the region for their character, culture, sense of place, contribution to our understanding history and contribution to the region's competitive advantage.***

CV 1.1 ***Support the completion of the review of the Aboriginal Relics Act 1975 including the assimilation of new Aboriginal heritage legislation with the RMPS.***

CV 1.2 ***Improve our knowledge of Aboriginal heritage places to a level equal to that for European cultural heritage, in partnership with the Aboriginal community,***

CV 1.3 ***Avoid the allocation of land use growth opportunities in areas where Aboriginal cultural heritage values are known to exist.***

CV 1.4 ***Support the use of predictive modelling to assist in identifying the likely presence of Aboriginal heritage values that can then be taken into account in specific strategic land use planning processes.***

CV 2 ***Recognise, retain and protect historic cultural heritage values within the region for their character, culture, sense of place, contribution to our understanding history and contribution to the region's competitive advantage.***

CV 2.1 ***Support the completion of the review of the Historic Cultural Heritage Act 1995.***

CV 2.2 ***Promulgate the nationally adopted tiered approach to the recognition of heritage values and progress towards the relative categorisation of listed places as follows:***

- ***a. places of local significance are to be listed within Heritage Codes contained within planning schemes, as determined by the local Council***
- ***b. places of state significance are to be listed within the Tasmanian Heritage Register, as determined by the Tasmanian Heritage Council.***
- ***c. places of national or international significance are listed through national mechanisms as determined by the Australian Government.***

CV 2.3 ***Progress towards a system wherein the assessment and determination of applications for development affecting places of significance is undertaken at the level of government appropriate to the level of significance:***

- ***a. Heritage places of local significance: by the local Council acting as a Planning Authority***
- ***b. Heritage places of state significance: by the Tasmanian Heritage Council on behalf of the State Government with respect to heritage values, and by the local Council with respect to other land use planning considerations, with coordination and integration between the two.***

CV 2.4 ***Recognise and list heritage precincts within planning scheme Heritage Codes and spatially define them by associated overlays on planning scheme maps.***

CV 2.5 ***Base heritage management upon the Burra Charter and the HERCON Criteria, with heritage code provisions in planning schemes drafted to conform with relevant principles therein.***

CV 2.6 ***Standardise statutory heritage management at the local level as much as possible.***

- ***a. Listings in planning schemes should be based on a common regional inventory template, (recognising that not all listings will include all details due to knowledge gaps).***
- ***b. Heritage code provisions in planning schemes should be consistent in structure and expression, whilst providing for individual statements in regard to heritage values and associated tailored development control***

CV 2.7 ***Provide a degree of flexibility to enable consideration of development applications involving the adaptive reuse of heritage buildings that might otherwise be prohibited.***

CV 3 ***Undertake the statutory recognition (listing) and management of heritage values in an open and transparent fashion in which the views of the community are taken into consideration.***

CV 3.1 ***Heritage Studies or Inventories should be open to public comment and consultation prior to their finalisation.***

CV 4 ***Recognise and manage significant cultural landscapes throughout the region to protect their key values.***

CV 4.1 ***State and local government, in consultation with the community, to determine an agreed set of criteria for determining the relative significance of important landscapes and key landscape values.***

CV 4.2 ***Ensure the key values of regionally significant landscapes are not significantly compromised by new development through appropriate provisions within planning schemes.***

CV 4.3 ***Protect existing identified key skylines and ridgelines around Greater Hobart by limited development potential and therefore clearance through the zones in planning schemes.***

CV 5 ***Recognise and manage archaeological values throughout the region to preserve their key values.***

CV 5.1 ***Known archaeological sites of significance to be considered for listing as places of either local or state significance within Heritage Codes contained within planning schemes or on the State Heritage Register respectively, as appropriate.***

CV 5.2 ***Ensure development that includes soil disturbance within archaeology zones of significance is undertaken in accordance with archaeological management plans to ensure values are not lost, or are recorded, conserved and appropriately stored if no reasonable alternative to their removal exists.***

10 RECREATION AND OPEN SPACE

10.1 OVERVIEW

"Well-planned, designed and implemented open space and recreation planning policies aid in the delivery of a range of broader personal, social, economic and environmental objectives..."

Open spaces and recreational facilities contribute to the quality of life enjoyed by the Tasmanian community. They are often thought of as local parks or reserves, however open spaces can be any land or water setting maintained for a variety of environmental and social purposes that is utilised by the community. Well-planned, designed and implemented open space and recreation planning policies aid in the delivery of a range of broader personal, social, economic and environmental objectives for the community.

While predominantly publically owned and maintained, open spaces can also include private land such as golf courses, private reserves and trails, hydro storage dams (for recreational fishing) as well as agricultural land (which often contributes to broader regional landscape values). Not all open space needs to be zoned as 'open space' under a planning scheme. Indeed the zoning-based system under planning schemes can create difficulties for the broader multi-purpose function of open spaces to be clearly articulated to the community.

Planning for a regional system of built and natural environments has significant benefits including:

- Providing opportunities for a diverse range of physical activities;
- contributing to the 'liveability' of towns and cities;
- creating 'green spaces' for relaxation, contemplation, and social interaction;
- conserving natural and cultural values;
- encouraging healthy lifestyles;
- creating environments for hosting cultural and social events and functions;
- maintaining utilitarian values, such as water storage and quality, flood mitigation, and other environmental services (e.g. clean air); and
- contributing to climate change adaptation and mitigation (e.g. through carbon storage, buffers to sea level rise, and by encouraging non-motorised transport etc).

In the absence of such an approach, open space planning to date has been piece-meal, lacking consistency, slow to respond to emerging needs and fails to deliver on many of the potential benefits. As identified through the Tasmanian Open Space Policy and Planning Framework there are many inconsistencies in the provision of open space across the State, including inconsistencies in the methodologies used to determine need and the 'tools' associated with open space planning (e.g. classification and hierarchy systems, zoning, developer contributions, development standards, and application of needs analysis).

Sporting facilities complement the open space network, but are focused on purpose built structures and environments for active recreation pursuits. These can also be publicly or privately owned. The construction and maintenance of sporting facilities can be a significant expense and they should be designed and located in accordance with regional considerations to serve a broader sub-regional or regional catchment to avoid under-utilisation. A regional approach to providing major sporting facilities will ensure that unnecessary duplication of facilities is avoided, thereby minimising long-term costs to the community. Access

and transport factors, and the need to minimising land use conflicts between regionally significant sporting facilities and nearby sensitive uses are also key locational considerations.

10.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD2: Holistically Managing Residential Growth
- SD6: Increasing Responsiveness to our Natural Environment
- SD8: Supporting Strong and Healthy Communities
- SD9: Making the Region Nationally and Internationally Competitive
- SD10: Creating Liveable Communities.

10.3 RELEVANT STATE AND REGIONAL POLICIES

- The Tasmania Open Space Policy and Planning Framework 2010
- Social Inclusion Strategy for Tasmania 2009.

10.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 4 – Social Infrastructure and Interactions.

10.5 REGIONAL POLICIES

ROS 1 ***Plan for an integrated open space and recreation system that responds to existing and emerging needs in the community and contributes to social inclusion, community connectivity, community health and well being, amenity, environmental sustainability and the economy.***

ROS 1.1 ***Adopt an open space hierarchy consistent with the Tasmanian Open Space Policy and Planning Framework 2010, as follows;***

a. ***Local***
b. ***District***
c. ***Sub-regional***
d. ***Regional***
e. ***State***
f. ***National***

ROS 1.2 ***Adopt an open space classification system consistent with the Tasmanian Open Space Policy and Planning Framework 2010, as follows;***

a. ***Parks;***
b. ***Outdoor Sports Venues;***
c. ***Landscape and Amenity;***
d. ***Linear and Linkage;***
e. ***Foreshore and waterway;***
f. ***Conservation and Heritage;***
g. ***Utilities and Services; and***
h. ***Proposed Open Space.***

ROS 1.3 ***Undertake a regional open space study, including a gap analysis, to establish a regional hierarchy within a classification system for open space in accordance with the Tasmanian Open Space Policy and Planning Framework 2010.***

ROS 1.4 ***Undertake local open space planning projects through processes consistent with those outlined in the Tasmanian Open Space Policy and Planning Framework 2010 (Appendix 3).***

ROS 1.5 ***Ensure residential areas, open spaces and other community destinations are well connected with a network of high-quality walking and cycling routes.***

ROS 1.6 *Ensure subdivision and development is consistent with principles outlined in 'Healthy by Design: A Guide to Planning and Designing Environments for Active Living in Tasmania'.*

ROS 2 *Maintain a regional approach to the planning, construction, management, and maintenance of major sporting facilities to protect the viability of existing and future facilities and minimise overall costs to the community.*

ROS 2.1 *Avoid unnecessary duplication of recreational facilities across the region.*

11 SOCIAL INFRASTRUCTURE

11.1 OVERVIEW

"The lack of strategic land use planning has provided challenges for the provision of social infrastructure services... often been located in areas of perceived need, with some areas having multiple facilities, and others greatly lacking."

Social infrastructure refers to all services, facilities and structures that are intended to support the well being and amenity of the community. This includes not only educational and health facilities, but social housing and other community facilities (such as online access centres).

Social infrastructure providers face many challenges.

The education sector faces significant challenges in strategic planning due to the regular changes in school populations that are related to a range of factors other than local residential population size and profile, such as stigmatisation issues that may arise for particular schools from time to time. With the lack of strategic land use planning, planning for school closures or new schools has occurred in the absence of any growth management strategy. The consequences are that delivery of education services does not match what is the most sustainable and desirable pattern of residential growth. Regional strategic land use planning provides the mechanism through which these factors can be better synchronised.

The health sector also faces challenges in providing for the needs of the current community whilst planning for future demands in an environment characterised by changing political responses to demographic and clinical needs. Tasmania's Health Plan 2007 now provides the overall strategic framework for service provision.

In addition the region has a strong force of ageing. This will mean that health services will need to adapt to serving an older population and their particular health needs. Notably this will potentially mean the supply of more aged care facilities and nursing home beds, a form of development that is not well accommodated for in some current planning schemes.

Notwithstanding this, opportunities now exist to strategically plan for these services and their sites and provide collaboration between various social infrastructure providers and the strategic land use planning system. There are significant co-location opportunities between the education and health sector, providing cost benefits to the government and the public by maximising utilisation of buildings and sites that are expensive to construct and maintain.

Social housing provides a source of affordable housing for low-income households who are unable to rent in the private market. There is evidence that due to the decreasing affordability of housing, increasing numbers of households under mortgage stress, and the general increase in cost of living, that the percentage of the community forced into reliance upon social housing is increasing. There is also clear evidence that the current social housing stock, of predominantly 3 bedroom dwellings, does not match the demand for smaller one and two bedroom homes.

Historically the trend has been to create broad acre social housing estates on the fringe of the metropolitan area remote from many services, employment opportunities, and with poor access to transport. Notable examples are at Bridgewater, Gagebrook, and Clarendon Vale. Current thinking aims to provide social housing, with a range of dwelling sizes, in smaller clusters in well located

"Unfortunately there is sometimes local community resistance, especially in older established suburbs dominated by private ownership, to social housing infill developments."

areas (generally established residential areas), which are well serviced by schools, health facilities and every day requirements (such as shops, government facilities and so on) and have good access to a range of transportation options, including walking and cycling. Not only are social housing developments being given a strategic focus but urban design principles are also now a specific consideration in the assessment of social housing developments. Unfortunately there is sometimes local community resistance, especially in older established suburbs dominated by private ownership, to social housing infill developments.

It is also recognised that the design of urban and town environments are important elements in creating a more socially inclusive environment. While building controls relating to access largely address issues associated with access for people with disability, consideration needs to be given to a consistent approach to the provision or maintenance of a clear accessible path of travel for use or development in public areas, which are not subject to building controls. Further, the design of the built environment can also contribute to crime prevention as recognised through the 'Crime Prevention through Environmental Design' principles. New development already requiring a permit should embrace these principles.

11.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD3: Creating a Network of Vibrant and Attractive Activity Centres
- SD8: Supporting Strong and Healthy Communities
- SD10: Creating Liveable Communities.

11.3 RELEVANT STATE AND REGIONAL POLICIES

- Tasmanian Health Plan 2007
- Social Inclusion Strategy for Tasmania.

11.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 4 – Social Infrastructure and Interactions.

11.5 REGIONAL POLICIES

SI 1 ***Provide high quality social and community facilities to meet the education, health and care needs of the community and facilitate healthy, happy and productive lives.***

SI 1.1 ***Recognise the significance of the Royal Hobart Hospital and support, through planning scheme provisions its ongoing function and redevelopment in its current location.***

SI 1.2 ***Match location and delivery of social infrastructure with the needs of the community and, where relevant, in sequence with residential land release.***

SI 1.3 ***Provide social infrastructure that is well located and accessible in relation to residential development, public transport services, employment and education opportunities.***

SI 1.4 ***Identify and protect sites for social infrastructure, particularly in high social dependency areas, targeted urban growth areas (both infill and greenfield) and in identified Activity Centres.***

SI 1.5 ***Provide multi-purpose, flexible and adaptable social infrastructure that can respond to changing and emerging community needs over time.***

SI 1.6 ***Co-locate and integrate community facilities and services to improve service delivery, and form accessible hubs and focus points for community activity, in a manner consistent with the Activity Centre hierarchy.***

SI 1.7 ***Provide flexibility in planning schemes for the development of aged care and nursing home facilities in areas close to an Activity Centre and with access to public transport.***

SI 1.8 ***Provide for the aged to continue living within their communities, and with their families, for as long as possible by providing appropriate options and flexibility within planning schemes.***

SI 1.9 ***Ensure relevant planning scheme provisions include Crime Prevention through Environmental Design principles.***

SI 1.10 ***Recognise the role of the building approvals processes in providing access for people with disabilities.***

SI 2 ***Provide for the broad distribution and variety of social housing in areas with good public transport accessibility or in proximity to employment, education and other community services.***

SI 2.1 ***Provide flexibility in planning schemes for a variety of housing types (including alternative housing models) in residential areas.***

SI 2.2 ***Ensure planning schemes do not prevent the establishment of social housing in residential areas.***

12 PHYSICAL INFRASTRUCTURE

"The use of an infrastructure program to support and direct development can substantially influence the preferred settlement pattern and urban form."

12.1 OVERVIEW

The timely and efficient delivery of infrastructure services is a crucial aspect of a well planned and efficiently functioning region. In the past, ad-hoc decisions on the location and delivery of infrastructure have significantly changed settlement patterns, in the absence of broader strategic planning. Furthermore, ad-hoc decision making on the location of new settlements has generated the need for new infrastructure and placed additional pressure on existing infrastructure with long term and far reaching impacts.

The use of an infrastructure program to support and direct development can substantially influence the preferred settlement pattern and urban form. This includes greenfield areas, urban infill and redevelopment sites, and activity centres. Combined with the broader regional strategic planning work now being undertaken should ensure efficient delivery of infrastructure in the Region.

A number of funding and charging mechanisms are used to finance infrastructure projects and services. These include federal and state taxes, local government rates, water and sewerage developer charges, special-purpose levies, user charges, private investment, public-private partnerships and developer contributions. These have historically been applied in an ad-hoc manner, which has often not reflected the actual cost of delivery of these services, or the relative costs of servicing different areas, and has been quite varied across the State. The move towards regional bodies for the provision of water and sewage infrastructure should go part way to alleviating these issues.

The provision of infrastructure and developer charges associated with the delivery of infrastructure should not be underestimated as implementation tools to deliver desired strategic land use planning outcomes, and are identified as major considerations in this Regional Land Use Strategy.

12.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD3: Creating a Network of Vibrant and Attractive Activity Centres
- SD7: Improving Management of our Water Resources
- SD9: Making the Region Nationally and Internationally Competitive
- SD10:Creating Liveable Communities.

12.3 RELEVANT STATE AND REGIONAL POLICIES

- State Infrastructure Strategy
- Southern Integrated Transport Plan.

12.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 9 – Infrastructure.

12.5 REGIONAL POLICIES

PI 1 *Maximise the efficiency of existing physical infrastructure.*

PI 1.1 *Preference growth that utilises under-capacity of existing infrastructure through the regional settlement strategy and Urban Growth Boundary for metropolitan area of Greater Hobart.*

PI 1.2 *Provide for small residential scale energy generation facilities in planning schemes.*

PI 2 *Plan, coordinate and deliver physical infrastructure and servicing in a timely manner to support the regional settlement pattern and specific growth management strategies.*

PI 2.1 *Use the provision of infrastructure to support desired regional growth, cohesive urban and rural communities, more compact and sustainable urban form and economic development.*

PI 2.2 *Coordinate, prioritise and sequence the supply of infrastructure throughout the region at regional, sub-regional and local levels, including matching reticulated services with the settlement network.*

PI 2.3 *Identify, protect and manage existing and future infrastructure corridors and sites.*

PI 2.4 *Use information from the Regional Land Use Strategy, including demographic and dwelling forecasts and the growth management strategies, to inform infrastructure planning and service delivery.*

PI 2.5 *Develop a regionally consistent framework(s) for developer charges associated with infrastructure provision, ensuring that pricing signals associated with the provision of physical infrastructure (particularly water and sewerage) is consistent with the Regional Land Use Strategy.*

PI 2.6 *Ensure electricity generation and major transmission assets are recognised and protected within planning schemes to provide for continued electricity supply.*

13 LAND USE AND TRANSPORT INTEGRATION

13.1 OVERVIEW

"Improved integration of transport and land use planning is both a major challenge and critical factor in the development of efficient and liveable urban areas."

Demand for transport infrastructure is derived from the community's need to travel and to move freight. The relative location of different land uses (for example where people live in relationship to places for employment and shopping) is a significant determinant of transport demand, cost and modal choice. Improved integration of transport and land use planning is both a major challenge and critical factor in the development of efficient and liveable urban areas and becoming a more environmentally sustainable community in the face of a changing climate.

The region's transport system includes the National network, State roads, major arterial roads and associated infrastructure, and a rail network linking key centres, ports and resource areas. Transport infrastructure is owned, planned and maintained by a range of Federal, State and local governments and other organisations such as TasRail, Forestry Tasmania, and the Hydro.

The region relies on the northern ports for freight movement (86% of the region's imports move through the three northern ports: Bell Bay, Burnie and Devonport) making intra-state connections critical. Freight movement is focused on the road network with rail an inter-regional bulk and containerised goods carrier. An efficient and effective freight transport system is critical to industry and includes efficient transport networks, high standard intermodal facilities and good access to and from processing and industrial areas. The Brooker Highway is the region's most significant freight route, with the Midland Highway a significant inter-regional freight route. The Brighton Hub will provide a modern road-rail transport facility to support freight movement to and from the region.

The region's passenger transport system is oriented towards road transport and private car travel. Many past transport infrastructure projects have supported significant expansion of outer urban areas (for example the Southern Outlet connecting Kingston), but in more recent years the provision of transport infrastructure and services has responded to land use planning and development decisions.

The region now has a highly dispersed settlement pattern – although increasingly focussed on a number of key activity centres – with a very low population. This has a twofold effect. Firstly it has impacted on the use and provision of public transport. As residential development has increased in outer suburbs, away from established public transport routes, services have gradually spread far across a wide geographic area, but still across a small population base. Secondly it has resulted in high road construction and maintenance costs on a per person basis in rural areas.

All transport options must respond to demand. Our daily transport needs are increasingly complex: understanding how and where people are travelling is critical to passenger transport planning. We are no longer just planning for point to point commuter journeys to central business districts or for school based travel that sees children travel to their nearest school. Improving accessibility over mobility, in a way that meets these diverse needs is a key challenge for land use and transport planning.

The focus areas under this Strategy are broad and include:

"Improving accessibility over mobility, in a way that meets these diverse needs is a key challenge for land use and transport planning."

- Maximising the efficiency of freight and public transport corridors and assets including maintaining and improving existing key public transport corridors to facilitate reliable, frequent public transport services;
- Recognising and protecting major infrastructure corridors and assets through planning schemes including retaining and protecting the rail corridor to preserve potential for the future development of mass transit options;
- Improving walking and cycling infrastructure and linkages, particularly for local trips;
- Recognise and preserve the Derwent River as a passenger transport corridor, including identifying passenger boarding locations and maintaining road and river access to these locations;
- Addressing car parking as a key determinant of car based travel;
- Increasing residential densities and mixed use around designated integrated transit corridors where appropriate; and
- Consolidating residential development in rural areas into key settlements where daily and weekly needs of residents are met.

13.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD2: Holistically Managing Residential Growth
- SD3: Creating a Network of Vibrant and Attractive Activity Centres
- SD4: Improving our Economic Infrastructure
- SD10:Creating Liveable Communities.

13.3 RELEVANT STATE AND REGIONAL POLICIES

- SD1: Adopting a More Integrated
- State Infrastructure Strategy
- Southern Integrated Transport Plan
- Tasmanian Urban Passenger Transport Framework
- Tasmanian Walking and Cycling for Active Transport Strategy
- Social Inclusion Strategy for Tasmania.

13.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 8 – The Regional Transport System
- Background Report No. 9 – Infrastructure.

13.5 REGIONAL POLICIES

LUTI 1 ***Develop and maintain an integrated transport and land use planning system that supports economic growth, accessibility and modal choice in an efficient, safe and sustainable manner.***

LUTI 1.1 ***Give preference to urban expansion that is in physical proximity to existing transport corridors and the higher order Activity Centres rather than Urban Satellites or dormitory suburbs.***

LUTI 1.2 ***Allow higher density residential and mixed use developments within 400, and possibly up to 800 metres (subject topographic and heritage constraints) of integrated transit corridors.***

LUTI 1.3 ***Encourage residential development above ground floor level in the Primary, Principal and Major Activity Centres***

LUTI 1.4 ***Consolidate residential development outside of Greater Hobart into key settlements where the daily and weekly needs of residents are met.***

LUTI 1.5 ***Locate major trip generating activities in close proximity to existing public transport routes and existing higher order activity centres.***

LUTI 1.6 ***Maximise road connections between existing and potential future roads with new roads proposed as part of the design and layout of subdivision.***

LUTI 1.7 ***Protect major regional and urban transport corridors through planning schemes as identified in Maps 3 & 4.***

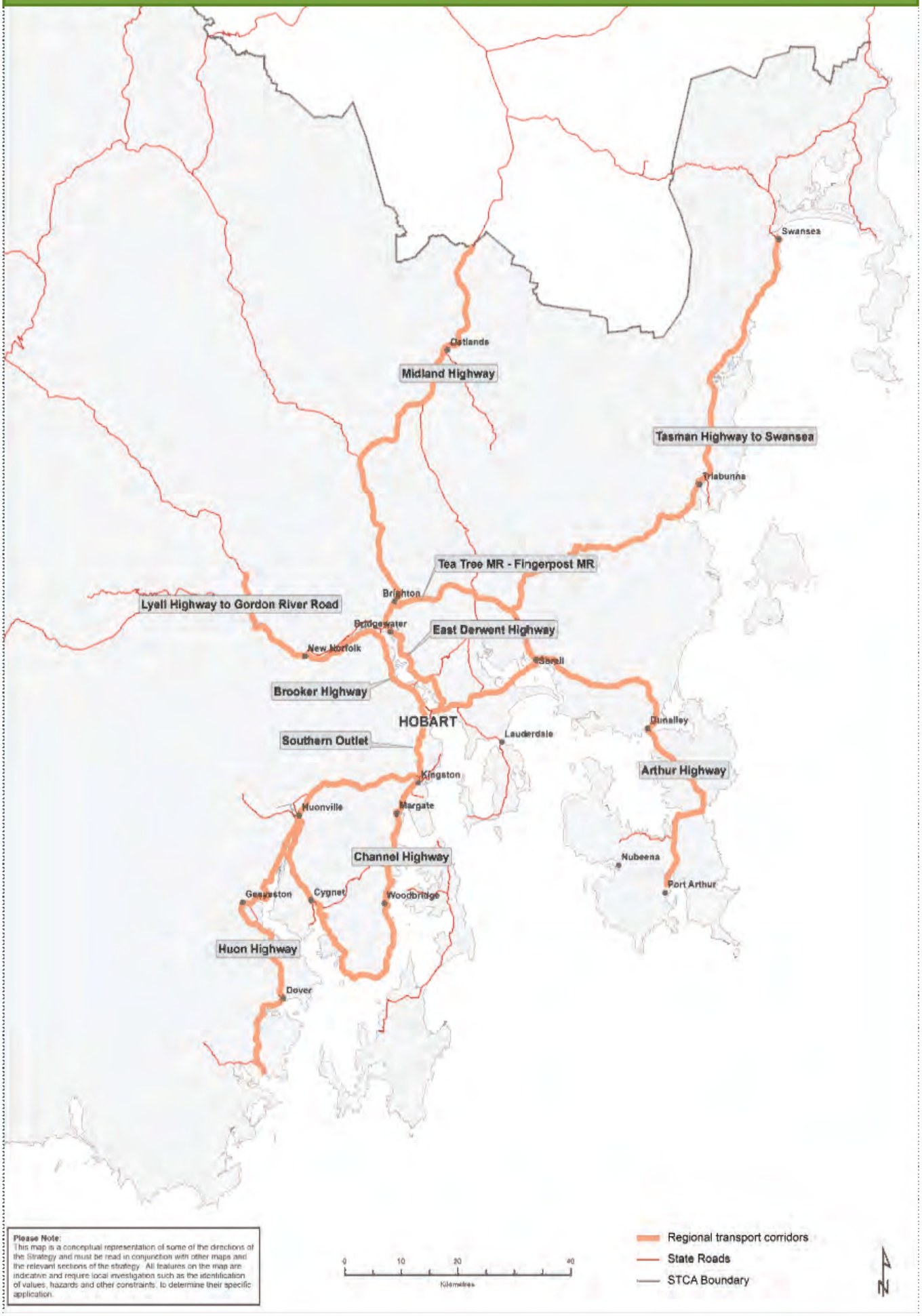
LUTI 1.8 ***Ensure new development incorporates buffer distances to regional transport corridors identified in Map 4 to minimise further land use conflict***

LUTI 1.9 ***Ensure car parking requirements in planning schemes and provision of public car parking is consistent with achieving increased usage of public transport.***

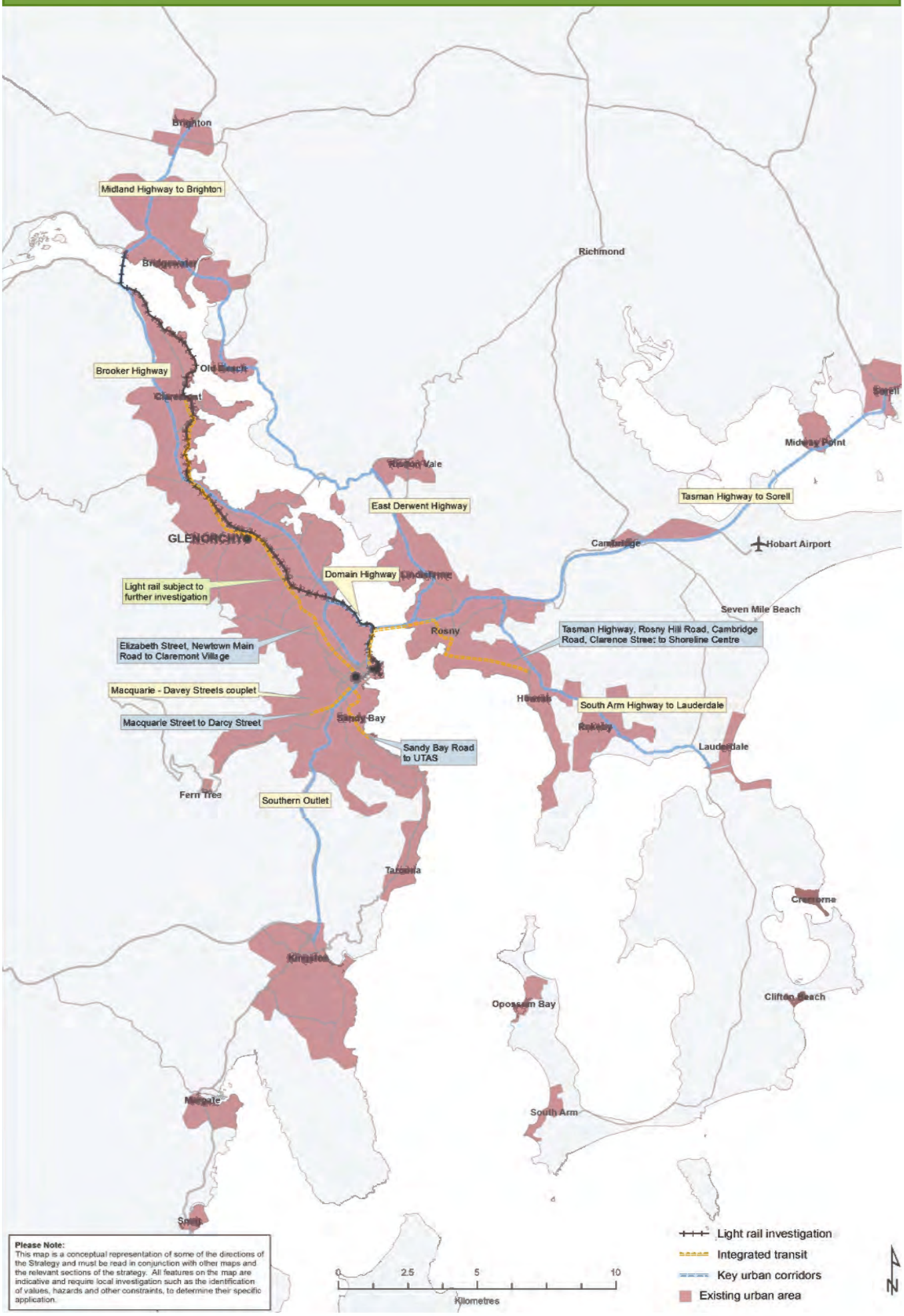
LUTI 1.10 ***Identify and protect ferry infrastructure points on the Derwent River (Sullivans Cove, Kangaroo Bay and Wilkinson Point) for their potential use into the future and encourage increased densities and activity around these nodes.***

LUTI 1.11	***Encourage walking and cycling as alternative modes of transport through the provision of suitable infrastructure and developing safe, attractive and convenient walking and cycling environments.***
LUTI 1.12	***Include requirements in planning schemes for end-of-trip facilities in employment generating developments that support active transport modes.***

MAP 3: REGIONAL TRANSPORT CORRIDORS



MAP 4: GREATER HOBART URBAN TRANSPORT CORRIDORS



14 TOURISM

14.1 OVERVIEW

"Land use planning and its outcomes have numerous impacts upon the tourism industry including how well authentic landscapes and character is protected and enhanced..."

Tourism in Tasmania has grown substantially in the nine years to June 2009, with the number of people visiting the state increasing by 68 per cent to 932,700, and the associated contribution to the economy almost doubling to $1.4 billion. With the addition of cruise ship passengers and crew, visitation jumps to 1.03 million visitors. Southern Tasmania also benefits from intrastate visitation, particularly for key sporting and cultural events. Tourism is a spatially dispersed industry with most towns and regions benefitting from the industry.

Despite a decline in the average length-of-stay from 9.3 nights to 8.1 nights over the last nine years, the total visitor nights have increased by 50 per cent to 7.86 million during this period. Key contributors to this growth were the introduction of low cost carriers, the introduction of Spirit of Tasmania I and II, and the strength in the Australian economy through wages growth, low interest rates and decreasing unemployment.

Research indicates that travellers are seeking a variety of experiences. Whether they actively participate in all available experiences is immaterial when considering most destinations, but having choice is important, and for repeat visitors having a reason to return is also a key driver.

Land use planning and its outcomes have numerous impacts upon the tourism industry including how well authentic landscapes and character are protected and enhanced; and the degree to which planning schemes provide flexibility to ensure that tourism industry can be innovative and respond to demand and the market.

Careful management of the landscapes and characteristics within the region that contribute to the tourism experience, as well as how tourism developments are handled through the planning process, is important to this key economic activity. In addition land uses associated with tourism also need to be managed to ensure that they do not detract from the value of the region as a living environment.

14.2 RELEVANT STRATEGIC DIRECTIONS

- SD4: Creating a Network of Vibrant and Attractive Activity Centres
- SD5: Supporting our Productive Resources
- SD9: Making the Region Nationally and Internationally Competitive.

14.3 RELEVANT STATE AND REGIONAL POLICIES

- Tasmanian Economic Development Strategy (under preparation)
- Tourism 21 Strategic Plan.

14.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 10 – Tourism and Land Use Planning.

14.5 REGIONAL POLICIES

T 1 ***Provide for innovative and sustainable tourism for the region***

T 1.1 ***Protect and enhance authentic and distinctive local features and landscapes throughout the region.***

T 1.2 ***Identify and protect regional landscapes, which contribute to the region's sense of place, through planning schemes.***

T 1.3 ***Allow for tourism use in the rural and significant agriculture zones where it supports the use of the land for primary production.***

T 1.4 ***Provide flexibility for the use of holiday homes (a residential use) for occasional short-term accommodation.***

T 1.5 ***Provide flexibility within commercial and business zones for mixed use developments incorporating tourism related use and development.***

T 1.6 ***Recognise, planning schemes may not always be able to accommodate the proposed tourism use and development due to its innovative and responsive nature.***

T 1.7 ***Allow for objective site suitability assessment of proposed tourism use and development through existing non-planning scheme based approval processes (43A application).***

15 STRATEGIC ECONOMIC OPPORTUNITIES

15.1 OVERVIEW

"...a significant opportunity to enhance the locational advantage of being the Southern most region in Australia, through a Antarctic and marine research gateway."

Southern Tasmania and Greater Hobart in particular is well placed to take advantage of its location, size, accessibility, and its history as a hub for research, creativity and learning. There exists a significant opportunity to enhance the locational advantage of being the most Southern region in Australia, through an Antarctic and marine research gateway. In addition there are associated urban regeneration opportunities that will drive economic development for the broader region by encouraging increased population and visitor numbers, with flow on effects to gross regional product. Broader benefits from realisation of these objectives will include making Hobart a more vibrant and active space and attracting significant investment to the broader region.

There are a number of key economic opportunities. These include:

- **A place of research excellence and learning** – The region is host to a number of world-class research institutions and tertiary education facilities. It is also Australia's base for Antarctic exploration and research. These provide significant economic benefits to the region with opportunities to capitalise upon existing facilities through the construction of key research institutes including the Institute of Marine and Antarctic Science (IMAS), redevelopment of Domain House and the expansion of the Menzies Research Centre.
- **Antarctic and Southern Ocean Gateway** – Australia has increasing marine research and protection responsibilities and priorities in the Southern Ocean due to its territorial claim of 42% of Antarctica and the recently increased economic exclusion zone in the Southern Ocean. The region's position as Australia's base for Antarctic exploration and research can be cemented through the upgrading of existing facilities and development of new. Already the region is home to the Antarctic Division in Kingston and the CSIRO facility in Hobart. Potential future opportunities include IMAS and the Hobart International Airport Antarctic Airlink.
- **A place of arts, culture and recreation** – The region has a long history as a cultural hub in recognition of our significant cultural values. The region accommodates many cultural facilities, world class recreational opportunities and events. The recent opening of MONA on the shores of the Derwent is a case in point. Promotion and enhancement of this role will also attract greater number of visitors as well as increased employment opportunities.
- **A small but vital working port** – The importance of Hobart Port in terms of Antarctic and Southern Ocean Gateway is outlined above. Hobart Port is also important in terms of the movement of key export products for the region (i.e. timber based products), the fishing industry and tourism industry (cruise ship terminal). Upgrading and maintaining the Hobart port area is essential to the region's long term economic health.

- **Marine manufacturing and ship repair** - The excellent deepwater harbour of the Derwent Estuary has provided the base for ship building and marine services since European settlement. This industry continues today and potential exists to further expand into the future.

15.2 RELEVANT STRATEGIC DIRECTIONS

- SD4: Creating a Network of Vibrant and Attractive Activity Centres
- SD4: Improving our Economic Infrastructure
- SD9: Making the Region Nationally and Internationally Competitive
- SD10: Creating Liveable Communities.

15.3 REGIONAL POLICIES

SE0 1 ***Support and protect strategic economic opportunities for Southern Tasmania.***

SE0 1.1 ***Protect the following key sites and areas from use and development which would compromise their strategic economic potential through planning scheme provisions:***

a. ***Hobart Port (including Macquarie and Princes Wharves)***
b. ***Macquarie Point rail yards; and***
c. ***Princes of Wales Bay marine industry precinct***

SE0 1.2 ***Include place specific provisions for the Sullivans Cove area in the planning scheme.***

SE0 1.3 ***Recognise the regional economic importance of Southwood through specific planning provisions within the planning scheme that allow for its expansion and use by timber, mineral or other primary industries benefitting from its strategic location.***

16 PRODUCTIVE RESOURCES

16.1 OVERVIEW

"Whilst the region has negligible prime agricultural land... it is nevertheless a significant contributor to the regional and local economy, with an increasing focus on low volume, high value production."

Primary industry generates a significant amount of wealth for the Tasmanian economy through agriculture, mineral resource extraction, forestry and aquaculture.

In Southern Tasmania, agricultural production contributes over $188 million to the State's economy. Whilst the region has negligible prime agricultural land and its contribution to the State's overall production is somewhat less than the other two regions, it is nevertheless a significant contributor to the regional and local economy, with an increasing focus on low volume, high value production. It is also particularly important to the social make of some local communities. Proposed expanded and new irrigation schemes for the region, both in the short and long term, will assist in strengthing the agricultural industries within the region, particularly in light of changing climatic conditions. The characteristics of agricultural land and associated production within the region are particularly diverse. It varies from the extensive dry-land areas of the Southern Midlands and parts of the Central Highlands and Derwent Valley, to the intensive crop and fruit growing regions of the Huon, Derwent and Coal River Valleys and through to the wine growing areas scattered throughout the region including along parts of the East Coast. A marked feature of the pattern of agricultural land in the region is the large range in productive capacity and the discrete, spatially well defined nature of areas of high productivity nestled within larger areas of much lower productivity. As such the region should adopt a strategy recognising that the one size fits all approach to planning scheme standards across the region will not achieve the best outcomes. While the region contains negligible prime agricultural land (Class 1, 2 & 3), there is still productive agricultural land evident in the region (Class 4 & 5 land) which is either irrigated, has access to natural water resources or has physical conditions suited to particular high value crops (see Map 6). This very productive agricultural land within the region can be spatially distinguished against significantly less productive land due to topographic, soil, water availability and climatic conditions.

It is therefore appropriate that this land be afforded the highest level of protection from land use conflicts and fettering recognised though its status as 'significant agricultural land' (as per Principle 7 under the State Policy on the Protection of Agricultural Land).

In addition, Principle 8 of the State Policy requires that agricultural land benefitting from existing irrigation schemes declared under the Water Management Act 1999 be afforded appropriate protection. Further that other land benefitting from broad scale irrigation development may be afforded the same level of protection.. With this in mind the renewed program to investigate and establish new or expanded large-scale irrigation schemes needs to be taken into account, particular given the significant of the State investment in dollar terms. The only current declared irrigation district within the South is the South-East Irrigation Scheme, which extends across part of the Brighton, Clarence, and potentially Sorell areas (the Coal River Valley sub-district), however the Tasmanian Irrigation Development Board have projects in place to expand this district and establish the new Midlands and Swan Apsley Irrigation Schemes.

"Appropriate zoning, attenuation distances, and growth boundaries must be implemented to enable the protection of agricultural land and farmers' ability to farm unfettered."

The Midlands and expanded South East scheme proposals are currently well advanced through the Tasmanian Irrigation Development Board planning process. These potentially irrigable areas should be recognised and protected in the new planning schemes.

Embodied within the Strategic Direction of holistically managing residential growth is the principle that residential development in rural areas should first and foremost be determined by a proactive settlement strategy, tempered by the productive and potential productive capability of land. Therefore, decisions to convert rural land to non-rural land use (such as large-lot residential) should not be driven by the current apparent productive capability, which has been the case in years past. Appropriate zoning, attenuation distances, and growth boundaries linked to settlement strategies must be implemented to enable the protection of agricultural land and farmers' ability to farm unfettered.

Beyond agricultural production, there are other productive resources, which contribute to the region's economy: mineral extraction, forestry, aquaculture, and fisheries.

Mineral extraction within Southern Tasmania is limited and is concentrated on quarrying operations for hard rock, sand, materials for concrete construction, and blue metal. A number of quarrying operations in the South are of regional significance and particularly important to the construction industry, including the Leslie Vale and Brighton quarries.

Forestry has been, and is still, a significant industry for the region, predominantly occurring across the Derwent Valley, Central Highlands, and Huon Valley municipal areas, although all non-urban municipalities in the region have some level of forestry. Whilst much forestry activity exists outside of the jurisdiction of the Land Use Planning and Approvals Act 1993, the activities of the forestry industry nevertheless have some land use planning implications and impacts on other use and development.

The forestry industry is currently in a state of flux and its future is a highly politicised issue. The land use planning system needs to ensure it can accommodate future directions in regard to those parts of the industry that do fall under its jurisdiction, for example; the establishment of new value-adding timber product manufacturing facilities.

Aquaculture (or farmed fisheries) is a burgeoning industry for the region. Much of the activity is focused in Salmonoid fishery with over 95% of Australia's farmed salmon produced in the State, the majority of which occurs in the Huon and Kingborough municipal areas. Another significant form of aquaculture for the region is oyster farming.

While marine farming falls outside the land use planning system in a similar fashion to forestry activities, associated shore-based facilities, do not. Ports and other key marine facilities for both the farmed and wild fisheries must be identified and protected, taking into account future needs. In addition the planning system needs to ensure that appropriate coastal locations for such facilities are identified and protected from inappropriate use and development and land use conflict. These are increasingly contentious issues due to:

- Increasing rural residential development in close proximity to operating fish farms;

- Farms becoming more noisy due to increasing mechanisation of the industry; and
- Residents purchasing property without being aware of the proximity of working salmon farms or dormant leases.

16.2 RELEVANT STRATEGIC DIRECTIONS

- SD2: Holistically Managing Residential Growth
- SD5: Supporting our Productive Resources
- SD7: Improving Management of our Water Resources.

16.3 RELEVANT STATE AND REGIONAL POLICIES

- State Economic Development Strategy (under preparation)
- Natural Resource Management Strategy for Southern Tasmania
- State Policy for the Protection of Agricultural Land 2009.

16.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 7 – Productive Resources.

16.5 REGIONAL POLICIES

PR 1 ***Support agricultural production on land identified as regionally significant by affording it the highest level of protection from fettering or conversion to non-agricultural uses.***

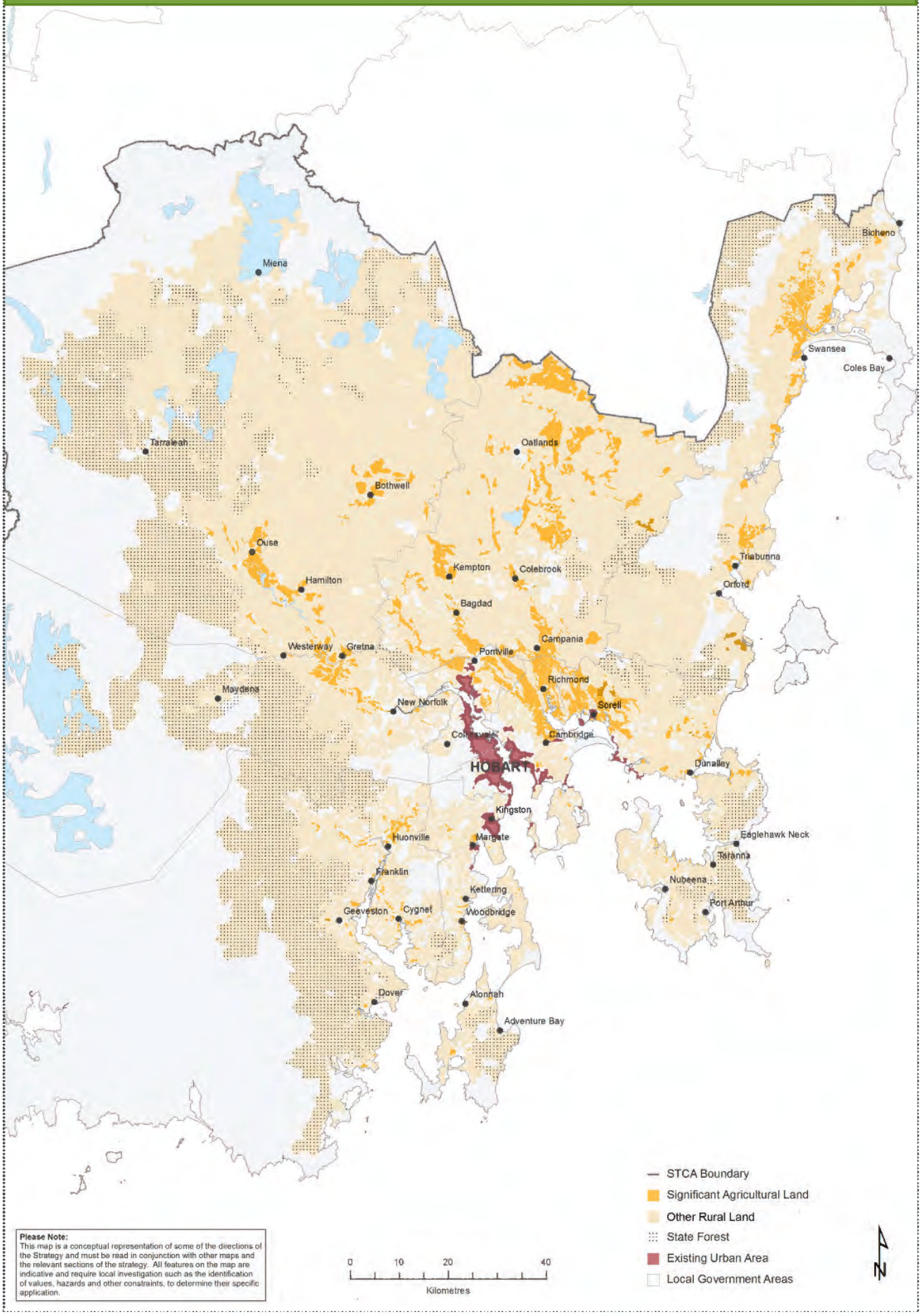
- ***PR 1.1*** ***Utilise the 'Significant Agriculture Zone' to identify regionally significant agricultural land in planning schemes and manage that land consistently across the region.***
- ***PR 1.2*** ***Avoid potential for further fettering from residential development by setting an accetpable solution buffer distance of 200 metres from the boundary of the Significant Agriculture Zone, within which planning schemes are to manage potential for land use conflict.***
- ***PR 1.3*** ***Allow for ancillary and/or subservient non-agricultural uses that assist in providing income to support ongoing agricultural production***
- ***PR 1.4*** ***Prevent further land fragmentation by restricting subdivision unless necessary to facilitate the use of the land for agriculture.***
- ***PR 1.5*** ***Minimise the use of significant agricultural land for plantation forestry***

PR 2 ***Manage and protect the value of non-significant agricultural land in a manner that recognises sub-regional diversity in land and production characteristics.***

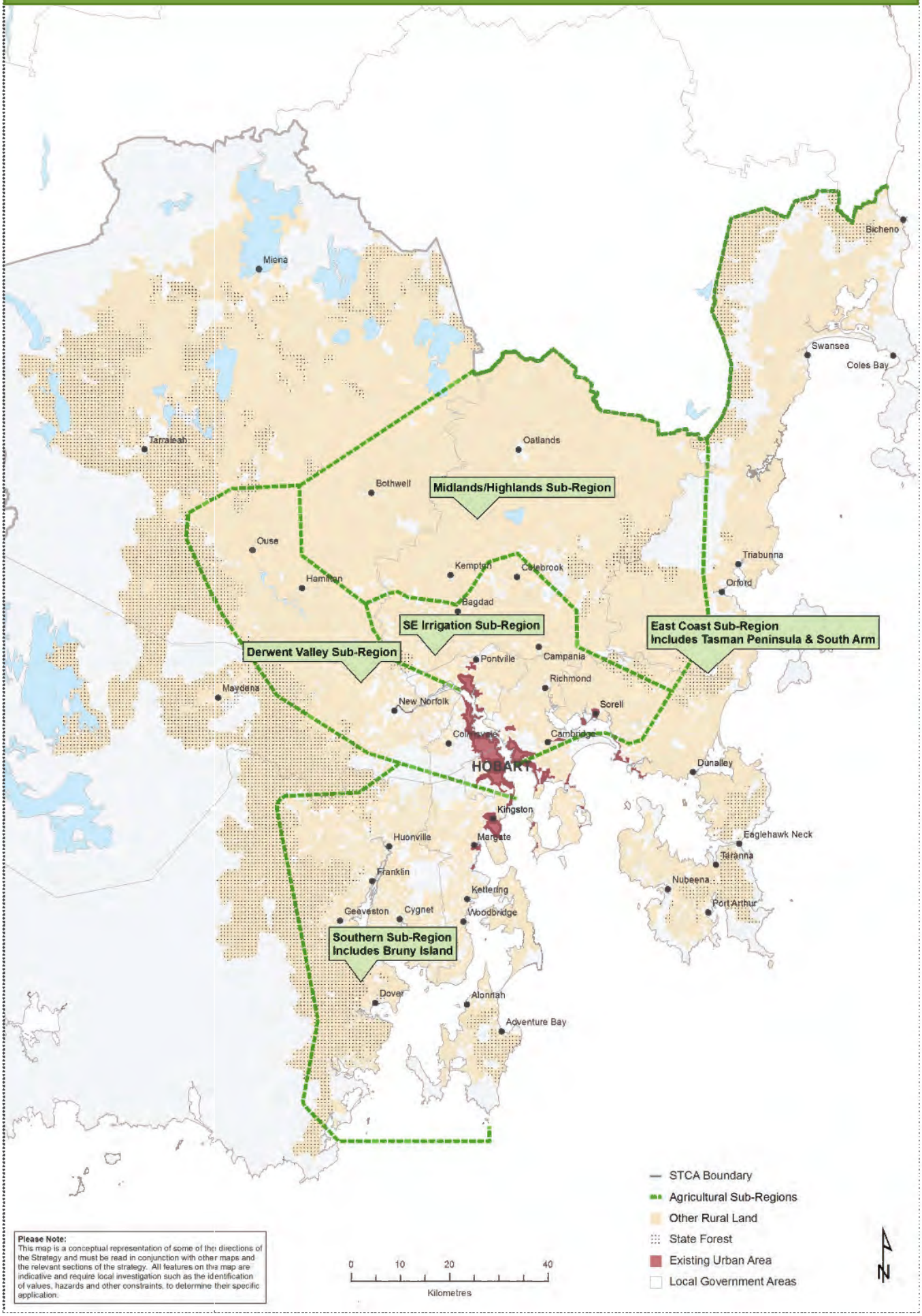
- ***PR 2.1*** ***Tailor planning scheme standards, particularly the minimum lot size for subdivision, according to the designated subregion.***
- ***PR 2.2*** ***Ensure the minimum lot size takes into account the optimum size for the predominating agricultural enterprise within that subregion.***
- ***PR 2.3*** ***Utilise the settlement strategy to assess conversion of rural land to residential land through rezoning, rather than the potential viability or otherwise of the land for particular agricultural enterprises.***
- ***PR 2.4*** ***Ensure opportunities for down-stream processing of agricultural products are supported in appropriate locations or 'on-farm' where appropriate supporting infrastructure exists and the use does not create off-site impacts.***

	PR 2.5	*Provide flexibility for commercial and tourism uses provided that long-term agricultural potential is not lost and it does not further fetter surrounding agricultural land.*
	PR 2.6	*Ensure the introduction of sensitive uses not related to agricultural use, such as dwellings on small non-farming titles, are only allowed where it can be demonstrated the use will not fetter agricultural uses on neighbouring land.*
PR 3	*Support and protect regionally significant extractive industries.*	
	PR 3.1	*Ensure existing regionally significant extractive industry sites are zoned either General Industry or Rural Resource and are protected by appropriate attenuation areas in which the establishment of new sensitive uses, such as dwellings, is restricted.*
PR 4	*Support the aquaculture industry.*	
	PR 4.1	*Ensure appropriately zoned land on the coast is provided in strategic locations, and in accordance with The Coast Regional Polices, for shore based aquaculture facilities necessary to support marine farming.*
	PR 4.2	*Identify key marine farming areas within planning scheme to assist in reducing potential land use conflicts from an increasingly industrialised industry.*
PR 5	*Support the forest industry.*	
	PR 5.1	*Ensure working forests, including State Forests and Private Timber Reserves (for commercial forestry), are zoned Rural Resource.*
	PR 5.2	*Recognise the Forest Practices System as appropriate to evaluate the clearance and conversion of native vegetation for commercial forestry purposes.*
	PR 5.3	*Allow for plantations in the rural resource zone subject to setbacks from existing dwellings.*
	PR 2.4	*Control the establishment of new dwellings in proximity to State Forests, Private Timber Reserves or plantations so as to eliminate the potential for land use conflict.*

MAP 5: SIGNIFICANT AGRICULTURAL LAND IN SOUTHERN TASMANIA



MAP 6: AGRICULTURAL SUB-REGIONS IN SOUTHERN TASMANIA



17 INDUSTRIAL ACTIVITY

17.1 OVERVIEW

"...identified a significant shortage of Industrial land within the region, largely a result of the absence of strategic planning beyond the local government level."

InIndustrial land use relates to the manufacturing, assembling, processing, storage and distribution of products and goods. It can include wholesaling and retailing of goods and may include some uses associated with primary production. Industrial uses can be large (i.e. Zinc Works at Lutana) or small scale (i.e. joinery & cabinet marker).

At present, in the absence of any strategic framework for industrial land use, industrial land in Southern Tasmania is for the most part planned through its identification by zones within individual council planning schemes. Most industrial uses tend to serve a regional or sub-regional catchment and not just the local municipal area, however to date the planning for industrial areas have largely been left to local planning processes. Establishing a strong regional strategic approach to industrial planning is critical to the region's ability to economically grow. Six key reasons for regional-level planning for industrial land use have been identified:

- Industrial land provides space for activities, which do not work well near residential uses. Noise, odours, light pollution, and heavy vehicle traffic are realities for industrial activity and complaints by residents and homeowners can force out or constrain the operation of otherwise viable businesses.
- Industrial land is typically well located with respect to transport and physical infrastructure. Local streets are often not specifically designed to accommodate heavy vehicles.
- Sufficient amounts of industrial land allow for clustering of businesses and reinforce the benefits of co-location. Spatial proximity allows industry to network, connect with local suppliers, use each other's services, and capture value along the supply chain.
- To function properly, industry needs both space and appropriate building stock. Buildings found on industrial land provide a number of features that are important to many businesses, for example: flexible floor plates, tall first stories, loading docks and roll-up doors, reinforced upper floors, and open yards for storage, inventory, goods handling and manipulation.
- Industrially zoned land and the buildings it contains provide another essential benefit to many businesses – affordability. Industrial zoned land is typically cheaper to purchase or rent when compared with land zoned for retail and commercial purposes.
- Protecting the amenity of Activity Centres. Without providing ample industrial land for industry to grow and expand, there will be pressure to utilise land within Activity Centres for industrial purposes, thereby compromising the mixed-use objectives of an Activity Centre.
- Identification and responding to potential environmental issues associated with industrial development. Many water catchments and airshed straddle council boundaries, with some locations in the regionally having greater environmental sensitivity than others.

Existing industrial land is significantly constrained by surrounding land uses in many cases. Future potential industrial land options are limited due to:

- The necessity to be close to freight transport corridors;
- The provision of adequate services, in particular water, wastewater, stormwater and electricity;

"Existing industrial land is significantly constrained by surrounding land uses."

- The need for a location that will have minimal impacts, allow for further expansion in the long term;
- The required land characteristics (i.e. relatively flat land); and
- The proximity to resource and market, particularly for light industrial/service industries (i.e. demand primarily generated within Greater Hobart area).

A preliminary industrial land demand and supply analysis has indicated a potential shortage of industrial land within the region within a short term. This situation is largely a result of the absence of strategic planning beyond the local municipal level. It is crucial to plan for industrial land to ensure it is located well in respect of transport and physical infrastructure, adjoining land uses and allow for clustering of businesses. The potential shortfall of industrial land provision for the region is being investigated further through the Southern Tasmania Industrial Land Study (an adjunct to this Strategy). The results will be taken into account during the preparation of new planning schemes and should be integrated into the next iteration of this Strategy).

17.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD4: Improving our Economic Infrastructure.

17.3 RELEVANT STATE AND REGIONAL POLICIES

- State Economic Development Strategy (under preparation).
- Environmental Protection Policy (Air Quality) 2004
- State Policy on Water Quality Management 1997
- State Coastal Policy 1996
- Environment Protection Policy (Noise) 2009
- Tasmanian Waste and Resource Management Strategy 2009

17.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 11 – Industrial Activity.

17.5 REGIONAL POLICIES

IA 1 ***Identify, protect and manage the supply of well-sited industrial land that will meet regional need across the 5, 15 and 30 year horizons.***

IA 1.1 ***Ensure industrial land is relatively flat and enables easy access to major transport routes, other physical infrastructure such as water, wastewater, electricity and telecommunications***

IA 1.2 ***Locate new industrial areas away from sensitive land uses such as residentially zoned land.***

IA 1.3 ***Provide for a 30-year supply of industrial land, protecting such land from use and development that would preclude its future conversion to industrial land use - in accordance with the recommendations within the Southern Tasmania Industrial Land Strategy 2013.***

IA 1.4 ***Provide a 15-year supply of industrial land, zoned for industrial purposes within the new planning schemes - in accordance with the recommendations within the Southern Tasmania Industrial Land Strategy 2013.***

IA 1.5 ***Aim to ensure a minimum 5-year supply of subdivided and fully serviced industrial land.***

IA 1.6 ***Take into account the impact on regional industrial land supply, using best available data, prior to rezoning existing industrial land to non-industrial purposes.***

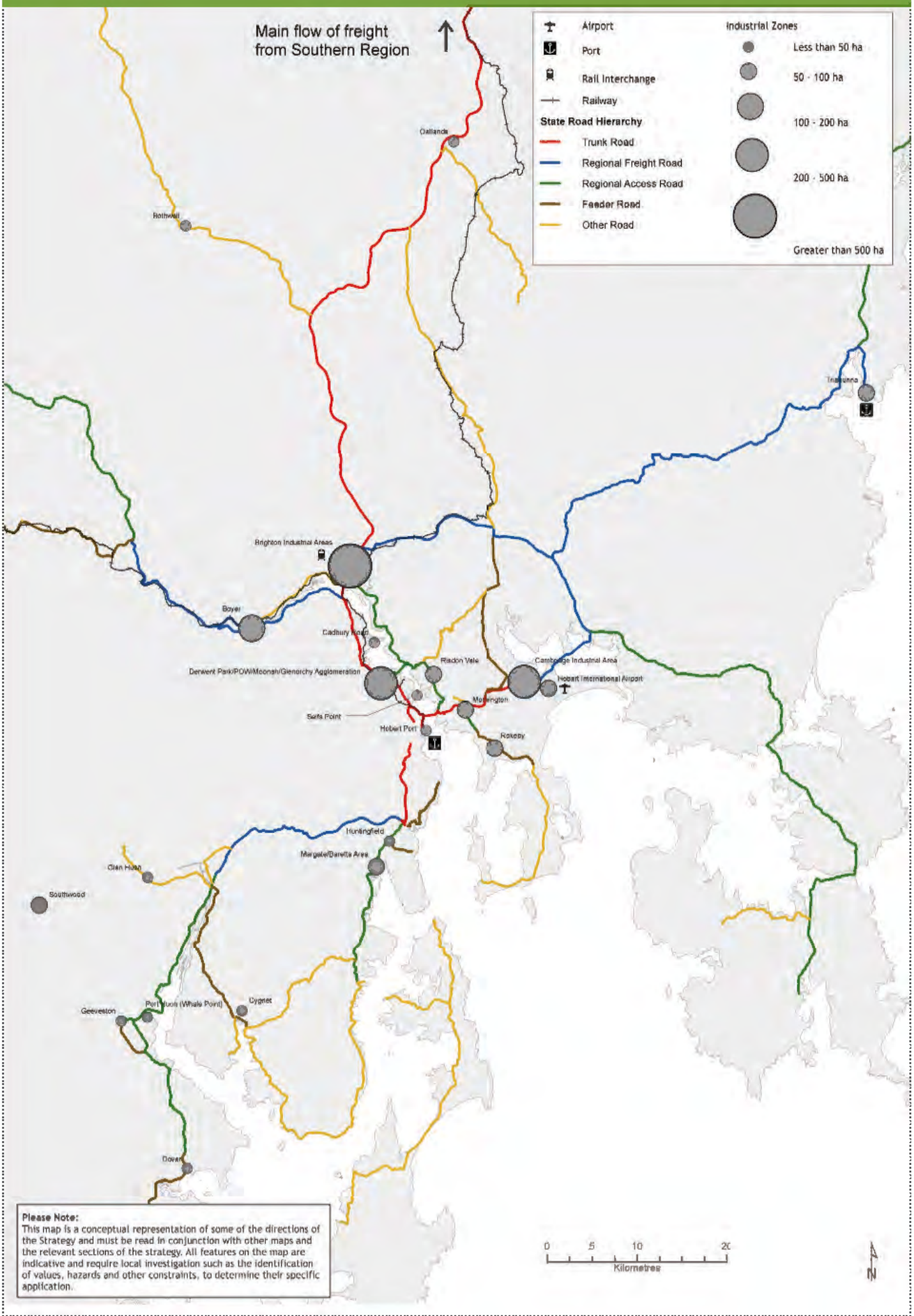
IA 2 ***Protect and manage existing strategically located export orientated industries.***

IA 2.1 ***Identify significant industrial sites through zoning and ensure that other industrial uses not related to its existing function do not diminish is strategic importance.***

IA 3 ***Ensure industrial development occurs in a manner that minimises regional environmental impacts and protects environmental values.***

IA 3.1 ***Take into account environmental values and the potential environmental impacts of future industrial use and the ability to manage these in the identification of future industrial land.***

MAP 7: INDUSTRIAL ACTIVITY IN SOUTHERN TASMANIA



18 ACTIVITY CENTRES

18.1 OVERVIEW

"Activity Centres are much broader than just retail and commercial centres. They are also community meeting places, centres of community and government services, locations for education and employment, settings for recreation, leisure and entertainment activities..."

Activity Centres provide the focus for services, employment, and social interaction in cities and towns. They provide a broader function than just retail and commercial centres. They are also community meeting places, centres of community and government services, locations for education and employment, settings for recreation, leisure and entertainment activities, and places for living through new forms of higher density housing with good levels of amenity, in mixed land use settings.The Regional Land Use Strategy promotes the development of multifunctional, accessible Activity Centres. The benefits of an Activity Centre approach are significant in that it:

- Enhances the viability and vibrancy of centres and the surrounding urban environment;
- Enables a more efficient and equitable use of resources and infrastructure;
- Assists in focussing the delivery of key community services;
- Provides a centre around which housing opportunities can be strategically planned;
- Creates opportunities to live and work more closely;
- Assists in creating a more sustainable urban environment by reducing private vehicle travel and facilitating use of non motorised forms of transport (walking and cycling); and
- Facilitates agglomeration economies for business and industry.

While there are other nodes of activity, which include trade and construction related retail, significant employment, and community functions that play an important function, they are not 'Activity Centres' as they do not encompass the range of functions.

An 'Activity Centre Network' is proposed in order to provide for a regionally planned and defined hierarchy to ensure complementarities and efficiencies, rather than creating unnecessary competition, between centres. The proposed network recognises the 'pre-eminence' of the Hobart CBD as the centre for public administration, financial services and commerce for the region and the State as a whole, while at the same time recognising the 'poly-centric' nature of Greater Hobart.

Activity Centres that have regional and sub-regional functions are specifically recommended in the Activity Centres Network, however as with all Activity Centres, appropriate planning at the local level should be undertaken. Structure and management plans need to be prepared for these centres to strengthen their overall function and operation and to ensure that they are satisfactorily integrated with surrounding uses and the transport network.

18.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD3: Creating a Network of Vibrant and Attractive Activity Centres
- SD4: Improving our Economic Infrastructure
- SD10: Creating Liveable Communities.

"...provide for a regionally planned and defined hierarchy to ensure complementarities and efficiencies rather than creating unnecessary competition between centres."

18.3 RELEVANT STATE AND REGIONAL POLICIES

- State Economic Development Strategy (under preparation).

18.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 12 – Activity Centres Analysis.

18.5 THE ACTIVITY CENTRE NETWORK

An Activity Centre Network is proposed as the foundation for the activity centres policy under the Regional Land Use Strategy. The Network is outlined in Table 1 below. Although these activity centres are described in a hierarchy of importance, they are more a continuum of size and function. The size and townscape of each centre should be relative to its function, the availability of land, ease of pedestrian movement and improving linkages with public transport.

TABLE 1: ACTIVITY CENTRE NETWORK

PRIMARY ACTIVITY CENTRE		
Role	The primary hub for Tasmania, the region and the Greater Hobart metropolitan area in terms of business, government administration, leisure, entertainment and tourism services providing a comprehensive range of services and facilities including public transport. A significant proportion of all employment opportunities within the region is currently and should continue to be focussed in the Primary Activity Centre. Providing high level of public amenity and high quality urban design.	Hobart CBD & immediate surrounds (including waterfront)
Employment	High concentration of employment and diversity of employment by sector.	
Commercial including retail	Primary location for offices, including corporate headquarters, professional services, government administration. Regional shopping facilities including major department stores with high level of speciality shops, secondary retailing and a focus on the 'high street' shopping experience. Should include at least one major supermarket/food market. Bulky good retailing may be accommodated at the fringe.	
Government Services & Community infrastructure	Regional and State facilities for the State and Federal Government. Education facilities including prominent tertiary education facilities, cultural based facilities i.e. State Library and Museum), Major Health Care facilities including Royal Hobart Hospital and a wide range of medical practitioners including GPs, specialists and research facilities and community services (including child care centres to support its high concentration of employment). All other services expected in the Principal Activity Centres. Urban public spaces provide focus for community facilities and events.	
Residential	Higher density residential development in centre utilising innovative housing solutions such as business/shop top arrangements should be complemented by infill and consolidation of surrounding residential areas and along Integrated transit corridors at higher net densities (25+ dwellings per hectare).	
Entertainment	A range of dining and entertainment uses including night-time activities and major cultural facilities for the region.	
Access	Key interchange location for public transport and central node for radial road network..	
Catchment	Whole region (particularly for higher order retailing and services) and whole State (for government and administrative functions).	
PRINCIPAL ACTIVITY CENTRE		
Role	Provide for a wide range of services and facilities (including offices for business and government) to serve the surrounding sub-region, with a strong focus on the retail and commercial sector.	Central Glenorchy Rosny Park Kingston
Employment	Provides a focus for employment at the sub-regional level. Retailing a major industry but complemented by a range of office and administration employment mostly of the small to medium scale enterprises.	
Commercial including retail	Sub-regional shopping facilities with a range of major supermarkets, department stores and a range of speciality shops.	
Government Services & Community infrastructure	Secondary location for regional and State facilities for the State and Federal Government; and district facilities for those tiers of government, including but not limited to Service Tasmania, Centrelink Customer Service Centre, Medicare/Family Assistance Office), State Library branch. Health facilities should include Integrated Care Centres and a range of medical practitioners. An urban public space as the focus for community facilities and events. Educational facilities either within or in close proximity are highly desirable as are child-care centres to support employment. Should be centre of Local Government services within the relevant LGA.	
Residential	Some in-centre residential development above ground floor level, complemented by infill and consolidation of surrounding residential areas at higher densities (20+ dwellings per hectare).	

TABLE 1: ACTIVITY CENTRE NETWORK (CONTINUED)

Entertainment	A range of dining and entertainment uses including night-time activities and sporting clubs/facilities.	
Access	Bus interchange with high frequency links to and from other major activity centres and key residential catchments. Ideally links a number of public transport modes and connects directly or readily to other Principal Activity Centres and the Primary Activity Centre.	
Catchment	Catchment of regional significance across at least two Local Government Areas.	
MAJOR ACTIVITY CENTRE		
Role	To serve the surrounding district and provide a range of convenience goods and services as well as some community services and facilities.	Moonah Bridgewater (Greenpoint)
Employment	Provides a focus for employment at the LGA level, primarily in retailing, but complemented by a range of office based employment mainly in professional and personal services	
Commercial including retail	At least 1 major supermarket, a range of speciality shops and secondary retailing. May contain small discount department store. Office spaces are limited to small-scale finance, banking, insurance, property, and professional services.	
Government Services & Community infrastructure	Community Hall, Community Health Centres, some urban community space, Private Medical Centre, may include some social services such as Service Tasmania or Centrelink Customer Service Centre. Educational facilities either within or in close proximity are highly desirable. Should be centre of Local Government services within the relevant LGA., if no primary or principal activity centre exists in that LGA.	
Residential	Some shop-top residential and increased density of surrounding residential area should be encouraged if located in an inner urban environment.	
Entertainment	Includes some night-time activities, focussed on dining.	
Access	High quality bus services linking from residential catchment. If locationally possible, should be linked with other public transport modes.	
Catchment	Complements the Primary and Principal Activity Centres. Generally an LGA wide catchment, although may attract people from adjacent LGAs.	
RURAL SERVICES CENTRE		
Role	To provide predominantly non-urban communities with a range of goods and services to meet their daily and weekly needs. Trips to larger Primary and Principal Activity Centres only required occasionally	Brighton Huonville New Norfolk Oatlands Sorell
Employment	Includes a mix of retail and office based employment servicing the local area or having limited office space requirements. May include one or two larger employers that are not suited to an urban location.	
Commercial including retail	Should offer at least one major or a combination of independent supermarkets and a range of speciality shops. Local or district level commercial office space servicing the community. May include district offices of government functions if strong correlation to features of the surrounding location.	
Government Services & Community infrastructure	Should offer a range of health and cultural facilities required to support rural community: District Health Centre, Service Tasmania outlet, Community Centre/Community Hall. Educational facilities should be provided (at least Primary and Secondary School,). Should be centre of Local Government services within the relevant LGA. May include State Government district offices benefitting from a more rural location (i.e. Park & Wildlife, Inland Fisheries,	
Residential	Some limited residential.	

TABLE 1: ACTIVITY CENTRE NETWORK (CONTINUED)

Entertainment	Hotel(s), restaurant, and dining facilities with other entertainment for rural community. Local sporting facilities/clubs	
Access	Local bus service with connections to higher order centres, but with expected low service frequency. Predominantly accessed via private motor vehicle with good walking and cycling linkages to surrounding residential area.	
Catchment	Serving outer, more rural based sub-regions and LGAs.	
MINOR OR NEIGHBOURHOOD CENTRE		
Role	To serve daily needs of surrounding community and provide a focus for day-to-day life within a community.	To be determined at the local level, (examples include Claremont, Howrah (Shoreline), Lauderdale, Margate, Sandy Bay Shopping Centre, Triabunna)
Employment	Includes a mix of retail, community, and health services (such as GP) and small scale office-based employment servicing the local area.	
Commercial including retail	Should offer at least one supermarket, a range of speciality shops and secondary retailing. Should be mix of convenience and range. May include discount department store. In rural context, often includes tourism related businesses.	
Government Services & Community infrastructure	Local community services, including community health facilities.	
Residential	Some residential may be interspersed, although there is no emphasis on residential amenity.	
Entertainment	May include some night time activities focussed on dining or a local Hotel.	
Access	In an urban context ideally located on a public transport corridor with at good bus services. Should be highly accessible by cycling or walking from surrounding area to enhance local access.	
Catchment	Serves a number of suburbs but may attract people from a wider catchment on an occasional basis.	
LOCAL CENTRE		
Role	To provide a focus for day-to-day life within an urban community.	To be determined at the local level
Commercial including retail	Offer at least one grovery/convenience store and a range of small specialty shops (i.e. newsagents, pharmacy, gift store) or small-scale easting establishments.	
Government Services & Community infrastructure	Local community services, including Child Health Centre.	
Residential	Some residential may be interspersed.	
Entertainment	May have some dining in the evening or local bar, but residential amenity should be preserved.	
Access	Should be highly accessible by cycling or walking from surrounding area to enhance local access. In an urban context should be serviced by existing public transport.	
Catchment	Locality.	

TABLE 1: ACTIVITY CENTRE NETWORK (CONTINUED)

SPECIALIST CENTRE		
Role	To provide for activity of a specialist nature as defined through specific local area or structure plans.	Cambridge Park Derwent Park (Others may be identified of a local nature. An example of a local Specialist Centre is a highway services precinct)
Employment	Dependent upon specialist characteristics.	
Commercial including retail	Retail should reflect specific centre's purpose or defined character. Broader retailing (take-aways, cafes etc.) should be limited to serving employment in the centre, unless identified as part of its defined purpose or character. Office space should be limited to focussed clusters of employment affiliated with the centre's predefined purpose or character.	
Government Services & Community infrastructure	None, unless predefined purpose or character details a specific need.	
Residential	Generally none, but may have specialised accommodation nearby relating to centre's focus (i.e. student accommodation).	
Entertainment	None.	
Access	Ideally located at or adjacent to public transport corridor, between existing activity centres.	
Catchment	Regional or Local, Dependent upon specialisation.	

18.6 REGIONAL POLICIES

AC 1 *Focus employment, retail and commercial uses, community services and opportunities for social interaction in well-planned, vibrant and accessible regional activity centres that are provided with a high level of amenity and with good transport links with residential areas.*

AC 1.1 *Implement the Activity Centre Network through the delivery of retail, commercial, business, administration, social and community and passenger transport facilities.*

AC 1.2 *Utilise the Central Business, General Business, Local Business Zones to deliver the activity centre network through planning schemes, providing for a range of land uses in each zone appropriate to the role and function of that centre in the network.*

AC 1.3 *Discourage out-of-centre development by only providing for in-centre development within planning schemes.*

AC 1.4 *Promote a greater emphasis on the role of activity centres, particularly neighbourhood and local activity centres, in revitalising and strengthening the local community.*

AC 1.5 *Ensure high quality urban design and pedestrian amenity through the respective development standards*

AC 1.6 *Encourage an appropriate mix of uses in activity centres to create multi-functional activity in those centres.*

AC 1.7 *Improve the integration of public transport with Activity Centre planning, particularly where it relates to higher order activity centres.*

AC 1.8 *Ensure that new development and redevelopment in established urban areas reinforce the strengths and individual character of the urban area in which the development occurs.*

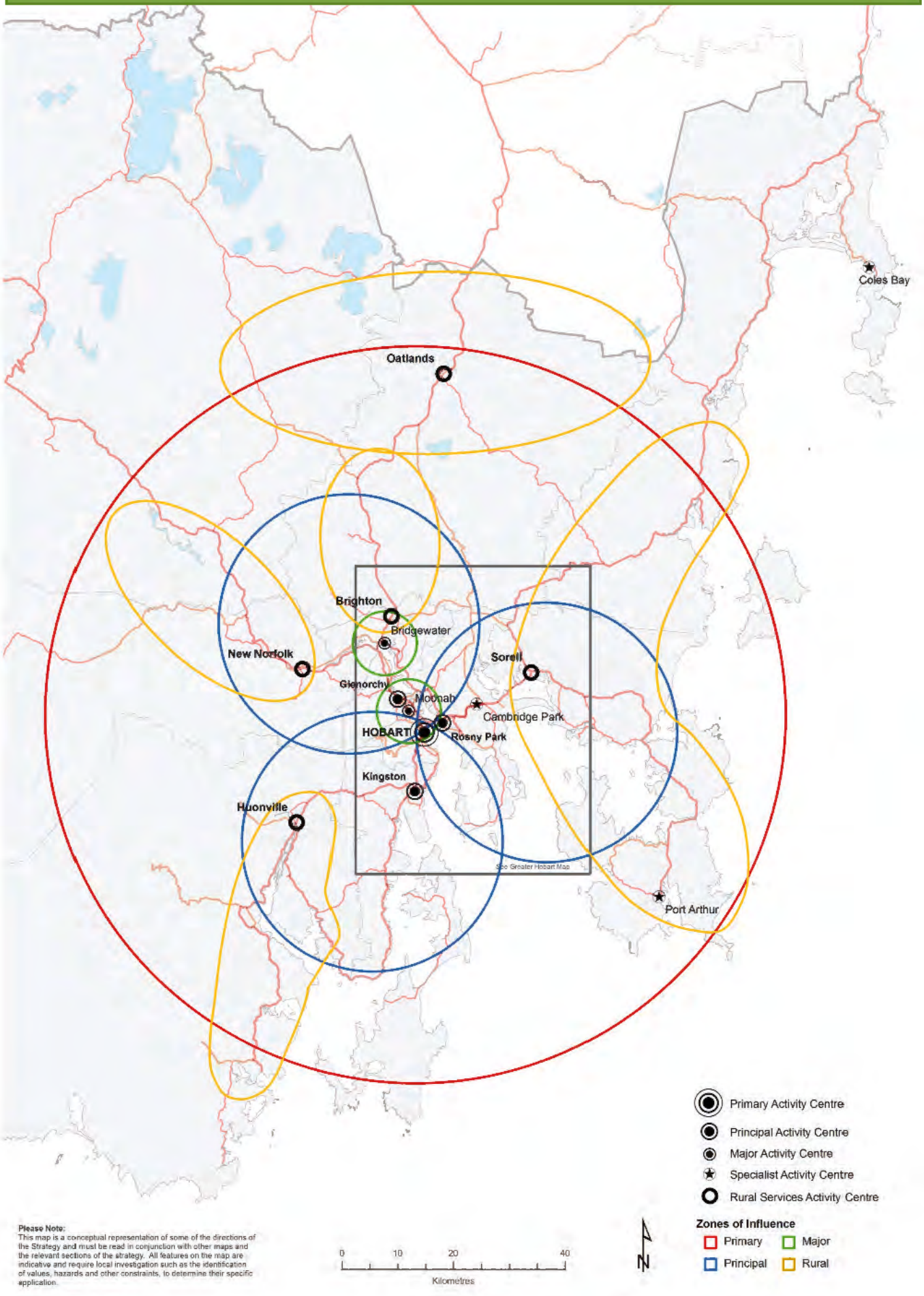
AC 1.9 *Require active street frontage layouts instead of parking lot dominant retailing, with the exception of Specialist Activity Centres if the defined character or purpose requires otherwise.*

AC 1.10 *Activity centres should encourage local employment, although in most cases this will consist of small scale businesses servicing the local or district areas.*

	AC 1.11	*Ensure the Cambridge Park Specialist Activity Centre is consolidated by restricting commercial land to all that land bound by Tasman Highway and Kennedy Drive, and provide for a wide range of allowable uses, including, but not limited to, service industry, campus-style office complexes and bulky goods retailing*
	AC 1.11	*Provide for 10 – 15 years growth of existing activity centres through appropriate zoning within planning schemes.*
AC 2	*Reinforce the role and function of the Primary and Principal Activity Centres as providing for the key employment, shopping, entertainment, cultural and political needs for Southern Tasmania*	
	AC 2.1	*Encourage the consolidation of cultural, political and tourism activity within the Primary Activity Centre*
	AC 2.2	*Achieve high quality design for all new prominent buildings and public spaces in the Primary and Principal Activity Centres*
	AC 2.3	*Undertake master planning for the Primary and Principal Activity Centres taking into account this Strategy. These should examine issues of urban amenity, economic development, accessibility, urban design and pedestrian movement.*
	AC 2.4	*Encourage structure and economic development planning for lower-level Activity Centres by local planning authorities.*
AC 3	*Evolve Activity Centres focussing on people and their amenity and giving the highest priority to creation of pedestrian orientated environments.*	
	AC 3.1	*Actively encourage people to walk, cycle and use public transport to access Activity Centres.*
	AC 3.2	*Support high frequency public transport options into Principal and Primary Activity Centres*
	AC 3.3	*Ensure the minimum car parking requirements and associated 'discretion' in planning schemes for use and development in the Principal and Primary Activity Centres encourages the use of alternative modes of transport than private cars.*

AC 3.4	***Provide for coordinated and consistent car parking approaches across the Principal and Primary Activity Centres that support improved use of public transport and alternative modes of transports, pedestrian amenity and urban environment.***
AC 3.5	***Allow flexibility in providing on-site car parking in the lower order Activity Centres subject to consideration of surrounding residential amenity.***

MAP 8: THE ACTIVITY CENTRE NETWORK



19 SETTLEMENT AND RESIDENTIAL DEVELOPMENT

19.1 OVERVIEW

"Home to just over 86% of the region's population, Greater Hobart is the most significant single settlement within the region... There is considerable connectivity between Greater Hobart as a settlement and residential development in other towns and locations within the region."

The location, form, type and density of residential development is a significant land use planning issue as it is a key element in:

- the extent of urban development;
- the economic and environmental sustainability of our overall urban form;
- travel behaviour and the demands upon the transport system;
- the location and capacity of the physical infrastructure;
- demand for social services and infrastructure;
- impacts upon the natural environment and its values;
- managing for, mitigating or adapting to natural hazards and risks;
- the capacity to accommodate a growing and ageing population; and importantly; and
- the resilience of the community to climate change.

Within Southern Tasmania, a significant proportion of residential development to meet the community's housing needs is located within the Greater Hobart area. Greater Hobart is home to just over 82% of the region's population, and is the most significant single settlement within the region and should be planned for as a single entity.

Outside of Greater Hobart, residential development is fragmented and dispersed across more than 110 other settlements ranging in size from major towns to hamlets of which many of the smallest ones are un-serviced.

There is, however, considerable connectivity between Greater Hobart as a settlement and residential development in other towns and locations within the region. As the location for over 90% of the region's employment there are still many people outside of Greater Hobart who travel daily into the metropolitan area. There is evidence of 'commuter' communities who have taken advantage of the coastal, rural and bushland lifestyle opportunities presented in those locations with the benefit of relatively small travel times (in comparison to mainland circumstances).

There is also evidence of settlements experiencing significant growth pressures for holiday homes for the region's residents as well as visitor accommodation. These growth pressures are particularly evident in the Central Highlands, Glamorgan Spring Bay and Tasman municipal areas where natural, cultural and recreational assets strongly underpin their attractiveness.

Clearly in the absence of any state or regional level land use and settlement planning, residential development has been occurring in an ad-hoc manner. Small shack settlements are growing into permanent residential populations in the absence of physical, social and community infrastructure. Urban areas are rapidly expanding, with larger dwellings on larger allotments being a consistent trend, while both rural residential and low density residential development is becoming more prevalent.

Contemporary imperatives of climate change, changing demographics, rising infrastructure costs and environmental management require a more sustainable approach to residential growth. The Strategy is therefore promoting consolidation of existing settlements

"...in the absence of any state or regional level land use and settlement planning, residential development has been occurring in an ad-hoc manner."

and minimisation of urban sprawl and lower density development. This policy direction has a range of economic, social and environmental benefits, which are articulated in the background analysis (see Section 5.1 under Background Report No. 14)

19.2 RELEVANT STRATEGIC DIRECTIONS

- SD1: Adopting a More Integrated Approach to Planning and Infrastructure
- SD2: Holistically Managing Residential Growth
- SD8: Supporting Strong and Healthy Communities
- SD10:Creating Liveable Communities.

19.3 RELEVANT STATE AND REGIONAL POLICIES

- Social Inclusion Strategy for Tasmania.

19.4 RELEVANT BACKGROUND REPORTS

- Background Report No. 2 – The Regional Profile
- Background Report No. 13 – Dwelling Yield Analysis
- Background Report No. 14 - Providing for Housing Needs

Please note that all background analysis has influenced both the Regional and Greater Hobart Settlement Strategies.

19.5 REGIONAL SETTLEMENT STRATEGY

The move towards a more structured approach to residential growth has already occurred with the development of the existing sub-regional and municipal level settlement strategies (Joint Land Use Planning Initiative, Vision East and Huon Valley Land Use & Development Strategy). The Regional Settlement Strategy builds upon this work at a whole of region level and is aimed at:

- Encouraging the consolidation and strengthening of rural towns and villages;
- Discouraging new residential uses not associated with rural activity in productive rural areas;
- Planning for rural living opportunities to minimise detrimental impacts;
- Minimising inappropriate residential evelopment in areas at risk from hazards such as sea-level rise, flooding and bushfire;
- Maximising use of existing infrastructure;
- Minimising pressure on duplication of services in remote areas;
- Avoiding the creation of any further environmental issues caused by on-site wastewater disposal;
- Preventing linear development in coastal areas; and
- Protecting distinct landscape character.

19.5.1 The Settlement Network

The Regional Settlement Strategy provides a framework to define the future role and function of each of the region's settlements. A two tier classification system has been developed whereby either a suburb or settlement is part of Greater Hobart (and therefore subject to the Greater Hobart Settlement Strategy) or its role and function is categorised as Major District Centre, District Town, Township, Village, Other Small Settlements or Locality.

Table 2 below describes the network of settlements proposed by this Regional Land

"... there needs to be a balance between promoting better utilisation of existing urban land with opportunities to build new housing in greenfield estates."

Use Strategy with the Growth Management Strategies identified in Table 3. These tables should be read in conjunction with each other and are spatially depicted in Map 9

Whilst the Settlement Network provides guidelines as to the typical population and service levels for settlements, this is a guide only and there may be variations and exceptions due to local characteristics.

19.5.2 Regional Growth Management Strategy

The growth management strategies for the settlements across the region are divided into four categories as follows (the percentage growth is calculated as the percentage of the number of dwelling existing at the declaration date that can occur across the 25 year planning period):

- High Growth - 20% to 30% increase in no. of potential dwellings.
- Moderate Growth - 10% to 20% increase in no. of potential dwellings.
- Low Growth - less than 10% increase in no. of potential dwellings.
- Very Low Growth - no new potential dwellings except single dwellings on existing lots or where there is existing low density subdivision potential subject to demonstrating that:
    - there will be no off-site impacts from on-site waste water disposal;
    - there is adequate provision of potable water either through reticulation or tank water; and
    - hazard and natural values constraints are adequately addressed.

The growth strategies also need to be considered against the growth scenario. The growth scenarios are categorised into Mixed and Consolidation. A mixed growth scenario indicates that residential growth should come from a mix of both greenfield and infill circumstances and that expansion of the residential zone may be required dependent upon an assessment of the yield capacity and vacancy of existing zoned land. A consolidation scenario indicates that growth should be predominantly from infill development which can involve development of existing subdivided lots, subdivision of existing zoned but vacant or developed residential, construction of additional dwellings on existing developed lots, redeveloping existing developed lots.

19.5.3 Seasonal Population Pressures

Across the region there are settlements which experience significant seasonal fluctuations in population due to their attractiveness as shack/holiday settlements for residents of the region or because of the strength of the tourism industry in that particularly area. Managing growth arising from seasonal population pressures is not straightforward.

Allowing for additional residential growth above that allowed in Table 3 to accommodate demand for holiday homes or shacks could create land use and infrastructure problems into the future as holiday dwellings are converted into permanent residential dwellings (a trend already evident in the region). The physical and social infrastructure requirements for permanent dwellings are different from season populations. This is a particularly pertinent issue since the planning system through the Common Key Elements Template does not distinguish between the use of a dwelling for permanent residence and dwellings for occasional residence.

TABLE 2: THE SETTLEMENT NETWORK

GREATER HOBART (INCLUDING THE METROPOLITAN AREA AND SATELLITES)	
METROPOLITAN AREA OF GREATER HOBART	
Description	The metropolitan area of Greater Hobart is the largest urban area in the State and the region. As the economic and social centre for the region it provides all the higher order administrative and commercial functions as well as a significant proportion of all employment opportunities available. It is also the administrative and political centre for the State.
Population	200,000+ (including all Satellites and dormitory suburbs)
Utility Connections	Full reticulated services
Services	A full range of services as provided through the Activity Centres Network
Growth Strategy	Will be identified through a specific spatial strategy including Urban Growth Boundary
DORMITORY SUBURB OF GREATER HOBART	
Description	Predominantly residential settlements where residents are highly dependent upon services and facilities within metropolitan area of Greater Hobart, particularly for employment
Population*	Less than 2000
Utility Connections	Electricity. May have reticulated water and sewerage if existing
Services	May contain local shop/newsagents and petrol station.
MAJOR DISTRICT CENTRE	
Description	Significant urban areas physically divorced from Greater Hobart where residents of and visitors to the region can access a wide range of services, education and employment opportunities, although employment is strongly related to surrounding productive resources. Important centres to surrounding sub-region.
Population*	5000+
Utility Connections	Reticulated water, sewerage, stormwater and electricity
Services	See Activity Centre Network: Rural Services Centre
DISTRICT TOWN	
Description	Larger townships located at significant distances from Greater Hobart providing lower order administrative and commercial functions for sub-regions where distances to major urban areas make regular travel difficult. Important centres for surrounding district.
Population*	1000+
Utility Connections	Reticulated water, sewerage and electricity
Services	See Activity Centre Network: Town Centre
TOWNSHIP	
Description	Townships are residential settlements with prominent town centres providing a number of facilities, some local employment opportunities and convenience shopping.
Population*	500 to 1500 (excluding any surrounding rural living areas)
Utility Connections	Electricity. May have reticulated water and sewerage if existing
Services	See Activity Centre Network: Town Centre

VILLAGE	
Description	Predominantly residential settlements with a small often mixed use centre that provides for basic services and daily needs
Population*	200 to 600 (excluding any surrounding rural living areas)
Utility Connections	Electricity. May have reticulated water and sewerage if existing
Services	As a minimum local convenience shop, newsagent/post office agency, community hall
OTHER SMALL SETTLEMENT	
Description	Residential settlements with limited or no services and commercial activity in a defined spatial area. Often shack settlements that have more recently established a more permanent population.
Population*	Up to 200 (excluding any surrounding rural living areas)
Utility Connections	Electricity.
Services	May have local convenience shop or community hall

* *Permanent population as opposed to peak population during holiday months.*

TABLE 3: GROWTH MANAGEMENT STRATEGIES FOR SETTLEMENTS

SETTLEMENT	PROPOSED REGIONAL FUNCTION	GROWTH STRATEGY**	GROWTH SCENARIO
Greater Hobart	Primary urban centre for the region, providing for significant housing and employment opportunities for the broader region.	See Map 10	See Map 10
Sorell	Major Satellite of Greater Hobart		
Brighton			
Margate			
Lauderdale	Minor Satellite of Greater Hobart		
Midway Point			
Seven Mile Beach			
Snug			
Collinsvale, Fern Tree, Dodges Ferry	Dormitory Suburb	Low	Consolidation
Carlton Beach, Clifton, Cremorne, Lewisham, Primrose Sands, Opossum Bay, South Arm,	Dormitory Suburb	Very Low	Consolidation
New Norfolk	Major District Centre	High	Mixed
Huonville	Major District Centre	High	Mixed
Oatlands	District Town	Moderate	Consolidation
Triabunna	District Town	Moderate	Consolidation
Bicheno	Township	Moderate	Consolidation
Bothwell	Township	Moderate	Consolidation
Alonnah	Township	Moderate	Consolidation
Cygnet	Township	Moderate	Mixed
Dover	Township	Low	Consolidation
Franklin	Township	Low	Consolidation
Kempton	Township	Low	Consolidation
Geeveston	Township	Low	Consolidation
Nubeena	Township	Moderate	Mixed
Orford	Township	Low	Consolidation
Swansea	Township	Moderate	Consolidation
Ouse	Township	Low	Consolidation
Hamilton	Township	Low	Consolidation
Richmond	Township	Moderate	Consolidation
Dunalley	Township	Low	Consolidation
Adventure Bay, Alonnah, Bagdad, Buckland, Campania, Colebrook. Coles Bay, Eaglehawk Neck, Ellendale Gretna, Kettering, Maydena, Miena, Murdunna, Pontville, Port Arthur, Taranna, Tarraleah, Westerway, Woodbridge	Village	Low	Mixed
All other settlements	Other Small Settlements or Locality	Very Low	Consolidation

*For all settlements categorised as 'township' or lesser, the growth strategy indicated does not preclude growth possible under existing capacity

On the other hand growth associated with the tourism industry is more manageable as visitor accommodation and tourist operations are distinguished from other residential uses.

Notwithstanding these difficulties, in order to recognise these particular growth pressures, Table 4 below Identifies settlements which are subject to seasonal fluctuations in population and which require more detailed local level structure planning to ensure both residential and tourism related growth is managed appropriately having regard to infrastructure, environmental and social issues.

It is noted that there are many small coastal shack settlement across the region that are not identified in this table. These include settlements such as Eggs and Bacon Bay, Garden Island Sands, Saltwater River, Surveyors Bay, Verona Sands. Due to the lesser role of the tourism industry and less residential growth pressure evident in these settlements (see Table 26 in Background Report No. 2) in addition to the environmental sensitivities associated with their coastal location, it is considered more appropriate that these settlements are managed solely under Table 3.

19.6 GREATER HOBART RESIDENTIAL STRATEGY

The management of residential growth within Greater Hobart requires a more detailed approach because of the size and extent of growth pressures and the influence that metropolitan growth has on the economic, social and environmental health of the whole region. Furthermore, from many respects, it is right to consider Greater Hobart as a single settlement and to plan it accordingly.

The Greater Hobart Settlement Strategy has been formulated on the basis of the forecast demand of an additional 26,500 dwellings (see Section 3: About the Region). Existing supply and construction trends have been analysed and it is clear that continuing the current rate of urban expansion is not sustainable, particularly against the capacity of existing residential areas to accommodate additional dwellings. At present approximately 85% of new dwellings occur through greenfield development and at relatively low densities of between 7 to 10 dwelling per hectare (net density).

TABLE 4: GROWTH MANAGEMENT STRATEGIES FOR SETTLEMENTS

SETTLEMENT	INFLUENCES ON POPULATION FLUCTUATIONS
Bicheno	Tourism Industry & Shack/Holiday Homes
Bruny Island Settlements	Tourism Industry & Shack/Holiday Homes
Coles Bay (including Swanick)	Tourism Industry & Shack/Holiday Homes
Eaglehawk Neck (including Pirates Bay)	Primarily Shack/Holiday Homes
Highland Lakes Settlements	Tourism Industry & Shack/Holiday Homes
Nubeena/White Beach	Primarily Shack/Holiday Homes
Orford/Spring Beach	Primarily Shack/Holiday Homes
Port Arthur (including Stewarts Bay)	Tourism Industry & Shack/Holiday Homes
Swansea	Tourism Industry & Shack/Holiday Homes

Greater efficiency in the use of land for residential development is required through balancing the ratio of greenfield development to infill development. The benefits of infill development resulting in increased residential densities are numerous:

- More efficient use of physical and transport infrastructure;
- Reduced vulnerability to increases in petrol costs and peak oil;
- Reduced ecological footprint of urban development and reduction in loss of biodiversity
- Increased opportunities for social interaction and reduction in social segregation;
- A greater proportion of the population living in proximity to services and employment opportunities;
- Increased economic viability of public transport, and subsequent extension thereof;
- Better utilisation and revitalisation of other public infrastructure, including parks and open spaces;
- Provision of a greater range of housing options to suit the decreasing size of households and ageing population;
- Promotion of health and wellbeing by eliminating distance as a barrier to walking and cycling as preferred modes of transport; and
- Maximising agglomeration potential of inner cities through intensification of land use.

While the dwelling yield analysis for Greater Hobart indicated that there are sufficient infill opportunities within existing residential land to entirely accommodate the forecast demand of 26,500 new dwellings, it is recognised that there would be many barriers to overcome if a 100% infill policy were to be adopted. Most significantly infill dwelling costs generally exceed those of greenfield development and in Greater Hobart where the market is slower to respond to the push towards infill and greater densities (largely because the perceived costs of living greater distances from major centres - such as travel time - is not outweighed by the perceived amenity). The result will be a decrease in housing affordability in the short to medium term.

Consequently this Strategy proceeds on the basis of a 50/50 ratio of greenfield to infill scenario, with a minimum net residential density of 15 dwellings per hectare. Residential growth will be primarily managed through an Urban Growth Boundary that will set the physical extent for a 20 year supply of residential land for the metropolitan area. As the name implies, it will include land for other urban purposes (i.e. commercial and industrial development) as well as pockets of open space and recreational land that assist in providing urban amenity. Smaller dormitory suburbs have been excluded from the Urban Growth Boundary and are managed through the Growth Strategy articulated in Table 3.

In adopting a 50/50 greenfield to infill ratio it can be deduced that approximately 710 hectares of further residential land (using net density) is required. To ensure an orderly release of land within the Urban Growth Boundary a land release program built around Precinct Structures Plans will be required.

Precinct Structure Plans will be required to be completed and relevant aspects incorporated into planning schemes through the Specific Area Plan mechanism, and the rezoning process (under the Land Use Planning and Approvals Act 1993) will then be triggered. Once rezoned

individual Planning Authorities may then consider subdivision application. Site Development Plans will be required to support subdivision applications, and will principally need to show that the proposed subdivision is in accordance with the Specific Area Plan.

The Urban Growth Boundary is shown in Map 10 and has been mapped on the basis of known constraints, values and opportunities including infrastructure capacity, environmental, landscape and heritage values and land hazards. It has also taken into account well established expectations of development rights that to remove at this point in time would deny natural justice. For example, there is already an urban growth boundary established in the Clarence area under their planning scheme.

The Strategy targets the areas around the Integrated transit corridors (Map 4) and Principal and Primary Activity Centres for increased density to at least 25 dwellings per hectare (net density). It is, however, acknowledged that some inner city suburbs in these densification target areas are already at or exceed this density (see density mapping under Background Report No. 8).

Taking into account the presence of these densification corridors, heritage and topographic constraints and the capacity of each Local Government Area to accommodate existing dwellings in the existing zoned land, infill targets have been developed for each municipal area. To achieve these infill targets an Infill Development Program that identifies key greyfield and brownfield redevelopment opportunities to maximise infill development, without relying upon small scale subdivision and unit development, will be required. In this way the amenity of existing residential areas will be better maintained.

It is recognised that the success of this strategy will also require:

- Control of low density, rural and environmental living opportunities outside of the Urban Growth Boundary, particularly where within 'commutable' distance.
- Reduction in regulatory barriers to multiple dwellings and higher density development within planning schemes (subject to heritage constraints);
- Identification of high density residential opportunities, particularly on greyfield and brownfield sites.
- Cooperation between the public and private sector to develop major greyfield and brownfield sites;
- Specific government initiatives to assist in increasing the stock of affordable housing;
- Provision of high quality open spaces and urban environments to support the amenity of higher density living;
- The coordination of use and development of Crown Land within Greater Hobart;
- Community education to dispel common negative myths about multiple dwelling development and promoting the importance of higher urban densities in achieving a more sustainable future;
- Consistent developer charges for physical infrastructure in a manner that reflects long term cost benefits of higher densities and developing existing serviced areas; and
- Minimising construction costs of infill development by reviewing state and local government taxes, fees and charges that contribute to development costs.

- Acknowledgement of the impact of non-government regulated influences on infill development, such as reluctance of financial institutions to lend money for infill development as compared to greenfield and the influence of the higher proportion that the capital improvement accounts for in Greater Hobart as compared to other major cities.

Finally, achievement of the greenfield and infill targets will need to be constantly monitored on a yearly basis with reviews to incentives or restrictions triggered if the ratio of greenfield to infill development is not on track

19.7 REGIONAL POLICIES

SRD 1 ***Provide a sustainable and compact network of settlements with Greater Hobart at its core, that is capable of meeting projected demand.***

SRD 1.1 ***Implement the Regional Settlement Strategy and associated growth management strategies through planning schemes.***

SRD 1.2 ***Manage residential growth in District Centres, District Towns and Townships through a hierarchy of planning processes as follows:***

1. ***Strategy (regional function & growth scenario);***
2. ***Settlement Structure Plans (including identification of settlement boundaries);***
3. ***Subdivision Permit;***
4. ***Use and Development Permit.***

SRD 1.3 ***Support the consolidation of existing settlements by restricting the application of rural living and environmental living zones to existing rural living and environmental living communities. Land not currently zoned for such use may only be zoned for such use where one or more of the following applies:***

a. ***Recognition of existing rural living or environmental living communities, regardless of current zoning. Where not currently explicitly zoned for such use, existing communities may be rezoned to rural living or environmental living provided:***

   (i) the area of the community is either substantial in size or adjoins a settlement and will not be required for any other settlement purpose; and

   (ii) only limited subdivision potential is created by rezoning.

b. ***Replacing land currently zoned for rural living purposes but undeveloped and better suited for alternative purposes (such as intensive agricultural) with other land better suited for rural living purposes, in accordance with the following:***

(i) the total area rezoned for rural living use does not exceed that which is back-zoned to other use;
(ii) the land rezoned to rural living use is adjacent to an existing rural living community;
(iii) the land rezoned to rural living use is not designated as Significant Agriculture Land;
(iv) the land rezoned to rural living use is not adjacent to the Urban Growth Boundary for Greater Hobart or identified for future urban growth; and
(v) the management of risks and values on the land rezoned to rural living use is consistent with the policies in this Strategy.

c. *Rezoning areas that provide for the infill or consolidation of existing rural living communities, in accordance with the following:*

(i) the land must predominantly share common boundaries with:
- *existing Rural Living zoned land; or*
- *rural living communities which comply with SRD 1.3(a);*

(ii) the amount of land rezoned to rural living must not constitute a significant increase in the immediate locality;

(iii) development and use of the land for rural living purposes will not increase the potential for land use conflict with other uses;

(iv) such areas are able to be integrated with the adjacent existing rural living area by connections for pedestrian and vehicular movement. If any new roads are possible, a structure plan will be required to show how the new area will integrate with the established Rural Living zoned area;

(v) the land rezoned to rural living use is not designated as Significant Agricultural Land;

(vi) the land rezoned to rural living use is not adjacent to the Urban Growth Boundary for Greater Hobart or identified for future urban growth; and

(vii) the management of risks and values on the land rezoned to rural living use is consistent with the policies in this Strategy.

SRD 1.4 *Increase densities in existing rural living areas to an average of 1 dwelling per hectare, where site conditions allow.*

SRD 1.5 *Ensure land zoned residential is developed at a minimum of 15 dwellings per hectare (net density).*

SRD 1.6 *Utilise the low density residential zone only where it is necessary to manage land constraints in settlements or to acknowledge existing areas.*

SRD 2 *Manage residential growth for Greater Hobart on a whole of settlement basis and in a manner that balances the needs for greater sustainability, housing choice and affordability.*

SRD 2.1 *Ensure residential growth for Greater Hobart occurs through 50% infill development and 50% greenfield development.*

SRD 2.2 *Manage greenfield growth through an Urban Growth Boundary, which sets a 20 year supply limit with associated growth limits on dormitory suburbs.*

SRD 2.3 *Provide greenfield land for residential purposes across the following Greenfield Development Precincts:*

- *Bridgewater North*
- *Brighton South*
- *Droughty Point Corridor*
- *Gagebrook/Old Beach*
- *Granton (Upper Hilton Road up to and including Black Snake Village)*
- *Midway Point North*
- *Risdon Vale to Geilston Bay*
- *Sorell Township East*
- *Spring Farm/Huntingfield South*

SRD 2.4 *Recognise that the Urban Growth Boundary includes vacant land suitable for land release as greenfield development through residential rezoning as well as land suitable for other urban purposes including commercial, industrial, public parks, sporting and recreational facilities, hospitals, schools, major infrastructure, etc*

SRD 2.5 *Implement a Residential Land Release Program that follows a land release hierarchy planning processes as follows:*

1. *Strategy (greenfield targets within urban growth boundary);*
2. *Conceptual Sequencing Plan;*
3. *Precinct Structure Plans (for each Greenfield Development Precinct);*
4. *Subdivision Permit; and*
5. *Use and Development Permit*

SRD 2.6 *Increase densities to an average of at least 25 dwellings per hectare (net density)[i] within a distance of 400 to 800 metres of Integrated transit corridors and Principal and Primary Activity Centres, subject to heritage constraints.*

SRD 2.7 *Distribute residential infill growth across the existing urban areas for the 25 year planning period as follows:*

Glenorchy LGA	*40% (5300 dwellings)*
Hobart LGA	*25% (3312 dwellings)*
Clarence LGA	*15% (1987 dwelling)*
Brighton LGA	*15% (1987 dwellings)*
Kingborough LGA	*5% (662 dwellings)*

SRD 2.8 *Aim for the residential zone in planning schemes to encompass a 10 to 15 year supply of greenfield residential land when calculated on a whole of settlement basis for Greater Hobart.*

SRD 2.9 *Encourage a greater mix of residential dwelling types across the area with a particular focus on dwelling types that will provide for demographic change including an ageing population.*

SRD 2.10 *Investigate the redevelopment to higher densities potential of rural residential areas close to the main urban extent of Greater Hobart.*

SRD 2.11 *Increase the supply of affordable housing.*

SRD 2.12 *Notwithstanding SRD 2.2 and SRD 2.8, land outside the Urban Growth Boundary shown in Map 10 may be considered for rezoning for urban development if it:*

(a) shares a common boundary with land in the Urban Growth Boundary which is zoned for urban development;

(b) comprises:

(i) a lot that is outside the Urban Growth Boundary with an area not more than 2ha; or

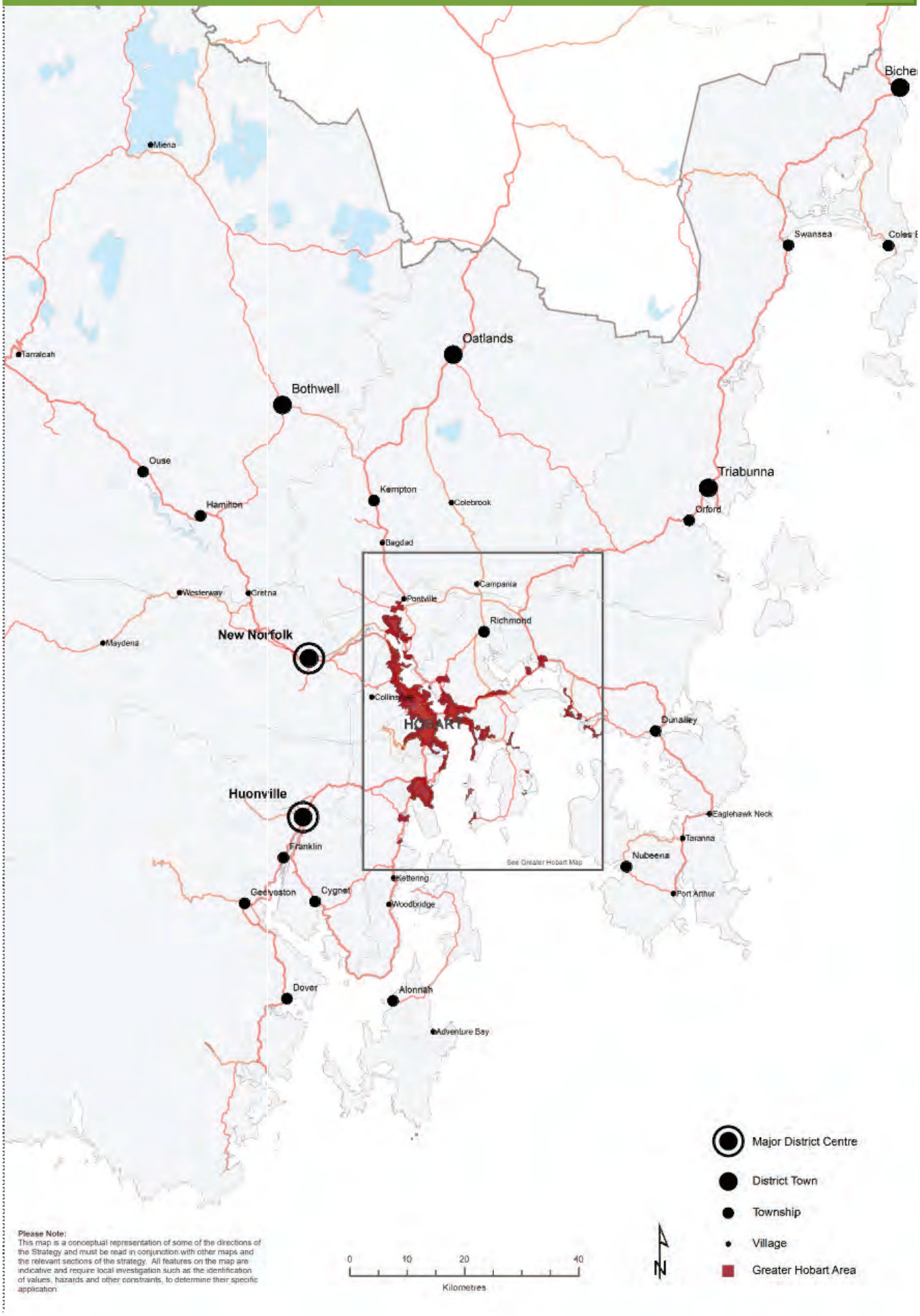
(ii) the residual area of a lot that is partially outside the Urban Growth Boundary, with the area of the lot outside the Urban Growth Boundary not more than 2ha;

(c) does not constitute a significant increase in land zoned for urban development outside the Urban Growth Boundary in that locality; and

(d) results in minimal potential for land use conflicts with adjoining land uses.

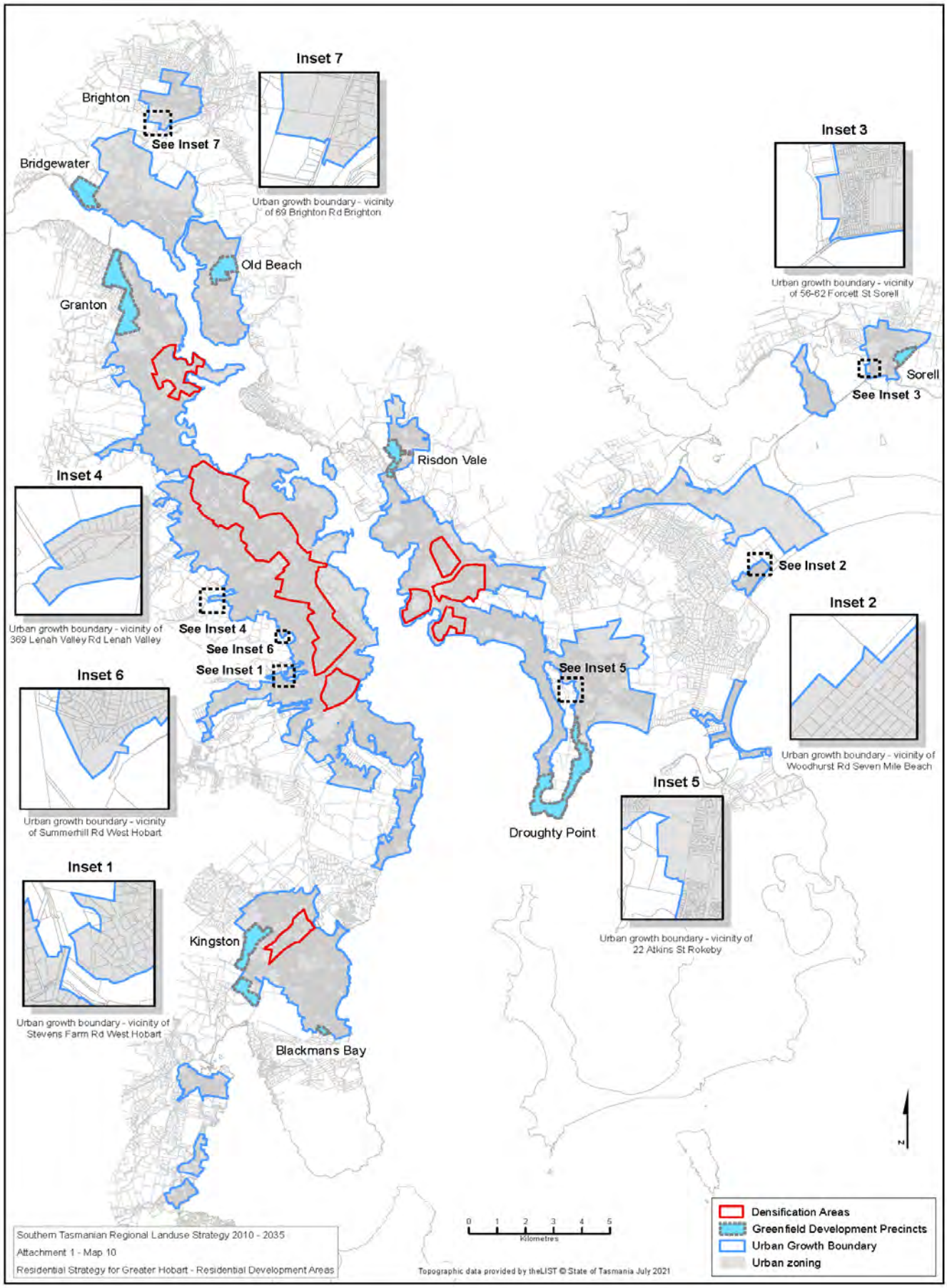
(i) It is recognised that within a defined suburb or precinct in the densification area that not every hectare will contain 25 dwellings. Indeed in some locations a consistent increase in density across a single hectare may be less desirable than the redevelopment of key sites at much higher densities to achieve an alternative measure of densification such as 250 dwellings per 10 hectares.

MAP 9: REGIONAL SETTLEMENT STRATEGY



Please Note:
This map is a conceptual representation of some of the directions of the Strategy and must be read in conjunction with other maps and the relevant sections of the strategy. All features on the map are indicative and require local investigation such as the identification of values, hazards and other constraints, to determine their specific application.

MAP 10: THE RESIDENTIAL STRATEGY FOR GREATER HOBART – RESIDENTIAL DEVELOPMENT AREAS



Note:

A large-scale map providing for a more accurate spatial definition of the Urban Growth Boundary the Densification Areas is provided in Attachment 1

GLOSSARY

Activity Centres *Are mixed use areas that provide a focus for services, employment, retail and commercial activity and social interaction in cities and towns. They also include community meeting places, community and government services, education facilities, settings for recreation, leisure and entertainment and may include in larger activity centre residential development in mixed land use settings.*

Affordable Housing *Housing that is affordable for households on low to moderate incomes, when housing costs are low enough to enable the households to meet other basic long-term living costs. For example household costs should be less than 30 per cent of household income for occupants in the bottom 40 per cent of household incomes.*

Brownfield Sites *Underutilised or former industrial or commercial sites in an urban environment characterised by the presence of site contamination*

Density *Number of dwellings per hectare*

Dormitory Suburbs *Physically isolated suburbs that have high social and economic dependence upon the metropolitan area of Greater Hobart and which are listed as such under Table 3.*

Dwelling *means a building or part of a building used as a self-contained residence which includes food preparation facilities, a bath or shower, a toilet and sink and any outbuilding and works normal to a dwelling*

Greater Hobart or Greater Hobart area *Means the land contained within the Statistical Local Areas (ABS statistical data unit) of Brighton, Clarence, Glenorchy, Hobart Inner, Hobart Outer, Kingborough Part A and Sorell Part A. It includes the metropolitan area and dormitory suburbs.*

Greenfield Sites *Former agricultural or undeveloped natural land on the periphery of towns and cities that has been identified for urban development.*

Greyfield Sites *Underutilised, derelict or vacant residential or commercial sites in an urban environment that are not contaminated.*

Gross Density *The number of dwelling per hectare on a given land area, including public infrastructure such as roads, public open space and, in some instances, non-residential development (e.g. schools and local shops).*

Infill Development	*Development within existing urban areas through:* *a. Small scale subdivision or unit development on existing residential lots; or* *b. Redevelopment of brownfield or greyfield sites.* *May involve increases in density.*
Integrated Transit Corridors	*Means corridors designated as Integrated Transit Corridors in Map 4.*
Metropolitan area (of Greater Hobart).	*The main urban areas of Greater Hobart as identified within the Urban Growth Boundary on Map 11.*
Net Density	*The number of dwelling per hectare on land devoted solely to residential development. While it includes private driveways and private open space, it does not include public infrastructure such as roads, streets and public open space.*
Precinct Structure Plan	*A Precinct Structure plan provides detail on the spatial arrangement of the future use and development in the defined Greenfield Development Precincts (see SRD 2.3). In addition to illustrating details such as road configuration, infrastructure provision and the location of retail and community facilities such as shops, schools and public open space, a Structure Plan should also show details such as desired housing density, land use classification and buffer zones.*
RMPS	*The Resource Management and Planning System of Tasmania*
Settlement Structure Plan	*A Settlement Structure plan provides detail on the spatial arrangement of the future use and development over a Major District Centre, District Centre or Township. In addition to illustrating details such as road configuration, infrastructure provision and the location of retail and community facilities such as shops, schools and public open space, a Structure Plan should also show details such as desired housing density, land use classification and buffer zones.*
Strategy	*The Southern Tasmania Regional Land Use Strategy 2010-2035.*
Threatened Vegetation Communities	*Vegetation communities listed under Schedule 3 of the Nature Conservation Act 2002*
Use Terms: General:	*Where this Strategy makes reference to specific types of uses (i.e. resource development or resource processing) the definition of these uses are to be taken from the Planning Scheme Template for Tasmania (Planning Directive No. 1)*





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Attachment 1

MAP 10: LARGE SCALE

RESIDENTIAL STRATEGY FOR GREATER HOBART - RESIDENTIAL DEVELOPMENT AREAS

Densification Areas
Greenfield Development Precincts
Urban Growth Boundary
Urban zoning

Bridgewater
Granton
Old Beach
Risdon Vale
Sorell
Droughty Point
Kingston
Blackmans Bay

Southern Tasmanian Regional Landuse Strategy 2010 - 2035

Attachment 1 - Map 10: Large Scale

Residential Strategy for Greater Hobart - Residential Development Areas

N

0 10
Kilometres

Topographic data provided by theLIST © State of Tasmania September 2019

Southern Tasmania

Regional Land Use Strategy 2010–2035

TASMANIAN PLANNING SCHEME

ADDENDUM

5 BIODIVERSITY AND GEODIVERSITY

5.5 REGIONAL POLICIES

BNV 1 ***Maintain and manage the region's biodiversity and ecosystems and their resilience to the impacts of climate change.***

BNV 1.1 ***Manage and protect significant native vegetation at the earliest possible stage of the land use planning process.***

Where possible, avoid applying zones that provide for intensive use or development to areas that retain biodiversity values that are to be recognised and protected by the planning scheme.

BNV 1.2 ***Recognise and protect biodiversity values deemed significant at the local level and in the planning scheme:***

- ***a specify the spatial area in which biodiversity values are to be recognised and protected; and***
- ***b implement an 'avoid, minimise, mitigate' hierarchy of actions with respect to development that may impact on recognised and protected biodiversity values.***

BNV 1.3 ***Provide for the use of biodiversity offsets if, at the local level, it is considered appropriate to compensate for the loss of biodiversity values where that loss is unable to be avoided, minimised or mitigated.***

Biodiversity offsets:

- ***a are to be used only as a 'last resort';***
- ***b should provide for a net conservation benefit and security of the offset in perpetuity;***
- ***c are to be based upon 'like for like' wherever possible.***

BNV 1.4 ***Manage clearance of native vegetation arising from use and development in a manner that is generally consistent across the region but allowing for variances in local values.***

BNV 1.5 ***Where vegetation clearance and/or soil disturbance is undertaken, provide for construction management plans that minimise further loss of values and encourages rehabilitation of native vegetation.***

BNV 1.6 ***Include in the planning scheme, preserving climate refugia where there is scientifically accepted spatial data.***

BNV 2 ***Protect threatened native vegetation communities, threatened flora and fauna species, significant habitat for threatened fauna species, and other native vegetation identified as being of local importance and places important for building resilience and adaptation to climate change for these.***

BNV 2.1 ***Avoid the clearance of threatened native vegetation communities except:***

a. ***where the long-term social and economic benefit arising from the use and development facilitated by the clearance outweigh the environmental benefit of retention; and***
b. ***where the clearance will not significantly detract from the conservation of that threatened native vegetation community.***

BNV 2.2 ***Minimise clearance of native vegetation communities that provide habitat for threatened species.***

BNV 2.3 ***Advise potential applicants of the requirements of the Threatened Species Protection Act 1995 and their responsibilities under the Environmental Protection and Biodiversity Conservation Act 1999.***

BNV 3 ***Protect the biodiversity and conservation values of the Reserve Estate.***

BNV 4 ***Recognise the importance of non land use planning based organisations and their strategies and policies in managing, protecting and enhancing natural values.***

BNV 4.1 ***Consult NRM-based organisations as part of the review and monitoring of the Regional Land Use Strategy.***

BNV 5 ***Restrict the spread of declared weeds under the Weed Management Act 1999 and assist in their removal.***

BNV 5.1 ***Provide for construction management plans where vegetation clearance or soil disturbance is undertaken that include weed management actions where the site is known, or suspected, to contain declared weeds.***

BNV 6 ***Geodiversity:***

BNV 6.1 ***Improve knowledge of sites and landscapes with geological, geomorphological, soil or karst features and the value they hold at state or local level.***

BNV 6.2 ***Progress appropriate actions to recognise and protect those values, through means commensurate with their level of significance (state or local).***

6 WATER RESOURCES

6.5 REGIONAL POLICIES

WR 1 *Protect and manage the ecological health, environmental values and water quality of surface and groundwater, including waterways, wetlands and estuaries*

- **WR 1.1** *Use and development is to be undertaken in accordance with the State Policy on Water Quality Management.*
- **WR 1.2** *Incorporate total water cycle management and water sensitive urban design principles in land use and infrastructure planning to minimise stormwater discharge to rivers.*
- **WR 1.3** *Include buffer requirements in the planning scheme to protect riparian areas relevant to their classification under the Forest Practices System.*
- **WR 1.4** *Where development that includes vegetation clearance and/or soil disturbance is undertaken, provide for construction management plans to minimise soil loss and associated sedimentation of waterways and wetlands.*

WR 2 *Manage wetlands and waterways for their water quality, scenic, biodiversity, tourism and recreational values.*

- **WR 2.1** *Manage use and development adjacent to Hydro Lakes in accordance with their classification: Remote Wilderness Lake, Recreational Activity Lake or Multiple Use Lakes.*
- **WR 2.2** *Provide public access along waterways via tracks and trails where land tenure allows, where there is management capacity and where impacts on biodiversity, native vegetation and geology can be kept to acceptable levels.*
- **WR 2.3** *Minimise clearance of native riparian vegetation.*
- **WR 2.4** *Allow recreation and tourism developments adjacent to waterways where impacts on biodiversity and native vegetation can be kept to acceptable levels.*

WR 3 *Encourage the sustainable use of water to decrease pressure on water supplies and reduce long term cost of infrastructure provision.*

- **WR 3.1** *Reduce barriers in the planning system for the use of rainwater tanks in residential areas.*

7 THE COAST

7.5 REGIONAL POLICIES

C 1 ***Maintain, protect and enhance the biodiversity, landscape, scenic and cultural values of the region's coast.***

C 1.1 ***Use and development is to avoid or minimise clearance of coastal native vegetation.***

C 1.2 ***Maximise growth within existing settlement boundaries through local area or structure planning for settlements in coastal areas.***

C 1.3 ***Prevent development on coastal mudflats, unless for the purposes of public access or facilities or for minor infrastructure that requires access to the coast. Prevent development on actively mobile landforms in accordance with the State Coastal Policy 1996.***

C 1.4 ***Zone existing undeveloped land within the coastal area, Environmental Management, Recreation or Open Space unless:***

- ***a. The land is utilised for rural resource purposes; or***
- ***b. It is land identified for urban expansion through a strategic planning exercise consistent with this Regional Land Use Strategy.***

C 2 ***Use and development in coastal areas is to be responsive to the effects of climate change including sea level rise, coastal inundation and shoreline recession.***

C 2.1 ***Include provisions in the planning scheme relating to minimising risk from sea level rise, storm surge inundation and shoreline recession and identify those areas at high risk through the use of overlays.***

C 2.2 ***Growth is to be located in areas that avoid exacerbating current risk to the community through local area or structure planning for settlements and the Urban Growth Boundary for metropolitan area of Greater Hobart.***

C 2.3 ***Identify and protect areas that are likely to provide for the landward retreat of coastal habitats at risk from predicted sea level rise.***

8 MANAGING RISKS AND HAZARDS

8.4 REGIONAL POLICIES

MRH 1 *Minimise the risk of loss of life and property from bushfires.*

MRH 1.1 *Provide for the management and mitigation of bushfire risk at the earliest possible stage of the land use planning process (rezoning or if no rezoning required; subdivision) by the identification and protection (in perpetuity) of buffer distances or through the design and layout of lots.*

MRH 1.2 *Subdivision road layout designs are to provide for safe exit points in areas subject to bushfire hazard.*

MRH 1.3 *Allow clearance of vegetation in areas adjacent to dwellings existing at the time that the planning scheme based on this Strategy come into effect, in order to implement bushfire management plans. Where such vegetation is subject to vegetation management provisions, the extent of clearing allowable is to be the minimum necessary to provide adequate bushfire hazard protection.*

MRH 1.4 *Include provisions in the planning scheme for use and development in bushfire prone areas based upon best practice bushfire risk mitigation and management.*

MRH 1.5 *Allow new development (at either the rezoning or development application stage) in bushfire prone areas only where any necessary vegetation clearance for bushfire risk reduction is in accordance with the policies on biodiversity and native vegetation.*

MRH 1.6 *Develop and fund a program for regular compliance checks on the maintenance of bushfire management plans by individual landowners.*

MRH 2 *Minimise the risk of loss of life and property from flooding.*

MRH 2.1 *Provide for the mitigation of flooding risk at the earliest possible stage of the land use planning process (rezoning or if no rezoning required; subdivision) by avoiding locating sensitive uses in flood prone areas.*

MRH 2.2 *Include provisions in the planning scheme for use and development in flood prone areas based upon best practice in order to manage residual risk.*

MRH 3 *Protect life and property from possible effects of land instability.*

MRH 3.1 *Prevent further development in declared landslip zones.*

MRH 3.2 *Require the design and layout of development to be responsive to the underlying risk of land instability.*

MRH 3.3 *Allow use and development in areas at risk of land instability only where risk is managed so that it does not cause an undue risk to occupants or users of the site, their property or to the public.*

MRH 4 ***Protect land and groundwater from site contamination and require progressive remediation of contaminated land where a risk to human health or the environment exists.***

MRH 4.1 ***Include provisions in the planning scheme requiring the consideration of site contamination issues.***

MRH 5 ***Respond to the risk of soil erosion and dispersive and acid sulfate soils.***

MRH 5.1 ***Prevent further subdivision or development in areas containing sodic soils unless it does not create undue risk to the occupants or users of the site, their property or to the public.***

MRH 5.2 ***Wherever possible, development is to avoid disturbance of soils identified as containing acid sulfate soils. If disturbance is unavoidable then require management to be undertaken in accordance with the Acid Sulfate Soils Management Guidelines prepared by the Department of Primary Industries, Parks, Water and the Environment.***

9 CULTURAL VALUES

9.3 REGIONAL POLICIES

CV 1 ***Recognise, retain and protect Aboriginal heritage values within the region for their character, culture, sense of place, contribution to our understanding history and contribution to the region's competitive advantage.***

CV 1.1 ***Support the completion of the review of the Aboriginal Relics Act 1975 including the assimilation of new Aboriginal heritage legislation with the RMPS.***

CV 1.2 ***Improve our knowledge of Aboriginal heritage places to a level equal to that for European cultural heritage, in partnership with the Aboriginal community.***

CV 1.3 ***Avoid the allocation of land use growth opportunities in areas where Aboriginal cultural heritage values are known to exist.***

CV 1.4 ***Support the use of predictive modelling to assist in identifying the likely presence of Aboriginal heritage values that can then be taken into account in specific strategic land use planning processes.***

CV 2 ***Recognise, retain and protect historic cultural heritage values within the region for their character, culture, sense of place, contribution to our understanding history and contribution to the region's competitive advantage.***

CV 2.1 ***Support the completion of the review of the Historic Cultural Heritage Act 1995.***

CV 2.2 ***Promulgate the nationally adopted tiered approach to the recognition of heritage values and progress towards the relative categorisation of listed places as follows:***

- ***a places of local significance are to be listed within the Local Historic Heritage Code, as determined by the local Council.***
- ***b places of state significance are to be listed within the Tasmanian Heritage Register, as determined by the Tasmanian Heritage Council.***
- ***c places of national or international significance are listed through national mechanisms as determined by the Australian Government.***

CV 2.3 ***Provide for a system wherein the assessment and determination of applications for development affecting places of significance is undertaken at the level of government appropriate to the level of significance:***

- ***a. Heritage places of local significance: by the local Council acting as a Planning Authority.***
- ***b. Heritage places of state significance: by the Tasmanian Heritage Council on behalf of the State Government with respect to heritage values, and by the local Council with respect to other land use planning considerations, with coordination and integration between the two.***

CV 2.4 ***Recognise and list heritage precincts within the Local Historic Heritage Code and spatially define them by associated overlays.***

CV 2.5 ***Base heritage management upon the Burra Charter and the HERCON Criteria, with the Local Historic Heritage Code provisions in the planning scheme drafted to be consistent with relevant principles therein.***

CV 2.6 ***Standardise statutory heritage management.***

- ***a. Listings in the planning scheme should be based on a common inventory template, (recognising that not all listings will include all details due to knowledge gaps).***
- ***b. The Local Historic Heritage Code provisions in the planning scheme should be consistent in structure and expression, whilst providing for individual statements in regard to heritage values and associated tailored development control.***

CV 2.7 ***Provide a degree of flexibility to enable consideration of development applications involving the adaptive reuse of heritage buildings that might otherwise be prohibited.***

CV 3 ***Undertake the statutory recognition (listing) and management of heritage values in an open and transparent fashion in which the views of the community are taken into consideration.***

CV 3.1 ***Heritage Studies or Inventories should be open to public comment and consultation prior to their finalisation.***

CV 4 ***Recognise and manage significant local historic and scenic landscapes throughout the region to protect their key values.***

CV 4.1 ***State and local government, in consultation with the community, to determine an agreed set of criteria for determining the relative significance of important landscapes and key landscape values.***

CV 4.2 ***The key values of regionally significant landscapes are not to be significantly compromised by new development through appropriate provisions within the planning scheme.***

CV 4.3 ***Protect existing identified key skylines and ridgelines around Greater Hobart by limited development potential and therefore clearance through the zones in the planning scheme.***

CV 5 ***Recognise and manage archaeological values throughout the region to preserve their key values.***

CV 5.1 ***Known sites of archaeological potential to be considered for listing as places of either local or state significance within the Local Historic Heritage Code or on the State Heritage Register respectively, as appropriate.***

CV 5.2 ***Development that includes soil disturbance within an area of archaeological potential is to be undertaken in accordance with archaeological management plans to avoid values being lost, or provide for the values to be recorded, conserved and appropriately stored if no reasonable alternative to their removal exists.***

10 RECREATION AND OPEN SPACE

10.5 REGIONAL POLICIES

ROS 1 *Plan for an integrated open space and recreation system that responds to existing and emerging needs in the community and contributes to social inclusion, community connectivity, community health and well being, amenity, environmental sustainability and the economy.*

ROS 1.1 *Adopt an open space hierarchy consistent with the Tasmanian Open Space Policy and Planning Framework 2010, as follows;*

a. *Local*
b. *District*
c. *Sub-regional*
d. *Regional*
e. *State*
f. *National*

ROS 1.2 *Adopt an open space classification system consistent with the Tasmanian Open Space Policy and Planning Framework 2010, as follows;*

a. *Parks;*
b. *Outdoor Sports Venues;*
c. *Landscape and Amenity;*
d. *Linear and Linkage;*
e. *Foreshore and waterway;*
f. *Conservation and Heritage;*
g. *Utilities and Services; and*
h. *Proposed Open Space.*

ROS 1.3 *Undertake a regional open space study, including a gap analysis, to establish a regional hierarchy within a classification system for open space in accordance with the Tasmanian Open Space Policy and Planning Framework 2010.*

ROS 1.4 *Undertake local open space planning projects through processes consistent with those outlined in the Tasmanian Open Space Policy and Planning Framework 2010 (Appendix 3).*

ROS 1.5 *Provide for residential areas, open spaces and other community destinations that are well connected with a network of high quality walking and cycling routes.*

ROS 1.6 ***Subdivision and development is to have regard to the principles outlined in 'Healthy by Design: A Guide to Planning and Designing Environments for Active Living in Tasmania'.***

ROS 2 ***Maintain a regional approach to the planning, construction, management, and maintenance of major sporting facilities to protect the viability of existing and future facilities and minimise overall costs to the community.***

ROS 2.1 ***Avoid unnecessary duplication of recreational facilities across the region.***

11 SOCIAL INFRASTRUCTURE

11.5 REGIONAL POLICIES

SI 1 ***Provide high quality social and community facilities to meet the education, health and care needs of the community and facilitate healthy, happy and productive lives.***

SI 1.1 ***Recognise the significance of the Royal Hobart Hospital and support, through planning scheme provisions, its ongoing function and redevelopment in its current location.***

SI 1.2 ***Match location and delivery of social infrastructure with the needs of the community and, where relevant, in sequence with residential land release.***

SI 1.3 ***Provide social infrastructure that is well located and accessible in relation to residential development, public transport services, employment and education opportunities.***

SI 1.4 ***Identify and protect sites for social infrastructure, particularly in high social dependency areas, targeted urban growth areas (both infill and greenfield) and in identified Activity Centres.***

SI 1.5 ***Provide multi-purpose, flexible and adaptable social infrastructure that can respond to changing and emerging community needs over time.***

SI 1.6 ***Co-locate and integrate community facilities and services to improve service delivery, and form accessible hubs and focus points for community activity, in a manner consistent with the Activity Centre hierarchy.***

SI 1.7 ***Provide flexibility in the planning scheme for the development of aged care and nursing home facilities in areas close to an Activity Centre and with access to public transport.***

SI 1.8 ***Provide for the aged to continue living within their communities, and with their families, for as long as possible by providing appropriate options and flexibility within the planning scheme.***

SI 1.9 ***Provide for the inclusion of Crime Prevention through Environmental Design principles in the planning scheme.***

SI 1.10 ***Recognise the role of the building approvals processes in providing access for people with disabilities.***

SI 2 ***Provide for the broad distribution and variety of social housing in areas with good public transport accessibility or in proximity to employment, education and other community services.***

SI 2.1 ***Provide flexibility in the planning scheme for a variety of housing types (including alternative housing models) in residential areas.***

SI 2.2 ***The planning scheme is not to prevent the establishment of social housing in residential areas.***

12 PHYSICAL INFRASTRUCTURE

12.5 REGIONAL POLICIES

PI 1 ***Maximise the efficiency of existing physical infrastructure.***

PI 1.1 ***Preference growth that utilises under-capacity of existing infrastructure through the regional settlement strategy and Urban Growth Boundary for metropolitan area of Greater Hobart.***

PI 1.2 ***Provide for small residential scale energy generation facilities in the planning scheme.***

PI 2 ***Plan, coordinate and deliver physical infrastructure and servicing in a timely manner to support the regional settlement pattern and specific growth management strategies.***

PI 2.1 ***Use the provision of infrastructure to support desired regional growth, cohesive urban and rural communities, more compact and sustainable urban form and economic development.***

PI 2.2 ***Coordinate, prioritise and sequence the supply of infrastructure throughout the region at regional, sub-regional and local levels, including matching reticulated services with the settlement network.***

PI 2.3 ***Identify, protect and manage existing and future infrastructure corridors and sites.***

PI 2.4 ***Use information from the Regional Land Use Strategy, including demographic and dwelling forecasts and the growth management strategies, to inform infrastructure planning and service delivery.***

PI 2.5 ***Develop a regionally consistent framework(s) for developer charges associated with infrastructure provision, with pricing signals associated with the provision of physical infrastructure (particularly water and sewerage) consistent with the Regional Land Use Strategy.***

PI 2.6 ***Recognise and protect electricity generation and major transmission assets within the planning scheme to provide for continued electricity supply.***

13 LAND USE AND TRANSPORT INTEGRATION

13.5 REGIONAL POLICIES

LUTI 1 ***Develop and maintain an integrated transport and land use planning system that supports economic growth, accessibility and modal choice in an efficient, safe and sustainable manner.***

LUTI 1.1 ***Give preference to urban expansion that is in physical proximity to existing transport corridors and the higher order Activity Centres rather than Urban Satellites or dormitory suburbs.***

LUTI 1.2 ***Allow higher density residential and mixed use developments within 400 metres, and possibly up to 800 metres (subject to topographic and heritage constraints) of integrated transit corridors.***

LUTI 1.3 ***Encourage residential development above ground floor level in the Primary, Principal and Major Activity Centres.***

LUTI 1.4 ***Consolidate residential development outside of Greater Hobart into key settlements where the daily and weekly needs of residents are met.***

LUTI 1.5 ***Locate major trip generating activities in close proximity to existing public transport routes and existing higher order activity centres.***

LUTI 1.6 ***Maximise road connections between existing and potential future roads with new roads proposed as part of the design and layout of subdivision.***

LUTI 1.7 ***Protect major regional and urban transport corridors through the planning scheme as identified in Maps 3 & 4.***

LUTI 1.8 ***Apply buffer distances for new development to regional transport corridors identified in Map 4 in accordance with the Road and Railway Assets Code to minimise further land use conflict.***

LUTI 1.9 ***Car parking requirements in the planning scheme and provision of public car parking is to be consistent with achieving increased usage of public transport.***

LUTI 1.10 ***Identify and protect ferry infrastructure points on the Derwent River (Sullivans Cove, Kangaroo Bay and Wilkinson Point) for their potential use into the future and encourage increased densities and activity around these nodes.***

LUTI 1.11 ***Encourage walking and cycling as alternative modes of transport through the provision of suitable infrastructure and developing safe, attractive and convenient walking and cycling environments.***

LUTI 1.12 ***Encourage end-of-trip facilities in employment generating developments that support active transport modes.***

14 TOURISM

14.5 REGIONAL POLICIES

T 1 ***Provide for innovative and sustainable tourism for the region.***

T 1.1 ***Protect and enhance authentic and distinctive local features and landscapes throughout the region.***

T 1.2 ***Identify and protect regional landscapes, which contribute to the region's sense of place, through the planning scheme.***

T 1.3 ***Allow for tourism use in the Rural Zone and Agriculture Zone where it supports the use of the land for primary production.***

T 1.4 ***Provide flexibility for the use of holiday homes (a residential use) for occasional short-term accommodation.***

T 1.5 ***Provide flexibility within commercial and business zones for mixed use developments incorporating tourism related use and development.***

T 1.6 ***Recognise, that the planning scheme may not always be able to accommodate the proposed tourism use and development due to its innovative and responsive nature.***

T 1.7 ***Allow for objective site suitability assessment of proposed tourism use and development through existing planning scheme amendment processes (section 40T application).***

15 STRATEGIC ECONOMIC OPPORTUNITIES

15.3 REGIONAL POLICIES

SEO 1 ***Support and protect strategic economic opportunities for Southern Tasmania.***

SEO 1.1 ***Protect the following key sites and areas from use and development which would compromise their strategic economic potential through the planning scheme provisions:***

a. ***Hobart Port (including Macquarie and Princes Wharves);***
b. ***Macquarie Point rail yards; and***
c. ***Princes of Wales Bay marine industry precinct.***

SEO 1.2 ***Include place specific provisions for the Sullivans Cove area in the planning scheme.***

SEO 1.3 ***Recognise the regional economic importance of Southwood through specific planning provisions within the planning scheme that allow for its expansion and use by timber, mineral or other primary industries benefitting from its strategic location.***

16 PRODUCTIVE RESOURCES

16.5 REGIONAL POLICIES

PR 1 ***Support agricultural production on land identified as significant for agricultural use by affording it the highest level of protection from fettering or conversion to non-agricultural uses.***

PR 1.1 ***Utilise the Agriculture Zone to identify land significant for agricultural production in the planning scheme and manage that land consistently across the region.***

PR 1.2 ***Avoid potential for further fettering from residential development by setting an acceptable solution buffer distance of 200 metres from the boundary of the Agriculture Zone, within which the planning scheme is to manage potential for land use conflict.***

PR 1.3 ***Allow for ancillary and/or subservient non-agricultural uses that assist in providing income to support ongoing agricultural production.***

PR 1.4 ***Prevent further land fragmentation in the Agriculture Zone by restricting subdivision unless necessary to facilitate the use of the land for agriculture.***

PR 1.5 ***Minimise the use of prime agricultural land for plantation forestry.***

PR 2 ***Manage and protect the value of non-significant agricultural land in a manner that recognises the potential and characteristics of the land.***

PR 2.1 ***Utilise the settlement strategy to assess conversion of rural land to residential land through rezoning, rather than the potential viability or otherwise of the land for particular agricultural enterprises.***

PR 2.2 ***Support opportunities for down-stream processing of agricultural products in appropriate locations or 'on-farm' where appropriate supporting infrastructure exists and the use does not create off-site impacts.***

PR 2.3 ***Provide flexibility for commercial and tourism uses provided that long-term agricultural potential is not lost and it does not further fetter surrounding agricultural land.***

PR 2.4 *The introduction of sensitive uses not related to agricultural use, such as dwellings, are only to be allowed where it can be demonstrated the use will not fetter agricultural uses on neighbouring land.*

PR 3 *Support and protect regionally significant extractive industries.*

PR 3.1 *Existing regionally significant extractive industry sites are to be appropriately zoned, such as the Rural Zone, and are protected by appropriate attenuation areas in which the establishment of new sensitive uses, such as dwellings, is restricted.*

PR 4 *Support the aquaculture industry.*

PR 4.1 *Provide appropriately zoned land on the coast in strategic locations, and in accordance with The Coast Regional Polices, for shore based aquaculture facilities necessary to support marine farming.*

PR 4.2 *Identify key marine farming areas to assist in reducing potential land use conflicts from an increasingly industrialised industry.*

PR 5 *Support the forest industry.*

PR 5.1 *Working forests, including State Forests and Private Timber Reserves (for commercial forestry), are to be appropriately zoned, such as the Rural Zone.*

PR 5.2 *Recognise the Forest Practices System as appropriate to evaluate the clearance and conversion of native vegetation for commercial forestry purposes.*

PR 5.3 *Control the establishment of new dwellings in proximity to State Forests, Private Timber Reserves or plantations so as to eliminate the potential for land use conflict.*

17 INDUSTRIAL ACTIVITY

17.5 REGIONAL POLICIES

IA 1 *Identify, protect and manage the supply of well-sited industrial land that will meet regional need across the 5, 15 and 30 year horizons.*

IA 1.1 *Industrial land is to be relatively flat and enable easy access to major transport routes, and other physical infrastructure such as water, wastewater, electricity and telecommunications*

IA 1.2 *Locate new industrial areas away from sensitive land uses such as residentially zoned land.*

IA 1.3 *Provide for a 30-year supply of industrial land, protecting such land from use and development that would preclude its future conversion to industrial land use - in accordance with the recommendations within the Southern Tasmania Industrial Land Strategy 2013.*

IA 1.4 *Provide a 15-year supply of industrial land, zoned for industrial purposes within the planning scheme – in accordance with the recommendations within the Southern Tasmania Industrial Land Strategy 2013.*

IA 1.5 *Aim to provide a minimum 5-year supply of subdivided and fully serviced industrial land.*

IA 1.6 *Take into account the impact on regional industrial land supply, using best available data, prior to rezoning existing industrial land to non-industrial purposes.*

IA 2 *Protect and manage existing strategically located export orientated industries.*

IA 2.1 *Identify significant industrial sites through zoning and avoid other industrial uses not related to its existing function from diminishing its strategic importance.*

IA 3 *Industrial development is to occur in a manner that minimises regional environmental impacts and protects environmental values.*

IA 3.1 *Take into account environmental values and the potential environmental impacts of future industrial use and the ability to manage these in the identification of future industrial land.*

18 ACTIVITY CENTRES

18.6 REGIONAL POLICIES

AC 1 *Focus employment, retail and commercial uses, community services and opportunities for social interaction in well-planned, vibrant and accessible regional activity centres that are provided with a high level of amenity and with good transport links with residential areas.*

AC 1.1 *Implement the Activity Centre Network through the delivery of retail, commercial, business, administration, social and community and passenger transport facilities.*

AC 1.2 *Utilise the Central Business, General Business, Local Business Zones as the main zones to deliver the activity centre network through the planning scheme, providing for a range of land uses in each zone appropriate to the role and function of that centre in the network.*

AC 1.3 *Discourage out-of-centre development by only providing for in-centre development within the planning scheme.*

AC 1.4 *Promote a greater emphasis on the role of activity centres, particularly neighbourhood and local activity centres, in revitalising and strengthening the local community.*

AC 1.5 *Encourage high quality urban design and pedestrian amenity through the respective development standards.*

AC 1.6 *Encourage an appropriate mix of uses in activity centres to create multi-functional activity in those centres.*

AC 1.7 *Improve the integration of public transport with Activity Centre planning, particularly where it relates to higher order activity centres.*

AC 1.8 *Encourage new development and redevelopment in established urban areas to reinforce the strengths and individual character of the urban area in which the development occurs.*

AC 1.9 *Require active street frontage layouts instead of parking lot dominant retailing, with the exception of Specialist Activity Centres if the defined character or purpose requires otherwise.*

AC 1.10 *Activity centres should encourage local employment, although in most cases this will consist of small scale businesses servicing the local or district areas.*

AC 1.11 *Consolidate the Cambridge Park Specialist Activity Centre by restricting commercial land to all that land bound by Tasman Highway and Kennedy Drive, and provide for a wide range of allowable uses, including, but not limited to, service industry, campus-style office complexes and bulky goods retailing.*

AC 1.11 *Provide for 10 – 15 years growth of existing activity centres through appropriate zoning within the planning scheme.*

AC 2 *Reinforce the role and function of the Primary and Principal Activity Centres as providing for the key employment, shopping, entertainment, cultural and political needs for Southern Tasmania.*

AC 2.1 *Encourage the consolidation of cultural, political and tourism activity within the Primary Activity Centre.*

AC 2.2 *Encourage high quality design for all new prominent buildings and public spaces in the Primary and Principal Activity Centres.*

AC 2.3 *Undertake master planning for the Primary and Principal Activity Centres taking into account this Strategy. These should examine issues of urban amenity, economic development, accessibility, urban design and pedestrian movement.*

AC 2.4 *Encourage structure and economic development planning for lower-level Activity Centres by local planning authorities.*

AC 3 *Evolve Activity Centres focussing on people and their amenity and giving the highest priority to creation of pedestrian orientated environments.*

AC 3.1 *Actively encourage people to walk, cycle and use public transport to access Activity Centres.*

AC 3.2 *Support high frequency public transport options into Principal and Primary Activity Centres.*

AC 3.3 *The minimum car parking requirements and associated 'discretion' in the planning scheme for use and development in the Principal and Primary Activity Centres are to encourage the use of alternative modes of transport other than private cars.*

AC 3.4 *Provide for coordinated and consistent car parking approaches across the Principal and Primary Activity Centres that support improved use of public transport and alternative modes of transports, pedestrian amenity and urban environment.*

AC 3.5 *Allow flexibility in providing on-site car parking in the lower order Activity Centres subject to consideration of surrounding residential amenity.*

19 SETTLEMENT AND RESIDENTIAL DEVELOPMENT

19.7 REGIONAL POLICIES

SRD 1 ***Provide a sustainable and compact network of settlements with Greater Hobart at its core, that is capable of meeting projected demand.***

SRD 1.1 ***Implement the Regional Settlement Strategy and associated growth management strategies through the planning scheme.***

SRD 1.2 ***Manage residential growth in District Centres, District Towns and Townships through a hierarchy of planning processes as follows:***

1. ***Strategy (regional function & growth scenario);***
2. ***Settlement Structure Plans (including identification of settlement boundaries);***
3. ***Subdivision Permit;***
4. ***Use and Development Permit.***

SRD 1.3 ***Support the consolidation of existing settlements by restricting the application of the Rural Living Zone:***

1. ***to existing rural living communities; or***
2. ***for the purposes of preparing a Local Provision Schedule, to land within an existing Environmental Living Zone in an interim planning scheme if consistent with the purpose of the Rural Living Zone.***

Land not currently zoned for rural living or environmental living communities may only be zoned for such use where one or more of the following applies:

a. ***Recognition of existing rural living communities, regardless of current zoning. Where not currently explicitly zoned for such use, existing communities may be rezoned to Rural Living provided:***
   - ***(i) the area of the community is either substantial in size or adjoins a settlement and will not be required for any other settlement purpose; and***
   - ***(ii) only limited subdivision potential is created by rezoning.***

b. ***Replacing land currently zoned for rural living purposes but undeveloped and better suited for alternative purposes (such as intensive agriculture with other land better suited for rural living purposes, in accordance with the following:***

(i) the total area rezoned for rural living use does not exceed that which is back-zoned to other use;

(ii) the land rezoned to rural living use is adjacent to an existing rural living community;

(iii) the land rezoned to rural living use is not designated as Significant Agriculture Land on Map 5 of this Strategy;

(iv) the land rezoned to rural living use is not adjacent to the Urban Growth Boundary for Greater Hobart or identified for future urban growth; and

(v) the management of risks and values on the land rezoned to rural living use is consistent with the policies in this Strategy.

c. Rezoning areas that provide for the infill or consolidation of existing rural living communities, in accordance with the following:

(i) the land must predominantly share common boundaries with:

- *existing Rural Living zoned land; or*
- *rural living communities which comply with SRD 1.3(a);*

(ii) the amount of land rezoned to rural living must not constitute a significant increase in the immediate locality;

(iii) development and use of the land for rural living purposes will not increase the potential for land use conflict with other uses;

(iv) such areas are able to be integrated with the adjacent existing rural living area by connections for pedestrian and vehicular movement. If any new roads are possible, a structure plan will be required to show how the new area will integrate with the established Rural Living zoned area;

(v) the land rezoned to rural living use is not designated as Significant Agricultural Land on Map 5 of this Strategy;

(vi) the land rezoned to rural living use is not adjacent to the Urban Growth Boundary for Greater Hobart or identified for future urban growth; and

(vii) the management of risks and values on the land rezoned to rural living use is consistent with the policies in this Strategy.

SRD 1.4 *Allow for increased densities in existing rural living areas to an average of 1 dwelling per hectare, where site conditions allow.*

SRD 1.5 *Encourage land zoned General Residential to be developed at a minimum of 15 dwellings per hectare (net density).*

SRD 1.6 *Utilise the Low Density Residential Zone only where it is necessary to manage land constraints in settlements or to acknowledge existing areas.*

SRD 2 *Manage residential growth for Greater Hobart on a whole of settlement basis and in a manner that balances the needs for greater sustainability, housing choice and affordability.*

SRD 2.1 *Residential growth for Greater Hobart is to occur through 50% infill development and 50% greenfield development.*

SRD 2.2 *Manage greenfield growth through an Urban Growth Boundary, which sets a 20 year supply limit with associated growth limits on dormitory suburbs.*

SRD 2.3 *Provide greenfield land for residential purposes across the following Greenfield Development Precincts:*

- *Bridgewater North*
- *Brighton South*
- *Droughty Point Corridor*
- *Gagebrook/Old Beach*
- *Granton (Upper Hilton Road up to and including Black Snake Village)*
- *Midway Point North*
- *Risdon Vale to Geilston Bay*
- *Sorell Township East*
- *Spring Farm/Huntingfield South*

SRD 2.4 *Recognise that the Urban Growth Boundary includes vacant land suitable for land release as greenfield development through residential rezoning as well as land suitable for other urban purposes including commercial, industrial, public parks, sporting and recreational facilities, hospitals, schools, major infrastructure, etc.*

SRD 2.5 *Implement a Residential Land Release Program that follows a land release hierarchy planning processes as follows:*

1. *Strategy (greenfield targets within urban growth boundary);*
2. *Conceptual Sequencing Plan;*
3. *Precinct Structure Plans (for each Greenfield Development Precinct);*
4. *Subdivision Permit; and*
5. *Use and Development Permit.*

SRD 2.6 *Increase densities to an average of at least 25 dwellings per hectare (net density)(i) within a distance of 400 to 800 metres of Integrated transit corridors and Principal and Primary Activity Centres, subject to heritage constraints.*

SRD 2.7 *Distribute residential infill growth across the existing urban areas for the 25 year planning period as follows:*

Glenorchy LGA 40% (5300 dwellings)

Hobart LGA 25% (3312 dwellings)

Clarence LGA 15% (1987 dwelling)

Brighton LGA 15% (1987 dwellings)

Kingborough LGA 5% (662 dwellings)

SRD 2.8 *Aim for the residential zones in the planning scheme to encompass a 10 to 15 year supply of greenfield residential land when calculated on a whole of settlement basis for Greater Hobart.*

SRD 2.9 *Encourage a greater mix of residential dwelling types across the area with a particular focus on dwelling types that will provide for demographic change including an ageing population.*

SRD 2.10 *Investigate the redevelopment to higher densities potential of rural residential areas close to the main urban extent of Greater Hobart.*

SRD 2.11 *Increase the supply of affordable housing.*

SRD 2.12 *Notwithstanding SRD 2.2 and SRD 2.8, land outside the Urban Growth Boundary shown in Map 10 may be considered for rezoning for urban development if it:*

(a) shares a common boundary with land in the Urban Growth Boundary which is zoned for urban development;

(b) comprises:

(i) a lot that is outside the Urban Growth Boundary with an area not more than 2ha; or

(ii) the residual area of a lot that is partially outside the Urban Growth Boundary, with the area of the lot outside the Urban Growth Boundary not more than 2ha;

(c) does not constitute a significant increase in land zoned for urban development outside the Urban Growth Boundary in that locality; and

(d) results in minimal potential for land use conflicts with adjoining land uses.

(i) It is recognised that within a defined suburb or precinct in the densification area that not every hectare will contain 25 dwellings. Indeed in some locations a consistent increase in density across a single hectare may be less desirable than the redevelopment of key sites at much higher densities to achieve an alternative measure of densification such as 250 dwellings per 10 hectares.

Sport and
Recreation Tasmania

Tasmanian Open Space Policy and Planning Framework

Summary



Prepared for Sport and Recreation Tasmania
Department of Economic Development, Tourism and the Arts
December 2010

Prepared by:
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Tasmania
Explore the possibilities

SUMMARY

Context

BACKGROUND

Open spaces contribute to the quality of life enjoyed by the Tasmanian community. Well-planned, designed and implemented open space planning policies aid in the delivery of a range of broader personal, social, economic and environmental objectives for the community.

In the absence of a state-wide approach to open space planning, there is a risk that approaches to open space planning at a state, regional and local level will continue to be ad hoc, lack consistency, not respond to emerging needs and fail to deliver the many benefits associated with good open space planning.

Climate change, the aging profile of the Tasmanian population, changing recreation participation levels and emerging activities, increased community expectations and changing work patterns are just some of the trends that will influence the need for, type and amount of open space required in the future.

Many of the open space plans prepared at the regional level (e.g. *Cradle Coast Open Space Plan 2009*, *Tamar Regional Valley Open Space System 2004)* and plans prepared for local councils share common values and strategic directions for improving the provision, development and management of open space. However, there is a need to develop clear and consistent policies and strategies that will help guide open space planning and provision in the future at a state, regional and local level.

The Tasmanian Government, through Sport and Recreation Tasmania, recognised this need and commissioned the preparation of an open space planning project for the state. This was considered timely given the current work being undertaken into strategic and statutory planning by the Regional Planning Initiatives for northwest, north and southern Tasmania.

The purpose of the this project is to provide sound policy guidance and establish a framework for effective open space planning and provision at a state, regional and local level in Tasmania. In doing so, it is expected that this will help increase the capacity and commitment to better policy and practices in open space planning and allow for more effective integration of open space objectives within statutory and non-statutory planning tools.

The project was managed through a project steering committee consisting of representatives from Sport and Recreation Tasmania, each of the three Regional Planning Initiatives, and the Tasmanian Planning Commission.

DEFINING OPEN SPACE

An open space definition has been prepared which responds to the significant natural and cultural values of our Tasmanian landscape, and the physical, psychological and spiritual benefits that can be gained from engaging with these places. The definition also recognises the significant local, regional and state economic benefits that are associated with quality open space provision, such as tourism, recreation, events and attracting residential and other investors to an area.

Open space, in the context of this project, means:

Land and water settings maintained and managed for a range of environmental and social purposes and that are valued and may be used by the community, including:

- conservation of ecological processes (including ecosystem services such as clean water) native flora, wildlife habitat
- conservation of cultural heritage and aesthetic values
- sport, recreation and leisure functions – both passive and active, competitive and non-competitive and including open space user support facilities but excluding indoor facilities
- spaces to enhance the visual qualities and social character of urban and rural landscapes
- linear linkages, including trails, pathways, road reserves, riparian reserves, habitat corridors and beaches
- parks, playgrounds and other public spaces where the community can exercise, play, learn, and relax
- hazard management, including but not limited to flood control, bushfire hazard management, climate change and rising sea level.

Benefits of open space

Open space is a valuable community asset, providing a range of personal, social, environmental and economic benefits, including:

- opportunities for a diverse range of physical activities, including organised sports and informal recreation - usually free of charge
- contributing to the 'livability' of towns and cities, including linear linkages for alternative transport (e.g. off-road cycling and walking routes), providing safe spaces to gather and socialise, and enhancing scenic quality
- 'green spaces' for relaxation, contemplation, and play opportunities for people to connect with, and learn about their local environment, contributing to psychological as well as physical well-being
- conservation of natural and cultural values, such as native flora, wildlife habitat, cultural heritage and aesthetic values;
- contributing to the viability of local economies through encouraging capital investment
- encouraging healthy lifestyles and providing opportunities for physical activity, potentially reducing healthcare costs through lowering diseases associated with inactivity and stress (e.g. obesity, diabetes, heart conditions and depression)
- opportunities to engage with natural areas to undertake recreational activities (e.g. riparian reserves along waterways allow access for walking and fishing)
- maintenance of utilitarian values, such as water storage, flood mitigation, and other environmental services (e.g. clean air and water)
- the emerging function of contributing to climate change adaptation and mitigation (e.g. through carbon storage, buffers to sea level rise, and by encouraging non-motorised transport etc).

Trends influencing open space

The report refers to a range of national trends that influence or impact upon open space needs and provision, including:

- increased economic development and affluence
- increased community debt associated with financial borrowing regulations
- population growth
- changing work hours and employment structures
- changing family structures
- changing home and living styles
- ageing population
- more of a multi-cultural society
- growing community-based cultural interests
- growing levels of education
- new, different, more accessible and affordable technology
- greater policy focus on equity and access.

Whilst the majority of these changes have been positive in their impacts, changing work structures have dramatically impacted on volunteering and club activities. Further, pockets of disadvantage have emerged, particularly amongst newly-arrived immigrant groups, the aged, and residents in more remote rural communities that are progressively losing population and suffering the impacts of drought.

Open space issues

The main issues and challenges associated with open space planning in Tasmania include:

- lack of an agreed definition and policy on open space, to guide the planning and implementation of open space provision at a state, regional and local level

the limitations of the planning system in being able to deliver sustainable open space outcomes on the ground, given the range of factors involved in open space provision, management and maintenance, that are outside of the statutory planning framework

inconsistencies in the provision of open space across the state, including the methodologies used to determine need and the 'tools' associated with open space planning (e.g. classification and hierarchy systems, zoning, developer contributions, development standards, and application of needs analysis)

inadequacies in open space provision, in part stemming from the use of inappropriate application or quantitative 'rules' such as the provision under the *Local Government (Building and Miscellaneous Provisions) Act 1993*, which states that developers must transfer 5% of subdivided land to council for open space purposes

the statutory process for councils to follow in the disposal of open space land are complex and time consuming

limited integration of open space planning considerations with broader land use planning objectives at the state, regional and local levels, further contributing to the inconsistencies, and gaps in provision evident at a local level

limited resources available to undertake open space planning at all levels of government

difficulties associated with the management of a diverse open space system, including differing management regimes, provision of facilities, maintenance schedules etc

past subdivision and planning has delivered isolated pockets of open space rather than focus on the creation of open space systems, easily accessible to the community, connected by trail and public transport networks where possible

limited capacity to create integrated, flexible and multi-use venues, which consolidate resource requirements and avoid duplication of services and amenities, and therefore reduce overall operating and maintenance costs

the limited or ad hoc response to changes in demographic, sport, recreation, and other societal trends when considering open space needs (the system should not be 'fixed')

the slow recognition of the need to apply contemporary planning practice and societal concerns into open space planning (e.g. climate change, social inclusion), moving away from the traditional model of sport and recreation facility provision (e.g. single purpose, single user facilities) to a state-wide system of built and natural environments, aimed at improving the quality of life for Tasmanians on a range of levels.

STAKEHOLDER VIEWS

During the early stages of the study, regional forums were held with key stakeholders in Launceston, Devonport and Hobart. A state-wide forum was held in Launceston following release of the draft report. A final round of consultation with local government was held after public feedback on the draft report had been received and processed.

In addition to discussing the key issues presented above, the forums were important in identifying:

the role and value of all open space as part of a comprehensive open space system;

the requirement for a consistent approach and guidelines for open space planning

the need to rationalise the number of open space planning objectives;

support for planning and policy integration across different agencies and spheres of government;

the need for legislative change to achieve more effective open space planning outcomes;

the need for better planning tools to guide open space planning and provision;

the need for better resourcing and partnerships for the management and maintenance of open space;

that open space planning must be informed by community needs rather than standards of provision;

that planning schemes and development control processes are not the only tools for improving open space planning and greater emphasis should be placed on achieving greater strategic planning, use of outline development plans and legislative change; and

the opportunity for greater co-ordination and information exchange about open space planning between different agencies.

Developing a state-wide open space policy and planning framework

Benefits

The preparation of a state-wide open space policy and planning framework will provide a range of benefits, these include:

the provision of a consistent definition, suite of objectives and policies to guide open space planning and management at a state, regional and local level

the provision of direct assistance with the creation of an open space system that better reflects the needs and aspirations of the Tasmanian community, and that has the capacity to be adapted to meet changing needs

guidance within the development of effective open space planning tools, including a consistent open space classification and hierarchy system, developer contribution policy, demand analysis policy, and requirements for the preparation of open space plans

greater recognition of open space as a legitimate land use across all levels of governance.

VISION

A vision for the Tasmanian open space system is:

Tasmania will have a diverse, comprehensive and sustainable open space system, providing health and well-being, environmental, sport and recreation, social, and economic benefits. The Tasmanian open space system will be developed and managed in response to the needs of the community and visitors, whilst respecting our unique environment.

Four principal objectives have been formulated to support this vision, along with 15 key policy statements for these objectives, as shown in Table 1.

The report sets out 60 recommended strategies to achieve these objectives and policies. The strategies within the main report have been grouped to cover policy areas of planning and governance, land management, training and education, design, marketing and promotion.

OBJECTIVE 1: To Establish an integrated and consistent open space policy and planning framework for Tasmania
Policy 1: The Tasmanian open space planning framework will provide a strategic, 'whole-of-government' approach to open space planning and provision in Tasmania.
Policy 2: The Tasmanian open space planning framework will incorporate open space policy guidance to aid integrated state, regional and local planning.
Policy 3: The Tasmanian open space planning framework will foster consistency in the adoption of planning tools and processes to support effective open space planning.
OBJECTIVE 2: To have the capacity to manage an open space system that contributes to environmental sustainability
Policy 1. The Tasmanian open space system will protect and enhance ecological processes, biodiversity conservation and environmental services.
Policy 2. The Tasmanian open space system will protect and enhance cultural heritage, local character and aesthetic values.
Policy 3. The Tasmanian open space system will contribute directly and indirectly to climate change mitigation and adaptation.
Policy 4: The Tasmanian open space system will facilitate non-motorised transport (or 'active') transport, minimise emissions, and lower Tasmania's carbon footprint.
Policy 5: The Tasmanian open space system will be managed in a cooperative way, with the various land managers and the community working in partnership to achieve environmentally sustainable outcomes.
OBJECTIVE 3: To support an open space system that contributes to social inclusion, community connectivity and community health and well-being
Policy 1: The Tasmanian open space system will be developed and managed in collaboration with the Tasmanian community, and be based on demonstrated need.
Policy 2: The Tasmanian open space system will facilitate community health and well-being, including physical activity through good design, linkages, and quality facilities.
Policy 3: The Tasmanian open space system will be accessible and well-connected.
Policy 4: The Tasmanian open space system will be equitable, and respond to issues such as mobility impairment or disability, social isolation, economic and environmental disadvantage.
OBJECTIVE 4: To manage an open space system that contributes to the Tasmanian economy
Policy 1: The Tasmanian open space system will be planned, developed and managed with consideration given to delivering a potential a range of economic benefits to the Tasmanian community.
Policy 2: The Tasmanian open space system will improve Tasmania's competitiveness as a destination for visitors, and as an attractive place to relocate and do business.
Policy 3: The Tasmanian open space planning framework will support greater public and private investment in appropriate infrastructure and services that benefit access, use and management of Tasmania's open space values.

Table 1 : Objectives and policies

Implementation

The key requirements for implementing a state-wide open space policy and planning framework are:

establishing clear and improved governance in relation to open space planning and provision

adopting a suite of planning tools to assist implementation of the state-wide open space policy and the planning framework

developing sufficient capacity and commitment to ensure effective and sustainable open space planning, provision and management.

Planning tools

A range of planning tools have been developed to aid more effective open space planning within the state, these include:

preparing an audit of open space supply

adopting an open space hierarchy

adopting an open space classification system

improving the open space planning process

achieving consistency in planning scheme zoning provisions for open space in the future.

Open Space Hierarchy

An open space hierarchy refers to the scale of the area served or the catchment from which the open space attracts users, as well as the 'status' of the facilities provided (e.g. national-level mountain bike course). A hierarchical classification of open space is an invaluable planning, management and information tool. From a planning perspective, the position which a facility occupies within a hierarchy provides an indication of the role it is expected to perform and thereby, the size of the site and the scale and quality of the amenities, services and other resources which could be expected to be provided. These factors will generally be different for each level of the hierarchy.

From a management point of view, the position of a resource in a hierarchy provides an indication of the maintenance inputs, which should be, or will need

to be allocated to it, and which activities might not be permitted to use it. This helps to ensure the limited resources are used effectively and efficiently, rather than spending scarce resources on all open space areas regardless of their importance and what role they serve in the overall open space system. The following hierarchy for open space was presented:

Local

District

Sub-regional

Regional

State

National

Open space classification system

Each 'parcel' of open space can be classified into different types that are generic in characteristics and functions, and are therefore, likely to require similar management responses. This process assists significantly in understanding what mix of open spaces exist within the current system, and where there are possible gaps or overlaps.

A proposed classification of open space types has been derived from a range of open space studies conducted over the past 15 years. The proposed categories are:

Parks

Outdoor Sports Venues

Landscape and Amenity

Linear and Linkage

Foreshore and waterway

Conservation and Heritage

Utilities and Services

Proposed Open Space.

For each category of open space, a brief outline is provided to:

define the open space category

the purpose of the open space

amenities which may be provided.

The above classification system (or similar versions) has been applied within local council Open Space and Recreation Strategy Plans for the City of Launceston, City of Burnie, City of Glenorchy and Municipality of Huon Valley.

It is expected that the classification system will be a more effective tool for local area planning given the diversity and multitude of open spaces being managed by local councils. However the classification system will support strategic open space planning within a region or metropolitan area. At the state level, it may have limited value for future planning given the diversity of land tenure types managed and maintained by the State Government. In this regard, land managers typically have other management tools to assist with future planning e.g. code of practice, generic management plans and policies covering land tenure types. However the classification provides the planning capacity for assessing consistency across the open space system.

Open space planning process

It is critical that the planning and/or providing agencies are very clear about what they want to achieve through an open space planning process and about the needs and aspirations of those for whom they are providing. This planning tool proposes an open space planning process based on open space studies conducted over the last 15 years.

The stages of an open space planning process are:

1. Agree on the need for open space planning

2. Establish a Project Steering Team with representation from all key stakeholders

3. Define the provision purpose, principles and objectives

4. Review the policy context

5. Establish and implement a community consultation program

6. Evaluate the current and projected demographic characteristics

7. Establish an open space inventory

8. Apply the open space classification and hierarchy system to the inventory

9. Assess community and user needs

10. Assess trends in open space provision, use and need

11. Identify improvements to existing provision and *additional* provision ('Needs Analysis')

12. Identify sites for acquisition, reallocation and development

13. Proceed to acquisition and development

Although they are listed in a numbered sequence, it is possible to begin at a variety of points depending on the specific circumstances that apply. In some instances a reiterative process may need to be followed as the findings of later steps in the process may lead to or warrant a rethinking of earlier stages of the work.

These stages, or tasks, can be applied to a range of issues and contexts ranging across all open space types and across differing scales of development. The process outlined is generic in nature and may well need to be tailored to specific situations and tasks. Depending on the situation, some elements will almost certainly need to be given greater or lesser attention in light of the project scale, previous research and planning and the degree to which the desired outcomes are known. At the very least, the process can be used as a checklist of issues that may need attention and resolution.

Planning scheme zones

The possible range of zones to be included as common elements in future Tasmanian planning schemes is currently being reviewed under the guidance of the Tasmanian Planning Commission. The study recommends that:

there should be one open space zone with planning provisions that clearly differentiates between the planning and development requirements for active use/developed or 'formal' sporting sites, compared to more passive/less developed, or 'natural' open spaces

other zones, such as the proposed Environmental Management Zone, should be used to identify land which is also deemed to be open space (e.g. riparian reserves) and should be managed for environmental values as a primary purpose, with appropriate recreational use as secondary purpose

improved ‘checks and balances’ should be introduced into legislation or statutory processes for the disposal of open space to give greater security to community concerns about the potential loss of open space e.g. classification of community land and operational landthe broader values and aspects of open space (e.g. contributing to health, well-being, livability, social inclusion) should be integrated within the subdivision approval process, the preparation of outline development plans, the intent and planning provisions of other zones, to support good design and better development outcomes related to community open space.

ACTION PLAN

An action plan has been prepared to guide the steps involved in the implementation process over the next 2 years. The focus is placed on those actions, which have priority and will need to be implemented so as to support the ongoing implementation of the recommended strategies for each of the policy objectives listed.

Table 2 sets out the recommended action, responsibility and proposed timing for the completion of the task.

No	Recommended action	Responsibility	Timing
1	Review and adoption of the open space policy and planning framework to help facilitate a commitment towards achieving a whole-of-government approach.	State Government - Tasmanian Planning Commission, DPAC and DEDTA (Sport and Recreation Tasmania)	6 months
2	The preparation of an Open Space Advisory Guidance Policy and to foster infusion within a range of existing government policies that are interrelated to achieving effective open space planning e.g. health, transport, social inclusion, environment, transport.	Tasmanian Planning Commission in association with all relevant government agencies	12 months
3	Integrate the open space policy and planning framework within the current preparation of the regional land use plans and common elements for planning schemes (e.g. common definition, zone and purpose statement).	Tasmanian Planning Commission, Regional Planning Teams and support of local councils	12 months
4	Promote the basic planning tools to aid more effective open space planning including: preparing an audit of open space supply; adopting an open space hierarchy; adopting an open space classification system; and improving the open space planning process.	State Government and local councils – facilitated by Sport and Recreation Tasmania	12 months
5	Support the implementation of core policy documents such as A Social Inclusion Strategy for Tasmania, the State Physical Activity Plan and Healthy By Design: A Guide to Planning and Designing: Environments for Active Living, which are clearly linked with the need for achieving more effective open space planning.	State Government – DEDTA (Sport and Recreation Tasmania, PPAC), Department of Health and Human Services	Ongoing commitment
6	Undertake a review of the provisions of the *Local Government (Building & Miscellaneous Provisions) Act 1993* and other relevant Acts to consider more effective powers for councils and other land managers in acquiring and managing open spaces that reflect best practice in open space provision.	State Government – Parliamentary Legislation Committee	18 months
7	Prepare regional and metropolitan open space strategy plans consistent with the open space policy and planning framework and the direction of the regional land use plans.	Partnership resourcing between State Government and local councils	Ongoing commitment

Table 2 : Implementation action plan

No	Recommended action	Responsibility	Timing
8	Support the commitment of land managing agencies and councils in the preparation of open space management plans, local open space strategy plans and master plans consistent with progressing the open space policy and planning framework.	State Government (Sport and Recreation Tasmania), local councils	Ongoing commitment
9	Develop a case for increased funding and resourcing for land mangers and council to be directed towards open space planning, development and management based on the beneficial relationship between improving community access to open space and achieving more active, equitable and healthy communities.	Inter-agency working group involving all relevant agencies including land managing agencies	18 months
10	Incorporate climate change research and 'best practice' into open space planning, including strategies and actions that are intended to mitigate the predicted impacts of climate change (e.g. retention of native vegetation for carbon storage, minimising emissions), and those that are aimed at impact adaptation (e.g. the role of foreshore 'buffers' to sea level rise and storm surge).	State Government – DPAC Tasmanian Climate Change Office	18 months
11	Foster the development of an open space system that is well-connected to residential areas and other community destinations by a network of trails and public transport routes.	Local councils, State Government (e.g. guided by documents such as the T*rails Tasmania Strategy*, T*asmanian Walking and Cycling for Active Transport Strategy*, *Healthy by Design*, regional and local transport plans)	Ongoing

Table 2 : Implementation action plan (cont)

Tasmanian Open Space Policy and Planning Framework

About this document:

The Tasmanian Open Space Policy and Planning Framework is made up of three documents:

- Tasmanian Open Space Policy and Planning Framework: **Summary**
- Tasmanian Open Space Policy and Planning Framework: **Main Report**
- Tasmanian Open Space Policy and Planning Framework: **Attachments**

The Tasmanian Open Space Policy and Planning Framework was prepared by Inspiring Place Pty Ltd with HM Leisure Planning Pty Ltd.

A copy of this document can be downloaded from the Sport and Recreation Tasmania website: www.sportandrecreation.tas.gov.au

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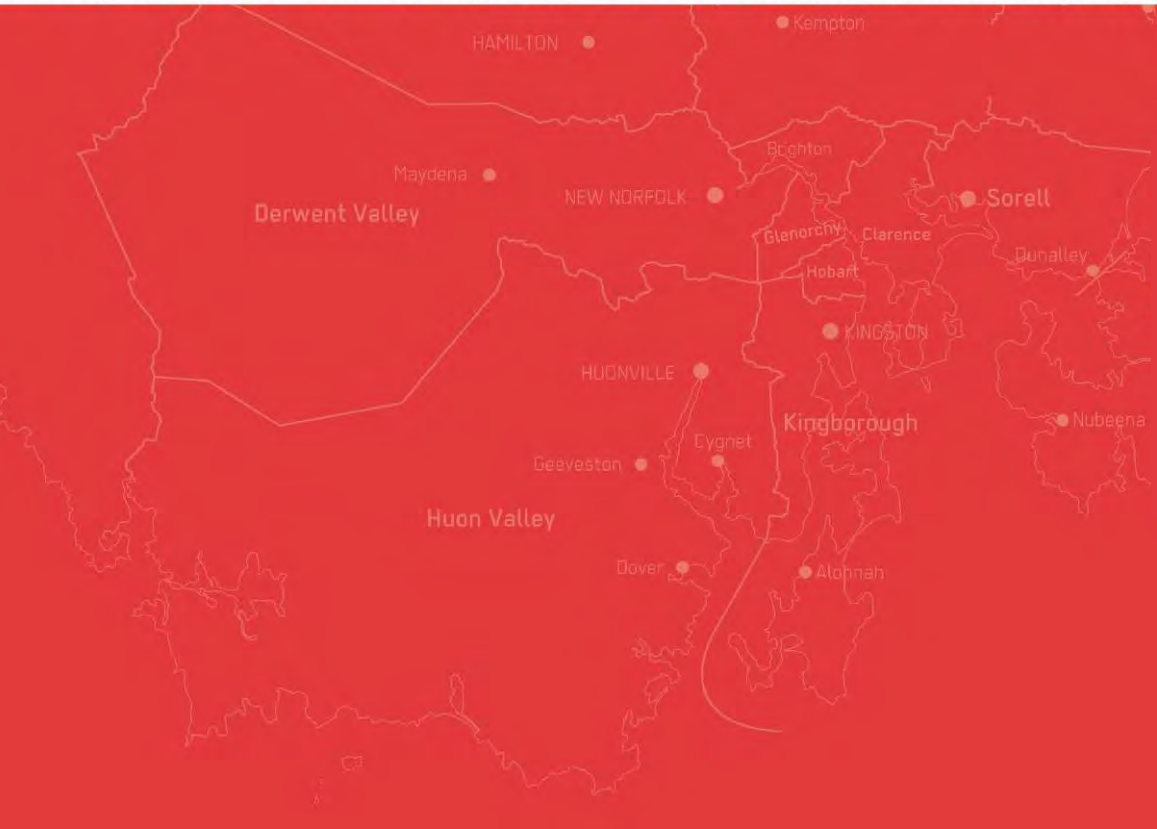
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Huonville/Ranelagh

Structure Plan



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1 Introduction

Huonville is a regional centre south of Hobart and is the largest urban area in the Huon Valley municipal area. It provides a key service and employment role for the wider region. Combined with the nearby residential settlement of Ranelagh, these settlements provide popular living environments, as is evident through recent increases in residential development. The attractive river and bushclad hill setting provide opportunities to enhance the resident and visitor experiences. Further opportunities exist to revitalise the town centre, including consideration of traffic management and the creation of a focal point for the community.

In order to ensure that the town's future is planned for and managed in a co-ordinated manner, the Huon Valley Council and the Department of Economic Development, Tourism and the Arts have engaged Urbis and Cardno Grogan Richards to prepare a Structure Plan for Huonville and Ranelagh. This report presents the results of the background data investigations, land use and community needs analysis, options assessment, and the final recommendations from the project.

1.1 Project aims

The Structure Plan will provide a vision for future land use and development within Huonville and Ranelagh over the next 20 years. It will also provide a basis for the provisions relating to these settlements in the revised planning scheme that the Council is currently preparing to replace the Huon Planning Scheme 1979.

The aims of the structure plan are to:

- Further the goals of the existing strategic planning documents such as the Huon Valley Land Use and Development Strategy and the Future Development Strategy for Huonville.
- Identify residential, commercial and industrial land use options.
- Maintain and expand Huonville's role as a significant regional centre.
- Prepare a co-ordinated strategy for the growth and revitalisation of the town centre.
- Consider issues such as infrastructure demand, flooding, and sea level rise.
- Improve linkages between Huonville and Ranelagh.
- Ensure that the community has access to a wide range of services and facilities now and in the future.
- Identify specific sites for tourism and other economic activities.



What is a Structure Plan?

A structure plan is a strategic document prepared to guide the major changes to land use, transport, built form and public spaces within settlements, including the identification of greenfield growth areas where appropriate.

1.2 Project process

The process involved in the preparation of the Structure Plan is outlined below.



2 Existing Conditions

2.1 Township Profile

2.1.1 Location

Located at the junction of the Huon and Channel Highways, Huonville is the main settlement in the Huon Valley, and is closely linked to the smaller residential settlement of Ranelagh. Set on the northern and southern banks of the Huon River, Huonville and Ranelagh are situated approximately 27km southwest of Hobart and 21km west of Kingston. The Huon Valley contains a number of smaller settlements, including Franklin, Geeveston, Cygnet and Dover.

In the wider context, the Huon River and Dentrecasteaux Channel accommodates a number of aquaculture operations, and also provides a range of recreational boating opportunities. To the west lies the Southwest National Park and the Southern Working Forests.

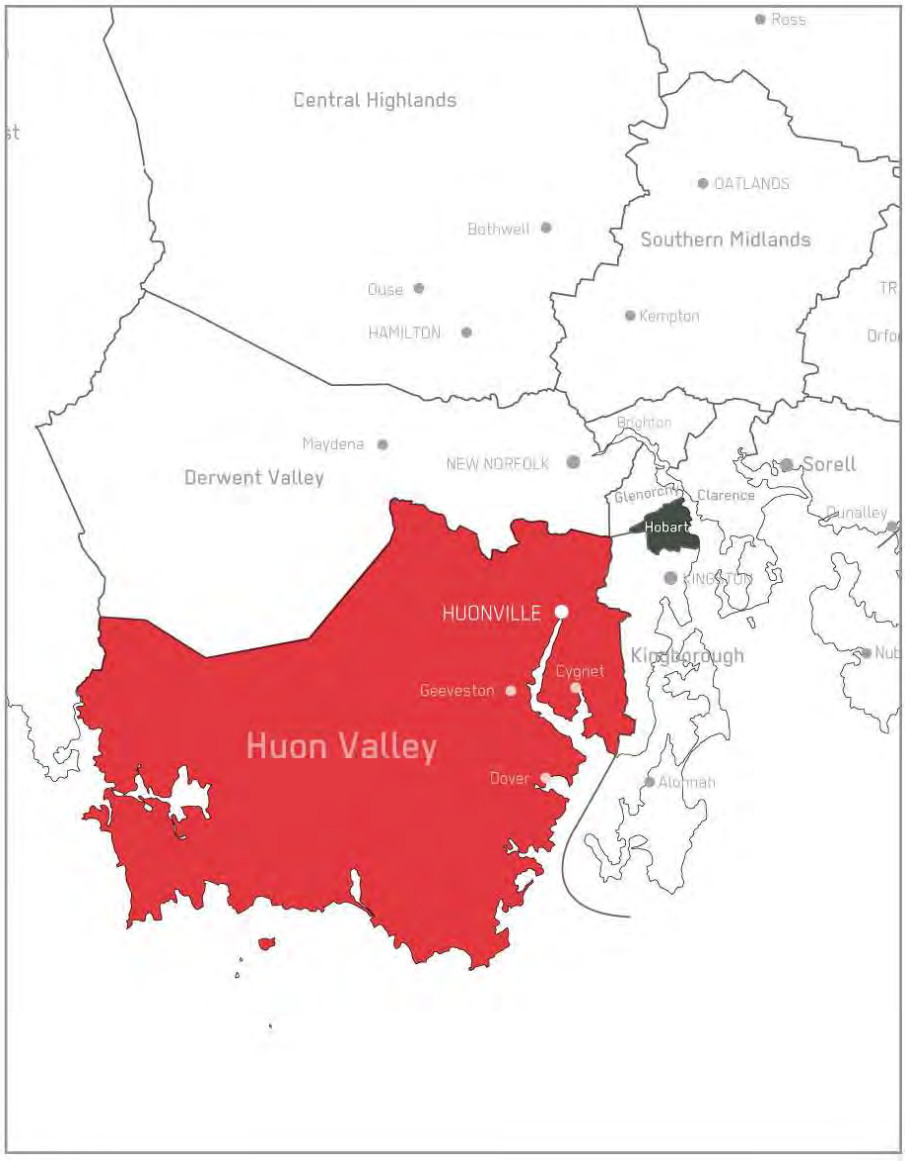


Figure 1: Regional context

2.1.2 Settlement structure



Figure 2: Study area

The study area is located on the valley floor and lower slopes of the Huon Valley, and incorporates the settlements of Huonville and Ranelagh, which lie in close proximity to each other. The Huonville town centre is clustered around the intersection of Huon Highway, Wilmot Road and Sale Street, with the urban form extending out along these roads. There are some land uses that extend south to the Huon riverfront, however due to the floodprone nature of this land, much of the river frontage is undeveloped. Beyond the bridge lies the mainly residential area of Southbridge, which extends partly up the hill. The majority of the minor roads are cul-de-sacs that limit the permeability of the urban form.

Northwest from Huonville and Mountain River lies the settlement of Ranelagh, which is generally laid out in a wide grid pattern with some newer cul-de-sacs infilling the large blocks. The Ranelagh Showgrounds are an important local feature.

2.1.3 Transport and access

The Huon Highway passes through the town in a north-south direction, providing access to Hobart and Franklin. The Channel Highway traverses along the northern bank of the Huon River and intersects with the Huon Highway just north of the bridge. Other key roads in the study include Wilmot Road and Glen Road, which link Huonville and Ranelagh, and Sale Street and Glen Huon Road, which provide alternative access routes into Huonville from the east and west respectively.

Huonville and Ranelagh are within travelling distance of Hobart International Airport, which is located along the Tasman Highway approximately 40km to the northeast with a travel time of around 45 minutes.

Public transport services to the area consist of a private bus service operated by Tassielink, which provides seven services on weekdays and daily services on weekends to Hobart and a range of other settlements.

There are a number of walking tracks established or proposed along the Huon River, Waltons Inlet and Skinners Creek. Cycling facilities are currently limited to the use of roads, although some shared paths are proposed.

2.1.4 Infrastructure

Southern Water provide water and wastewater services to the township, and have advised the following:

- Water:
  - Southern Water are implementing the Huon Valley Regional Water Scheme which will improve the quality and quantity of the supply.
  - Upgrade works are being undertaken to the Huonville Water Treatment Plant.
  - There are no constraints on infill development or urban growth in terms of water supply.
- Wastewater:
  - There are currently some issues with the plant including from some local processing activities but this is being addressed.
  - Upgrade works to the Ranelagh Wastewater Treatment Plant are planned over the next three years.
  - There will be no constraints on infill development or urban growth in terms of wastewater systems over the next 20 to 30 years. However, if more industries are developed, they will have to comply with a trade waste agreement if their operations are of a significant size, and some processors may need on-site pre-treatment,

Reticulated stormwater in Huonville includes under capacity open drains that in some locations cause localised flooding. Entura Hydro Tasmania have been engaged by Council to prepare a stormwater strategy to identify options to minimise this risk and provide reticulation.

Telecommunications are provided within fixed line and mobile broadband formats. The speed and data capabilities of the infrastructure varies considerably, with some of the older residential areas being serviced by aged line infrastructure. Both Telstra and Optus provide mobile phone services to the township. A Community Wireless Broadband project is being undertaken in the Huon Valley by the Tasmanian Broadband Development Program. Council is working with private company Tasmanet on the Huon Valley Regional Wireless Network. Huonville is not one of the Stage 1-3 communities in the National Broadband Network.

For all reticulated infrastructure avoiding inefficient extensions should be encouraged. As such, the urban form considered in the Structure Plan should encourage infill development to occur before increasing the town boundaries.

2.2 Community and Population Profile

2.2.1 Community profile

The community profile has been compiled through analysis of data at the following levels:

- Tasmania
- Southern Region
- Huon Valley
- Huonville Ranelagh.

The data sources, *ABS 1379.0.55.001 National Regional Profile Series 2004-2008* and *ABS 2001.0 Basic Community Profile 2006*, allow for analysis at the state, regional and local government levels. It must be noted that Greater Hobart is excluded from analysis at the regional level (Southern Tasmania) and included in the state level data.

The data source *ABS 2001.0 Basic Community Profile 2006* has been used to provide data for the Urban Centre Locality (UCL) of Huonville Ranelagh. An indicative map of the Huonville Ranelagh UCL is provided in Picture 1. It must be noted that the boundary of the investigation area does not match the boundary of the Huonville Ranelagh UCL and that data is only available for the year 2006 so comparisons must be made cautiously with the *National Regional Profile Series* data, some of which relates to 2008.

Picture 1 – Huonville Ranelagh UCL



Source: ABS Website

Table 1 provides the following information in regards to the Huonville Ranelagh UCL and Huon Valley Council:

- The median[1] age of persons in the Huonville Ranelagh UCL is lower than the state and regional average.
- The median weekly household income is much lower than the state average, and the median monthly housing loan repayment is also lower but only marginally. This suggests that residents of the Huonville Ranelagh UCL have less disposable income than state averages.
- The unemployment rate in the Huonville Ranelagh UCL in 2006 was comparatively low.
- The Indigenous population is comparatively high.
- It is considered likely that the registered motor vehicles statistics, although unavailable, are similar to the Huon Valley data provided.

Table 1 – General statistics

	Huonville Ranelagh	Huon Valley	Southern Region	Tasmania
Land area (km2)	6.4	5497.3	24,125.3	67,914.2
Total population 2008	1,806 (2006)	14,858	36,875	497,529
Population density 2008 (persons per km2)	NA	2.7	1.5	7.3
Total registered motor vehicles per 1,000 population 2008	NA	797	823	784
Median age of persons 2006	36	39	42	39
Median monthly housing loan repayment 2006	$800	$780	$758	$867
Median weekly household income 2006	$689	$711	$688	$801
Unemployment rate 2006	5.4%	7.3%	10.2%	6.5%
Estimated resident Indigenous population 2006	9.1%	8.8%	6.3%	3.8%
Total population born overseas 2006	8.4%	11.9%	11.3%	11.3%
Speaks a language other than English at home 2006	2.2%	2.3%	2.1%	3.7%

[1] The median refers to the middle value of a range of numbers in their ascending order.

Table 2 below shows that Huonville Ranelagh has a considerably younger age profile than both the Southern Tasmania region and Tasmania as a whole. Huonville Ranelagh has higher than state average numbers of 0-14 year olds and lower than state average numbers of 35-64 year olds.

Table 2 – Age structure 2008 (NB: Note that individual values have been rounded)

Age Group	Huonville Ranelagh (2006)		Huon Valley		Southern Tasmania		Tasmania	
	No.	%	No.	%	No	%	No	%
0-4	153	8.5%	1,035	7.0%	2,452	6.7%	32,096	6.5%
5-14	251	13.9%	2,164	14.6%	4874	13.2%	65,023	13.1%
15-19	112	6.2%	984	6.6%	2,155	5.8%	34,434	6.9%
20-24	116	6.4%	600	4.0%	1,431	3.9%	30,867	6.2%
25-34	229	12.7%	1,518	10.2%	3,519	9.5%	56,629	11.4%
35-44	215	11.9%	2,031	13.7%	5,042	13.7%	67,414	13.6%
45-54	221	12.2%	2,324	15.6%	6,010	16.3%	72,711	14.6%
55-64	212	11.7%	2,188	14.7%	6,003	16.3%	63,595	12.8%
65-74	173	9.6%	1,229	8.3%	3,392	9.2%	40,086	8.1%
75-84	96	5.3%	614	4.1%	1,549	4.2%	25,287	5.1%
85+	28	1.6%	171	1.2%	448	1.2%	9,327	1.9%
Total	1,806	100.0%	14,858	100.0%	36,875	100%	497,529	100%

Table 3 shows that Huonville Ranelagh has a low rate of lone person households and a high rate of family households. Huonville Ranelagh's average household size in 2006 was 2.5.

Table 3 – Household by type 2006

	Huonville Ranelagh	Huon Valley	Southern Tasmania	Tasmania
Lone person households	24.5%	22.9%	24.5%	26.9%
Group households	1.9%	2.1%	2.1%	3.2%
Family households	72.9%	74.8%	73.4%	69.9%

Table 4 below shows that 37.3% of place of usual residence dwellings are fully owned with 32.7% under finance and a further 25.9% being rented. It also shows that there is reasonable diversity of housing stock currently in Huonville Ranelagh with 10% of dwellings being a flat, unit or apartment.

Table 4 – Housing tenure type by dwelling structure – Huonville Ranelagh 2006

	Separate house		Semi-detached townhouse etc		Flat, unit or apartment		Other dwelling		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Fully owned	236	38.6%	0	0.0%	17	27.4%	5	62.5%	258	37.3%
Being purchased	221	36.1%	0	0.0%	5	8.1%	0	0.0%	226	32.7%
Rented	133	21.7%	6	66.7%	37	59.7%	3	37.5%	179	25.9%
Other tenure type	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tenure type not stated	22	3.6%	3	33.3%	3	4.8%	0	0.0%	28	4.1%
Total	612	100%	9	100%	62	100%	8	100%	691	100%

Table 5 below shows that Huonville Ranelagh has a higher percentage of families with children under the age of 15 than the state average.

Table 5 – Family composition 2006

	Huonville Ranelagh		Tasmania	
	No.	%	No	%
Couple family with no children	186	36.7%	52,161	40.5%
Couple family with children under 15	164	32.3%	37,528	29.2%
Couple family with no children under 15	51	10.1%	15,753	12.2%
One parent family with children under 15	54	10.7%	12,928	10.0%
One parent family with no children under 15	44	8.7%	8,544	6.6%
Other family	8	1.6%	1,746	1.4%
Total	507	100%	128,660	100%

Table 6 shows that Huonville Ranelagh residents have considerably lower levels of post-graduate, graduate and bachelor degrees than both the regional and state averages. The prevalence of is slightly higher than the state and regional averages.

Table 6 – Level of post school qualifications 2006

	Huonville Ranelagh	Huon Valley	Southern Tasmania	Tasmania
Postgraduate degree	1.1%	3.3%	3.0%	3.5%
Graduate diploma and graduate certificate	1.6%	2.6%	2.1%	2.4%
Bachelor degree	9.2%	15.8%	14.8%	19.0%
Advanced diploma or diploma	8.3%	12.0%	12.1%	12.4%
Certificate	43.6%	38.2%	39.4%	37.0%

Table 7 shows that the occupations of employed persons in Huon Valley and Huonville Ranelagh display some interesting local trends including:

- There being less managers, professionals and administrative employees in Huonville Ranelagh than the state average.
- There being more trades people, labourers and machinery operators in Huonville Ranelagh than the state average.

Table 7 – Occupation of employed persons 2006

	Huonville Ranelagh	Huon Valley	Southern Tasmania	Tasmania
Managers	9.1%	14.6%	17.7%	12.8%
Professionals	7.5%	13.6%	12.2%	17.5%
Technicians / Trades	18.1%	15.6%	15.3%	14.6%
Community and personal service	10.8%	9.6%	9.2%	10.0%
Clerical and administrative	11.0%	12.3%	10.8%	14.0%
Sales	9.9%	7.0%	6.6%	9.9%
Machinery operators	9.9%	7.8%	8.0%	7.1%
Labourers	20.5%	17.7%	18.4%	12.5%

Table 8 confirms that residents of Huonville Ranelagh and Huon Valley have considerable disadvantage in relation to internet access at home. The table below shows that people from Huonville Ranelagh are 5.8% less likely to have broadband access and 11.9% more likely to have no internet access when compared to the state average.

Table 8 – Type of internet connection by dwelling 2006

	Huonville Ranelagh	Huon Valley	Southern Tasmania	Tasmania
Broadband	21.9%	19.2%	15.2%	27.7%
Dial-up	16.1%	32.1%	33.2%	24.9%
Other	0.6%	0.6%	0.6%	0.7%
No internet connection	55.5%	45.0%	48.1%	43.6%

The data in Table 9 has been sourced from *ABS 2033.0.55.001 Socio-economic Indexes for Areas 2006.* The data represents the Index of Relative Socio-economic Disadvantage which is derived from Census variables such as low income, low educational attainment, unemployment, and dwellings without motor vehicles. The mean[2] score across Australia is 1000. A lower score represents that an area is relatively disadvantaged in comparison to an area with a higher score.

Table 9 provides a percentage of residents that live in Census Collection Districts (CCDs) pertaining to each score. For example, on the line of 875 to < 900, the data shows that 15.2% of Huon Valley residents live in a CCD that scored between 875 and 900 against the variables related to disadvantage. The table also shows that 20% of Huon Valley residents live in areas that received scores between 825 and 875. These areas are considered to be suffering from greater disadvantage than those with scores greater than 875.

Analysis of the data in Table 9 provides the following information in relation to the level of relative disadvantage in Huon Valley:

- No CCD within Huon Valley scored greater than the Australian Mean of 1000 meaning all CCDs in Houn Valley have higher than average levels of disadvantage.
- All residents of Huon Valley are living in CCDs that scored lower than 975. Across Tasmania, less than 49% of residents are living in CCDs with scores below 975.
- In the Southern Tasmania region, 67.5% of residents are living in CCDs with scores below 975 in comparison to 100% of Houn Valley residents.
- No CCD within Huon Valley scored lower than 825 meaning the level of disadvantage in Huon Valley is reasonably contained (7.88% of residents in Tasmania are living in CCDs that scored below 825).

[2] The mean refers to the mathematical average of a set of numbers, and is calculated by adding up the numbers and dividing by how many numbers there are.

Table 9 – SEIFA Index of Relative Socio Economic Disadvantage 2006 – Percentage of Residents

Census Collection District Score	Huon Valley	Southern Tasmania	Tasmania
< 800			5.01%
800 to < 825		1.80%	2.87%
825 to < 850	13.4%	2.57%	3.35%
850 to < 875	6.6%	8.78%	5.35%
875 to < 900	15.2%	11.13%	5.93%
900 to < 925	13.6%	14.55%	6.70%
925 to < 950	21.3%	13.46%	9.71%
950 to < 975	29.8%	15.20%	9.73%
975 to < 1000		17.13%	11.48%
1000 to < 1025		10.60%	11.81%
1025 to < 1050		1.75%	10.20%
1050 to < 1075		3.03%	8.17%
1075 <			9.73%

2.2.2 Projections

Population Projections

No population projections for the Huonville Ranelagh study area currently exist. The *State Demographic Change Advisory Council population projections* are available at the local government level only.

An estimation of the future population of the study area has been made using data from *ABS 1379.0.55.001 National Regional Profile Series 2004-2008, ABS 2001.0 Basic Community Profile 2006, State Demographic Change Advisory Council population projections – medium growth scenario and high growth scenarios* and a number of assumptions.

Section 2.3.1 below shows that 27.13% of all residential dwelling approvals in the Huon Valley local government area over the last ten years were in Huonville Ranelagh. An assumption has been made that this residential dwelling approvals percentage correlates to population growth and as such has been used to estimate the percentage of the local government area population growth that is attributable to the study area.

It is important to note that the *Southern Tasmania Regional Land Use Strategy Background Report No.2: The Regional Profile* uses the *State Demographic Change Advisory Council population projections – medium growth scenario.*

Table 10 details a projection of the future population for Huonville Ranelagh through use of the *State Demographic Change Advisory Council population projections – medium growth scenario and high growth scenario* and the assumption that 27.13% of population growth in the local government area will be within the study area.

The analysis at the medium scenario shows a total population increase of 391 people for the study area between 2010 and 2030. It is arguable that this represents a low growth scenario for Huonville Ranelagh due to its strategic positioning, lessening rural land availability and rates of recent dwelling approvals as shown in Figure 6. The medium growth scenario is based on a decreasing birth rate from 2.16 babies per woman in 2007 to 1.95 in 2017 and remaining constant there after.

The analysis of the high scenario shows a total population increase of 886 people for the study area between 2008 and 2030. The high growth scenario that is based on a constant birth rate of 2.16 babies per woman.

Consideration of both the medium and high scenarios has been included in the Section 5 Land Use and Community Needs Assessment analysis.

Table 10 – Population projections for Huon Valley and Huonville Ranelagh

	Medium Growth Scenario			High Growth Scenario		
	Huon Valley	Annual growth rate	Huonville Ranelagh	Huon Valley	Annual growth rate	Huonville Ranelagh
2008	14,781		1,845	14836		1852
2009	14,898	0.8%	1,877	15017	1.2%	1,901
2010	15,010	0.8%	1,907	15200	1.2%	1,951
2011	15,108	0.7%	1,934	15379	1.2%	1,999
2012	15,213	0.7%	1,962	15566	1.2%	2,050
2013	15,314	0.7%	1,990	15748	1.2%	2,099
2014	15,408	0.6%	2,015	15923	1.1%	2,147
2015	15,503	0.6%	2,041	16099	1.1%	2,195
2016	15,594	0.6%	2,066	16278	1.1%	2,243
2017	15,683	0.6%	2,090	16458	1.1%	2,292
2018	15,775	0.6%	2,115	16627	1.0%	2,338
2019	15,853	0.5%	2,136	16799	1.0%	2,385
2020	15,935	0.5%	2,158	16969	1.0%	2,431
2021	16,007	0.5%	2,178	17138	1.0%	2,477
2022	16,082	0.5%	2,198	17302	1.0%	2,521
2023	16,142	0.4%	2,214	17461	0.9%	2,564
2024	16,205	0.4%	2,231	17618	0.9%	2,607
2025	16,258	0.3%	2,246	17770	0.9%	2,648
2026	16,305	0.3%	2,258	17918	0.8%	2,688
2027	16,357	0.3%	2,273	18060	0.8%	2,727
2028	16,388	0.2%	2,281	18203	0.8%	2,765
2029	16,422	0.2%	2,290	18340	0.8%	2,803
2030	16,449	0.2%	2,298	18466	0.7%	2,837

According to the *Department of Health and Human Services Tasmania's Health Plan* report, in 2006, Tasmania had the second highest proportion of people aged 65 years and over of any Australian state or territory and was ageing at a more rapid rate. The proportion of people aged 70 years and over was projected to increase from 10.6% in 2006 to 16.6% in 2021, and by 2021 there will be 28,236 more people aged 70 years and over.

Household projections

Table 11 shows the *ABS 2001.0 Basic Community Profile 2006* calculation of the average household size for the Huonville Ranelagh UCL in comparison to the state average in 2006.

Table 11 – Average household size 2006

	Huonville Ranelagh	Huon Valley	Southern Tasmania	Tasmania
Average household size	2.5	2.6	2.5	2.4

According to ABS *3236.0 – Household and Family Projections, Australia, 2006 to 2031*, Tasmania's population is projected to have the least growth (15%) of all the Australian states and territories between 2006 and 2031. The number of households in Tasmania is projected to increase by between 21% and 25% compared to between 47% and 52% projected for Australia.

Tasmania's average household size in 2006 was the equal smallest of the states and territories (equal to South Australia). Nationally, average household size is projected to be between 2.4 and 2.5 people per household in 2031. Tasmania's average household size is projected to decline to between 2.3 and 2.2 people per household by 2031.

2.3 Land uses

In Huonville, residential uses are generally located to the east of the Huon Highway and commercial, industrial and community uses are located to the west, with a mix of uses present along the northern and southern frontages to the highway. Southbridge and Ranelagh are predominantly residential in nature.

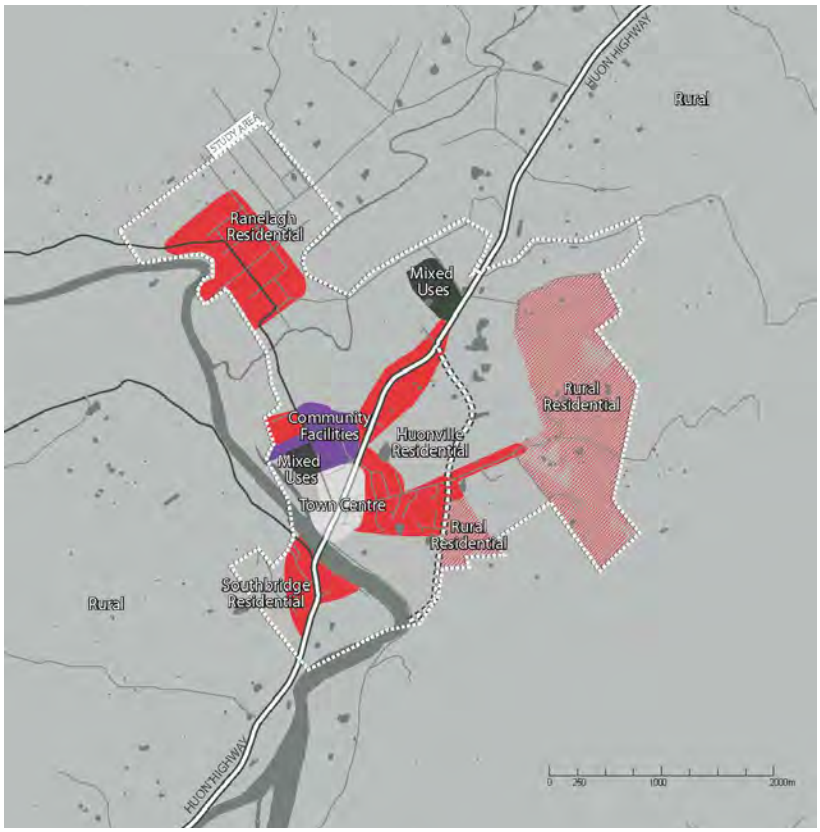


Figure 3: Existing land uses

2.3.1 Housing

The residential areas within Huonville extend along the main roads in a linear form, although there has been some recent development that is starting to fill in the areas between the main roads, and further development is planned. Recent infill development in Ranelagh has resulted in a more compact urban form. The eastern part of the valley contains rural residential dwellings that extend partly up the hill slopes.

There a range of dwelling styles present in the settlements, although in general dwellings are single storey with pitched roofs. Weatherboard character homes on large allotments were the traditional dwelling form during the settlement of Huonville and Ranelagh, and many of these have been retained today. Subsequent urban expansion over the years means that there are dwellings from most eras present. In recent years smaller units have also been constructed both on greenfield sites and on subdivided sections of existing dwellings. Recent subdivisions have allotment densities of around 850m^2.

Figure 4 – Dwellings examples



Picture 2 – Character dwelling in Huonville



Picture 3 – Character dwelling in Ranelagh



Picture 4 – New dwellings in Huonville



Picture 5 – New dwellings in Huonville

There are still some areas of undeveloped residential land within the existing Urban Growth Boundary; as illustrated in Figure 5, there are several allotments with approved subdivisions and approximately 39ha of additional vacant residential land. There is limited vacant residential land within Ranelagh, and no vacant rural residential land within either Ranelagh or Huonville. There are also some areas of land that are currently zoned for residential purposes but that are subject to constraints such as flooding that make them unsuitable for development; these have been excluded from the vacant land analysis and are recommended for backzoning (see Section 9.2 for further details of these). It should also be noted

that the southernmost site on Figure 5 is zoned for residential use but that its current owners have not shown interest in developing it at present.

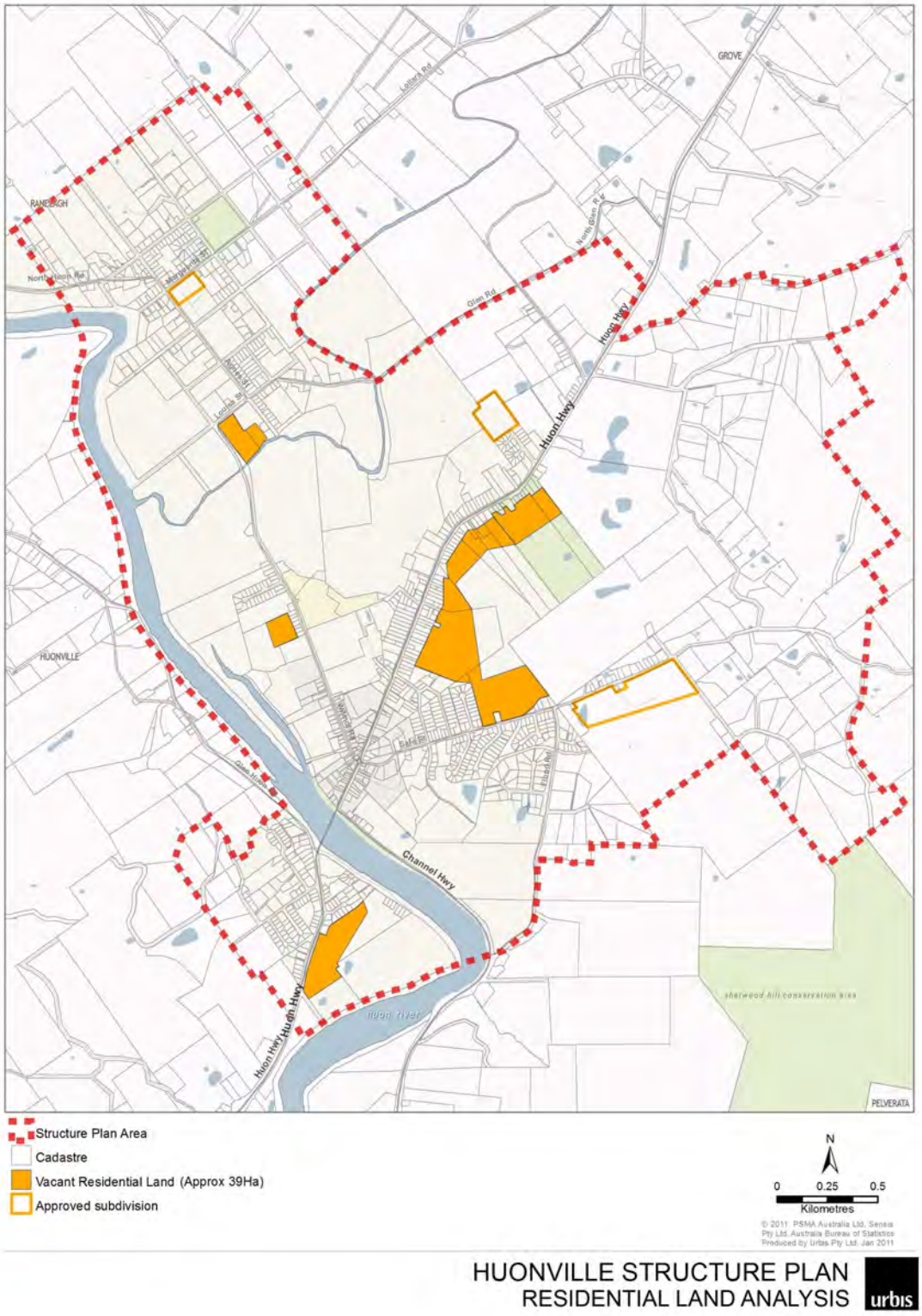


Figure 5: Residential land analysis

According to the *Southern Tasmania Regional Land Use Strategy Background Report No.2: The Regional Profile 2010*, the ten year period between 1999/2000 and 2009/2010 saw 171 residential dwelling approvals issued for Huonville and 55 for Ranelagh. This results in an average of 22.6 dwelling approvals per year for the study area. The *Southern Tasmania Regional Land Use Strategy Background Report No.2: The Regional Profile 2010* shows a total of 833 residential dwelling approvals for the same ten year period. This suggests that the study area accounted for 27.13% of dwelling approvals from within the LGA.

Figure 6 shows that the most recent six year period has seen significantly more dwelling approvals in the study area than the previous five years, and the 2009/2010 period has seen a dramatic increase in the number of approvals recorded. 30 of the approvals for Huonville during this period were for units under the federal Nation Building Program.

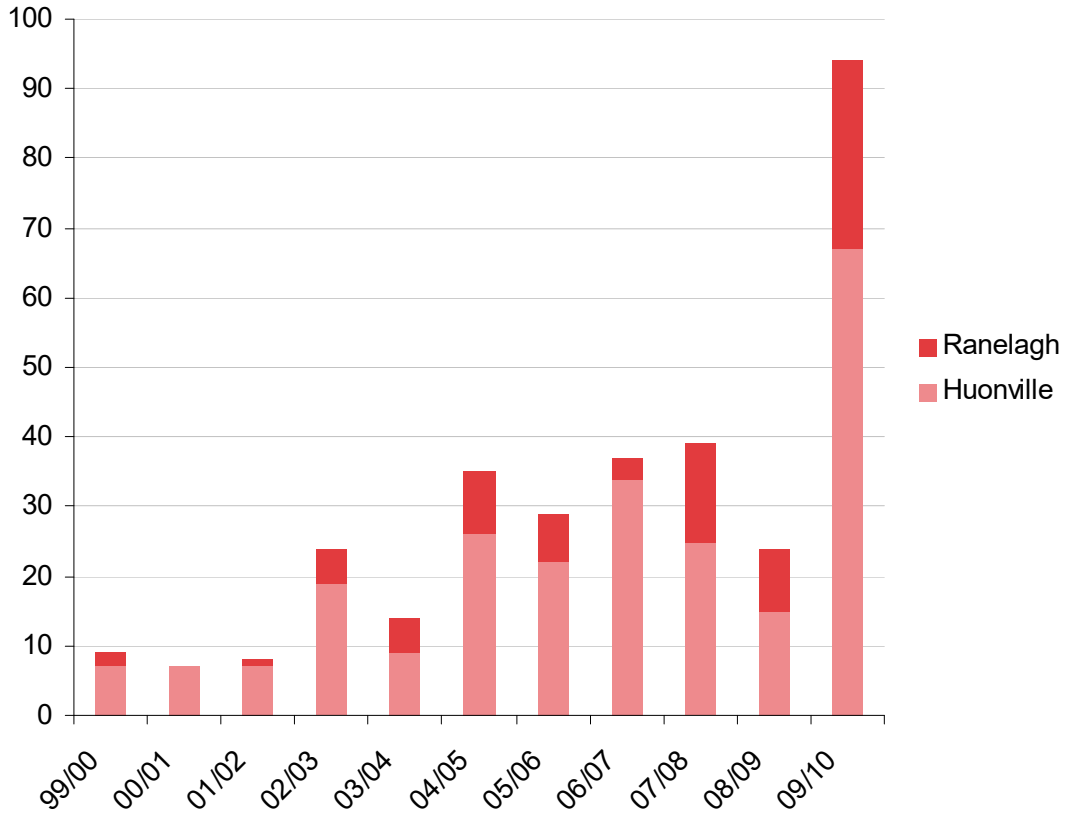


Figure 6: Dwelling approvals 1999/2000 to 2008/2009 (data source: Southern Tasmania Regional Land Use Strategy Background Report 2: The Regional Profile and Huon Valley Council records)

The 2006 Census, which was held on August 8th and thus reflects data from the off-peak season, indicated that 9.5% of private dwellings were unoccupied in Huonville and Ranelagh on census night. This is lower than the 13% of dwellings that were unoccupied in Tasmania as a whole.

2.3.2 Economic activities

Town centre

The Huonville town centre contains a range of retail services, including Woolworths and IGA supermarkets. The commercial facilities in Ranelagh are limited to convenience retail services.

Industrial

There are three industrial precincts located at Glen Huon, Huonville and.Ranelagh. These contain a mix of local industry uses, including the Tassal processing plant.

Tourism

Tourism facilities in Huonville include a jet boating business on the riverfront and a range of tourist accommodation including several bed and breakfasts, a backpackers, and an RV-friendly parking area. Council operate a Visitor Information Centre north of Huonville.

2.3.3 Recreation and community facilities

Huonville Ranelagh is currently well serviced for community infrastructure to meet the majority of needs of its community locally (refer to Figure 7).

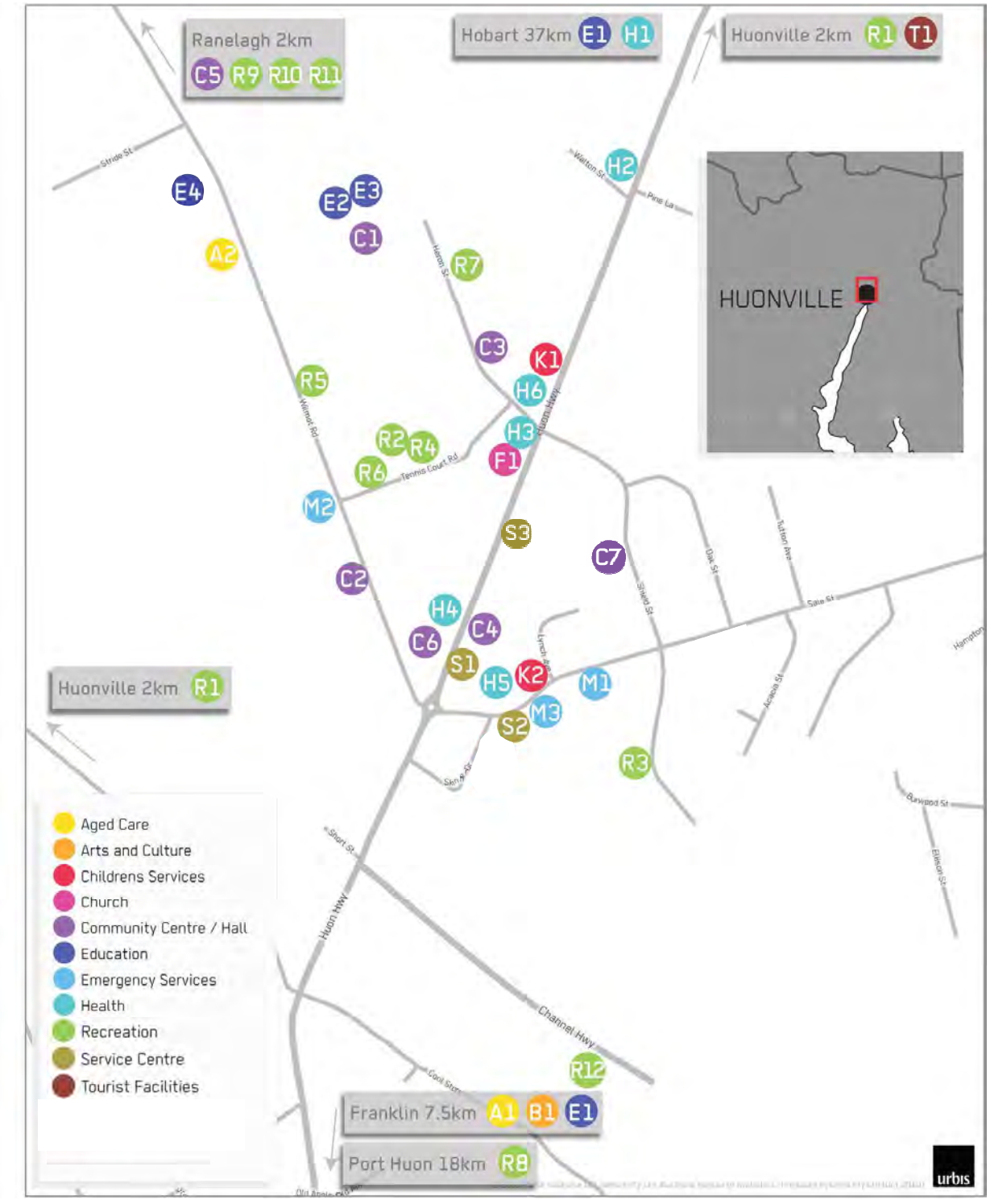


Figure 7: Community facilities in Huonville Ranelagh and the surrounding area

Table 12: Community facilities in Huonville Ranelagh investigation area

Facility name	Facility category	Facility address	Label
McMullen Abbeyfield House	Aged care	Wilmot Road, Huonville	A2
The Cottage Child Care Centre	Childrens Services	91-93 Main Street, Huonville	K1
Huonville Community Church	Church	81 Main Street, Huonville	F1
Huonville Police and Community Youth Club	Community Centre / Hall Recreation	72 Wilmot Rd, Huonville	C1
Huonville Salvation Army Hall	Community Centre / Hall	31 Wilmot Rd, Huonville	C2
Huonville Scout Hall	Community Centre / Hall	Heron Street, Huonville	C3
Huonville Town Hall	Community Centre / Hall	40 Main Street, Huonville	C4
Ranelagh Memorial Hall	Community Centre / Hall	Marguerite Street, Ranelagh	C5
Huonville Youth Services	Community Centre/Hall	37 Main Street, Huonville	C6
Huonville Ex-Servicemen's and Women's Club	Community Centre/Hall	25 Shield Street, Huonville	C7
Huonville High School	Education	82 Wilmot Road, Huonville	E2
Huonville Primary School	Education	74 Wilmot Road, Huonville	E3
Trade Training Centre	Education	Wilmot Road, Huonville	E4
Huonville Ambulance Station	Emergency services	27 Sale St, Huonville	M1
Huonville Fire Station	Emergency services	Wilmot Road, Huonville	M2
Huonville Police Station	Emergency services	11 Sale Street, Huonville	M3
Channel Dental Care	Health	127 Main Street, Huonville	H2
Huon Valley Community & Health Centre	Health	85 Main Street, Huonville	H3
Huon Valley Doctor's Surgery	Health	49a Main Street, Huonville	H4
Huonville Child Health Centre	Childrens Services	6 Sale St, Huonville	K2
Huonville Community Health Centre	Health	Sale Street, Huonville	H5
Huonville Dental Clinic	Health	89 Main St, Huonville	H6
Huon Valley Athletics Track	Recreation	40 Wilmot Rd, Huonville	R2
Huonville Bowls Club	Recreation	Lower Shield Street, Huonville	R3
Huonville Netball Courts	Recreation	Tennis Court Rd, Huonville	R4
Huonville Recreation Ground	Recreation	40 Wilmot Rd, Huonville	R5
Huonville Tennis Courts	Recreation	Tennis Court Rd, Huonville	R6
Huonville Swimming Pool	Recreation	Heron Street, Huonville	R7
Ranelagh Equestrian Centre	Recreation	Charlotte St, Ranelagh	R9
Ranelagh Oval	Recreation	49 Marguerite St, Ranelagh	R10
Ranelagh Showgrounds	Recreation	Marguerite St, Ranelagh	R11
Huonville Apex Park	Recreation	The Esplanade, Huonville	R12
Huon Valley Council Offices Huonville	Service Centre	40 Main St, Huonville	S1
LINC Centre – includes the LINC, Library, Magistrates Courts, Service Tasmania, Centrelink	Service Centre	1 Skinner Dve, Huonville	S2

Facility name	Facility category	Facility address	Label
Huonville RSL Sub-branch	Service Centre	66 Main Street, Huonville	S3
Huon Visitor Centre	Tourist Facilities	2273 Huon Highway, Grove	T1

Huonville Ranelagh's relatively small population makes it difficult to justify the provision of some of the larger catchment services and facilities locally. As such, there are some services that residents must travel to regional centres to access. These include facilities for health, aged care, education and arts. For these facilities residents of Huonville Ranelagh must travel to Franklin, Port Huon and Hobart. A list of facilities in surrounding areas that provide services not available in Huonville Ranelagh is provided below:

Table 13: Required community facilities in surrounding towns

Facility name	Facility category	Facility address	Label
Huonville Kingdom Hall	Church	9 Voss Rd, Huonville	F2
Huon Valley Golf Course	Recreation	Glen Huon Rd, Huonville	R1
Huon Eldercare	Aged care	Huon Hwy, Franklin	A1
Palais Theatre	Arts & Culture	Main Road, Franklin	B1
Royal Hobart Hospital	Health	48 Liverpool St, Hobart	H1
Port Huon Aquatic & Sports Centre	Recreation	Huon Highway, Port Huon	R8
University of Tasmania, Hobart	Education	Churchill Ave, Sandy Bay, Hobart	E1

2.4 Natural Features

2.4.1 Landscape

Huonville and Ranelagh are located on the plains and terraces surrounding the Huon and Mountain Rivers. Set amongst bushclad hills, the views to and from the town incorporate backdrops of green, with spectacular views up the valley towards Sleeping Beauty. Many parts of the riverbanks are vegetated, providing a serene riverview experience. The surrounding agricultural uses also contribute to the visual character, with open fields, horticultural operations, and shelterbelt plantings common across the valley floor.

2.4.2 Flora and Fauna

Most native vegetation has been cleared from the study area. There are two threatened vegetation communities located in the northwestern and southern portions of the study area.

2.4.3 Soils

The Land Capability Classification System indicates that the study area contains Class 4, 5 and 6 soils, and thus does not contain any prime soils, which are Class 1, 2 and 3 soils. There are no areas with a high probability of containing acid sulphate soil.

2.4.4 Natural hazards

Flooding

The Huon River and its tributaries are prone to flooding. DPIPWE's Flood Plain Map for the Huon and Mountain Rivers (refer Figure 8) depicts extensive areas that would be inundated during a 100 year ARI (Average Recurrence Interval) flood.

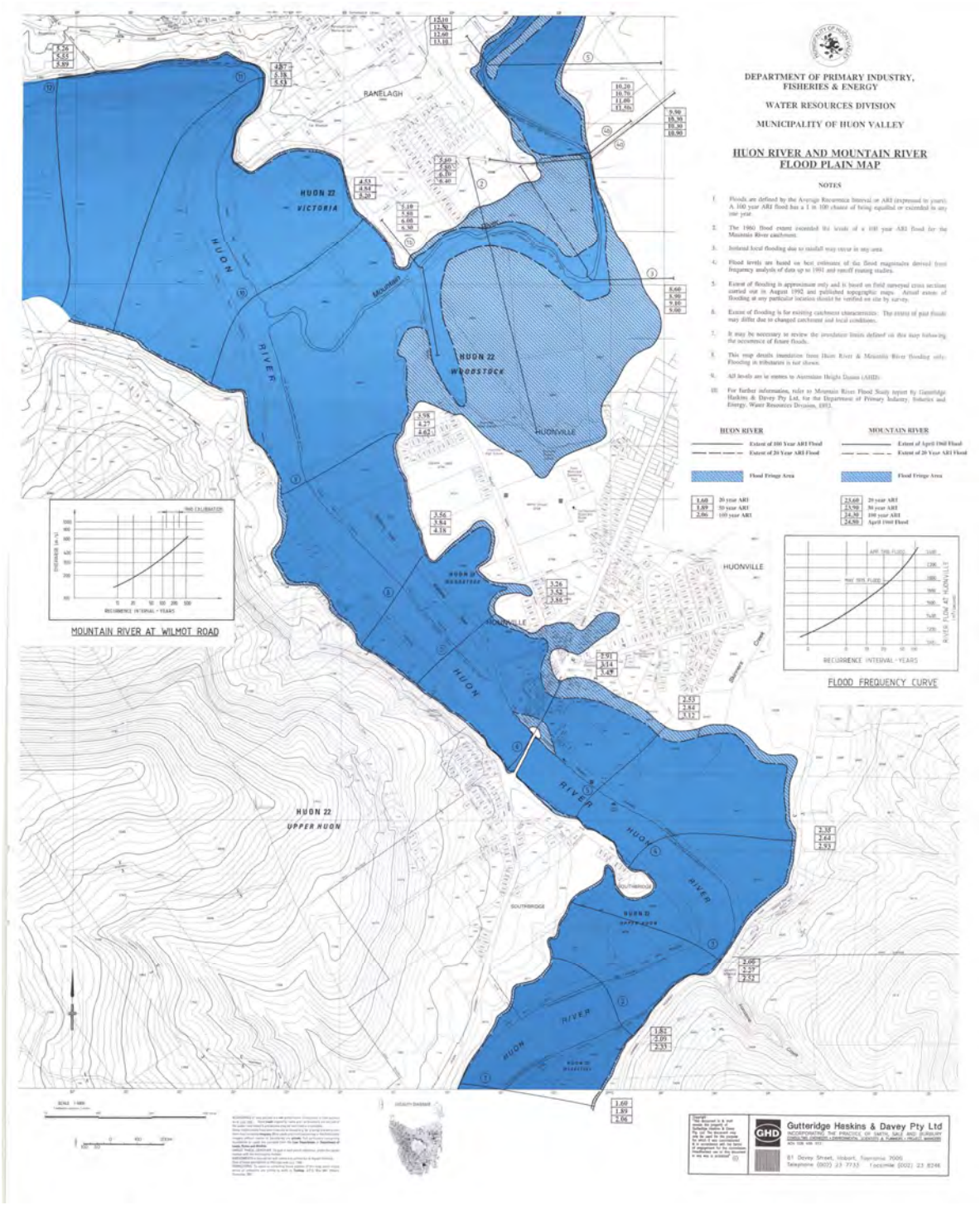


Figure 8: DPIPWE Flood Plain Map for the Huon and Mountain Rivers

There are no DPIPWE Flood Data Books that relate to Huonville.

The consideration of flooding impacts is a key determinant for the future development of the town.

Bushfires

The Huon Valley is vulnerable to bushfires, and the proximity of Huonville and Ranelagh to vegetated areas means that there are potential bushfire hazards to life and property. Given that a significant part of the Huon Valley's character is derived from being set near bush-clad hills, it is important to ensure bushfire risks are mitigated, such as providing cleared areas around dwellings, whilst retaining its bush-clad setting. For example, it would not be appropriate to allow the town to extend up hills where extensive clearing is required. The state government is currently preparing a draft Bushfire Schedule that will be referred to the Tasmanian Planning Commission for consideration as a new Planning Directive.

Land stability

It is recognised that parts of Tasmania are subject to land instability, which can result in events such as landslides that can pose hazards to life and property. The Southern Regional Tasmania Land Use Strategy has identified that areas with a slope of 15% or greater may be susceptible to erosion, some of which are within the study area. Whilst no land instability modelling has been done for these areas, this does indicate that geotechnical assessments may be required for some building sites.

Sea level rise

Sea level rise as a result of climate change has the potential to impact land uses adjacent to the coast. Huonville is located at a point on the Huon River which may be susceptible to sea level rise, and the state-wide coastal vulnerability mapping indicates that there are several areas at risk from coastal flooding by 2100 along both sides of the river downstream from the bridge. The Tasmanian Planning Commission is currently preparing more detailed sea level rise mapping using LIDAR data; however, this is not yet available for use in this structure plan.

Climate change

Climate change has potential to impact the area significantly, resulting in potential adverse impacts to tourism, industry (such as agriculture and aquiculture), biodiversity of the region and lifestyle qualities that are currently valued in the area. Potential impacts include:

- The availability of water due to decreased rainfall, impacting residential settlements, agriculture and industry.
- Extreme weather events which may cause flooding and erosion, particularly within lower lying coastal areas.
- Potential sea level rise, impacting the extent of lifestyle and tourism assets of the coastal areas.

2.5 Cultural Features

Huonville and Ranelagh contain the following places and buildings that have Tasmanian Heritage Register listings (as at August 2010):

- Huonville:
  - House (Ewins), Huon Highway
  - House (Heron), Coolstore Road
  - House, 5 The Esplanade Huonville
  - Ferry Inn, 31 Cygnet Road
  - House (Menon), Franklin Road

  - War Memorial, Heron Street
  - Huon Manor, 1 Short Street
  - House, 158 Huon Highway
  - House, 145 Main Road Huonville
  - House, 108 Huon Highway Huonville
  - Huon Municipal Chambers, 40 Huon Highway Huonville
  - Four Winds RA, 21 Dowlings Road
  - House (Munton), Shield Street
  - Inlet Farm, Wilmot Road
- Ranelagh:
  - Amesbury, Agnes Street
  - House, 150 Lollara Road
  - Clifton, Louisa Street
  - St. James' Anglican Church, Louisa Street
  - St. James' Anglican Church Hall and Cemetery, Louisa Street
  - House, 60 Helen Street

In regards to Aboriginal cultural heritage, the Huon Valley contains a number of known sites, and given the location of the study area adjacent to a river and near a point where freshwater meets the sea, the potential for further sites is likely to be high.

3 Opportunities and Constraints

The results of the background data investigations, key stakeholder workshops and site visits have been summarised into a list of strengths, weaknesses, opportunities and threats that have been identified for Huonville and Ranelagh. These are presented on the following pages, along with a map of some of the key opportunities and constraints (refer Figure 9).

Strengths	Weaknesses
Natural ▪ Views to Sleeping Beauty and other surrounding hills ▪ Attractive riverfront setting **Settlement Structure, Role and Access** ▪ Excellent road access via the Huon and Channel Highways ▪ Proximity to Hobart, which is within commuting distance ▪ Affordable land and housing options that are more competitively priced than places such as Kingston **Services and Facilities** ▪ Huonville serves a regional role and thus has a wide range of services and facilities, including local, state and commonwealth agencies ▪ Large sporting precinct within close proximity to the town centre ▪ The Ranelagh Show Grounds provide a venue for a range of events such as the Taste of Huon ▪ Huonville is an "RV-friendly" town and has dedicated riverside facilities for these vehicles ▪ The public pool facilities are well-utilised both by residents and visitors ▪ There are a number of large off-street car parking areas ▪ Work is currently being undertaken to develop the town's stormwater drainage works **Economic** ▪ Tassal processing plant provides employment for approximately 500 workers ▪ Huonville serves as an agricultural service centre for the region **Social and Cultural** ▪ The settlement caters for a range of households including young family and aged persons ▪ There are some scattered heritage buildings	**Natural** ▪ Flood prone areas and roads ▪ Land in the northwest of Ranelagh is steep and consists of loose soils ▪ Susceptibility to sea level rise **Settlement Structure, Role and Access** ▪ Weak connections between Huonville and Ranelagh ▪ Lack of connections to and along the river in some places ▪ Residential developments designed with cul-de-sacs do not promote permeability and ease of movement throughout the urban area ▪ No discernable 'gateway' treatments for the settlement ▪ Heavy vehicle movements along the Huon Highway reduce the amenity of the town centre ▪ Poor amenity in some parts of the town centre, especially in streetscapes ▪ Separation of Southbridge from the remainder of Huonville **Services and Facilities** ▪ Lack of tourist and seasonal worker accommodation ▪ Lack of services and retail/commercial facilities in Ranelagh ▪ Inadequate visitor information facilities ▪ Lack of public transport services ▪ The existing bus transit station and park and ride facilities are inadequate **Economic** ▪ Lack of suitably zoned industrial land for businesses such as downstream agricultural processing **Social and Cultural** ▪ Lack of cultural facilities, which are generally provided in other locations ▪ Declining participation in sporting activities

Opportunities	Threats
Natural ▪ Connections to the river and improvements to the foreshore are being made as the recommendations of the Huon River Foreshore Masterplan are being implemented **Settlement Structure, Role and Access** ▪ There are a number of infill development opportunities ▪ Reinforce a sense of place and identity through the establishment of appropriate urban design guidelines ▪ Realignment of the Channel Highway would allow for greater recreational use of the foreshore ▪ The planned upgrades to Sale Street could promote revitalisation of the adjoining land ▪ Enhance the gateway treatments at the arrival points into the township **Services and Facilities** ▪ Develop a caravan park to provide tourist and seasonal worker accommodation ▪ Provide recreation and any other facilities needed to support the population growth in Ranelagh ▪ A site for visitor information facilities has been identified **Economic** ▪ Develop the former quarry site for tourist accommodation to take advantage of the views to the north ▪ Encourage the establishment of downstream agricultural processing businesses ▪ Potential new industrial estate ▪ There are vacant and potential sites for new commercial/retail businesses such as a supermarket ▪ The development of a market will boost economic activity in the town ▪ Changes to the Huon Aquaculture business may provide additional staff for the Tassal factory. ▪ Possible redevelopment of Council depot and adjoining Council owned lands ▪ Improved broadband access will provide economic opportunities **Social/Cultural** ▪ Improved broadband access will provide social opportunities	**Natural** ▪ Coastal and surface flooding and erosion ▪ Unknown flooding impacts of illegally filled areas **Settlement Structure, Role and Access** ▪ Uncoordinated urban development in Ranelagh taking place before land in Huonville with better access to services and facilities is fully utilised ▪ Intersection upgrades may be required for the proposed industrial estate ▪ Whilst there is currently minimal development on the hills, inappropriate development could impact on the visual character of the town ▪ Increased population and traffic levels may result in car parking issues **Services and Facilities** ▪ Inability of the market to sustain retail/commercial facilities in Ranelagh ▪ Inappropriate car parking management **Economic** ▪ Spending leakage to other settlements such as Kingston and Hobart ▪ Realignment of the Channel Highway could lower visitor numbers to the town centre, affecting the viability of businesses



Figure 9: Key opportunities and constraints

4 Strategic Context

4.1 State

4.1.1 Resource Management and Planning System

The Resource Management and Planning System (RMPS) is the overarching planning and environmental framework which promotes the sustainable development of Tasmania's resources. The system requires local governments to further the objectives of the RMPS through their planning schemes. Several pieces of legislation embody the aims of the RMPS, and the Land Use Planning and Approvals Act 1993 is the principal planning legislation.

The Tasmanian Resource Management and Planning System is based on the following set of objectives:

- *to promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity*
- *to provide for the fair, orderly and sustainable use and development of air, land and water*
- *to encourage public involvement in resource management and planning*
- *to facilitate economic development in accordance with the objectives set out in the above paragraphs*
- *to promote the sharing of responsibility for resource management and planning between the different spheres of government, the community and industry in the State.*

The Huonville/Ranelagh Structure Plan must facilitate the sustainable development of the settlement's resources as per these objectives.

4.1.2 State Policies

There are currently three state policies as follows:

- The State Coastal Policy 1996 defines the coastal zone as State waters and land within 1km of the high-water mark. It has three principles relating to the protection of natural and cultural values, sustainable use and development, and integrated management and protection. The Structure Plan and the Planning Scheme must be prepared in accordance with the policy. It should be noted that the policy is currently subject to review by the Tasmanian Planning Commission.
- The purpose of the State Policy on Water Quality Management 1997 is to achieve the sustainable management of Tasmania's surface water and groundwater resources by protecting or enhancing their qualities while allowing for sustainable development in accordance with the objectives of Tasmania's Resource Management and Planning System. It includes a Protected Environmental Values classification system which identifies that there are a number of reserves in the study area that will need to be protected via the Structure Plan.
- The purpose of the State Policy on the Protection of Agricultural Land 2009 is to conserve and protect agricultural land so that it remains available for the sustainable development of agriculture, recognising the particular importance of prime agricultural land. The policy also seeks to protect non-prime agricultural land from conversion to other uses through consideration of its local and regional significance. Whilst there is no prime agricultural land in the study area, there are areas of agricultural land that may require protection.

4.1.3 Tasmania Together 2020

Tasmania Together is a state-wide visioning document that is used to provide strategic direction for policy and administrative decision-making. The goals of *Tasmania Together* are:

1. A reasonable lifestyle and standard of living for all Tasmanians.

2. Confident, friendly and safe communities.

3. High quality education and training for lifelong learning and a skilled workforce.

4. Active, healthy Tasmanians with access to quality and affordable health care services.

5. Vibrant, inclusive and growing communities where people feel valued and connected.

6. Dynamic, creative and internationally recognised arts community and culture.

7. Acknowledgement of the right of Aboriginal people to own and preserve their culture, and share with non-Aboriginal people the richness and value of that culture.

8. Open and accountable government that listens and plans for a shared future.

9. Increased work opportunities for all Tasmanians.

10. Thriving and innovative industries driven by a high level of business confidence.

11. Built and natural heritage that is valued and protected.

12. Sustainable management of our natural resources.

The Structure Plan will seek to further these goals for Huonville and Ranelagh.

4.1.4 Other Strategies

Other state-wide strategies of relevance are as follows:

- Tasmanian Framework for Action on Climate Change
- State Infrastructure Strategy
- Tasmania Health Plan 2018
- Social Inclusion Strategy
- Tourism 21

The Structure Plan must be prepared in accordance with these documents.

4.2 Regional

4.2.1 Southern Tasmania Regional Land Use Strategy

The Southern Tasmania Regional Land Use Strategy is being prepared at the present. Once completed, it will provide high-level strategic directions to facilitate and manage change, growth and development. It will include a Regional Settlement Strategy that will assign Huonville and Ranelagh roles in the settlement network and a growth management strategy, which will need to be furthered in the Structure Plan. There will also be a number of regional policies and actions that will be of relevance to the Structure Plan.

At the time of the preparation of this Structure Plan, the consultation draft of the STRLUS had assigned Huonville and Ranelagh the following roles:

- Huonville:
  - Regional Function: Major District Centre
  - Growth Strategy: High
  - Growth Scenario: Mixed

  - Activity Centre: Rural Services Centre
- Ranelagh:
  - Regional Function: Other small settlements or locality
  - Growth Strategy: None
  - Growth Scenario: N/A

4.2.2 Southern Integrated Transport Plan

The Draft Southern Integrated Transport Plan was released for public consultation in 2009, and is due to be finalised this year. The draft document includes the following guiding objectives that are of relevance to the Huonville/Ranelagh Structure Plan:

Our guiding objective is a southern region transport system that:

- *maximises the efficient use of current infrastructure, assets and services;*
- *is well maintained and managed in a sustainable manner for the long term;*
- *supports seamless inter-modal connections for passengers and freight;*
- *is capable of supporting future economic growth and meeting the needs of our communities, while supporting quality of life;*
- *improves accessibility and safety for all users;*
- *provides an integrated and well connected transport system for rural and urban areas;*
- *improves environmental and health outcomes for our community;*
- *responds to climate change by lowering greenhouse gas emissions;*
- *is integrated with land use planning; and*
- *is planned, coordinated and funded through a cooperative partnership approach between different spheres of government and the community.*

4.2.3 Natural Resource Management Strategy for Southern Tasmania

The Structure Plan will need to protect Huonville and Ranelagh's natural resources in order to achieve the following relevant goals of the strategy:

- *maintain and improve the condition of the Southern Region's natural resources*
- *contribute to the development of sustainable human communities to provide employment and a quality lifestyle*

4.3 Local

4.3.1 Planning Scheme

The Huon Planning Scheme 1979 is currently being revised in line with Planning Directive 1, which requires that all Councils prepare schemes in line with the state-wide Key Common Elements Template. This will involve the existing zones and special areas being changed so that each property is assigned a new zoning name as per the template.

4.3.2 Huon Valley Land Use and Development Strategy

The Huon Valley Land Use and Development Strategy was completed in 2007 to guide the preparation of the revised planning scheme that will replace the three existing planning schemes (being the Huon, Port Cygnet and Esperance Planning Schemes). The Strategy articulates a range of strategic directions and guiding principles and includes strategies for each town. The following strategic directions have relevance for the Huonville/Ranelagh Structure Plan:

- *The Huon Valley Community*
  - *Planning for diversity of age*
    - *Respond to the ageing population, while also taking into consideration the needs of young people.*
  - *Affordable housing*
    - *Respond to Housing Tasmania initiatives and policies, which will assist in providing affordable housing, increased accessibility and promotes socio-economic well-being in the Huon Valley.*
  - *Community facilities*
    - *Acknowledge the requirements of different service providers and allow flexibility to provide services that are responsive to the changing community profile.*
    - *Identify preferred locations for education, community and health facilities.*
  - *Recreation and open space*
    - *Provide opportunities for the development of new facilities within existing areas.*
  - *Crime prevention*
    - *The design of new built environments should consider measures to reduce crime.*
- *Natural Resource Management*
  - *Promotion of natural resource management*
    - *Integrate principles of natural resource management with land use and development controls.*
    - *Recognise the importance of maintaining natural values through natural resource management.*
  - *Land systems*
    - *Recognise the importance of land systems in the Huon Valley and provide appropriate mechanism [sic] for their protection.*
  - *Protection of waterways and wetlands*
    - *Recognise the importance of the protection of wetlands and waterways within the Huon Valley.*
    - *Require development to maintain the identified Protected Environmental Values (PEVs), as documented in the State Policy on Water Quality Management (1997)…*
  - *Protection of coastal and estuarine values*
    - *Recognise the importance of the protection of coastal and estuarine quality and values.*
  - *Protection of biodiversity values*

        - *Acknowledge the importance of the municipal area's biodiversity, by ensuring that the abundance, health and distribution of species is maintained.*

- *Natural Hazards*
    - *Landslip and tunnel erosion hazards*
        - *Minimise loss of property and life and avoid economic impacts by ensuring use and development avoids or manages the risks associated with landslip hazards.*
    - *Bushfire hazard*
        - *Recognise the management of bushfire hazard as an important land use considerations [sic] in order to protect lives, property and natural values of the Huon Valley as well as avoid unnecessary cost to the community.*
    - *Flooding hazard*
        - *Ensure that flood risk is a key land use consideration and the use and development is located and designed with due regard to hazard associated with flooding.*
    - *Storm surge and sea level rise*
        - *Ensure that use and development is located and designed with due regard to hazards associated with sea level rise and storm surge.*
- *Heritage*
    - *Aboriginal heritage*
        - *Ensure that sites and artefacts of Aboriginal Heritage Significance are managed appropriately into the future through and integrated approach to management.*
    - *European and built heritage*
        - *Sites of heritage significance need to be protected against inappropriate development – this also includes sites of geo-conservation significance, historic value and those with unique environmental features.*
    - *Cultural landscape and natural heritage*
        - *The Huon Valley landscapes are important in attracting residents and visitors and providing for a sense of place. Landscape values will therefore be protected as far as practicable.*
- *Infrastructure*
    - *Sewerage and water*
        - *Give preference to developments that will maximise the efficiency of existing infrastructure in the major towns that have existing capacity.*
    - *Stormwater management*
        - *Encourage the use of innovative and alternative infrastructure for stormwater management and treatment.*
- *Transport*
    - *Huon Valley Road Network*
        - *Maintain and protect the safety and efficiency of the transport system.*
    - *Integrating land use and transport planning*

- *Recognise the consolidation of development in existing towns will promote sustainable development by increasing accessibility, reducing the reliance on motor vehicles and promoting alternative modes of transport including walking and cycling.*

- *The Economy*
  - *Agricultural development*
    - *Recognises the importance of maintaining productive and viable agricultural areas and ensure that the State Protection of Agricultural Land Policy (PAL) is implemented. To do this, Council will ensure that*
      - *Subdivision of agricultural land will not result in the loss of land to agricultural production*
      - *Agricultural land is protected from encroachment by residential use and development*
      - *A precautionary approach is adopted*
  - *Downstream processing*
    - *Provide for the development of industries that add value to the key export sectors of forest and food industry and flexibility for development close to raw materials in rural areas, subject to acceptable environmental and amenity impacts.*
  - *Light industrial development*
    - *Identify a particular site for a light industrial 'estate' that would be available for future demands and which would be suitable for the larger industrial enterprises within the Huonville area.*
- *Sustainable Tourism*
  - *Tourism development*
    - *Strengthen the key centres of Huonville, Cygnet, Franklin, Geeveston and Dover by encouraging tourism development to locate within them.*
- *Providing for Housing Needs*
  - *Providing for housing needs*
    - *Maximise the utilisation and efficiency of existing infrastructure and community services, and promote infill development in preference to settlement expansion.*
    - *Promote high quality residential design and residential amenity.*
  - *Living in the rural area*
    - *Encourage the use of rural areas predominantly for primary production and to protect these areas from undue encroachment from non-agricultural uses.*
- *Settlements*
  - *Huonville and Ranelagh*
    - *Huonville is recognised as the primary commercial centre and focus for the Huon Valley.*
    - *Enhance the Huon River foreshore and provide for better connections to the town.*
    - *Protect the safety and efficiency of the existing road infrastructure and have the capacity for upgrading and expansion to meet future development needs.*
    - *There is capacity for infill development to occur and there are potential development sites on the fringe of the town's commercial area.*

- *Main street improvements are necessary to ensure pedestrian safety and to mitigate against the adverse impacts of heavy vehicle traffic.*
- *The visual amenity of the Huon River, hills and bushland surrounding the town should be afforded protection from use and development incompatible with the projection of these values.*
- *Emphasis should be placed on upgrading Huonville's existing infrastructure, rather than investing in extensions to new areas.*

The Huonville and Ranelagh Strategy outline development plan includes an urban growth boundary and options for residential, commercial, industrial and recreational land uses.

4.3.3 Huon Valley 2020 Community Plan

The Huon Valley 2020 Community Plan is founded on the following vision and values statements:

Vision Statement:

From Sleeping Beauty to the Southern Ocean

Prosperous vibrant communities in the Huon Valley

Live, work and learn together

Enjoying beautiful rural landscapes, waterways and a healthy natural environment

Values Statement:

In all our dealings we will:

Be open, fair and honest

Respect our people, land and future

Embrace diversity and new ideas

Pursue community cohesion

The plan contains strategic objectives grouped under eight future directions, all of which have relevance for the Structure Plan:

- *Care for our environment*
- *Build health and wellbeing*
- *Enhance recreational opportunities*
- *Improve transport and communication*
- *Create diverse educational opportunities for all*
- *Develop prosperity*
- *Expanded community consultation and involvement*
- *Celebrating our arts, heritage and culture*

4.3.4 'Target 2015' – Huon Valley Council Strategic Plan 2010-2015

The current Council Strategic Plan includes five strategic focus areas, four of which have relevance for the Structure Plan:

- *A sense of place*

- *A dynamic economy*
- *A connected and thriving community*
- *A service organisation*

It also includes the following vision:

From Sleeping Beauty to the Southern Ocean

Prosperous vibrant communities in the Huon Valley

Live, work and learn together

Enjoying beautiful rural landscapes, waterways and a healthy natural environment

One of the townships strategies in the "A sense of place" strategic focus area is to progressively develop town structure plans.

4.3.5 Economic Development Strategy

The key issues raised in the 2009 Economic Development Strategy of relevance to the Structure Plan are:

- *Availability of industrial land*
- *Availability of tourist accommodation*
- *Availability of accommodation for seasonal workers*
- *Increased downstream processing of natural produce and resources*
- *Provision of adequate transport*
- *Commercial activity*
- *Infrastructure development*
- *Climate change*

4.3.6 A Future Development Strategy for Huonville, Value Management Study

This Value Management Study was undertaken in 2003 to explore and identity future development options for Huonville. The major outcomes of the study that have relevance for the Structure Plan are as follows:

- It was agreed that the current alignment of the Channel Highway is unacceptable, and a preferred realignment option was identified.
- A framework to progress the streetscape project was developed.
- A potential location for the bus transit station was identified off Skinner Drive.
- The foreshore adjacent to the Channel Highway was identified as the best potential location to attract tourists.
- A site referred to as "Page's land" was identified as providing significant tourism development opportunities.
- It was agreed that Huonville's marketing strategy should be as "Gateway to the Huon Valley" / "The Hub of the Huon".

4.3.7 Huon River Foreshore Masterplan

The Huon River Foreshore Masterplan was prepared in 2007 to provide direction for the enhancement of the northern bank of the foreshore downstream from the bridge. Based on the proposed realignment of the Channel Highway, it includes hard and soft landscaping and parking concepts.

4.3.8 Huon Valley Walking Track Strategy

Prepared in 2007, the Huon Valley Walking Track Strategy identified options for walking track developments within and between towns in the municipal area. Of relevance to the Structure Plan are the following options:

- Skinners Creek track – has been partially constructed
- Waltons Inlet track – involves the continuation of an existing track, although access over private land will need to be secured first
- Glen Huon Road track
- Coolstore Road track
- Flood Road nature walk – the alignment of which will be contingent on whether the Channel Highway realignment proceeds and whether the Huon Rover Foreshore Masterplan is implemented
- Esplanade link
- Huonville to Judbury – this would include a link from Huonville to Ranelagh

4.3.9 Huon River Flood Evacuation Plan

The Huon River Flood Evacuation Plan identifies the consequences of the flooding of the Huon River for a range of flood events.

4.3.10 Huonville Structure Plan 1997

The 1997 Structure Plan prepared for Huonville included the identification of an urban growth boundary, options for residential and commercial development, and transport options.

4.3.11 Huon Valley Regional Tourism Strategy 2009-12

The Huon Valley Regional Tourism Strategy identifies the following themed opportunities and priorities for further tourism development in the area:

- *Maximise visitor access to the region's fresh, local produce*
- *Expand the existing focus on the arts in and around Cygnet and link with other similar experiences across the region*
- *Extend the range of engaging nature-based experiences*
- *Increase 'whole of region' water access including water-based visitor experiences.*

4.3.12 Key projects

Some of the key projects that are underway or planned for Huonville include:

- Implementation of the Foreshore Masterplan
- Implementation of the Walking Track Strategy
- Stormwater upgrades

- Upgrades to Sale Street

5 Land Use and Community Needs Assessment

5.1 Residential land

5.1.1 Supply

There are currently a number of approved residential subdivisions and approximately 33ha of vacant residential land within the existing Urban Growth Boundary. It is noted that some of the residential land is subject to significant constraints that means it is inappropriate for residential development and that will be rezoned to another use.

Allowing for the average allotment sizes and development ratios detailed in Table 14 below, the vacant residential land equates to approximately 700 potential allotments. Some of these allotments may be constrained by factors such as topography or access difficulties, and to this end it is likely that the actual number of allotments that could be created will be less than this figure. However, there may also be existing allotments that could accommodate additional dwellings.

Table 14 – Existing residential land supply

Approximate existing vacant residential land (in the Residential Zone) that is not subject to significant known physical constraints and recommended for rezoning to Rural	39 ha
Land in Southbridge that will retain its Residential zoning but that is owned by a party not interested in developing it at present	6ha
Total potentially developable land currently zoned for residential purposes	33ha
Average dwellings per hectare (based on the middle value of the 11 to 25 dwellings per hectare anticipated in the consultation draft of the Southern Tasmania Regional Land Use Strategy; these allotments will generally be 400m^2 to 800m^2)	19
Total potential residential allotments on vacant land (NB: additional constraints analysis and subdivision design is likely to result in lower numbers of dwellings; for example, the land identified within Ranelagh is subject to heritage constraints)	627 allotments
Approved subdivisions	89 allotments
TOTAL POTENTIAL ALLOTMENTS	716 allotments

5.1.2 Demand

There are two components to the dwelling projections; dwellings that are a ‘place of usual residence’ and dwellings that are used as holiday homes.

The population and household size projections allow for estimations to be made of the housing demand for dwellings considered by occupants as their 'place of usual residence'. It must be recognised that this is only a segment of the demand as a significant proportion of dwellings in the settlement are used as holiday homes and as such would not be considered as a place of usual residence. It is assumed that there will continue to be demand for holiday homes over the next couple of decades.

It is difficult to obtain data on whether private dwellings are considered by occupants as their place of usual residence, especially as the extent to which they are occupied may change over time. *ABS 2068.0 Dwelling Structure by Occupied / Unoccupied Dwellings 2006* data relating to location on Census night has been used and an assumption has been made regarding the data. It has been assumed that as the Census was taken on Tuesday 8th August (mid-week in winter), the percentage of unoccupied dwellings on this night is considered a reasonable assessment of the proportion of holiday homes in the study area.

Analysis of this data has been undertaken to adopt an additional dwelling demand estimate factor based on the proportion of occupied versus unoccupied dwellings on Census night. It is important to recognise that actual dwelling trends may differ and this is to be considered a broad estimate only. Ongoing monitoring and analysis of dwelling approval data and population growth figures will assist in determining the true extent of dwelling demand.

The *ABS 2001.0 Basic Community Profile 2006* suggests that Huonville Ranelagh's average household size in 2006 was 2.5 people per household (for occupied private dwellings). Making some general assumptions, a projection of the future place of usual residence dwelling needs for Huonville Ranelagh can be made. This projection is shown in Table 18 below.

Table 15 – Huonville Ranelagh dwelling projections – place of usual residence

	Medium Scenario	High Scenario
Average household size 2030	2.3	2.3
Projected population growth 2010-2030	391	886
Projected new dwellings required for place of usual residence by 2030	170	385

A projection can also be made for the future holiday homes likely to be required in Huonville Ranelagh by using the *ABS 2068.0 Dwelling Structure by Occupied / Unoccupied Dwellings 2006* data and making the assumption that the rate of unoccupied dwellings will stay the same as the population grows. As shown in Table 16 below, 9.5% of private dwellings in Huonville Ranelagh were unoccupied on Census night in 2006. This means that for every 100 occupied dwellings there were 10.5 unoccupied dwellings.

Table 16 – Huonville Ranelagh occupied and unoccupied private dwellings 2006

	Occupied dwellings 2006		**Un-occupied dwellings 2006**	
	No.	**%**	**No.**	**%**
Separate houses	622	90.5%	65	9.5%
Semi-detached townhouse etc	14	100%	0	0.0%
Flat, unit or apartment	64	91.4%	6	8.6%
Other Dwelling	8	72.7%	3	27.3%
Total	708	90.5%	74	9.5%

Using the rate of unoccupied dwellings and assuming this rate will stay constant as the population grows; the following projection of the requirement for holiday homes can be made.

Table 17 – Huonville Ranelagh dwelling projections – place of usual residence

	Medium Scenario	High Scenario
Projected new dwellings required for place of usual residence by 2030	170	385
Rate of un-occupied dwellings	0.105	0.105
Total new holiday homes required by 2030	18	40

Based on this very simplistic methodology, the total number of new dwellings required for both place of usual residence and holiday homes by 2030 is 188 in the medium growth scenario and 426 in the high growth scenario.

Implications: The Structure Plan will need to consider:

- The provision of land for at least 188 additional dwellings. This has been extrapolated from the medium growth scenario, and the high growth scenario may result in the need for 426 dwellings. Ongoing monitoring of the demand for and supply of dwellings will be necessary to determine how much residential land should be made available.
- Whether to promote infill development, i.e. development utilising existing zoned land
- The suitability of existing zoned land for residential development – e.g. is it floodprone
- Staging of residential growth
- Village housing (e.g. smaller units) in close proximity to the town centre
- Long term residential growth area options

5.2 Retail and commercial land

There is currently 11.95ha of land in the Business Commercial Zone and a number of sites in the Public Purpose Zone that contain business and commercial activities (on land equating to around 2.5ha). Through the Planning Scheme revision process Council is considering extending the area to which a commercial zoning is applied to include sites such as the Council depot land.

An issue for consideration is where additional retail and commercial floor space can be accommodated over the life of this Structure Plan to meet future demand. The extent of floor space requirements and the specific types of floor space have not been determined in this Structure Plan. One key issue is identifying and protecting a site or several sites where large floor space activities, such as a second supermarket, could or should be located. It is considered important to do this in advance of any proposal to ensure that the Structure Plan "future-proofs" the town centre by ensuring land of a sufficient dimension is available when the demand justifies a second supermarket and to also maximise the benefits of such a development and minimise potential adverse effects in terms of traffic and connectedness to established retail and commercial areas.

A number of specific commercial land uses or activities have been raised during the workshops, including a location for market activities, travellers accommodation, and a tourist information centre.

Implications: The Structure Plan will need to consider:

- The provision of additional retail floorspace to cater for increased demand as a result of population growth
- The identification of sites for long-term land use options such as a second supermarket

- Locations for tourism facilities, including accommodation and an information centre
- Locations for a marketplace

5.3 Industrial land

The Southern Tasmania Regional Land Use Strategy Background Report 12 (Industrial Activity) identifies that there is currently 27.23ha of industrial land situated in Huonville/Ranelagh in three precincts. 12% of this land is considered to be vacant, which equates to 3.15ha.

The aforementioned report also identifies that there are no existing industrial land demand projections available for the best-practice 15 year planning period (the projections from the *Industrial Land Demand Tasmania: Short to Medium Term Overview* extend only to 2011). It also recognises that "while the regional areas of Southern Tasmania are expected to generate land demand, a significant portion of this demand will still be met by industrial areas within Greater Hobart, which has the market scale and infrastructure to service the surrounding areas" (STCA, 2010: p. 9). The Southern Tasmanian Industrial Land Study, to be completed in the later half of 2011, will better define demand and supply of industrial land for the municipal area.

The need for downstream agricultural and light industrial processing sites has been raised in the Huon Valley Land Use and Development Strategy and the key stakeholder consultation.

Implications: The Structure Plan will need to consider:

- Additional industrial land
- Downstream agricultural and light industrial processing sites

5.4 Transport and access

The following issues have been raised in the key stakeholder consultation and/or identified through previous strategic planning work:

- Traffic management in the town centre
- Bypass options
- Bus interchange including park and ride

An assessment of bypass options is provided in Appendix A[3].

Implications: The Structure Plan will need to provide or consider:

- Bypass options for the Channel Highway
- A bus interchange incorporating park and ride facilities
- The continued expansion of the walking track network
- Permeable subdivision layouts to promote walking
- Cycling facilities

[3] Note that the cover image on the Traffic and Transport Assessment is a corporate branding image and is not of Huonville.

5.5 Community services and facilities

As shown in Table 18 below, for a population of under 2,000 people, Huonville Ranelagh is extremely well resourced.

Whether the population increase is 391 people (medium scenario) or 886 (high scenario) in Huonville Ranelagh between 2010 and 2030, combined with the continuing ageing of the population profile, it is likely that some increased demand for local provision of health and community services will be experienced. As well as this it must be recognised that the catchment for services provided within Huonville Ranelagh is broader than the study area as the residents of a number of smaller outlying towns come to Huonville Ranelagh to access services.

In considering future service provision in Huonville Ranelagh, the below statement made by the *Department of Health and Human Services* in relation to health services is considered relevant to the provision of broader community infrastructure:

Many Tasmanian communities are small, creating a tension between the desire to deliver comprehensive health services locally and the need to structure services so that they are sustainable. This is a particular challenge for small and/or complex services. (Tasmania's Health Plan 2007).

An assessment of the level of community infrastructure provided in Huonville Ranelagh has been made through analysis of best practice community facility provision benchmarks in Table 18 below. It must be noted that these benchmarks are derived from a range of sources and are general in nature. On the whole, the benchmarks do not take into consideration levels of isolation or specific community needs. They do however provide a guide to help understand the current and potential community infrastructure requirements for Huonville Ranelagh.

While it is clear from Table 18 that Huonville Ranelagh is well resourced, it must be considered a future priority to provide adequate infrastructure to allow increasing outreach centre-based services, particularly for the elderly. This will require flexible spaces that can be used for a range of purposes as needs require. These multi-purpose spaces include consulting suites, class rooms and meeting places.

A consideration in the future community infrastructure planning for the investigation area must be the recognition of the need to provide *equity in service provision between urban, regional and rural Tasmania through the use of digital infrastructure* as detailed in the *Department of Infrastructure, Energy and Resources Tasmanian Infrastructure Strategy.*

Implications: The Structure Plan will need to consider:

- The provision of health and community services
- The provision of multi-purpose spaces for outreach services

Table 18 – Selected community service and facility benchmarking for Huonville Ranelagh

Benchmark	Source of benchmark	Application in study area
General practitioner 1 GP per 1000 persons	Australian average Tasmania's Health Plan 2007	At present Huonville has 6 FTE GP's signifying its role as a regional medical service provider. It is important that the study area retains its role as a regional medical server and that a sufficient number of GP's are available to support this role.
Maternal and child health 1 full time nurse per 140 births	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Population projections suggest that Huonville Ranelagh will not reach the threshold of 140 births to justify a full time maternal and child health nurse and should access services on an outreach basis
Community based health centre 1 per 10,000 population	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Retain access to existing health service and ensure spaces available for visiting health consultants to provide outreach services
Centre based library 1 per 30,000 population	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Retain access to library services through a centre based library or through a multi-purpose space that provides library services
Community meeting space 1 space for up to 20 people per 4,000 population	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Retain access to existing community meeting spaces
Multi-purpose community centre 1 per 8,000 population	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Retain access to existing spaces, ensure flexibility of spaces to cater for consulting services, community learning and community meetings
Residential aged care 44 low care and 44 high care beds per 1000 people aged over 70	Australian Government Department of Health and Ageing	Retain access to the existing aged care facilities and consider expansion of services as the population ages
Indoor recreation centres 1 per 10,000 population	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Retain access to the three multi-use indoor courts at the Police and Community Youth Club
Active open space reserves 1 (4-5ha) per 6,000 people	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Existing active open space should be retained to allow residents to participate in structured activity
Passive open space .7ha per 1000 people	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Passive open space should be retained to allow residents to participate in unstructured activity
Government primary school 1 per 8,000 population	Planning for Community Infrastructure in Growth Areas ASR Research 2008	Retain access to the existing school
Government secondary school	Planning for Community	Retain access to the existing

1 per 25,000 population	Infrastructure in Growth Areas ASR Research 2008	secondary school

6 Vision

The vision for the future of Huonville and Ranelagh is:

Huonville and Ranelagh will share their hidden secrets, with the riverfront, views to Sleeping Beauty and local food and beverages known to all. They will thrive as prosperous, vibrant and sustainable communities that provide opportunities for residents to live, work and learn together.

As complementary yet distinctly different settlements, Huonville will continue to serve as an employment services, retail and tourism hub for the Huon Valley, while Ranelagh will provide a supporting residential role that allows it to maintain its village feel. A diverse range of housing and tourism accommodation options will be available for residents and visitors to enjoy the outstanding natural setting and access employment opportunities.

The objectives and recommended actions in Section 9 provide support for and further this vision.

7 Assessment Criteria

A set of assessment criteria based on best-practice strategic land use planning and urban design principles have been developed. Many of these can be applied at a range of scales, from structure planning to individual development proposals. To this end as well as being used to evaluate the structure plan options, they can also be utilised to assess proposed permit applications and planning scheme amendments.

The criteria are framed as a set of questions, and examples of how these could be addressed are provided.

Table 19 – Assessment criteria

Criteria	Example of how the criteria can be met
Strategic land use planning criteria	
Ecology and natural features: Does it protect important flora and fauna and respond to the natural topography?	Avoids development extending up hillslopes, provides an open space network rather than fragmented patches, and retains key views.
Employment: Does it promote a range of employment opportunities?	Provides space for new businesses.
Climate and hazards: Does it consider natural hazards including climate change effects?	Avoids development in areas prone to flooding, bushfires or coastal flooding.
Resources: Does it make efficient use of resources?	Uses existing reticulated infrastructure rather than requiring extensions to be made.
Transport: Does it promote ease of movement?	Promotes walking and cycling through subdivision layouts that utilise connected roads to create permeable access networks that are easy to navigate rather than unconnected cul-de-sacs.
Strategic: Does it accord with other strategic planning documents?	Takes into account the Huon Valley Land Use and Development Strategy.
Diversity: Does it promote diverse, flexible and adaptable uses?	Provides a range of housing options to suit the needs of different households, such as young families, single person households, and aged persons. Includes residential buildings in the town centre that can also be used for business purposes.
Urban design criteria	
Placemaking: Does it create places for people?	Enhances the public realm and provides equitable access to public open spaces.
Legibility: How easy is the place to understand?	Signposts attractions and provides walking routes to them.
Richness and variety: Are there multiple things to do?	The town centre provides activities for a range of different ages and interest groups.
Authenticity: Does it ensure it is designed for the locals first and draw from local culture and history?	Is the town centre designed to encourage locals to shop and spend time there? Are buildings made from locally sourced materials where possible?
Software, hardware and etherware: Does it consider the “hardware” (built form), “software” (activities) and	Ensures that public spaces are designed to incorporate their intended uses, such as a town square that can

Criteria	Example of how the criteria can be met
"etherware" (online presence)?	accommodate a market. Considers the provision of online tourism information as well as information centres.
Creativity: Does it encourage innovative architecture and design?	Uses public art to add legibility and authenticity such as locally-designed bollards and interpretation boards.
Position and synergy: Does it make use of competitive and cooperative arrangements within the town and between other towns?	Encourages multiple restaurants to develop to form a precinct.
Value adding: Does it promote higher value products and more complex experiences?	Farms that also process food and provide food-related tourism facilities on site.
Liveability: Does it make a positive contribution to the wellbeing of residents?	Providing a range of pedestrian routes and walking tracks that encourage people to incorporate exercise into their lives.

8 Structure Plan Options

8.1 Identification of options

In preparing the structure plan, a number of options were considered for the growth and development of the town, as described below:

- Option 1: Settlement extensions for residential uses
  - This option involves rezoning rural land for residential development
- Option 2: Settlement extensions for industrial uses
  - This option involves rezoning rural land for industrial development.
- Option 3: Settlement extensions for tourism uses
  - This option involves rezoning rural land for tourism development[4].
- Option 4: Infill development
  - This option involves using existing urban land for residential development.
- Option 5: No unit development
  - This option bans the development of residential units on small sites.
- Option 6: Unit developments scattered throughout the urban area
  - This option involves allowing residential units on small sites to be located throughout the urban area.
- Option 7: Unit developments around the town centre
  - This option restricts the development of residential units on small sites to be located around the town centre only.
- Option 8: No major changes to the road network
  - This option does not include the development of an alternative north-south route or a traffic management plan
- Option 9: Develop an alternative north-south route
  - This option involves developing an alternative north-south route between the Channel Highway and the Huon Highway
- Option 10: Implement a traffic management plan
  - This option involves implementing a traffic management plan that will consider matters such as the treatment of existing intersections.

8.2 Assessment of options

The options are assessed against the strategic land use planning assessment criteria in Table 20.

[4] As the only tourism-related zoning in the Common Key Elements is the Major Tourism Zone, any rezoning is likely to be for a commercial use with a specific tourism proposal in mind

Table 20 – Assessment of options

Assessment criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10
Ecology and natural features: Does it protect important flora and fauna and respond to the natural topography?	✓/×	✓/×	✓/×	✓	✓	✓/×	✓	✓	✓/×	✓
Employment: Does it promote a range of employment opportunities?	N/A	✓	✓	N/A	N/A	N/A	N/A	✓	✓/×	✓
Climate and hazards: Does it consider natural hazards including climate change effects?	✓/×	✓/×	✓/×	✓/×	✓/×	✓/×	✓/×	×	✓	×
Resources: Does it make efficient use of resources?	×	×	×	✓	×	✓/×	✓	✓	×	✓
Transport: Does it promote ease of movement?	✓/×	✓/×	✓/×	✓	×	×	✓	×	✓	✓
Strategic: Does it accord with other strategic planning documents?	✓/×	✓	✓/×	✓	✓/×	✓/×	✓/×	×	✓	✓/×
Diversity: Does it promote diverse, flexible and adaptable uses?	✓/×	✓/×	✓/×	✓/×	×	✓	✓	✓/×	✓/×	✓/×

KEY: ✓ = meets criteria

✓/× = partially meets criteria and/or could vary from site to site

× = does not meet criteria

N/A = not applicable

8.3 Recommended option

The recommended option is based on the amalgamation of a number of development options to identify the most appropriate form of development for Huonville and Ranelagh. It is recommended that a development scenario be adopted that incorporates:

- The promotion of infill residential development before extending the settlement for housing purposes (Options 4 and 1 respectively).
- Investigating settlement extensions for industrial and tourism uses (Options 2 and 3).
- Ensuring unit developments are located around the town centre (Option 7).
- Investigating a traffic management plan as the first method to address transport network issues (Option 10), although ensuring land is set aside for the development of an alternative north-south route in the long term (Option 9).

The recommended option will further the vision for Huonville's future by:

- Providing land for housing, employment and tourism in the regionally important service hub of Huonville.
- Providing a diversity of housing choice in both settlements.
- Promoting sustainable land use through infill development and unit developments around the town centre.
- Addressing traffic management issues within the town centre.

9 Structure Plan

9.1 Introduction

The Structure Plan incorporates a range of recommended actions that seek to further the objectives for residential, employment and community land uses, the town centre, and the movement network.

The regional framework map illustrates the key geographically-based recommendations. Recommended improvements for the town centre are provided as separate diagrams.

Broadly the Structure Plan recommends that:

- The Urban Growth Boundaries around Huonville and Ranelagh be adjusted to ensure the ongoing sustainable and efficient use of land.
- A break be maintained between Huonville and Ranelagh so that each can retain its character and to avoid the development of floodprone land around Mountain River.
- Huonville's town centre be focused on Huon Highway and the foreshore of the Huon River.
- Residential, commercial and civic land uses continue to be primarily located in Huonville, with Ranelagh providing a supporting residential role.
- The road and walking/cycling networks be enhanced with further links.

It is recommended that the Huonville and Ranelagh Urban Growth Boundaries from the Huon Valley Land Use and Development Strategy be amended to reflect recent rezonings, the current zoning and land use patterns, and the recommended zoning changes. Both extensions and contractions are recommended.

Changes to the Ranelagh Urban Growth Boundary include the following:

- Incorporation of the land currently zoned and used for low density housing.
- Incorporation of land associated with the showgrounds.
- Incorporation of land that has been rezoned residential in recent years.
- Incorporation of land that is recommended to be rezoned for long term residential purposes.

Changes to the Huonville Urban Growth Boundary include the following;

- Incorporation of land that is recommended to be rezoned for industrial, recreational, public use and tourism accommodation purposes.
- Exclusion of land that is to be rezoned from residential to rural due to constraints such as flooding, topography and poor connectivity.
- Exclusion of rural living land east of Flood Road.

It should be noted that not all of the recommended rezonings will need to occur immediately. In this respect, further explanation is provided below in relation to the individual rezoning recommendations.

9.2 Residential land uses

Residential land uses include standard low density residential dwellings, rural living dwellings, unit developments, and aged care facilities. The residential land analysis in Section 5.1 concludes that the land currently zoned for residential purposes could accommodate in the order of 700 allotments, but that several areas are subject to significant constraints that will lower the yield. To this end it is necessary to identify both areas of land that should be rezoned from residential to other uses and areas of land that should be progressively zoned for residential purposes to ensure at least a 15 year forward supply of residential land is maintained. Providing an adequate forward supply of residential land will

Settlement limits

Industrial

Rural

Settlement limits

Public use

Residential

Rural

Rural

Commercial

Rural

Settlement limits

Mixed use

Investigate suitability for tourism accommodation and rezone if necessary

Rural

Mixed use

Recreation

Commercial with zone boundary to match final Channel Highway alignment

Settlement limits

N

0 0.25 0.5 1km

HUONVILLE

Proposed Settlement Limits and Zonal Recommendations

urbis

N

0 0.25 0.5 1km

Legend

- Study Area Boundary
- Proposed Town Centre
- Key Attractions / Landmarks
- Ranelagh Trail
  > Theme Tree Planting at key focal points
  > Supported by artistic signage / public art installations
- Waterfront Activity Centre
- Boating Water based Tourism
- Pedestrian / Bicycle Trail Connection
- Proposed Mixed Use

HUONVILLE
Proposed
Regional Framework

urbis

N

0 50 100 200 300 400 500m

Legend

- Study Area Boundary
- Proposed Town Centre and commercial use
- Key Attractions / Landmarks
- Mainstreet and Riverfront Theme Tree Planting
- Ranelagh Trail
  - > Theme Tree Planting at key focal points
  - > Supported by artistic signage / public art installations
- Waterfront Activity Centre
- Boating Water based Tourism
- Pedestrian / Bicycle Trail Connection
- Parking
- Potential Road Connection
- Camp site
- Proposed Mixed Use

HUONVILLE
Proposed Structure Plan for the Town Centre

urbis

assist to keep land prices at affordable levels as restricted supplies can result in increased land prices. Keeping a limit on the amount of land (i.e. a 15 year supply) that is to be zoned residential will ensure that infill development options are utilised before additional land is rezoned. The recommended rezonings will result in changes to the Urban Growth Boundaries that were identified in the Huon Valley Land Use and Development Strategy.

The promotion of infill development is a key tenet of the structure plan, including encouraging medium density units to be established within walking distance of the town centre. The Proposed Structure Plan for the Town Centre depicts two areas in yellow where this is already occurring.

9.2.1 Objectives

The objectives relating to residential land uses are as follows:

- Provide enough land zoned for residential development to ensure there is a 15 year supply available that meets the projected demand.
- Identify long-term residential growth options.
- Promote a consolidated urban form by the establishment of an urban growth boundary.
- Promote infill development by utilising existing residentially zoned land before rezoning more land for residential uses.
- Ensure unit developments are located within walking distance of the town centre.
- Ensure new subdivisions are designed appropriately with consideration of the location of roads, public open space and higher density housing.
- Maintain a break between Huonville and Ranelagh.
- Make efficient use of existing infrastructure.
- Provide a diverse range of housing options including detached houses, unit developments, housing for aged persons, social housing, affordable housing and live-work units.
- Avoid residential developments in unsuitable areas, such as land subject to flooding or landslips or containing significant flora and fauna.

9.2.2 Recommended Actions

The recommended actions relating to residential land uses are as follows:

Actions	Explanation
▪ Rezone land around Huonville adjacent to the proposed north-south route residential as depicted on the Proposed Settlement Boundary and Zonal Recommendations map once the existing residential land within the settlement boundary falls below a projected 15 year supply.	Huonville is constrained in its ability to grow in other directions due to the presence of physical constraints such as waterways and floodprone areas. The north-south residential route will provide a new physical definition to the northeast edge of Huonville, and will sever some rural land. Its most efficient long term use will thus be for urban rather than rural purposes.
▪ Rezone land south of Knights Road in Huonville residential as depicted on the Proposed Settlement Boundary and Zonal Recommendations map once the existing residential land within the settlement boundary falls below a projected 15 year supply.	The southern limit of this area of land is a watercourse which provides a natural physical limit to the settlement.
▪ Rezone land adjacent to Shield Street mixed use to allow commercial, live-work units and medium	Rezoning this site will encourage medium density units to be developed with good access to the town centre.

Actions	Explanation
density housing to be established in this area as depicted on the Proposed Settlement Boundary and Zonal Recommendations map.	
▪ Rezone land southwest of Agnes Street in Ranelagh residential once the existing residential land within the settlement boundary falls below a projected 15 year supply.	There are limited opportunities for additional infill residential development within Ranelagh.
▪ Consider rezoning land within Ranelagh from Low Density Residential to Residential in the long term if land within the settlement boundary falls below a projected 15 year supply.	There are limited opportunities for additional infill residential development within Ranelagh, and limited opportunities to expand the settlement due to the presence of natural barriers and constraints such as waterways and steep slopes.
▪ Rezone residential land outside the settlement boundary to a rural zoning.	There is some land currently zoned for residential purposes that is unable to be used for this land use due to the presence of constraints such as flooding. Four areas have been identified where it is recommended that this occurs as follows: ▪ An area north of Huon Highway and west of Orchard Avenue that is unsuitable for residential development due to poor connectivity. It is also adjacent to land recommended for industrial development, so rezoning it rural will provide a buffer between future industrial uses and the existing residential area to the south. ▪ An area of land west of Wilmot Road that is unsuitable for residential development as it is floodprone. ▪ An area of land north of Knights Road that is unsuitable for residential development due to its location. ▪ An area of land between Scenic Road and Frankcomb Street that is unsuitable for residential development due to its steep gradient.
▪ Monitor dwelling approval trends and the supply of vacant residential land.	In order to ensure that a sufficient supply of residential land is available at all times, it will be necessary to monitor dwelling approval trends, This will facilitate the identification of how much land is required to maintain a 15 year supply of land zoned for residential purposes.
▪ Include criteria within the Planning Scheme requiring subdivisions proposals to consider: – the location of roads so that interconnected permeable grid layouts rather than cul-de-sacs are included – the location and size of public open space to ensure that it is appropriate for its intended use, fronted by streets on at least three sides, and overlooked by dwellings to provide passive surveillance – the location of higher density housing so that it	These criteria reflect best-practice subdivision design.

Actions	Explanation
is located within walking distance of the town centre (400m) and where feasible overlooking public open space	
▪ Include criteria within the Planning Scheme to guide the design and assessment of unit developments.	This will ensure unit developments are developed to best-practice standards.
▪ Include provisions in the Planning Scheme providing for residents to construct wind turbines in appropriate situations.	This will assist residents to lessen their carbon footprint.

9.3 Employment and tourism land uses

Employment land uses include commercial, retail and industrial activities as well as tourism accommodation and facilities. It is noted that some tourism attractions will also be of recreational interest to residents.

Industrial land use options within the study area are limited due to the presence of flooding constraints and the need to maintain separation distances with sensitive uses such as dwellings. A proposed industrial site has been identified previously on Glen Road.

Should a second supermarket be proposed for Huonville, the Council depot site is considered the most appropriate location. It is larger than other potential sites, and its development will assist in encouraging the town centre to address the river.

9.3.1 Objectives

The objectives relating to employment and tourism land uses are as follows:

- Provide additional commercial land.
- Identify and protect large scale development sites.
- Provide tourist accommodation sites for camping and motel accommodation.
- Provide tourism information sites.
- Enhance the range of tourism activities available.
- Realise the potential for Huonville to showcase locally-produced food and wine.
- Provide additional industrial land.
- Provide downstream agricultural processing sites.
- Ensure that appropriate buffers are maintained between industrial activities and sensitive uses such as dwellings.

9.3.2 Recommended Actions

The recommended actions relating to employment land uses are as follows:

Actions	Explanation
▪ Rezone land adjacent to Shield Street mixed use to allow commercial, live-work units and medium	Mixed use zones allow for both residential and commercial uses to be established, and are commonly

Actions	Explanation
density housing to be established in this area as depicted on the Proposed Settlement Boundary and Zonal Recommendations map.	used adjacent to town centres to encourage increased residential densities on sites with excellent access to facilities and to provide additional commercial land. The dotted area outlined on the Structure Plan map is a former fuel depot, and an environmental audit for potential land contamination may be necessary to ascertain whether it can be used for residential purposes or not.
▪ Rezone the Council depot site commercial, and use it in the short term as a park and ride site. In the medium term, use it as a weekend market site, and in the long term, reserve it as a potential supermarket site.	The Council depot site is in a key location, and its use for these activities will assist to encourage the town centre to focus on the river as well as the Huon Highway. If the depot activities continue, the park and ride and market activities may need to occur on part of the site rather than the whole site.
▪ If the Aurora depot activities shift from their present site, develop the site for commercial uses, car parking and/or a park and ride facility.	The Aurora site could provide another option for a park and ride facility if the Council depot site is developed for other uses.
▪ Encourage tourism accommodation options to be located close to the riverfront and/or to take advantage of key view corridors.	Taking advantage of key visual features of the town will assist to increase the viability of tourism accommodation.
▪ Rezone the land adjacent to the realigned Channel Highway Recreational and consider development of recreational facilities as well as a Caravan Park and campsite here, or at other sites near the Huon River.	Due to the floorprone nature of this land it is not suitable for permanent built form. Its use for tourist accommodation will assist in encouraging the town centre to focus on the river as well as the Huon Highway.
▪ Develop and promote the former quarry as a viewing point to Sleeping Beauty with a picnic garden. In the longer term, undertake a feasibility study for the rehabilitation of the site and for its use of site as tourist accommodation, and rezone if necessary.	The former quarry has excellent views that can be capitalised on for tourism activities.
▪ Develop a Ranelagh Trail with themed tree planting at key focal points that is supported by artistic/public art installations. Promote the Ranelagh church, the former Oast House on Louisa Street, and the former Huon Valley Post Office as key features of this trail.	The village green (adjacent to the Ranelagh Church) could be further developed as a community focal point, for activities such as a farmers market. Plantings undertaken for the Ranelagh Trail at the intersection of the Huon Highway and Glen Road will also improve the northern entrance to Huonville. It is noted that part of the proposed Huon Trail extends north of the study area; however, it is considered that the development of the trail in this location will provide benefits for the study area.
▪ Provide bird-watching opportunities along the south side of the Huon River north of the bridge.	This will increase the number of tourism activities available.
▪ Provide tourism information at both the north and south ends of the town. This information may be provided in the form of an information point with supporting signage, a tourist information centre or other such facility. It is important that such facilities are considered as part of a wider tourism strategy/ tourism review for the area and are intrinsically connected with the remainder of the settlement.	Staffed operations open every day may not be viable, so it is important to ensure that tourism information is provided in a number of ways.

Actions	Explanation
Any facilities should be monitored in terms of staff operations and should remain combined with another activity such as a provider, and ensure on-line tourism information is also provided.	
▪ Investigate the feasibility of providing factory sales tourism at the Tassal plant, and/or of retailing locally produced products in the town centre.	This will increase the number of tourism activities available.
▪ Rezone land adjacent to along Glen Road for industrial uses as depicted on the Proposed Settlement Boundary and Zonal Recommendations map.	This site has been identified as suitable for industrial uses. It is adjacent to the existing urban area but also has separation from existing dwellings, and can be designed to maintain a buffer from sensitive uses. Its close proximity to the existing Tassal plant also provides the opportunity for other complementary downstream agricultural processing activities to occur on the site.
▪ Include requirements in the Planning Scheme for buffers to be provided between industrial and sensitive activities such as residential land uses.	This will reduce the likelihood of incompatible uses impacting on each other. In particular, the impacts of downstream agricultural processing activities should be considered. The proposed Glen Road industrial area may need to be designed so that these activities are located to the north of the site to provide an appropriate setback from residential areas.
▪ Monitor commercial and industrial approval trends and the supply of vacant land for these uses.	To ensure that sufficient land is available for commercial and industrial uses, regular monitoring of the availability of land will enable any future shortfalls to be identified before the supply is exhausted.



Picture 6 – Church in Ranelagh



Picture 7 – Former Oast House in Ranelagh

9.4 Community land uses

Community land uses include schools, medical facilities, community facilities, and areas of public open space.

9.4.1 Objectives

The objectives relating to community land uses are as follows:

- Provide expanded childcare facilities.
- Promote central locations for community facilities and where feasible co-location and shared use.
- Provide adequate provision of infrastructure to allow increasing outreach centre-based services.
- Provide areas of public open space that are safe.

9.4.2 Recommended Actions

The recommended actions relating to community land uses are as follows:

- Ensure areas of public open space are designed, landscaped and developed in accordance with Crime Prevention Through Environmental Design (CPTED) principles.
- Encourage the continued co-location of community services including childcare around the LINC centre on Sale Street and the education precinct on Ranelagh Road.

9.5 Town centre

This section of the Structure Plan considers the amenity and activities that occur in the town centre. As commercial, tourism and industrial land uses are considered above, urban design treatments are instead considered.

9.5.1 Objectives

The objectives relating to the town centre are as follows:

- Identify a multi-use area for the town centre that can be used for a range of activities, including a market.
- Identify appropriate landscaping treatments for the town centre.
- Protect heritage buildings.
- Utilise mixed use zones that allow for a wide range of activities to be undertaken.

9.5.2 Recommended Actions

The recommended actions relating to the town centre are as follows:

- Widen the footpath on the eastern side of the Huon Highway between the Channel Highway and Sale Street. Activate this space with activities such as a market, shops, restaurants, produce outlets, and tasting centres. Plant this space with theme trees that provide strong urban character that links with the waterfront park to encourage people to recognise the waterfront as part of the town centre.
- Utilise the widened Huon Highway footpath area as an initial location for a food and wine market due to the visibility of this location for passing traffic.
- In the medium term, if market activities increase, consider the use of land at the waterfront or the land used for park and ride facilities as a location for an expanded weekend market.

- Maintain the intersection of Huon Highway, Sale Street and Ranelagh Road as the gateway to the central part of the town centre from the northern approach.
- Upgrade the landscaping and parking arrangements on Sale Street to provide a gateway to the town centre from the east.
- Undertake a mainstreet and riverfront themed tree planting program.

9.6 Movement network

The movement network includes roads, public transport facilities, and cycling and walking tracks.

9.6.1 Objectives

The objectives relating to residential land uses are as follows:

- Realign the Channel Highway to provide an expanded foreshore area.
- Provide an alternative north-south route from the Channel Highway to the Huon Highway.
- Develop a safe bus interchange incorporating park and ride facilities.
- Expand the walking and cycling track network.
- Provide a walking and cycling link between Huonville and Ranelagh.

9.6.2 Recommended Actions

The recommended actions relating to residential land uses are as follows:

- Realign the Channel Highway along the foreshore (a number of options under consideration are shown on the Regional Framework and Structure Plan maps).
- Once the Channel Highway realignment has been decided on, prepare and implement a traffic management plan to consider matters such as the treatment of existing intersections (especially the Sale Street, Wilmot Road and Main Street intersection) and residential development.
- Undertake detailed parking surveys to confirm the availability of parking during peak tourist periods and during typical peak periods prior to additional parking being provided.
- Require any new developments to provide sufficient parking to meet their peak parking demands in accordance with Council policy, with due consideration to a sharing of car spaces.
- Set aside land for the long term development of an alternative north-south route (and rezone this appropriately).
- Develop a bus interchange with park and ride facilities west of Shield Street or on the Aurora site. Undertake detailed consultation with the bus service operators to ensure that the facility is designed in accordance with their operational needs.
- Develop walking and cycling track links between Huonville and Ranelagh on the north and south sides of the river, including providing a dedicated shared path along Wilmot Road for pedestrians and cyclists.
- Develop a walking and cycling track from the town centre to the Sleeping Beauty lookout on the former quarry site (noting that this may need to consist of a zig-zag path given the steepness of the slope in this location and that Scenic Drive may need to be utilised instead).
- Investigate options to widen Wilmot Road in the long term if traffic volumes increase.

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Tourism Industry Council Tasmania (2007) Tourism 21 Strategic Business Plan 2007-2010

Appendix A

Cardno Grogan Richards

Shaping the Future





Huonville Structure Plan

Traffic and Transport Assessment

Job Number: CG110751

Prepared for Urbis

21 June 2011

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1 Introduction

Cardno Grogan Richards has been retained by Urbis to undertake a desk top assessment of the traffic and parking conditions and the proposal to provide an alternative access road for the regional township of Huonville, Tasmania.

In the course of preparing this assessment the following background documents have been reviewed:

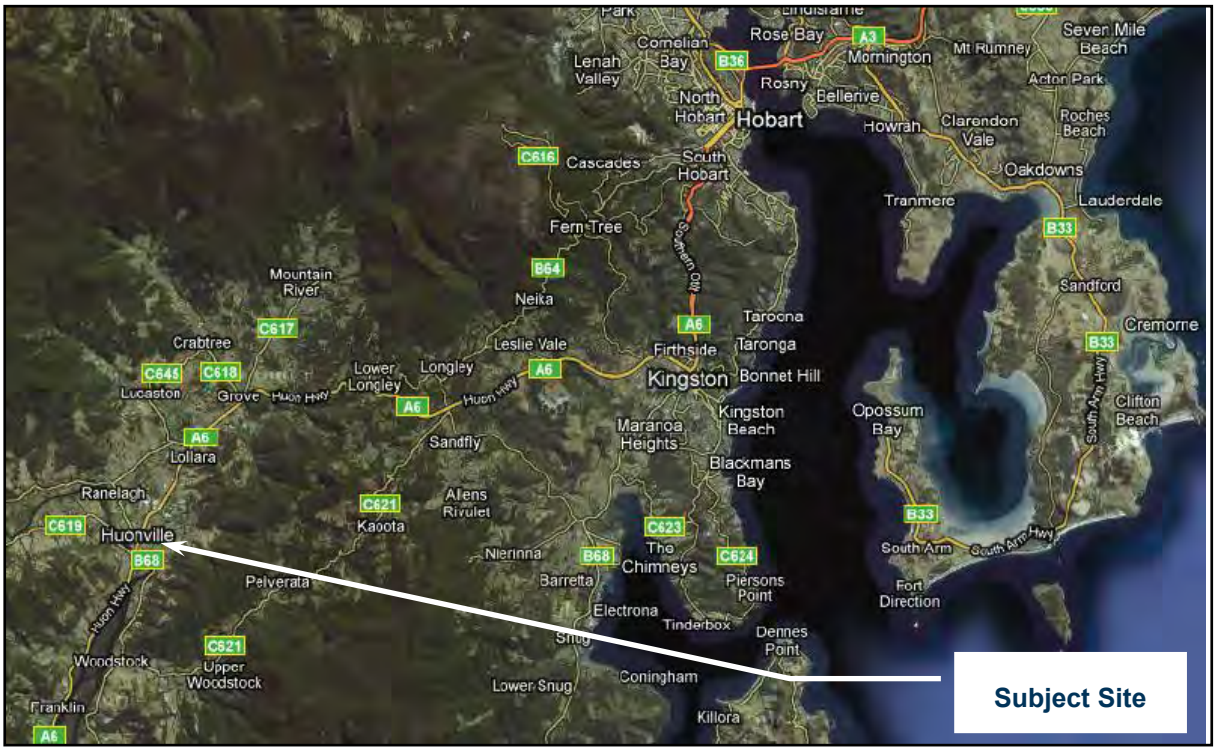
- A Future Development Strategy for Huonville dated June 2003;
- Huonville Township Structure Plan Area;
- Huon Valley Land Use and Development Strategy prepared by GHD; and
- Traffic Counts.

2 Background and Existing Conditions

2.1 Location

The township of Huonville is the largest town in the Huon Valley with a population of approximately 1,800 people. The town is located on the Huon River approximately 38km southwest of Hobart, Tasmania and is accessed via the Huon Highway generally as shown in Figure 1.

Figure 1: Site Location



The town centre is made up of approximately 26,500 square metres of retail/ commercial floor area including such uses as a supermarket, speciality retail, restaurants/cafes, restricted retail, service station, medical surgery and office.

Huonville's retail centre is located generally on/around the Huon Highway between Shield Street in the north and Channel Highway in the south.

2.2 Road Network

2.2.1 Huon Highway

Huon Highway is classified as a Category III road which provides access to Tasmania's regions but carrying less freight traffic than regional freight roads (Category I and Category II Roads).

The Huon Highway is the key transport corridor in the municipal area linking Southport in the south through to the capital city of Hobart in the northeast.

The Huon Highway in the vicinity of the towns centre is shown in Figure 2 to Figure 4.

Figure 2: Huon Highway Facing South Towards Channel Highway and the Huon River Bridge



Figure 3: Huon Highway Facing South Towards Sale Street



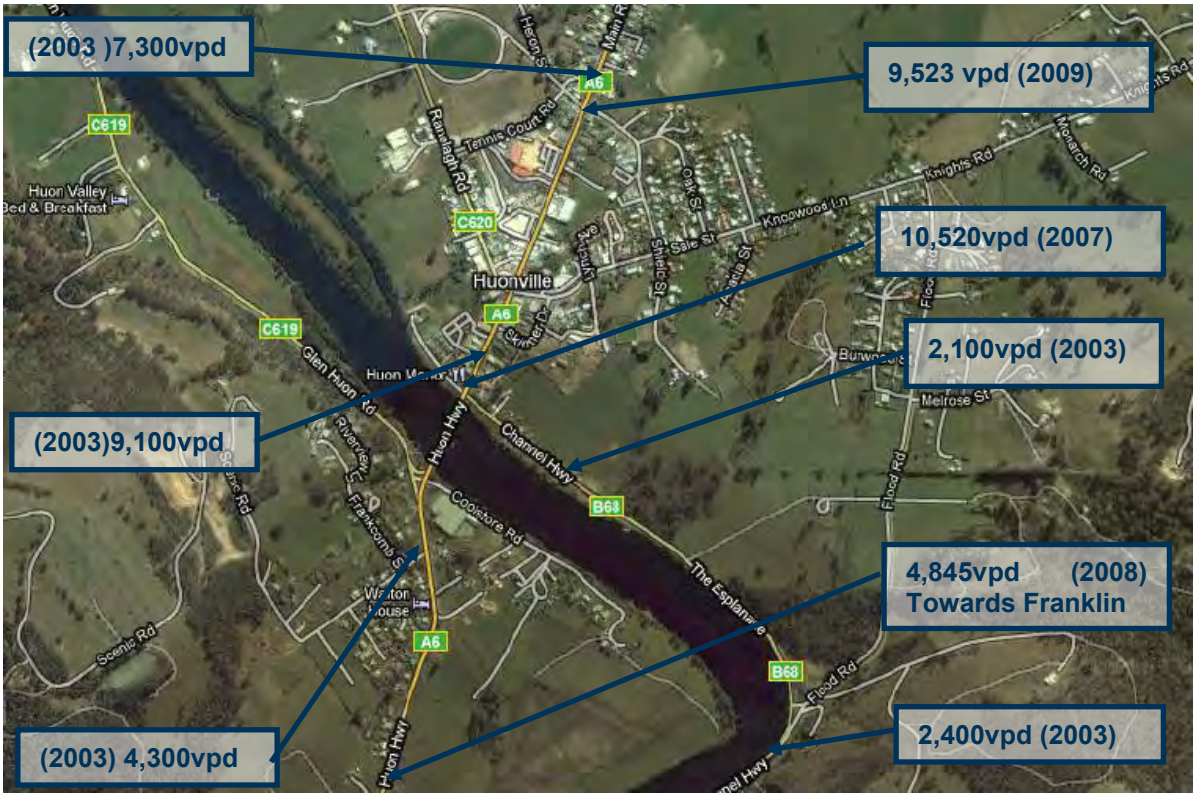
Figure 4: Huon Highway Facing South Towards the Main Supermarket Development



2.3 Traffic Considerations

Based on the available traffic data as outlined within "A Future Development Strategy for Huonville, Value Management Study" dated June 2003 and UTS Report traffic figures, indicative traffic volumes within the vicinity of the Huonville Town Centre are shown in Figure 5. It is noted that these traffic volumes do not identify what traffic movements are locally generated and what traffic movements are through traffic.

Figure 5: Indicative Traffic Volumes (June 2003)



Whilst the commercial vehicle volumes are not specified within the report, it was stated that:

> *In general terms, trucks travelling along the Channel Highway and the Huon Highway make up to 1% to 1.5% of the traffic count.*

Accordingly of the 9,523 vehicles recorded per day to the north of Huonville in 2009, between 95 and 143 vehicles were commercial vehicles anecdotally ranging from small rigid vehicles to semi-trailers.

In traffic engineering terms it is generally considered that approximately 10% of all vehicles are commercial in an urban environment and between 15% – 25% of all vehicle movements are commercial in nature along a rural highway. Accordingly the 1% – 1.5% recorded along the Huon Highway is very low in traffic engineering terms.

The report goes on to make the following comments regarding the traffic volumes illustrated in Figure 5:

> *In the Tasmanian context, the actual capacity of the road system is not an issue. The traffic volumes are relatively low.*
>
> *The challenge is the internal circulation of traffic within the town with various accesses, buses coming through, bus stops and pedestrians crossing the road. With this knowledge we will be better able to position ourselves to put together the jigsaw of what is really happening in Huonville.*

2.3.1 Traffic Concerns

"A Future Development Strategy for Huonville, Value Management Study" dated June 2003 identified a number of key issues with the following relating to vehicle movement;

- Traffic Management:
  - Improve or relocate the Channel/ Huon Highway Junction (Ranking = 2)
  - Pedestrian Safety (Ranking = 6)
  - Operation of junction
  - Turning opportunity in Main Street
  - Heavy vehicle turning movements
- Alternative Access Road
  - Need for and where
  - Impact
  - Acceptance/ rejection

It is noted that the improvement/relocation of the Channel Highway and Huon Highway junction area ranks as the second most important issue raised within the study, with the need for improved pedestrian safety ranked sixth (out of 29).

2.4 Parking Considerations

A review of the existing information does not provide any detailed car parking information. However it is envisaged that the township of Huonville would operate like any other tourist location with increased parking demands during peak tourist periods and a significantly reduced parking demand outside of these times.

Anecdotally the parking supply within the township of Huonville would be adequate to accommodate the typical parking demands with the demand reaching or exceeding capacity during peak tourist periods.

Detailed parking surveys should be undertaken to confirm the availability of parking during peak tourist periods and during typical peak periods prior to additional parking being provided. It is noted that any new development should provide sufficient parking to meet its peak parking demands in accordance with Council policy, with due consideration to a sharing of car spaces.

2.4.1 Parking Concerns

"A Future Development Strategy for Huonville, Value Management Study" dated June 2003 identified a number of key issues with the following relating to parking;

- Bus/Commercial Parking:
  - Need for a Bus Transit Centre (Ranking = 1)
  - Provision of facilities for caravans and camper homes including limited parking for these vehicles at the tourist information centre
- Passenger Vehicle Parking:
  - Car parking locations/signs not visible to visitors
  - Improve off street parking and incentives for use
  - People cannot identify and access existing car parks
  - It is not easy to stop in Huonville
  - Access (egress issues with major businesses)

It is worth noting that the need for a bus interchange was ranged as the number one issue while the passenger vehicle parking concerns rated nineteenth (out of 29).

2.5 Road Linkages – Huonville to Ranelagh

Access between Huonville and Ranelagh is provided via Wilmot Road, Louisa Street and Agnes Street as shown in Figure 6.

Wilmot Road, Louisa Street and Agnes Street generally comprise a rural cross section with one trafficable lane in each direction with gravel shoulders located within a wide road reserve. A typical view of Willmot Road is shown in Figure 7.

Whilst no traffic volume data is provided for these roads, anecdotally it is considered that the access route could be duplicated or widened to prove passing lanes within the existing road reserve as traffic volumes increase.

In the short term, the provision of a dedicated shared path along Wilmot Road for pedestrians and cyclists will significantly improve the linkage between these settlements.

Figure 6: Huonville to Ranelagh Access Route

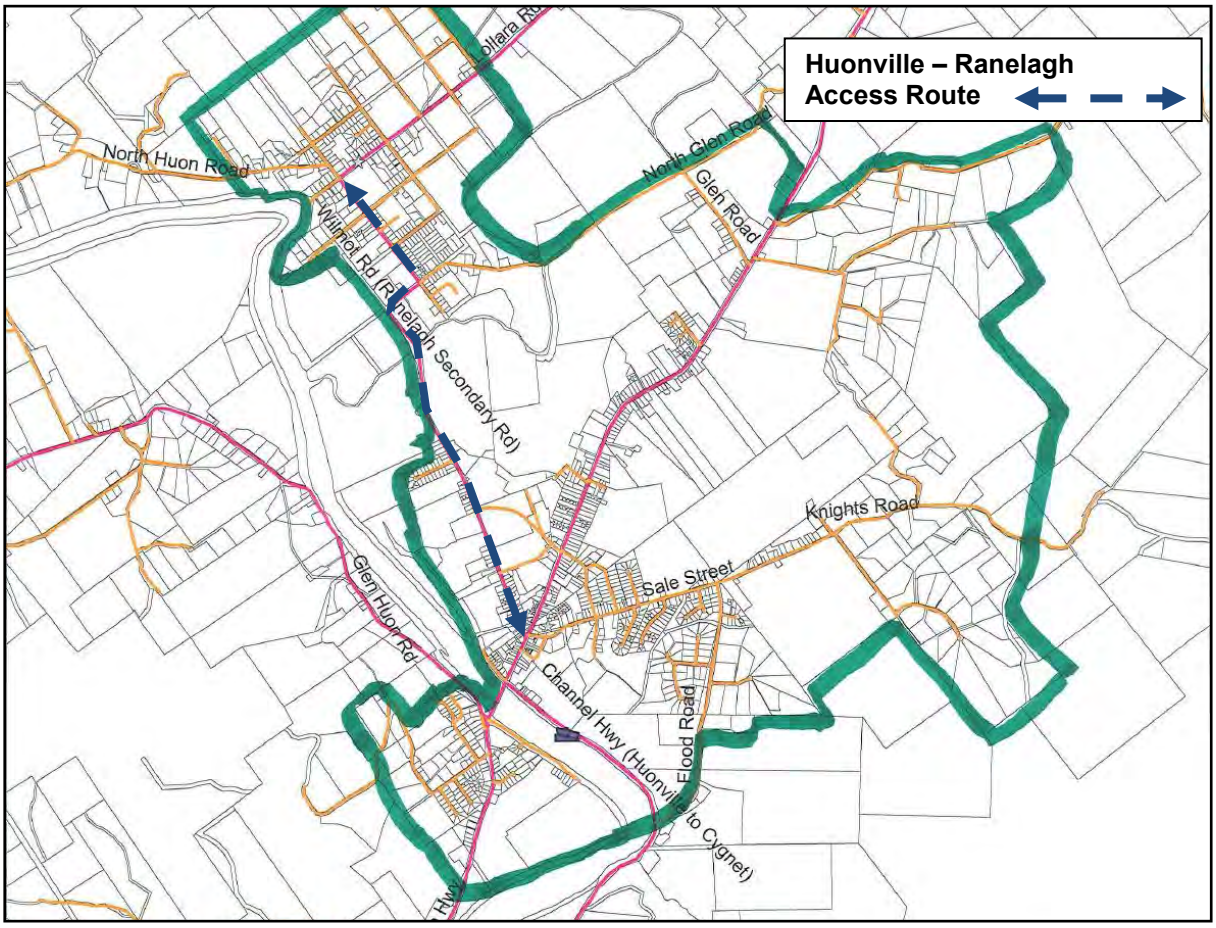


Figure 7: Wilmot Road Facing North between Stride Street and Louisa Street



3 Alternative Access Road Options

3.1 Proposed Alternative Access Road

An option for a future alternative access road has been illustrated within the Huon Valley Land Use & Development Strategy Map which generally starts from the Huon Highway, north of the existing Golf Course (north of the township) and provides a road connection to Knights Road before continuing along Flood Road to Channel Highway.

It is noted that Flood Road currently provides access to individual residential properties and access to these existing properties will need to be considered in light of any future alternative access road.

No future connection from Channel Highway to the Huon Highway has been illustrated for the proposed alternative access road. Accordingly the proposed alternative access road will only assist motorists wishing to travel between Hobart and Cygnet (and beyond).

The proposed alternative access road is illustrated in Figure 8.

3.2 Substitute Alternative Access Road Option

A substitute alternative access road option has been developed which retains the section of the proposed alternative access road until it approaches Knight Road when it is realigned to the west, behind existing residential properties. The route runs adjacent to Skinners Creek before connecting into Huon Highway generally as shown in Figure 8.

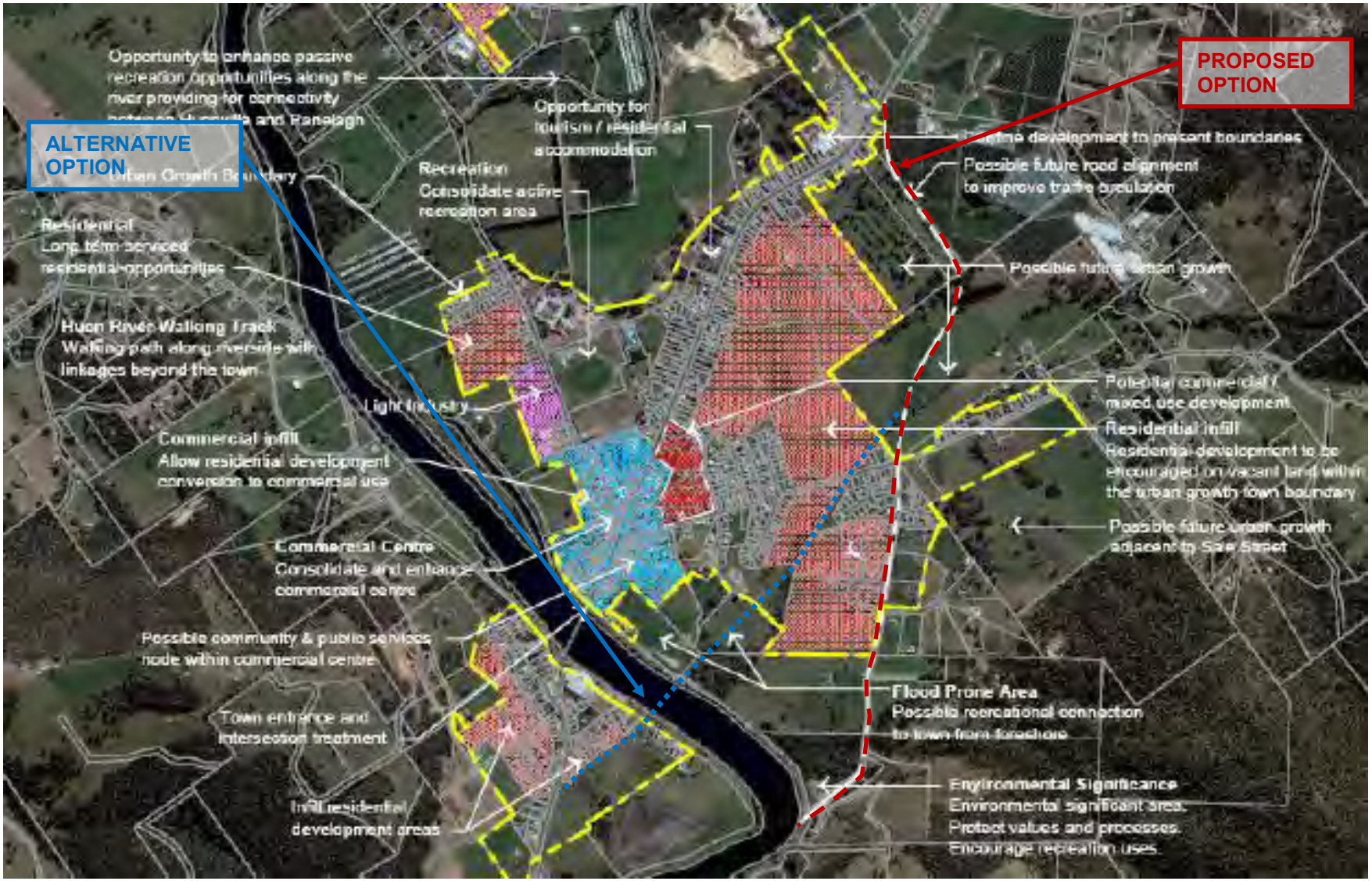
The inclusion of an interchange between the substitute alternative access road and the Channel Highway would allow motorists wishing to travel to Cygnet and south of Huonville to utilise the alternative access road greatly improving the utilisation of this roadway.

A significant cost in providing the substitute alternative access road would be the bridging of Huon River. However it is noted that the bridging of the Huon River would greatly improve the functionality of the alternative access road.

This route is located close to Skinners Creek and if it were pursued the acquisition of residential land may be necessary, decreasing the viability of this option.

A detailed assessment should be undertaken in assessing the feasibility of providing the alternative access road as indicated either as proposed or as indicated within the alternative. Given the planning constraints presented, it is likely that the proposed alternative access in Section 3.1 above is more feasible.

Figure 8: Alternative Access Road Options



4 Accessibility Considerations

4.1 Huonville Township

Following a review of the available information and concerns raised with regards to traffic for the township of Huonville it is considered that the construction of an Alternative Access Road will have limited effect in reducing the various traffic conflicts within the township.

In order to address the various conflicts within the town a detailed Local Area Traffic Management Study could be considered to address these specific issues. This is reiterated within "A Future Development Strategy for Huonville, Value Management Study" which states:

> *The challenge is the internal circulation of traffic within the town with various accesses, buses coming through, bus stops and pedestrians crossing the road*

Addressing these various traffic conflicts will anecdotally improve traffic operation for both local traffic and through traffic and will be required irrespective of the construction of an alternative access road.

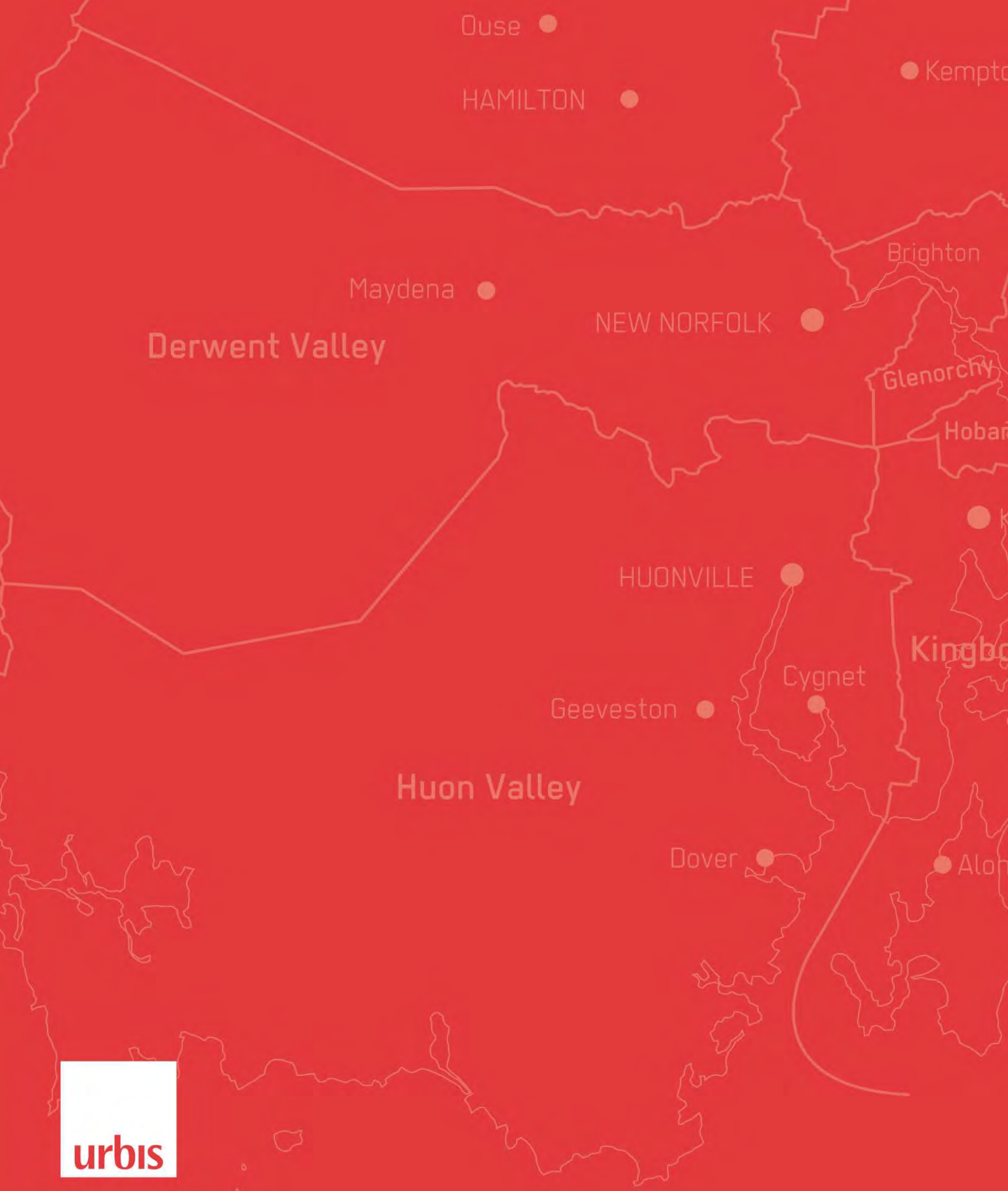
The option of an alternative access road should be retain and reconsidered as traffic capacity issues arise within the township.

4.2 Alternative Access Road Considerations

Based on the available information including existing traffic volumes it is considered that an alternative access road for the township of Huonville is not required in the short to medium term.

In order to ensure being able to provide an alternative access road if/when required the route and feasibility of the alternative access road should be reviewed in detail and the future road alignment included within the Huonville Township Structure Plan. It is considered important that a timely decision is made into the need for an alternative access road or otherwise as future residential development of land around Huonville reduces the options for providing the alternative access.

The inclusion of the road reserve within the Huonville Township Structure Plan will protect the viability of being able to provide the alternative access road into the future.



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Southern Tasmania
Regional Land Use Strategy

Background Report No.1: The Project Background

February 2011



This document is detailed supporting information for the Southern Tasmania Regional Land Use Strategy 2010 - 2035.

While every responsible effort has been made to ensure that this document is correct at the time of printing, the State of Tasmania, the Southern Tasmanian Councils Authority, the 12 Southern Councils and the Sullivans Cove Waterfront Authority, their agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance or upon the whole or any part of this document.

Please visit www.stca.tas.gov.au or telephone the Southern Tasmanian Councils Authority on 61 3 6270 2242 with any queries.



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1. The Southern Tasmania Regional Planning Project

The Southern Tasmania Regional Planning Project (the Project) is part of the Regional Planning Initiative currently being undertaken in the three regions of Tasmania: South, North and Northwest. Established through a Memorandum of Understanding (MoU), between the Southern Tasmanian Councils Authority (STCA), its 12 member Councils, the State Government and the Sullivans Cove Waterfront Authority, the overall purpose of the project is to undertake a joint planning initiative between State and Local Government to introduce coordinated, consistent and contemporary planning schemes based on a comprehensive regional land use and infrastructure and investment strategy in the Southern Tasmania region.

Under the original Project Plan attached to the MoU, the project had four distinct but closely interrelated phases being:

Phase 1	Preparation of a comprehensive regional land use strategy and infrastructure investment strategy for the region
Phase 2	Preparation of a Model planning scheme and review of existing planning schemes to determine compliance with that Model
Phase 3	Development and/or review local or sub-regional land use strategies to ensure consistency with the regional land use strategy
Phase 4	Preparation of an individual planning scheme for each Council based on the Model planning scheme

The nature and scope of these phases have altered as the project has progressed. Phase 3, being the review of local and sub-regional strategies has merged with Phase 1 of the project. In recognising the extensive work that many Councils and sub-regional groupings of Councils have undertaken within the Southern Tasmania region (which has generally involved significant community consultation), a decision was made at the beginning of the project, to utilise this existing work as the starting point for the development of the Regional Land Use Strategy. The originally envisaged Phases 1 and 3 have therefore proceeded largely in unison.

It should be noted that the Regional Land Use Strategy will only make recommendations to change existing local and sub-regional strategies where there is a benefit to the region as a whole.

Phase 2 of the Project Plan has also altered. Through discussions with the North and North-West Regional Planning Projects and the Tasmanian Planning Commission, a decision was made to replace some components of a Model Planning Scheme with a reviewed and expanded version of the Common Key Elements Template under Planning Directive No.1[1]. This template will however only provide a 'skeleton'.

The Regional Model Planning scheme for Southern Tasmania expands the template with standards common across the region. As an important element in implementing the Regional Land Use Strategy,

[1] The Regional Planning Projects are represented on the Steering Committee overseeing the review and expansion of Planning Directive No. 1. which is being coordinated by the Tasmanian Planning Commission.

the Regional Model Planning Scheme forms part of the Implementation report to the Regional Land Use Strategy. The Regional Model Planning Scheme also recognizes that there will be a suite of ‘Codes’ produced at the State level to consistently deal with matters such as hazards and risks in planning schemes across the State.

2. The Benefits of Regional Planning

Regional planning provides the mechanism to collectively determine and pursue an agreed vision for the region, better co-ordinate regional infrastructure and economic development and strategically tackle regional environmental and social issues. It can also address local environmental, social, and economic issues that require a regional focus to appropriately resolve. For example the metropolitan area of Hobart should be identified and planned for as a single settlement. The area is however located across six (6) Local Government areas whilst land use and infrastructure issues transcend these boundaries. Regional planning offers the opportunity, to plan for this settlement in a coordinated and efficient manner by reducing unnecessary competition and duplication of land use, infrastructure and services and through a standardized and systematic approach to the region's challenges.

While regional land use planning cannot address every land use issue that may be identified by some as important, it offers many opportunities and benefits including:

- A platform for the development of an agreed vision and set of principles for the region;
- A greater level of certainty within the planning system, in terms of establishing what is desirable and undesirable development;
- Changing the planning system from one that is essentially reactive to one that is more proactive;
- A mechanism to identify, promote and advance the comparative advantages of the Southern Tasmania region;
- Coordination of growth and the provision of physical and social infrastructure in a region in a sustainable and efficient manner;
- The coordination of the land use and development activities of State Agencies with respect to major infrastructure;
- The coordination of land use and development activities between State and Local Government;
- Establishment of a structure within which any State or regional level direction to the planning system (e.g. new State Policies, Planning Directives or regional strategies) can be readily implemented; and
- The highlighting of land use planning issues that would benefit from State level direction.

It will directly benefit the local community as well as anyone wanting to invest or undertake development in Southern Tasmania. There will also be direct benefits through the economic growth generated through greater certainty in the planning schemes and the existence of an over-arching policy framework for long-term land use and development control within the region.

The social, environmental and economic value of providing a regional land use planning framework is increasingly recognised and studies have indicated that an increase in Gross State Product (GSP) of between 1% - 5% can be achieved.

3. The Planning Framework

3.1 Introduction

More often than not, the community sees land use planning as 'development control': a reactionary and restrictive mechanism controlling the use and development of land. This perception of land use planning, being little more than 'statutory planning' has become entrenched in the Tasmanian community because of the general lack of strategic land use planning, particularly at the State and regional level.

Since the inception of the Resource Management and Planning System of Tasmania (the RMPS) in 1994, strategic land use planning has largely occurred only at the Local Government level, with Councils performing their statutory functions as a Planning Authority. In this time the State has provided minimal overall direction with only three State Policies and one Planning Directive.

Land use planning is however much more than 'development control'. It should first and foremost be about the creation of an agreed vision and associated strategic objectives, followed by the structuring of planning mechanisms to achieve these. Realising good planning outcomes requires the integration of land use planning with the delivery of infrastructure and services as well as ensuring consistency with other social, economic and environmental policies. It is generally acknowledged that this is best accomplished at the regional spatial level, whereas to date, comprehensive strategic land use planning has generally only been undertaken at the local level, by individual Councils.

In most developed countries across the world, land use planning is seen as an important part of social policy delivered by all levels of government, ensuring that land is used efficiently for the benefit of the wider economy and community as well as protecting the environment. The Canadian Institute of Planners defines land use planning as:

> *…the scientific, aesthetic, and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic and social efficiency, health and well-being of urban and rural communities.*

With this in the mind the statutory and strategic context for the Southern Tasmania Regional Planning Project extends beyond the RMPS and includes strategies and policies prepared by State Agencies and other regional bodies such as NRM South, as well as infrastructure planning policies prepared by Infrastructure Authorities.

The development of land use planning policy and strategy is also not just a top-down process. For example, the existing local and subregional strategies have inform the Regional Land Use Strategy, as well as the Regional Land Use Strategy in turn informing the development of State level strategies and delivery plans. As a result this report not only considers the implication of existing technical data relevant to the Region, but the implications of existing strategies and policies.

3.2 Resource Management and Planning System of Tasmania

3.2.1 Overview

The Resource Management and Planning System of Tasmania (RMPS) was established in 1994. The overarching objectives of the RMPS, as prescribed in the legislation that comprises it, are to:

- Promote sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity
- Provide for the fair, orderly and sustainable use and development of air, land and water
- Encourage public involvement in resource management and planning
- Facilitate economic development in accordance with the objectives set out above
- Promote the sharing of responsibility for resource management and planning between the different spheres of government, the community and industry in the State.

The particular objectives of the planning system under these overarching objectives are:

- To require sound strategic planning and co-ordinated action by State and local government; and
- To establish a system of planning instruments to be the principal way of setting objectives, policies and controls for the use, development and protection of land; and
- To ensure that the effects on the environment are considered and provide for explicit consideration of social and economic effects when decisions are made about the use and development of land; and
- To require land use and development planning and policy to be easily integrated with environmental, social, economic, conservation and resource management policies at State, regional and municipal levels; and
- To provide for the consolidation of approvals for land use or development and related matters, and to co-ordinate planning approvals with related approvals; and
- To secure a pleasant, efficient and safe working, living and recreational environment for all Tasmanians and visitors to Tasmania; and
- To conserve those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value; and
- To protect public infrastructure and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community; and
- To provide a planning framework which fully considers land capability.

3.2.2 Legislation comprises the RMPS

These objectives form the foundation of a suite of legislation that comprises the RMPS:

- Land Use Planning and Approvals Act 1993

- Tasmanian Planning Commission Act 1997
- Resource Management and Planning Appeal Tribunal Act 1993
- State Policies and Projects Act 1993
- Environmental Management and Pollution Control Act 1994
- Historic Cultural Heritage Act 1995
- Major Infrastructure Development Approvals Act 1999.

Other legislation that is relevant to the operation of the RMPS includes:

- Approvals (Deadlines) Act 1993
- Crown Lands Act 1976
- Gas Act 2000
- Gas Pipelines Act 2002
- Living Marine Resources Management Act 1995
- Local Government Act 1993
- Local Government (Building and Miscellaneous Provisions) Act 1993
- Marine Farming Planning Act 1995
- Mineral Resources Development Act 1995
- National Parks & Reserves Management Act 2002
- Nature Conservation Act 2002
- Public Land (Administration and Forests) Act 1991
- Strata Titles Act 1998
- Sullivans Cove Planning Act 1995
- Threatened Species Protection Act 1995
- Water Management Act 1999, and
- Wellington Park Act 1993.

Decisions by local Planning Authorities and State Agencies under the legislation which comprises the RMPS related to the use and development of resources need to take into account the wider economic, social and environmental implications (Resource Planning and Development Commission 2003).

Strategic land use planning is an essential element in ensuring that these implications are taken into account and the RMPS applied effectively. Strategic planning facilitates the establishment of allows government, industry and the community strategies for resource use and development, reducing the likelihood of conflict over individual developments. It also ensures that short-term decisions are consistent with long-term goals. This allows the need of future generations to be taken into account when providing for the resource development needs of existing communities (Resource Planning and Development Commission 2003:7).

In addition, other essential elements to the success of the RMPS include:

- Flexibility and currency;
- Whole of government approach;
- Public Participation;
- Monitoring.

These regional planning projects represent efforts to ensure a whole of government approach and public participation in land use planning and are being set up in a manner to ensure ongoing review and monitoring, which will ensure currency.

Particulars of the two most relevant pieces of legislation to the Regional Planning Projects are outlined below.

3.2.3 Land Use Planning and Approvals Act 1993

Recently approved amendments to the *Land Use Planning and Approvals Act 1993* provide new statutory mechanisms to recognise regional planning within the State. In particular the Minister will be able to divide the State into regions for the purposes of land use planning and then declare as statutory documents the strategies (or frameworks) relevant to that region. New planning schemes would then need to ensure consistency with the regional land use strategies.

It is intended that the three Regional Land Use Strategies prepared under the Regional Planning Initiative will be those documents declared as statutory strategies for the purposes of the *Land Use Planning and Approvals Act 1993*.

3.2.4 State Policies and Projects Act 1995

Under the RMPS, the State Government may prepare State Policies under the State Policies and Projects Act 1995, to represent the government's overarching position on certain policy matters. State Policies can only be made in relation to issues of genuine State significance and can not be used to override local government decisions (in regard to issues of local relevance only). They must seek to ensure a consistent and coordinated approach through the State and are the key to resolving longer term issues of use and development (Resource Planning and Development Commission 2003: 61).

This statutory mechanism was at the time of the inception of the RMPS, considered to be the cornerstone in its successful operation. However, to date, only three state policies have been prepared: The State Coastal Policy (under review), the State Policy on Water Quality Management and the State Policy on the Protection of Agricultural Land (recently reviewed). This lack of state policy direction, has contributed to the planning system in Tasmania being largely reactionary. It is foreseen however that these regional planning projects will assist in addressing this problem and identify specific land use and development issues which would benefit from a State Policy.

3.3 State Strategic Directions

The overall vision for the State of Tasmania is set out under the community strategic plan known as *Tasmania Together*. *Tasmania Together* has been adopted by State Government as a strategic guide to inform all policy and administrative decisions and identifies the vision for Tasmania as:

…an island community, unique for its natural and cultural environment, where people enjoy a prosperous lifestyle based on quality, creativity and opportunity.[2]

The specific goals are:

1. A reasonable lifestyle and standard of living for all Tasmanians.
2. Confident, friendly and safe communities.
3. High quality education and training for lifelong learning and a skilled workforce.
4. Active, healthy Tasmanians with access to quality and affordable health care services.
5. Vibrant, inclusive and growing communities where people feel valued and connected.
6. Dynamic, creative and internationally recognised arts community and culture.
7. Acknowledgement of the right of Aboriginal people to own and preserve their culture, and share with non-Aboriginal people the richness and value of that culture.
8. Open and accountable government that listens and plans for a shared future.
9. Increased work opportunities for all Tasmanians.
10. Thriving and innovative industries driven by a high level of business confidence.
11. Built and natural heritage that is valued and protected.
12. Sustainable management of our natural resources.

Regional land use planning can assist in achieving many of these goals. Goals, 1, 2, 4, 5,11, and 12 are particularly relevant to the preparation of a Regional Land Use Strategy.

3.4 State Agency Strategies

Regional land use planning also offers the opportunities to physically ground and support the specific strategies and policies of relevant State Government departments and agencies. The policies and strategies of particular relevance to the Southern Tasmania Regional Planning Project are as follows:

- State Infrastructure Strategy
- Southern Integrated Transport Plan
- State Economic Development Strategy (under preparation)
- Tasmania Health Plan 2008
- Department of Education, Infrastructure Projects Program
- Tourism 21
- The Social Inclusion Strategy for Tasmania

In addition to these specific strategies, many State Agencies have other strategies and policies that are not well articulated within a policy framework relevant to that Agency. Those strategies and policies that have been identified, for example those of the Housing Innovations Unit, have been discussed in this report in the relevant sections.

[2] Tasmania Together Website (www.tasmaniatogether.tas.gov.au), viewed 14 September 2009

3.5 Regional Level Strategies

Under the Resource Management and Planning System of Tasmania, there has been no legislative requirement to undertake land use planning at a regional level. While this has changed with the recent amendments to the *Land Use Planning and Approvals Act 1993*, some strategic planning at a regional level has already been undertaken within the Southern Tasmania region.

The Southern Tasmania Integrated Transport Plan is a joint initiative of State and Local Government. Overseen by the Department of Infrastructure, Energy & Resource and the Southern Tasmanian Councils Authority this plan is intended to provide the strategic framework for planning and investing in Southern Tasmania's regional transport system over the next 20 years.

In addition the Natural Resource Management strategies within the State are also undertaken at the regional level. NRM South has a specific strategy for Southern Tasmania. The Department of Economic Development, Tourism and the Arts also undertake planning at the region level including the Regional Economic Development Plans and their marketing strategies.

On a broader policy level the Southern Tasmanian Councils Authority is responsible for reflecting the collective interests of Local Government within the region.

3.6 Subregional Level Strategies

Two subregional groupings of Councils have, in recent years, embarked on strategic land use planning exercises with ultimate goals very similar to the broader Southern Tasmania Regional Planning Project, being the establishment of collective land use planning frameworks and subsequent, largely similar, planning schemes. These are:

- The *Joint Land Use Planning Initiative* Councils of Brighton, Central Highlands, Derwent Valley and Southern Midlands, forming a subregion to the north of Greater Hobart, and
- The *Vision East* Councils of Break O'Day, Glamorgan Spring Bay, (part of) Sorell and Tasman, forming the East Coast subregion.

Both projects have completed overarching strategic plans with the Joint Land Use Planning Initiative now close to completing local-level structure planning.

The strategies produced under these projects will now largely be subsumed within the Southern Tasmania Regional Planning Project, under which all new planning schemes will now be developed. It is envisaged that much of the subregional and local level strategic work produced within the subregional projects will not be in conflict with regional strategic directions and will remain intact to inform the new planning schemes.

3.7 Local Level Strategies

Land use planning policies and strategies have primarily been the purvey of Local Government, despite the presence of legislation to support the development of State Policies. The *Land Use Planning and Approvals Act 1993* requires consideration of land use policy and strategy in the development of planning schemes. Further, the strategic plan requirements of *the Local Government Act 1993* also have relevance in terms of land use planning policy and strategy. In addition some Councils, although not required by law, have undertaken further strategic work focussed on locally-defined priorities.

Notwithstanding this, the extent, depth and detail of policy and strategy relevant to land use planning decisions, across Local Government in the Southern Tasmanian region, does vary considerably. While the *Land Use Planning and Approvals Act 1993* (Section 21) does require a degree of coordination between neighbouring planning schemes, there is a noticeable lack of strategic coordination which has been recognised by the Southern Tasmanian Council's in their sponsorship of this regional planning project.

The following table outlines the work undertaken by Councils[3] within the Southern Tasmania region that has specific implications in terms of this State of the Region report.

Brighton Council	Brighton Strategic Plan 2006-2016
	Brighton Structure Plan (April 2009)
	Brighton Recreation Plan (2003)
	Brighton Planning Scheme 2000
Central Highlands Council	Central Highlands Strategic Plan 2009 – 2014
	Central Highland Economic Development Plan (August 2008)
	Central Highlands Planning Scheme 1998
	Highland Lakes Settlement Strategy 2009 (Draft) (Part of the Joint Land Use Planning Initiative)
Clarence City Council	Clarence Strategic Plan 2006-2011
	Clarence Residential Strategy (April 2008)
	Clarence Industrial Strategy (2007)
	Clarence Car Parking Strategy (2008)
	City of Clarence Business Prospectus (2008)
	Kangaroo Bay Urban Design Strategy & Plan (2008)
	Climate Change Impacts on Clarence Coastal Areas (2009)
	Clarence Retail and Commercial Strategy (under preparation)
	Clarence Planning Scheme 2007
Derwent Valley Council	Derwent Valley Strategic Plan 2005 – 2010
	New Norfolk s46 Planning Scheme 1994
Glamorgan Spring Bay Council	Glamorgan Spring Bay Strategic Plan 2006 – 2011
	Glamorgan Spring Bay Planning Scheme 1996
Glenorchy City Council	Glenorchy Strategic Plan 2009 – 2014

[3] Note that this list of documents is not a complete list of work undertaken by the respective Councils that have land use planning implications. Only those documents discussing matters with potential regional and subregional significance have been examined. For example specific Local Area Plans are local matters and therefore not within the scope of this study.

	Towards a New Planning Scheme: Issues & Options Report (April 2009)
	Towards a New Planning Scheme: Topic Papers (2009)
	City of Glenorchy Recreation Plan (2008)
	Glenorchy Planning Scheme 1996
Hobart City Council	Hobart City Council Strategic Plan 2008 – 2013
	Hobart 2025 Strategic Framework
	Hobart Economic Development Strategy 2009 – 2014
	Hobart Gaps & Opportunities Analysis 2006 & 2008 update report
	Hobart Parking Strategy (2006)
	Parking Standards & Provisions Review (2000)
	Central Area Zoning Review (2005)
	Commercial and Residential Zoning Review (2005)
	Central Area Strategic Plan (1992)
	Inner City Development Plan (under preparation)
	Sandy Bay Shopping Centre Statutory Review (2005)
	Planning Scheme Density Study (2001)
	City of Hobart Open Space Plan (2003)
	Journey to Work Final Research Report (2008)
	Strategic Directions for Sustainable Land Use Planning & Development in the City of Hobart, Report (2003)
	Water Sensitive Urban Design Site Development Guidelines and Practice Notes (2006)
	Hobart City Council Submission on proposed DFO at Hobart Airport (2006)
	Draft City of Hobart Planning Scheme 2008
	City of Hobart Planning Scheme 1992
	Battery Point Planning Scheme 1979
Huon Valley Council	Huon Valley Strategic Plan 2007 – 2012
	Huon Valley 2020 Community Plan (2008)
	Huon Valley Land Use & Development Strategy (2007)
	Huon Valley Economic Development Strategy (2009)
	Huon Valley Planning Scheme 1979

	Esperance Planning Scheme 1989
	Port Cygnet Planning Scheme 1988
Kingborough Council	Kingborough Strategic Plan 2004 – 2009
	Kingborough Strategic Directions Community Plan 2004 – 2009
	A review of the Kingborough Planning Scheme 2000: Kingborough Settlement Strategy (Draft) (2007)
	A review of the Kingborough Planning Scheme 2000: Desired Future Character Statements (Draft) (2007)
	Kingston Central Area Masterplan Review (2008)
	Kingborough Planning Scheme 2000
Sorell Council	Sorell Community Strategic Plan
	Sorell Township Masterplan (2009)
	Strategic Plan for Managing Southern Beaches Wastewater (2006)
	Sorell Planning Scheme (1993)
Southern Midlands Council	Southern Midlands Strategic Plan 2006 – 2011
	Southern Midlands Planning Scheme 1998
	Southern Midlands Recreation Plan 2007
	Oatlands Integrated Development Strategy 2008
	Bagdad-Mangalore Structure Plan 2009 (Draft) (Part of the Joint Land Use Planning Initiative)
Tasman Council	Tasman Council Strategic Plan 2004 – 2014
	Tasman Planning Scheme 1979
Sullivans Cove Waterfront Authority	Sullivans Cove Planning Review (1991)
	Sullivans Cove Urban Design Framework (2005)
	Hobart Waterfront Masterplan (under preparation)
	Sullivans Cove Planning Scheme 1997
Joint Land Use Planning Initiative (Brighton, Central Highlands, Derwent Valley & Southern Midlands Councils)	Joint Land Use Planning Initiative: Stage 1 Land Use Strategy (November 2008)
	Joint Land Use Planning Initiative: Stage 2 Settlement & Open Space Strategy, December 2009 (Draft), and the Heritage Management Plan, December 2009 (Draft)
Vision East Initiative (Break O'Day, Glamorgan Spring	Vision East 2030 – A Regional Land Use Framework for the East Coast (2009)

Bay, Sorell & Tasman Councils)

3.8 Commonwealth Government Involvement

Since the election of the Rudd Labor Government in 2007, the Commonwealth Government has once again begun to play a larger role in urban policy. The last involvement by the Commonwealth Government in urban policy was the Keating Government's *Better Cities* program in the early 1990s, although the level of involvement now being seen has not occurred since the Whitlam government days.

Involvement by the Commonwealth Government is now being delivered through two mechanisms: Firstly through the Council of Australian Governments (COAG) and secondly through the allocation of funding for infrastructure (primarily Infrastructure Australia).

Of particular relevant to the Southern Tasmania Regional Planning Project, as it contains Tasmania's major metropolitan area (Greater Hobart), are the following four events:

- COAG's communiqué on Microeconomic and Competition Reform from the 30 April 2009 meeting. This communiqué indicated that COAG had agreed to establish a Taskforce to examine existing strategic planning frameworks within jurisdictions to ensure that they support the ongoing integration of state and national infrastructure in major metropolitan cities with land use planning and urban development. This work will recognise that the States have a clear responsibility of land use planning within their jurisdiction; that the Commonwealth has an interest in the efficient operation of national infrastructure; and that efficient infrastructure and improving our cities requires the better integration in jurisdictions of major city land-use planning with state and national transport, energy, water and social infrastructure investment plans. The Taskforce will report to COAG by the end of 2009 on the outcomes of this work. The Commonwealth's aspiration is that the work of this Taskforce will encourage each jurisdiction to put in place, by the end of June 2010, best practice major strategic corridor and metropolitan planning arrangements that will ensure consistent strategic decision-making, improve the efficiency of infrastructure investment and further contribute to productivity and economic growth.
- The establishment of the Major Cities Unit within Infrastructure Australia. This unit has been established to identify where federal leadership (i.e. through the allocation of funding for infrastructure projects) can make a difference to the prosperity of our cities and the wellbeing of their residents. Given that the Tasmanian Government strongly relies upon Federal funding for major infrastructure projects, the importance of these regional planning projects in delivering the integration of land use and infrastructure is critical.
- The announcement by the Hon. Anthony Albanese MP, Minister for Infrastructure, Transport, Regional Development and Local Government in early August 2009, that the Commonwealth Government will be developing a comprehensive National Urban Policy. The Minister also discussed the need for all people involvement in urban development to change the current approach.
- The Prime Minister's speech to the Business Council of Australia on 27 October 2009. In particular the announcement of the development of national criteria for the future strategic planning of major cities, with the consideration of the Commonwealth of linking all future infrastructure funding to compliance with these criteria.

3.8.1 Capital City Strategic Planning Systems

The Prime Minister's announcement at the Business Council of Australia meeting on 27 October 2009, followed an agreement by COAG at their meeting of 30 April 2009 to establish a COAG Taskforce to examine existing strategic planning frameworks within jurisdictions to ensure they support the ongoing integration of State and national infrastructure in major metropolitan cities with land use planning and urban development.

The Taskforce identified that capital city strategic planning systems and associated governance arrangements need to be strengthened to address current problems and meet future challenges. Notably, the proposed reforms are, will by agreement by COAG not mandatorily applicable to Tasmania, given the different demographics and planning arrangements within that State. The Tasmanian Government will however still be a party to the intergovernmental agreement supporting the reforms relating to Capital City Strategic Planning Systems and appropriate arrangements will be made to ensure that the reforms are applied to Tasmania in a case specific manner.

The National Objective and Criteria for Future Strategic Planning of Capital Cities is still therefore relevant and is outlined below:

Objective

To ensure Australian cities are globally competitive, productive, sustainable, liveable and socially inclusive and are well placed to meet future challenges and growth.

Criteria

Capital city strategic planning systems should:

1. Be integrated:
    - o across functions, including land-use and transport planning, economic and infrastructure development, environmental assessment and urban development; and
    - o across government agencies.
2. Provide for a consistent hierarchy of future oriented and publicly available plans, including:
    - o long term (for example, 15-30 year) integrated strategic plans;
    - o medium term (for example, 5-15 year) prioritised infrastructure and land-use plans; and
    - o near term prioritised infrastructure project pipeline backed by appropriately detailed project plans.
3. Provide for nationally significant economic infrastructure (both new and upgrade of existing) including:
    - o transport corridors;
    - o international gateways;
    - o intermodal connections;
    - o major communications and utilities infrastructure; and
    - o reservation of appropriate lands to support future expansion.
4. Address nationally significant policy issues including:

- population growth and demographic change;
- productivity and global competitiveness;
- climate change mitigation and adaptation;
- efficient development and use of existing and new infrastructure and other public assets;
- connectivity of people to jobs and businesses to markets;
- development of major urban corridors;
- social inclusion;
- health, liveability, and community wellbeing;
- housing affordability; and
- matters of national environmental significance.

5. Consider and strengthen the networks between capital cities and major regional centres, and other important domestic and international connections.
6. Provide for planned, sequenced and evidence-based land release and an appropriate balance of infill and greenfield development.
7. Clearly identify priorities for investment and policy effort by governments, and provide an effective framework for private sector investment and innovation.
8. Encourage world-class urban design and architecture.
9. Provide effective implementation arrangements and supporting mechanisms, including:
    - clear accountabilities, timelines and appropriate performance measures;
    - coordination between all three levels of government, with opportunities for Commonwealth and Local Government input, and linked, streamlined and efficient approval processes including under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
    - evaluation and review cycles that support the need for balance between flexibility and certainty, including trigger points that identify the need for change in policy settings; and
    - appropriate consultation and engagement with external stakeholders, experts and the wider community.

4. History of Metropolitan and Regional Planning

In Southern Tasmania regional strategic land use planning has previously been attempted in relation to the Greater Hobart region and has therefore been referred to as 'metropolitan planning'.

Metropolitan planning in greater Hobart has followed a staggering and generally unsuccessful course, however. A brief chronology is outlined.

4.1.1 The Southern Metropolitan Master Planning Authority

1958

The Southern Metropolitan Master Planning Authority (SMMPA) was established by State Government legislation at the request of local Councils in 1958. It incorporated the municipalities of Brighton, Clarence, Glenorchy, Kingborough and Hobart and was funded by the local Councils themselves. It was to be responsible for the preparation and administration of a master plan.

Signs of future discontent amongst the constituent members were apparent at an early stage with members guarding their autonomy and obtaining legal opinion indicating that the master plan should avoid detail which might conflict with local plans, (Clark 1993 p180).

1958-1962

The first master plan prepared by the SMMPA gained provisional approval in 1962. However, the road network therein did not meet with the approval of the State Government's transport engineers who called in to question the legal validity of the plan. The Public Works Department's transport engineers and the State Housing Department generally dictated regional planning for many years thereafter. Under their shadow, the SMMPA continued to function although its practical achievements never amounted to more than map making and policy formulation.

1964-1973

In the mid 1960s the SMMPA resolved to prepare a new master plan and recommended that the 1962 plan be rejected. In the late 1960s a new draft master plan was completed which was proposed to be binding on the constituent municipalities, public authorities and the Crown. Political manoeuvring by opponents to the plan effectively halted the necessary amendments to State legislation and in 1973 the City of Hobart withdrew from the Authority. Naturally this was a severe blow and the planning function of the Authority halted.

1975-1976

The SMMPA received a breath of life in the mid 1970s with finance available from the Federal Government's Cities Commission and a new metropolitan plan was prepared. This recommended a dampening of growth in Kingborough, which prompted that municipality to withdraw from the Authority, heralding the end of the SMMPA.

4.1.2 The Southern Metropolitan Planning Authority

1978-1982

The Southern Metropolitan Planning Authority, (SMPA), was formed in 1978 with the State Government compelling local authorities to join for a minimum of three years. The State also contributed a significant proportion of funding.

The SMPA published a final report in 1982 although a year earlier the recalcitrant Kingborough Council had made clear its intention to withdraw once the obligatory three year period was over. Further to this, the crumbling State Labor Government drastically cut funding and the Authority was abandoned.

4.1.3 Other Metropolitan Planning Initiatives

During the time of the SMMPA and the SMPA, but separate from them, a number of transport studies were undertaken by the State Government's transport engineers within the department responsible for major roads. These studies, although focussing on only one element of the city-forming process, constituted significant metropolitan planning exercises.

Failure of Previous Initiatives:

Metropolitan planning authorities have been at odds with both State agencies and local Councils and were unable to achieve concrete results. Both experiments with statutory regional planning authorities failed, the reasons for which are summarised by Fowler (1980): "… a lack of ownership, partnership, shared vision and political commitment from all spheres of government."

Whilst they were created under State legislation, they relied heavily on the 'bottom up' drive from their local government members to remain viable. They were also vested with a broad range of policy interests but a narrow range of powers, relying on consensus between constituent members and voluntary compliance by external agencies.

Ever since 1958 when the first Master Planning Authority was established, there was continual debate on its work and threatened withdrawal from its members. The time spent in justifying (regional planning's) existence would probably exceed the time spent in doing what it should be doing. (Nolan 1981).

4.1.4 Lessons for the present

The current Southern Tasmania Regional Planning Project relies on the consensus of the participating local government partners and therefore has some of the inherent weaknesses of the SMMPA and the SMPA.

However, local government acting both individually and collectively through the Southern Tasmanian Councils Authority and the State Government have committed to the project through the signing of a Memorandum of Understanding, an there is political will on all sides to see the project through.

A better informed community, calls for greater consistency in planning schemes from both industry and the general public, along with recognition of global pressures for more efficient settlement patterns (peak oil, the need to cut greenhouse gas emissions, the need for infrastructure efficiencies) has produced an environment wherein local parochialism is increasingly seen as small mindedness. In short, the political environment now increasingly favours a successful attempt at regional planning.

5. Decision Making Principles

5.1 Introduction

Decision Making Principles were developed in consultation with the Project Sponsors in the initial phases of the project. These principles are intended to guide the development of the Regional Land Use Strategy and its associated settlement strategies.

The principles below do not, in themselves, constitute 'draft regional strategies'. Nor is it intended that they cover the full range of issues that the regional strategic framework will ultimately address.

5.2 The Principles

5.2.1 Principle 1

Development of the Regional Land Use Framework will:

- Be a consultative, integrated and iterative process.
- Be based on an agreed long-term vision.
- Bring together input from all levels of government, the community and industry.
- Focus on outcomes, rather than outputs.

5.2.2 Principle 2

Settlement will be planned in a manner that meets the sustainable development objectives of the Resource Management & Planning System and State Policies. Planning will therefore integrate input from all levels of government and will aim to achieve sustainable environmental, social and economic outcomes.

5.2.3 Principle 3

The overarching Settlement Strategy (the Strategy) within the Regional Land Use Planning Framework will include two sub-strategies:

- ❖ The Metropolitan Settlement Strategy
- ❖ The Rural Settlement Strategy

5.2.4 Principle 4

The Metropolitan Settlement Strategy:

- ❖ Will encompass the area in which:
  - the continuous settled area of greater Hobart is contained,
  - a significant level of daily interaction and cross-region movement for reasons of employment, access to services and education is encompassed, and
  - the factors influencing settlement decisions are primarily regional rather than local.

- ❖ Will define a nominal 10 year Urban Growth Boundary and a nominal 25 year Urban Growth Boundary. Land within the 10 year UGB will be zoned appropriately for development within the new draft planning schemes. Land within the 25 year UGB will be flagged as intended 'future urban land' within the Strategic Framework.
- ❖ Will set forth the preconditions necessary for 'future urban land' to be rezoned for development purposes.
- ❖ Urban Growth Boundaries will be defined spatially within the strategy. The boundaries of such areas will be well defined, but not necessarily to the cadastral level. Final cadastral level determination will be undertaken at the planning scheme drafting stage, in close liaison with the relevant Planning Authority.
- ❖ The preconditions for 'future urban land' to be rezoned for development purposes will be set so that:
  - the maximum use and benefit of existing and planning infrastructure is achieved,
  - new and existing communities are provided with the appropriate level of services, both physical and social, including access to employment and recreational opportunities,
  - the supply of land for residential development does not have an undue impact on the range of affordability within any one market segment, or overall.
- ❖ The poly-centric nature of the greater Hobart metropolitan area will be acknowledged.
- ❖ A hierarchy of Activity Centres will be recognised.

5.2.5 Principle 5

The Rural Settlement Strategy:

- ❖ Will encompass the area which:
  - is predominantly rural in nature,
  - contains settlements physically, socially and/or economically isolated from the metropolitan area, and
  - is relatively separate from metropolitan Hobart in that the factors influencing settlement decisions are primarily local.
- ❖ Will acknowledge and identify a hierarchy of Activity Centres.
- ❖ Will set guidelines for the determination of growth boundaries around rural settlements, to be applied at the local level, so that:
  - the maximum use and benefit of existing and planning infrastructure is achieved
  - new and existing communities are provided with the appropriate level of services, both physical and social, including access to employment and recreational opportunities, and appropriate transport connections to local and major centres
  - housing affordability is not adversely impacted, and

- up to 10 years projected growth is provided for within the new planning schemes drafted under the Southern Tasmania Regional Planning Project, and
- up to 25 years project growth is provided for within any intended future growth areas defined in the Regional Land Use Framework or any local land use strategy that is consistent with the Regional Land Use Framework.

❖ Will recognise significant agricultural land and subsequently protect viable and potentially viable agricultural land from fragmentation and from non-agricultural uses.

5.2.6 Principle 6

Existing LGA Strategies (Local & Subregional) & State Agency Strategies will provide the starting point the development of regional strategy and changes will only be recommended where there is a clear benefit to the region.

5.2.7 Principle 7

The Strategy will ensure that physical and community infrastructure, both public and private, is coordinated and provided in a fair, orderly and sustainable manner. This will be achieved by:

❖ Identifying the levels of physical infrastructure and social services that are necessary to achieve the desired growth outcomes.

❖ Planning for land use and development in a manner that allows for the logical and efficient provision and maintenance of infrastructure, including the setting aside of land for the long term construction of future transport routes and essential services.

❖ Facilitating the efficient use of existing physical infrastructure and human services and negating development that would generate out-of-sequence demand.

❖ Protecting key infrastructure, including ports, airports, roads, railways and service corridors, from land use and development that would threaten, prejudice, encroach or conflict with the purpose and function of such infrastructure.

❖ Recognising that the expansion and consolidation of some existing settlements can improve the economic viability of existing physical infrastructure and social services.

❖ Facilitating consultation with providers of infrastructure, to ensure they have regard to planning policies and strategic land use planning when making their investment decisions, in order to ensure that land use and development are closely integrated with the provision of infrastructure services, and

❖ Using the provision of infrastructure to influence the timing and location of growth.

5.2.8 Principle 8

The Strategy will accord significant weight to sustainable transport modes by favouring:

❖ Areas serviced by existing and planned public transport.

❖ New communities, (with the exception of new low density rural-living communities) that contribute to the overall ability of the public transport network to service the region.

- ❖ Communities serviceable through walking and cycling.
- ❖ Ease of access to employment, services and recreational opportunities.
- ❖ Increased densities and multi-use zoning around major public transport nodes.

5.2.9 Principle 9

The Strategy will recognise the need to provide adequate housing choice and opportunities across the full range of socio-economic groups.

5.2.10 Principle 10

The Strategy will aim to identify and strengthen local sense of place, particularly where valued highly by the local community.

5.2.11 Principle 11

The Strategy will aim to maintain and improve quality of life by providing for:

- ❖ Housing choice and different lifestyle opportunities.
- ❖ Liveable, efficient, attractive communities.
- ❖ Safer & healthier communities.
- ❖ Increasing accessibility.

5.2.12 Principle 12

The Strategy will aim to minimise land use conflict.

- ❖ Preventing environmental problems which might arise as a result of siting incompatible land uses close together.
- ❖ Protecting agricultural land resources from uses that would result in fettering or conversion to non-agricultural uses.
- ❖ Avoiding land use conflicts by separating sensitive and incompatible uses from industry and other economic activities with off-site impacts.
- ❖ Protecting areas and sites with significant historic, architectural, aesthetic, scientific and cultural values from inappropriate land use and development.

5.2.13 Principle 13

Strategically important industrial land will be recognised. The role and relative strength of each industrial area with respect to the region will be identified and reinforced.

5.2.14 Principle 14

In general, planning will aim to:

- Achieve appropriate levels of employment, services, retail and education facilities within each centre so as to reduce the need for cross-region travel.

- Provide appropriate levels of protection for the region's highly valued natural assets, cultural heritage, agricultural land, landscapes, resources, recreation areas.
- Recognise and account for the region's development constraints.
- Provide increased levels of certainty to investors, infrastructure providers, the community, and decision makers.

5.2.15 Principle 15

A Risk Management approach which aims to avoid or minimise hazards, will be adopted when identifying opportunities for use and development.

5.2.16 Principle 16

Planning policies and strategies to guide local decision making will be provided in the Regional Planning Framework



The Southern Tasmania Regional Planning Project
is a joint initiative of the State of Tasmania, the Southern Tasmanian Councils Authority,
the 12 Southern Councils and the Sullivans Cove Waterfront Authority



Southern Tasmania
Regional Land Use Strategy

Background Report No.6: Land Hazards

March 2011



This document is detailed supporting information for the Regional Land Use Strategy for Southern Tasmania.

While every responsible effort has been made to ensure that this document is correct at the time of printing, the State of Tasmania, the Southern Tasmanian Councils Authority, the 12 Southern Councils and the Sullivans Cove Waterfront Authority, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance or upon the whole or any part of this document.

Please visit www.stca.tas.gov.au or telephone the Southern Tasmanian Councils Authority on 61 3 6270 2242 with any queries.



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1. Introduction

1.1 What is a Hazard?

Natural hazards are essentially meteorological and/or geological phenomena that have the potential to create emergency or disaster situations for communities and the environment. The consequences of natural disasters cost governments, individuals and the community in terms of personal tragedy, financial and economic loss, environmental damage, loss of social amenity and damage to or loss of infrastructure. Losses and costs may be magnified if these events repeatedly affect the same areas (Emergency Management Australia 2002: 3)

Many hazards are naturally occurring events, and may only be described as hazards due to their potential impact on life or property. For example, flooding of a remote and unsettled area may not be considered a hazard as there may not be any potential for harm to life or property.

Conversely, if that area contained settlements or infrastructure that may be potentially harmed, the same event is likely to be considered a hazard.

1.2 Planning Approach

While the circumstances that give rise to extreme natural phenomena are often beyond human control, there are ways that communities can plan and behave to prevent or mitigate the consequences of extreme events.

Contemporary approaches to emergency management in Australia consider measures to reduce the impact of natural disasters in terms of prevention and mitigation of, preparation for, response to and recovery from natural disasters. A comprehensive approach to emergency management incorporates all of these elements; however it is clear that prevention of impacts to life and property by natural hazards reduces the demands on government, community and individuals. Land use planning, which takes into account natural hazards and risks, has been identified as the single most important mitigation measure in preventing future disaster losses in areas of new development (Council of Australian Governments 2002: 17).

Effective land use planning is therefore a critical component of any strategy to reduce exposure to natural disasters in the medium to long term. The obligations under the planning system to work towards the objective of sustainable development, which includes securing '…a pleasant, efficient and safe working, living and recreational environment for all Tasmanians and visitors to Tasmania' is the statutory expression of the ideal that settlement strategies and planning controls promote development that does not give rise to unacceptable risks to life or property.

Promoting sustainable development requires that development and use decisions:

- Are informed by the best available information on natural hazards;
- Adequately assess the risk from natural hazards; and

- Avoid those areas where natural hazards present an unreasonable[1] risk to life and/of property.

In order to support these objectives the planning system needs to:

- Guide, over time, the removal or modification of structures that are in areas of significant risk;
- Avoid development or use in areas of unacceptable risk; and
- Ensure development and use in areas of moderate risk incorporates appropriate features having regard to that risk.

The challenge, however, is to ensure that both state and local government maintain a sound understanding of natural hazards, the level of risk they present and what is meant by 'unacceptable risk'. There is a wide range of stakeholders involved in developing appropriate approaches to managing the impacts of natural hazards and risk, particularly in terms of the various responsibilities of State Agencies. Individually the responsibility for and management of hazards through emergency response is well understood and practiced with in the emergency management structures as outlined in the Tasmanian Emergency Management Plan 2009. In contrast to this the planning response is ad-hoc and poorly articulated between levels of government, with evidence, understanding of risk, policy and decision making being applied differently by all agencies, the result is to potentially increasing the individual, community or governments exposure to hazards and inhibiting the ability of the community to adapt to hazards as the hazard changes.

As part of the response the Office of Security and Emergency Management under the Department of Premier and Cabinet is undertaking a project to develop a common framework (figure 1) that bring together a common use of evidence, risk decision making and policy to natural hazards. The primary objective of the framework is to improve the clarity and consistency of advice and, where appropriate support to local and state government regarding the mitigating of the impacts of natural hazards in the planning system. One of the outcomes of the project will be to provide a single point of reference for individual hazards (flood, fire, landslip, coastal erosion, coastal inundation) on the standardisation, collection and consolidation of information currently available on each of the hazards in Tasmania.

The Regional Land Use Framework is a clear opportunity to provide a more coordinated approach to the consideration of natural hazards. It adopts a regional perspective (reflecting the nature of complex and interlinked natural systems that operate at a regional or catchment level), strikes an appropriate balanced between State level planning, which cannot reflect local circumstances, and local planning, which cannot deal with issues that extend beyond the boundaries of local planning authorities. Specifically the Regional Land Use Framework can identify the overarching principles as well as take measures to avoid areas with unacceptable risk through its settlement strategies.

[1] Understanding the tolerance of the community to the potential risk of loss of life and property is a key element for responding to natural hazards and risks through the planning system. Risk thresholds are used to gauge the level at which a risk is considered acceptable or 'tolerable'. They can evolve through international custom or best practice, such as the adoption of the 1% chance of flood. Risk is not static and there is a need to constantly review accepted thresholds in light of changing conditions and evidence. At present, there is no coordinated approach to setting appropriate risk threshold for the various natural hazards across planning schemes in Tasmania. Planning Authorities at present determine appropriate threshold independent of each other based on a combination of factors including historical use, national and international custom and practice, and local considerations.

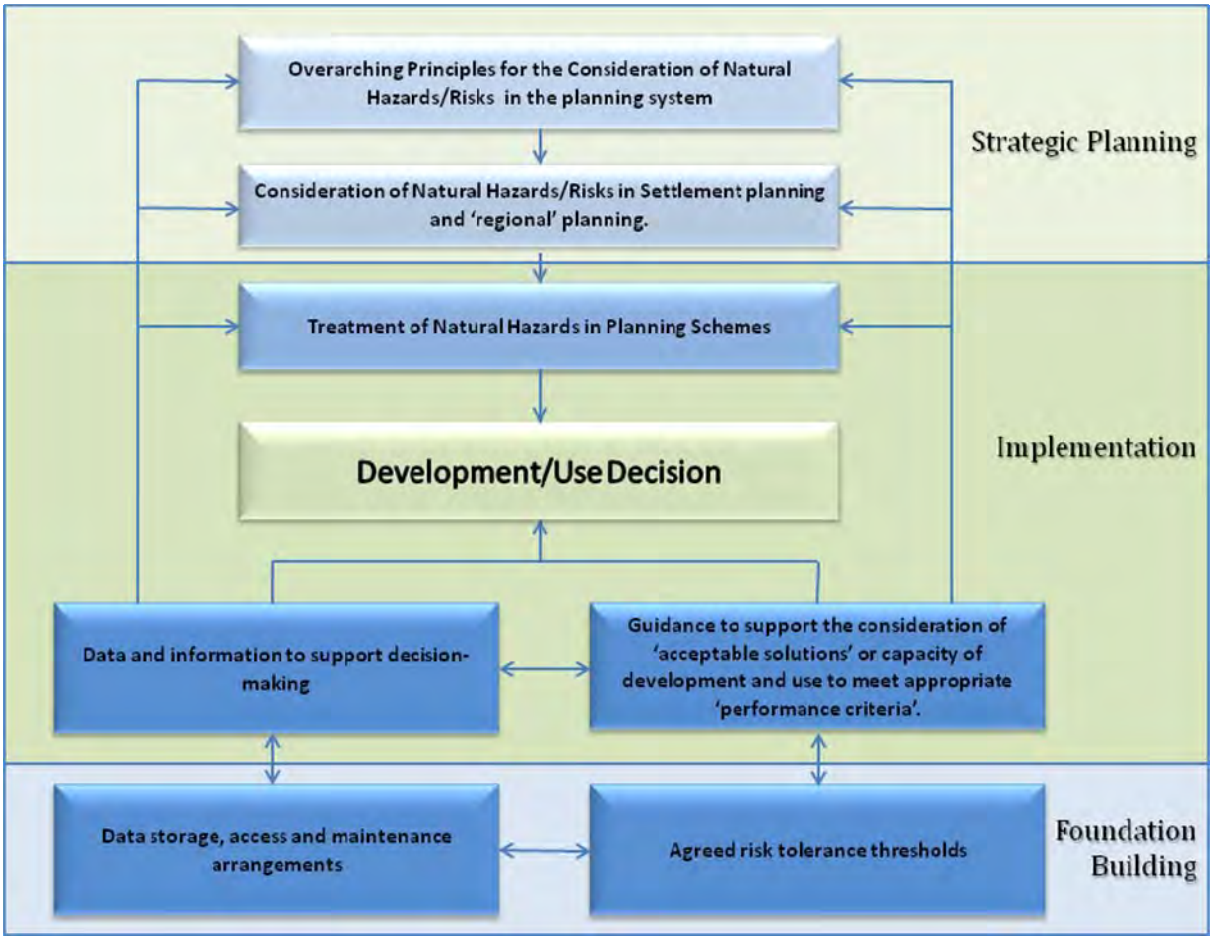


Figure 1: Conceptual Framework for Consideration of Natural Hazards in the Planning System

2. Sea Level Rise and Storm Surge

2.1 Overview

Australia's climate is clearly changing and increasing temperatures, sea level rise, changing rainfall patterns and more frequent and intense extreme climatic events are likely. Many Australian sectors and systems are highly vulnerable to climate change, including the functions and responsibilities of local governments. The State of the Environment Report for Tasmania (Tasmanian Planning Commission 2004) identifies the likely hazards arising from climate change in the Tasmanian context. These include higher sea levels, more frequent and more severe storm events and low-pressure systems, changes in short term climate cycles and an increased number of high rainfall events.

At a more detailed level, the CSIRO, University of Tasmania and Tasmanian Partnership have completed specific climate change modelling for Tasmania for Advanced Computing (TPAC) for Hydro Tasmania. This modelling has assisted in overcoming some of the uncertainty associated with applying the larger scale global modelling prepared by the Intergovernmental Panel on Climate Change (IPCC), to the Tasmanian circumstance. In summary the model scenario prepared for Hydro Tasmania predicts:

- Annual rainfall to increase in the SW of the State by about 10% by 2040, while in the NE it is projected to become drier by 10% to 20%;
- On a seasonal basis, there will be increased winter and early spring rainfall in all catchments;
- Only a very small trend in increased annual maximum temperatures for the SW, however a greater rise on the east coast, with a project maximum temperature increase on the east coast by 0.7°C by 2040;
- All areas expected to see a rise in annual minimum temperatures implying a warming projection of 0.5 C by 2040, with the maximum values occurring in the Derwent Valley;
- Annual evaporation rates are projected to increase except in the west coast and adjacent highland areas. In the midlands and east coast predications are in the order of 10% over 35 years; and
- Only slight increases in wind speeds, although changes in seasonal occurrence with increases in winter/early spring and early summer and the projected westerly component.

In terms of sea level rise, the IPCC has estimated a global rise in sea level between 0.09 and 0.88 m by 2100 relative to 1990 (or 0.8 to 8.0 mm per year, predominantly arising from the expansion of oceans as they warm (although contributions from melting of ice sheets and glaciers are also expected). These predictions clearly encompass a significant variation, with local sea level rise influenced by coastal subsidence or uplift.

More localised sea level rise predictions based upon Hobart data across the last 25 years indicates a trend of increasing sea level averaging 1.41 mm/yr (slightly higher than the mean overall trend across Australia of 0.7 mm).

The threat from sea level rise is not however just from the rising water levels. As sea levels rise, materials on sandy shorelines are eroded away, with shorelines retreating. CSIRO research has indicated that coastlines will retreat horizontally 50 to 100 times the vertical sea level rise. This prediction has been reflected in more specific local studies relevant to Southern Tasmania.

Preliminary mapping of the potential hazard zones relating to sea level rise impact was undertaken by Sharples (2004) in '*Indicative Mapping of Tasmanian Coastal Vulnerability to Climate Change and Sea Level Rise: Explanatory Report*'. This report provided a 'first pass' identification of the areas of Tasmanian coastline most likely to experience coastal flooding, both at present and predicated sea levels. In general this report indicated that sandy shorelines are more likely to recede and therefore pose the greatest hazard. Sharples (2004) does, however, indicate that the extent of coastal recession, at any given site, will be dependent upon:

- The actual degree of sea level rise and the nature of climate change;
- The actual storm patterns and exposure at each site;
- Seabed and shoreline topography at each site;
- Height and mass of dunes; and
- Existing coastal protection structures.

More recently, the Clarence City Council in association with the Australian Department of Climate Change and the State Emergency Service undertook a pilot study on the impact of climate change on Clarence coastal areas (SGS Economics & Planning and Water Research Laboratory, University of New South Wales). This study provided an integrated assessment of climate change risks on coastal areas within Clarence, specifically examining existing community attitudes and an assessment of 18 localities within Clarence City and the possible adaptive management options to the hazard presented. While many of the investigations and recommendations in this study are specific to Clarence, and therefore more detailed than the regional planning level, there are some general themes that are relevant to the broader Southern Tasmania region.

The community's knowledge and concern regarding climate change is rather vague. Many members of the Tasmanian community are aware of climate change, but are not aware of how it could impact upon their lifestyles. For instance, many community members living in coastal areas are prepared to continue living there, given the immediate and real lifestyle benefits of living close to the coast, against the likely timeframes in seeing the real impacts of climate change.

Despite this attitude, the community was strongly supportive of continued research in the field to devise possible management and adaptation measures; to reduce greenhouse gas emissions, protect shorelines, introduce planning controls to minimise flood risk for new developments and limit development in high risk areas.

The *Climate Futures for Tasmania* project will also have relevance to land use planning responses on climate change. This project builds upon the earlier work by CSIRO, University of Tasmania and Tasmanian Partnership for Hydro Tasmania as discussed above. Delivered by a consortium of research providers and research users such as the Antarctic Climate & Ecosystems CRC, CSIRO, TPAC, Tasmanian Institute of Agricultural Research, Australian Bureau of Meteorology and Hydro Tasmania. Overall project management responsibilities are vested in the ACE CRC & the State Government. The data generated under this project will better represent Tasmania's geography and its effect on the local climate. The project will also provide an accessible basis for subsequent climate change research, by archiving fine-scale climate model outputs for the entire state of Tasmania (www.acecrc.org.au, accessed 5 December 2009)

The key output of this project to date, has been the LiDAR dataset. This dataset has new high resolution digital elevation information that covers priority areas of coastline, up to 10 metres above sea level at 250mm intervals. Topographic maps of the more populated areas of the Tasmanian coast have been generated, including many areas within Southern Tasmania. The value of this data is that it can be used to identify and assess areas that may be affected by, or vulnerable to, sea level rise, sea inundation and storm or tidal surges in a more accurate and finer grained scale than previously possible (Antarctic Climate & Ecosystem CRC 2008). The LiDAR data was used in the Clarence City Council's pilot study to identify the areas most at risk.

This data has also been used in the Tasmanian Shoreline Vulnerability Mapping Project which has been jointly funded by the three regional planning projects and the Tasmanian Planning Commission. This project aims to provide an initial level of assessment of the impacts of sea level rise and inundation with basic modelling provided for different heights of sea level rise. The modelling gives a first indication of the areas which are vulnerable to sea level rise and should be recognised within planning schemes and zoned accordingly.

2.2 Planning Implications

The adoption of known and agreed climate change indicators such as sea level rise and storm surge events will have profound land use implications for adaptation and mitigation measures in the future to deal with the increasing threat of climatic change. Municipalities that are likely to be affected by climate change (coastal municipalities) will require strong policy approaches to determine what areas need to be protected from climate change events and how areas most likely to be affected can adapt to climate change events. Further consideration must be given to how future developments can use mitigation measures to reduce the immediate impacts of climate change (Aurecon 2009).

At the regional level, consideration of future storm surge events and sea level risks will be critical in determining the settlement strategies under the Regional Land Use Framework. The Tasmanian Shoreline Vulnerability Mapping Project will assist in providing the first cut of this data which will enable vulnerable communities to be recognised early on and further research to be undertaken where necessary. Bearing in mind the precautionary principle, whilst this data still requires a level of ground truthing and further work, some recognition of areas likely to be impacted through zoning and/or Codes is appropriate.

Beyond the consideration of climate change hazards in growth management, there are a number of other land use planning responses that will be required, particularly in terms of existing urban areas:

- Specific uses and developments should be located in areas well away from areas at high risk (i.e. dwellings, community facilities that would be used as emergency shelters, critical infrastructure, schools).
- Planning control measures such as building setbacks, minimum floor levels, appropriate engineering assessments, appropriate construction techniques (i.e. piled buildings, flood resistant materials).

Setting standards for new development within planning schemes will not address the risk for existing property. Government and Councils will need to consider a number of managed/adaptive measures as risk increases. For example, in terms of erosion, technically feasible options include hard protection (i.e. seawalls) and soft protection (i.e. sand nourishment, revegetation). Emergency planning is also a further option for existing development in risk areas. While emergency planning will not protect property and

assets, it will ensure that risk to human life is minimised. Emergency planning type measures are however outside the scope of strategic land use planning.

At a broader level there needs to be some understanding of the general community's acceptance of risk, and where there are areas that will be back zoned or require compulsory acquisition, compared to areas where engineering solutions may be acceptable. Whilst this is a question for the general community to debate and resolve, it has significant impacts and ramifications on zonings, codes, application of standards and requires further attention in the immediate future.

3. Bushfire

3.1 Overview

The physical and environmental setting of Southern Tasmania makes the area particularly susceptible to bushfires. Generally high rainfall and a predominance of eucalypt vegetation types, accompanied by dry summers, prevailing strong northerly winds and thunderstorms provides the ideal environment for bushfire ignition. Further, the steep topography of the landscape compounds the intensity and ferocity of bushfires. The higher rainfalls in certain areas and the fertility of the soil contribute heavier concentrations of ground fuels than in other parts of Australia. When the right conditions prevail, fires can become uncontrollable and large conflagrations occur (McNiece, 2006).

While bushfires are an inherent part of the Australian environment and have a fundamental and irreplaceable role in sustaining ecosystems and ecological processes, they can also pose a significant hazard to life and property.

Most houses are destroyed by ignition from embers that enter the house through gaps in the house construction (e.g. between the wall cladding, eaves and roof, subfloor vents or between the roof sheeting and ridge/valley capping) or through windows that are broken by radiant heat or airborne debris. Other causes include the ignition of external timbers, combustion of adjacent sources of fuel and house to house spread.

Those houses that abut standing vegetation are at greatest risk from bushfires, and studies suggest that up to 70% of burnt houses are within 50m of a vegetation boundary. However 80% of burnt houses are 80m or less, and 95% are 180m or less. Only 5% of burnt houses are at a distance greater than 180m from vegetation (Ahern and Chladil 1999).

A building's proximity to bushland has been identified as a key determinant of bushfire risk. The 100m distance from standing vegetation is often adopted as a threshold to define land susceptible to bushfire hazard as buildings within 100m have been shown to be at particular risk of ember attack (Standards Australia 2005: 13)

Bushland abuts a considerable portion of the urban fringe of Greater Hobart. Because of the physical proximity of bushland, bushfire can threaten houses several 'rows' back from standing vegetation. In many locations across Greater Hobart, the first 'row' back (i.e. those houses closest to the bushfire hazard) provide the separation to larger urban areas, as cleared buffer distances between the urban fringe and surrounding bushland is not a likely occurrence across Greater Hobart.

In addition, as a result of an increasing 'tree change' trend, there has been an influx of new residents into rural areas. Often located within or adjacent to standing vegetation, many lots have little bushfire protection, are difficult to access and do not have adequate water supplies for fire suppression.

Bushfires pose a direct hazard to the safety of occupants and fire fighters, either during fire fighting operations and /or evacuations

Bushfires in Southern Tasmania

Tasmania has faced a series of devastating fires from early settlement in 1803. The new settlers were not used to the summer conditions which caused fire to spread quickly. As early as 1854 a Bush Fires Act aimed 'to guard against damage by fire in certain months of the year', by preventing fires being lit and escaping on to another person's property. In 1897–98 an area almost the same as the 1967 fires was burnt when the 'Black Friday' fire spread rapidly through the south, destroying farms and forests. It covered the area from the lower Midlands and the Channel District to Port Arthur, the Derwent and Huon Valleys, as far as Esperance and Cygnet. The fire in late December 1933 to January 1934 threatened the whole of the Derwent Valley and 300 volunteers were rushed to fight it.

The worst bushfire disaster in Tasmania occurred on 7 February 1967, an event which became known as the *Black Tuesday* bushfires. They were the most deadly bushfires that Tasmania has ever experienced, leaving 62 people dead, 900 injured and over seven thousand homeless.

The late winter and early spring of 1966 had been wet over southeastern Tasmania, giving a large amount of growth by November. However, in November, Tasmania began its driest eight-month period since 1885, and by the end of January 1967 the dryness had dried off the luxuriant growth provided by the early spring rains in the area. Though January was a cool month, hot weather began early in February, so that in the days leading up to 7 February 1967, several bushfires were burning uncontrolled in the areas concerned. Some of these fires had been deliberately lit for burning off despite the extremely dry conditions at the time. Reports into the causes of the fire stated that only 22 of the 110 fires were started accidentally.

Shortly before midday on the 7th, a combination of extremely high temperatures, (the maximum was 39 °C), very low humidity and very strong winds from the northwest led to disaster.

125 separate fire fronts burnt through some 2,640 square kilometres (652,360 acres)(264,000 ha) of land in Southern Tasmania within the space of five hours. Fires raged from near Hamilton and Bothwell to the D'Entrecasteaux Channel as well as Snug. There was extensive damage to agricultural property near the channel, the Derwent Valley and the Huon Valley. Fires also destroyed forest, public infrastructure and properties around Mount Wellington and many small towns along the Derwent estuary and east of Hobart. The worst of the fires was the Hobart Fire, which encroached upon the city of Hobart. In total, the fires claimed 62 lives in a single day. Property loss was also extensive with 1293 homes, and over 1700 other buildings destroyed. The fires destroyed 80 bridges, 4800 sections of power lines, 1500 motor vehicles and over 100 other structures. It was estimated that at least 62,000 livestock were destroyed. The total damage amounted to $45 million in 1967.

(Sources: McNeice, & Whittaker)

3.2 Legislative & Governance Context

Several years ago, the Tasmanian Fire Service produced the *Guidelines for Development in Bushfire Prone Areas of Tasmania*. The objective of these guidelines is:

> *To minimise loss of life and property from bushfires by making living and working places defendable from bushfires.*

The guidelines identify a number of measures that can be applied to mitigate bushfire risk. These fall under different aspects of development:

1. Defendable space from bushfires – produced by separation of the building from the bushfire hazard and reduction of nearby fuel.
2. Roads – planning for network connectivity and the design and construction of roads and fire trails for emergency use and site access.
3. Water supplies – provision of adequate and accessible water supplied for effective fire fighting.
4. Buildings – siting, design and construction to maximise safety.

Much of the content concerning the creation of defendable space requires vegetation modification and management. Defendable space comprises the Building Protection Zone (BPZ) and Fuel Modified Buffer Zone (FMBZ). These zones are described below:

Building Protection Zone	Include non-flammable areas such as paths, driveways and short cropped lawns. Locate dams, orchards, vegetable gardens and effluent disposal areas on the fire prone side of the building. Using radiation shields and windbreaks such as stone fences and hedgerows avoiding highly flammable plants. Removing fire hazards such as wood piles, rubbish heaps and stored fuels. Replacing highly flammable plants with low flammability species such as dogwood, white flat iris, native frangipani. Ensuring there is horizontal separation between tree crowns as well as vertical separation between ground litter and the canopy by pruning low branches. Maintaining the area in minimum fuel conditions whereby fine fuels are minimised to the extent that the passage of fire will be restricted.
Fuel Modified Buffer Zone	Retaining established trees to trap embers and reduce wind speeds. Selectively removing small trees and scrubs to create dumps (rather than a continuous wall) separated by open areas. Removing the fuel between the ground and the bottom of the tree canopy or to height of at least 2 metres (pruning lower branches and scrubs). There is not need to remove most trees as they are beneficial in trapping embers and reducing wind speeds and will not be involved in a bushfire once the fuels below (understorey) have been modified.

Figure 50 is a nominal site plan illustrating the position of a BPZ and FMBZ in relation to a dwelling:

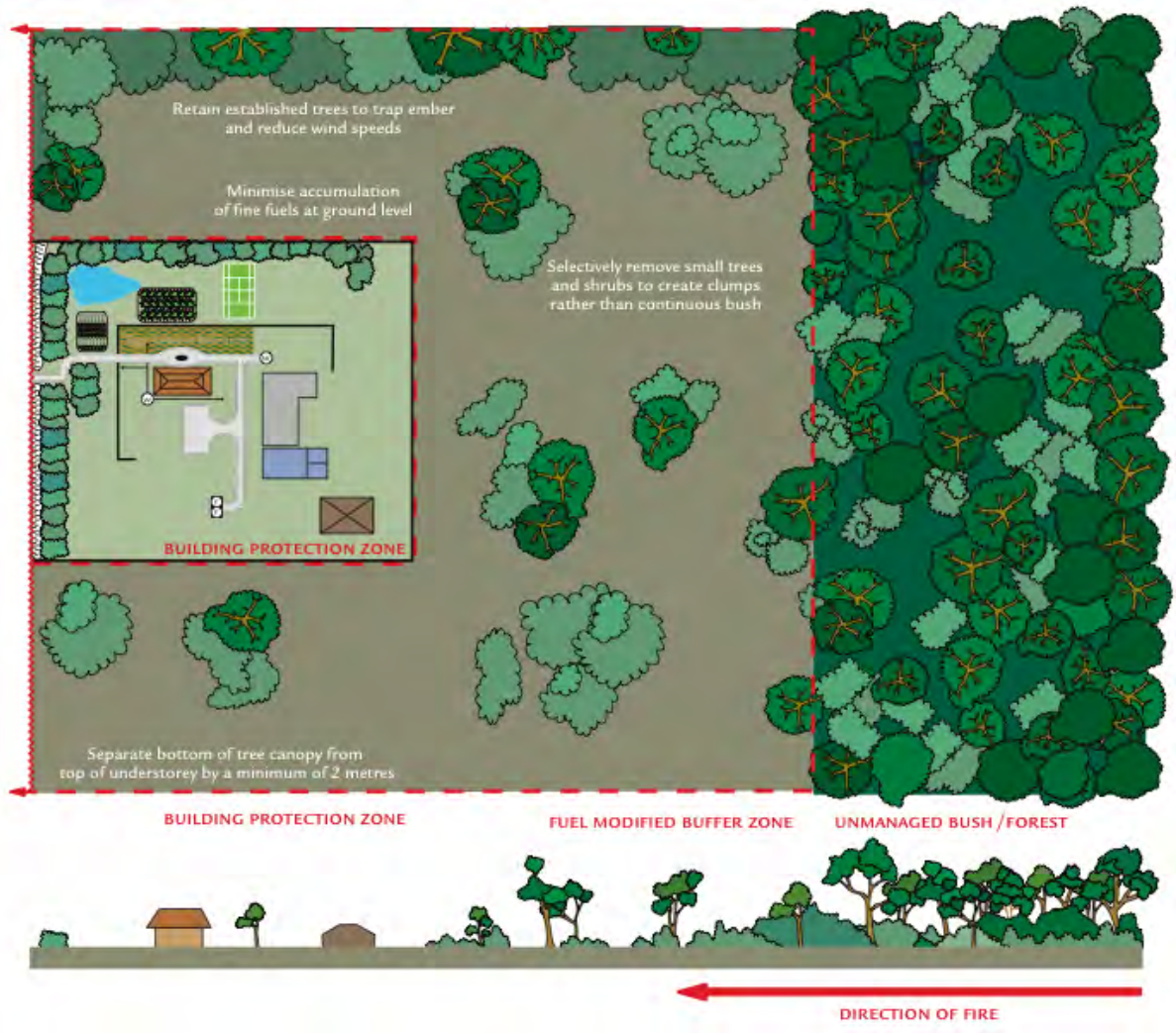


Figure 2: Site plan illustrating the Building Protection and Fuel Modified Zones *(Source: TFS)*

Many existing planning schemes within the region embrace the guidelines within their provisions and as a result there are residential areas across Southern Tasmania that do have a degree of protection from bushfires. In addition, some Planning Authorities have also utilised the construction standards under *Australian Standard 3959 – Construction of buildings in bushfire prone areas* (AS 3959) to permit dwellings in areas where sufficient buffer distances cannot be achieved.

AS 3959 details a range of building construction methods that provide guidance on construction standards for buildings in bushfire prone areas and is focused on standards that effectively 'harden' or protect a building from ember attack, radiant heat and in extreme cases, direct flame contact. These construction standards address particular weaknesses in building design that are known to increase a building's susceptibility to bushfire attack. Adoption of AS 3959 standards, when used in conjunction with other actions such as those outlined in the TFS guidelines, mean a building is safer and easier to defend.

While some Planning Authorities have utilised the standards in an informal way, as no bushfire prone areas as defined under the Building Code of Australia (BCA) have been declared in Tasmania (unlike other States) the adherence to AS 3959 is not mandatory.

In light of the recent Victorian bushfires, On 15 March 2009 the Premier of Tasmania announced that he had requested that the Department of Premier and Cabinet provide advice on a package of measures to ensure that the construction of houses in Tasmania was appropriate having regard to the risk from bushfires. The three main reforms that were to be considered were:

- An appropriate definition of 'bushfire prone areas' or a process for defining 'bushfire prone areas' for the purposes of applying relevant parts of AS3959-1999 *Australian Standard for the Construction of Buildings in Bushfire Prone Areas* or subsequent versions of the Standard in Tasmania through the *Building Act 2000;*
- An appropriate draft Standard Bushfire Schedule that can be referred to the Tasmanian Planning Commission for consideration as a new Planning Directive; and
- Advice on strategies to ensure that Development applications for building in "bushfire prone areas" can be considered and approved within a reasonable period.

The draft report has been released for consideration and comments by peak organisations and Councils. Once finalised, the draft Standard Bushfire Schedule, including definition of 'bushfire prone areas' will be forwarded to the Tasmanian Planning Commission for further consideration through a statutory process that includes public consultation. The current Royal Commission into the Victorian bushfires is also likely to produce outcomes that will be adaptable and relevant to the Tasmanian context.

3.3 Planning Implications

The planning system seeks to encourage sustainable development and the planning process obliges Council planning decisions to provide a safe living and working environment (Tasmania Fire Service 2005). Planning schemes can be used to implement controls to reduce and/or avoid risks associated with land use in areas susceptible to bushfire risk, through requirements such as minimum lot sizes, buffer distances involving fuel modification and the design and location of dwellings. A standard approach to these statutory mechanisms is being addressed by the current review being undertaken by the Department of Premier and Cabinet (standard schedule).

Above and beyond development control of areas already subdivided for residential purposes is the need to ensure that undeveloped areas identified for residential purposes are as far as practicable not bushfire prone. Recognising the physical extent of bushland adjacent to our urban area, it is however acknowledged that avoiding locating residential development in bushfire prone areas is a difficult task. Therefore the first priority should be ensuring that future residential areas that are bushfire prone can be appropriately managed. For example land that contains significant flora or habitat for threatened fauna should be avoided because of the inherent conflict between clearance required to minimise bushfire risk and the retention of natural values.

These measures must, however, be complemented by ongoing efforts to assist everyone already living or owning residentially zoned property in bushfire prone areas to understand the risks inherent in the environment within which they live and to take action to manage those risks. This is particularly important as there are existing subdivisions and residential areas where land clearance is difficult to achieve because of natural values (i.e. Tolpuddle Estate near Richmond).

Ultimately, good planning and development will include a series of measures for minimising the bushfire threat and reducing the physical and emotional costs that bushfires can create. Bushfire prone areas

should be defined and a range of planning responses provided which can be used to increase the chances of survival of buildings and occupants.

4. Land Instability

4.1 Overview

Land instability refers to a range of hazards that affect the stability of land. Landslides are the most common form of land instability, however debris flows and rock falls are known to occur. Physical and chemical weathering processes create an overall weakening of surface rock, which makes it more susceptible to the pull of gravity. There are many forms of mass movement including soil creep, earthflow, slumps, landslips, landslides and rock avalanches. Although relatively infrequent in Tasmania, large mass movement events are dramatic, resulting in permanent loss of houses, roads and agricultural land. All mass movement occurs on slopes under the influence of gravitational stress. The greater the slope angle the more susceptible the surface material is to mass wasting processes. Clays, shales and mudstones are highly susceptible to hydration. Every human disturbance of a slope such as highway road cut, surface mining, and housing development can all hasten mass wasting. The newly destabilised and over steepened surfaces are thrust into a search for a new equilibrium.

Large tracts of land throughout Tasmania are subject to slope instability and about 60 houses have been destroyed by landslides since the 1950s. Fortunately no loss of life has occurred in this time but such events are highly traumatic to those directly affected and the financial cost to individuals and the State runs into many millions of dollars. In 1872, however one person was killed in a major debris flow event in the Humphrey's Rivulet catchment in Glenorchy. Caused by an intense rainfall event, a slurry of boulders, rocks, timber and other debris raced down the catchment at an estimated speed of 40 kph.

Another major landslip event in Southern Tasmania occurred at Hone Road in Rosetta, which is now a declared landslip area. Areas such as this, have been mapped by Mineral Resources Tasmania (MRT) as declared Landslip A or B areas. These Maps of Tasmania, are used for identifying areas susceptible to debris flow, rock flows and deep-seated landslip hazard. The two areas A and B, are described as:

Land Slip A – as a location where significant landslide damage has occurred in the past, and/or the area with the greatest likelihood of future movement where no more building is allowed.

Land Slip B – are areas where strict development controls, are a form of buffer zone to the A area. The purpose of which is to recognise that inappropriate activities in the B area could destabilise the A area, and parts of the B area could also be susceptible to movement.

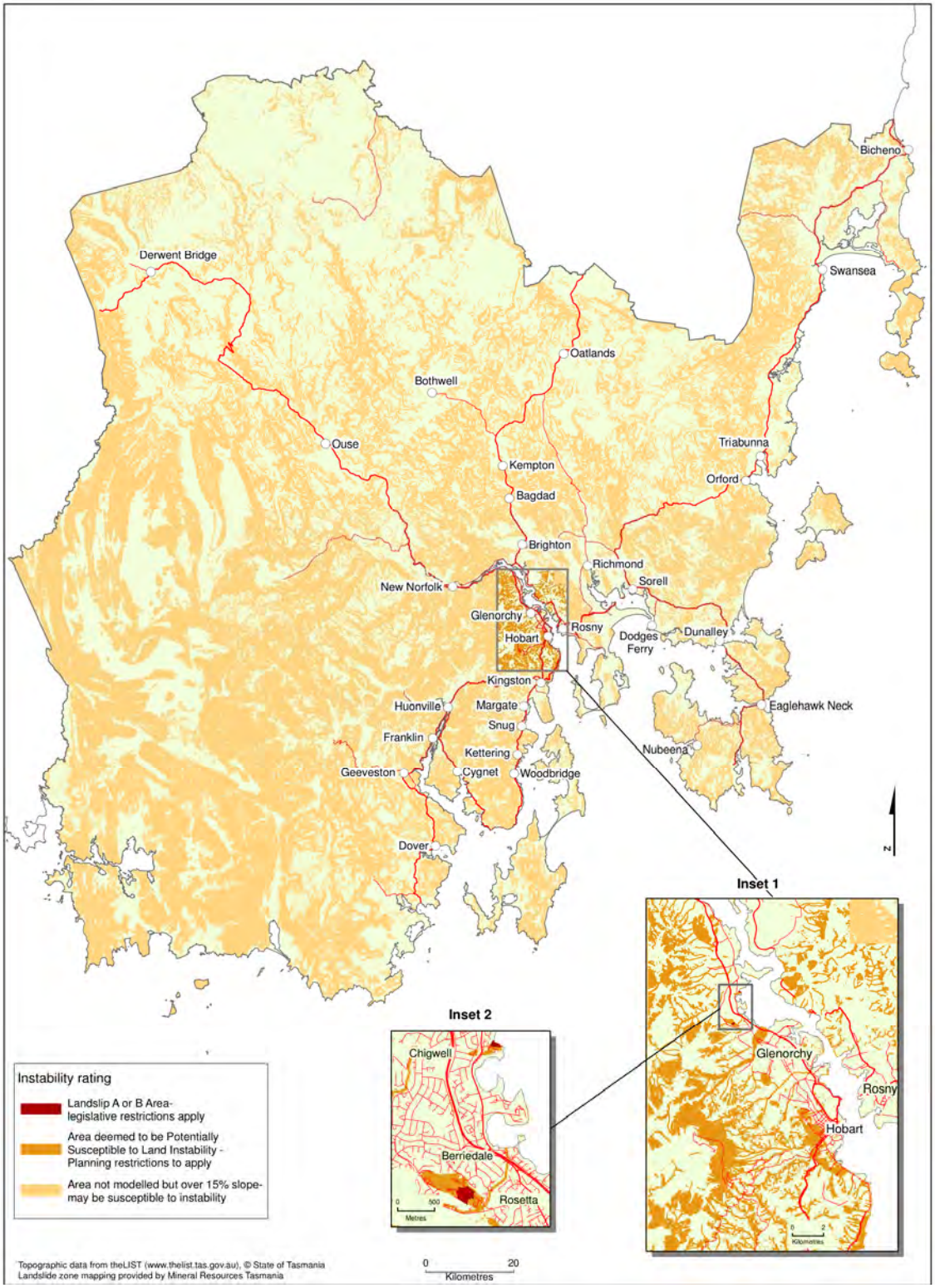


Figure 3: Land Instability Rating for Southern Tasmania (map available separately)

4.2 Legislative & Governance Context

Part 9A of the *Mineral Resource Development Act 1995* deals with the declaration of A and B Landslip Areas. The Minister may on the recommendation of the Director of Mines, declare an area to be an A Landslip Area or a B Landslip Area if satisfied that it is subject to earth movement because of inherent instability. An A Landslip Area is more unstable than a B Landslip Area.

The process calls for the relevant Council and affected owners to be formally notified and given the opportunity to lodge an objection.

Building in declared landslip areas is covered by Part 10, Division 1 of the *Building Act 2000* and Part 2, Division 1 of the *Building Regulations 2004*. The *Building Act 2000* prevails over local planning schemes. These regulations outline special requirements for building in landslip areas additional to the normal approval processes.

Outside of declared landslip areas, it is generally the responsibility of the Planning and Building Authorities to ensure that buildings are appropriately constructed in accordance with the underlying land instability risk. Within Southern Tasmania, some existing planning schemes already require assessment of land instability and where development is proposed on land where the slope potentially exceeds the threshold for the underlying geology, land instability assessments are required as part of the development application.

4.3 Planning Implications

Planners can use the MRT maps to avoid unstable areas when assessing new developments and subdivisions . The maps are intended to give general guidance on landslide susceptibility in the areas covered and consequently will be important tools in the establishment of the settlement strategies under the Regional Land Use Framework. The maps are not intended to be used for making development decisions on a block-by-block basis in the absence of a suitable geotechnical report.

Planning should focus on preventing inappropriate development through assessment criteria determined by the Regulators, in locations that may increase the risk to life or unacceptable risk to property. Community infrastructure also needs to be located and designed to function effectively during and immediately following rapid onset landslips and debris flow events. Residential dwellings, schools and critical infrastructure should be located to minimise social and community impacts from landslip or debris flow events. Further, use and development must maintain the safety of people and property.

There are a number of tools available for use when development is to occur within an area susceptible to landslip events. Mineral Resources Tasmania has released Urban Landslide Maps of Tasmania which are used for identification of areas susceptible to landslip hazard. A number of best practice guidelines, such as the Australian Geomechanics Society Landslide Risk Management Guidelines 2007, have been developed across Australia that must be adopted to manage landslide risk for landslide prone areas.

5. Flooding

5.1 Overview

A flood is defined as a high water level that overflows the natural or artificial levees along any portion of a watercourse. Both floods, and the flood plains that they might occupy, are rated statistically for the expected time intervals between floods.

Flooding is recognised as the most costly form of natural disaster in Australia. This is not necessarily due to the frequency of floods, but due to the fact that many towns and cities are located on floodplains; for reasons relating to water supply, transportation, advantageous points for water crossings, access to productive soils and recreation purposes (ARMCANZ 2000:1).

On average, floods cost the Australian community over $300 million a year. From 1967 to 1999 flooding accounted for 29% of total natural disasters in Australia. Floods can cause damage to properties and can affect personal safety, business activity, financial security and general health and well being (Bureau of Transport and Regional Economics 2002: 1)

The Southern region has a long history of flood events, with certain areas subject to regular inundation. Areas subject to hydrological hazard generally comprise the riparian zone that encompasses the active creek bed and immediate flood zone and recharge basins. Flash flooding can occur, particularly where natural watercourses are utilised for stormwater purposes in urban areas.

Under various funding programs, the Department of Primary Industries, Parks, Water & Environment has guided the development of Floodplain Maps and Flood Data Books in Tasmania. Floodplain maps are detailed maps of areas that have been inundated with flood waters. Floodplain maps are usually restricted to urban areas where significant historic information is available, and where the economic cost of flooding is high. Flood Data Books are a compilation of information on past flooding, mainly in rural areas, including photographs, maps of flood extent, flood profiles and a tabulation of heights reached by historic floods.

For the following watercourse floodplains within the region, the designated flood level is the level which has a 1% probability of being exceeded in any year (i.e. the 1:100 annual exceedance probability flood level). Most of these areas are covered by Floodplain Maps or Flood Data Books:

- Derwent River through New Norfolk;
- Huon River at Huonville and Mountain River;
- Jordan River below Pontville;
- Bagdad Rivulet; and
- Coal River at Richmond.

Flooding, particularly flash flooding also occurs on numerous other watercourses across the region. Whilst many of these are within rural areas and therefore create few hazards, in urban areas flooding on smaller watercourses is also important to consider. The landform of Greater Hobart, particularly those on the western shore) involves urban development extending from the foothills of surrounding mountains and hills through to Derwent River foreshore. A number of rivulets originate in the slopes above the settled areas. Many of these are prone to flooding, particularly as they are utilised as outlets for stormwater collected across the impervious surfaces of urban areas.

Given the steep topography of the catchments for many of these rivulets, floods are usually akin to 'flash floods'. The steep topography means floodwaters arrive quickly after heavy or prolonged rainfall, peak, and then also fall rapidly.

5.2 Planning Implications

Effective floodplain management is necessary to reduce economic losses and minimise the potential loss of life from flooding. In 2000, the Agriculture and Resource Management Council of Australia and New Zealand published *Floodplain Management in Australia - Best Practice Principles and Guidelines*. This document states that the principal aim of floodplain management "is to reduce the effect of flooding and flood liability on individual owners and occupiers of flood-prone property, and to reduce private and public losses resulting from floods" (DPIPWE). The Guidelines promote an integrated approach to floodplain management based upon a consideration of the total catchment, the integration of roles and responsibilities, the integration of floodplain management plans with flood emergency plans and the integration of stormwater and mainstream flood behaviour. Total catchment considerations are necessary to avoid moving flood effects from one point to another via inappropriately designed flood amelioration measures. For example, the construction of levees or structures may reduce the flooding on one parcel of land, but increase flooding on upstream or downstream properties.

Possible land use planning responses to flooding (Bureau of Transport and Regional Economics 2002) include:

- Restricting development to areas outside the floodplain (e.g. by prohibiting development in areas prone to frequent flooding).
- Controlling the mix of land uses to allow only 'flood compatible' activities in areas prone to less frequent flooding.
- Stipulating a minimum floor level usually 1% Annual Exceedence Probability (previously referred to a 1 in 100 year Average Recurrence Interval). This measure however only protects up to the design level and if a higher flood level event occurs (i.e. 1 in 500 year even), damage is likely.

Non structural measures such as land use planning and building controls were considered by the Bureau of Transport and Regional Economics (2002), as a more cost effective form of flooding response, with the costs being relatively low and potential benefits considerable, albeit such as response is limited to new development rather than existing development.

It is however difficult to impose a 'one size fits all' solution to flooding hazard. Rivers are natural landscape elements which are subject to aggradation (build up of material) and scouring (removal of material). Aggradation and scouring can lead to significantly different flood heights for the same flow. Dense willow growth, for example, in the river channel can lead to significant changes in flooded area. For example, at points along the Meander River in Northern Tasmania, floods of the same flow have been found to be 1 - 1 1/2 m higher when dense willow growth is present.

Each waterway has its own hydrological characteristics, each flood plain its own morphology, each flood its own duration and intensity and each locality is own social, economic and political attributes (Bureau of Transport and Regional Economics 2002: 16). As a response local based land use planning responses are therefore as important as regional land use planning responses.

6. Acid Sulphate Soils

6.1 Overview

Acid water and heavy metal pollution, caused by the disturbance of acid sulphate soils, is a major environmental issue for the management of coastal regions around Tasmania. Acid sulphate soil is the name given to soil and sediment containing oxidisable, or already oxidised sulfides (Charman & Murphy 2000: 249).

A Natural Heritage Trust funded report has confirmed the presence of acid sulphate soils in Tasmania, and has identified that acid is being released from some sites which host acid sulphate soils (Resource Planning and Development Commission 2004). The disturbance and exposure of acid sulphate soils from below the water table by earth moving practices and fluctuations in groundwater levels can result in the oxidation of pyrite, which in turn, produces sulphuric acid (Charman & Murphy 2000). Implications relate to the direct impact of acid on the receiving environment and the indirect impact of acid in mobilising toxic metals.

Elevated levels of mobilised trace heavy metals in soil and water can be toxic to aquatic life if released into the drainage system during high flow events or a rise in the groundwater table. Land areas impacted by exposed acid sulphate soils have poor fertility, high vegetation dieback and are prone to surface scalding and erosion.

Within Southern Tasmania the known extent of acid sulphate soils is minimal. The distribution of potentially acidic soils along coastal areas in southeast Tasmania is limited to small patches in low-lying flats in the Bicheno, Swansea and Dodges Ferry areas. The National Land and Water Resource Audit Atlas maps indicate that the region's agricultural topsoils have low (acidic) pH and are therefore a lower risk for acid sulphate compared to soils in the other regions.

All States and Territories across Australia have adopted a national policy framework (The National Strategy for the Management of Coastal Acid Sulphate Soils) that establishes the following key principles for management:

- Identify and define where acid soils occur,
- Avoid acid soil disturbance,
- Mitigate impacts when acid soil disturbance is unavoidable, and
- Rehabilitate disturbed areas.

The State Policy on Water Quality Management 1997 also identifies the need to assess the potential risk arising from the presence of acid sulphate soils. The Department of Primary Industries, Parks, Water and Environment in conjunction with the regional NRM bodies, as part of the Tasmanian Acid Sulphate Soils Information Project (TASSI), released guidelines for the management of Acid Sulphate Soils in early 2010

6.2 Planning Implications

While not as prevalent a risk in other regions, the disturbance of acid sulphate soils is a land hazard that needs to be managed within the region. The key planning implication in terms of managing this risk is

managing the disturbance of ground and soils within areas shown as having potential to contain acid sulphate soils (see Figure 4 below).

To avoid disturbing potential acid sulphate soils is clearly the first option, as it carries the least environmental risk and is usually the cheapest option. However as evident from the spatial information and mapping developed through the TASSI, there are many locations where these soils exists within or in close proximity to existing urban and town development, particularly given the prevalence in coastal areas.

In addition, it is recognised that particular developments in areas of high probability of acid sulphate soils have elevated risks because of their inherent development characteristics. These uses include extractive industries, golf courses, marinas, canal estates and developments requiring below ground floor areas.

While desirable, in view of the many other considerations affecting land use planning decisions, it may not always be possible to avoid the risk. In this instance management and mitigation through specific assessment provisions (building into planning schemes) is the next desirable option.

The 'Tasmanian Acid Sulphate Soil Management Guidelines' provides a best practice approach and assessment to managing the disturbance of potential acid sulphate soils over a 7 step process:

Step 1

If the proposed project is in the coastal zone and is at or below 20 metres AHD, or will disturb soil or nearby groundwater hydrology at or below 20m AHD, proceed to Step 2 (if not, no further consideration of ASS is required). If the proposal is in an inland area but within or adjacent to a deflation basin (topographic depression scoured by wind), wetland area or an area of known acid mine discharge, or if indicators of acid conditions are identified, proceed to Step 2.

Step 2

If the project will excavate 100m3 of soil or sediment, or will involve the dumping or filling of land with more than 500m3 of soil to a depth of greater than 0.5m then proceed to step 3, otherwise no further consideration of ASS is required.

Step 3

Existing mapping information should be checked. Maps identifying the predicted distribution of coastal areas affected by ASS are available at www.thelist.tas.gov.au and on the ASRIS website (http://www.asris.csiro.au/index_ie.html). If the project falls within an area identified as being at risk proceed to step 4, if not no further action is required.[2]

[2] Although the map is based on best available information, it is important to be aware of possible limitations of this dataset. The local scale variation in Tasmanian landscapes can result in small pockets of ASS outside the zones indicated on the map. Similarly, within the zones indicated, ASS may not be uniformly distributed. It is intended that proper application of these Guidelines will improve the capacity of soil scientists, environmental scientists, planners, engineers and landholders to carry out an initial risk assessment for ASS if suggested by indicators or local topography and determine the need for further testing.

Step 4

Conduct a desktop risk assessment. All disturbances to the groundwater hydrology or surface drainage patterns in coastal areas below 20 metres AHD should be investigated, designed and managed to avoid potential adverse effects on the natural and built environment (including infrastructure) and human health from ASS. This recommendation also applies to the investigation of subsoil or sediments below 20 metres AHD where the natural ground level of the land exceeds 20 metres AHD (figure 2). In some situations, ASS may also occur at elevations greater than 20 metres AHD (i.e. inland areas), and these guidelines also apply to the management of those soils where they are identified.

Step 5

Develop a soil profile. If it is determined, from mapping or site assessment, that the probability of ASS occurrence is likely, on site investigations will be required to determine where, and at what depth and concentration, the ASS may occur. The first step in this process is to develop a soil profile of the site, with detailed information on elevations, soil types and depths. Only some soil types are likely to contain ASS, and it will only be necessary to conduct further sampling if the proposed project is likely to disturb significant amounts of ASS (as per step 2). If disturbance is likely, consideration should be given to redesigning the project so that the ASS materials can be avoided. If this is not possible, a management plan should be developed to minimise environmental harm from the project and justification provided as to why the ASS cannot be avoided. If disturbance is unavoidable proceed to step 6.

Step 6

Conduct field tests and laboratory analyses. Sampling and testing of the soil types likely to contain ASS should be done by a qualified and experienced soils professional in accordance with the Guidelines (see Appendix B). Once the location, depth and concentration of any ASS present on the site have been determined, options to manage the risk can be considered (step 7).

Step 7

Develop an ASS Management Plan. The remainder of these Guidelines outlines the principles and management strategies to be used in developing a management plan to minimise and/or neutralise any impacts from the disturbance of ASS.

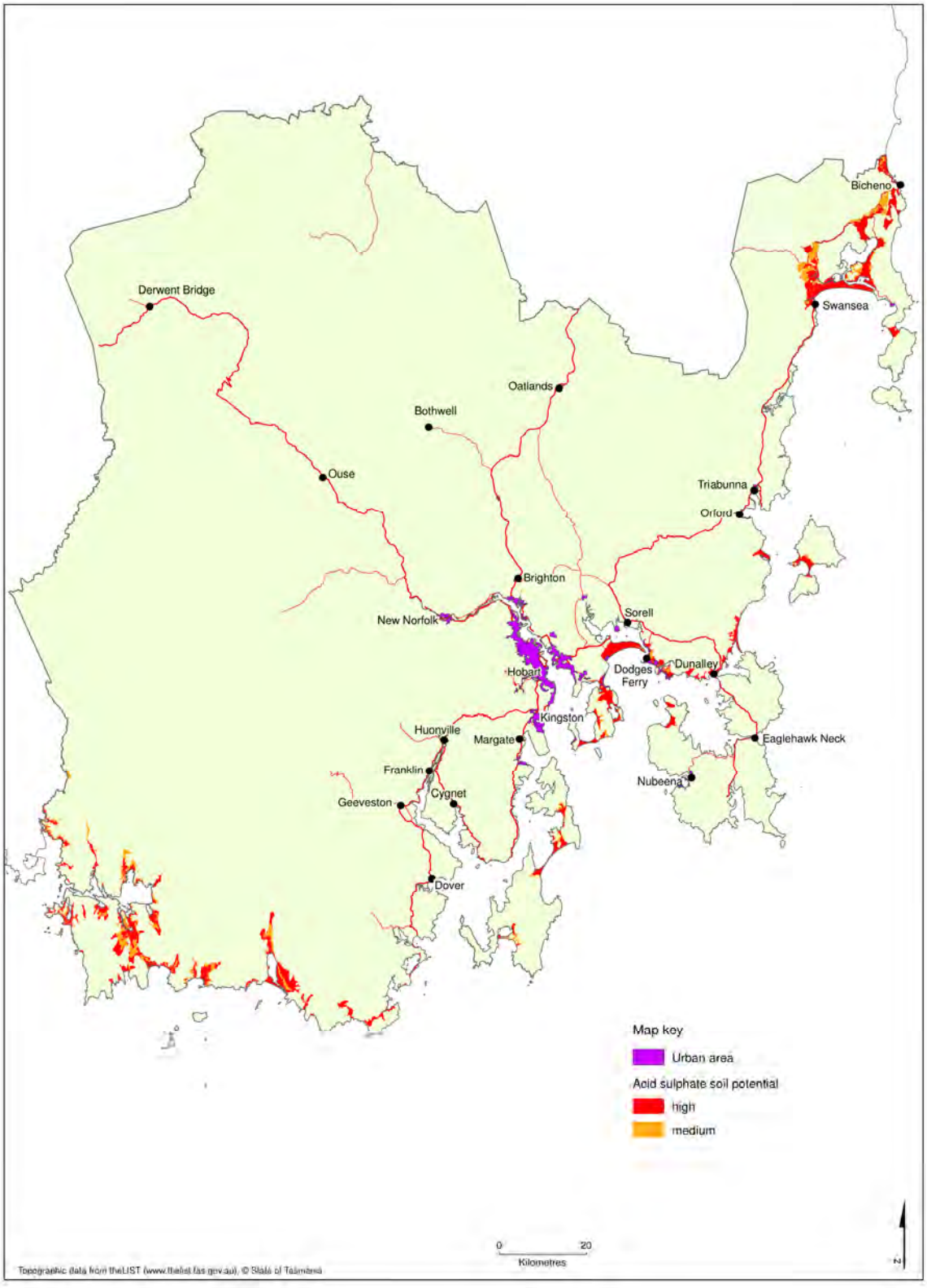


Figure 4: Potential for Acid Sulphate Soils in Southern Tasmania (map available separately)

7. Dispersive Soils

7.1 Overview

Dispersive soils (otherwise known as sodic soils or sodosols) are fine grained soils with a higher content of dissolved pore-water sodium than ordinary soils. When a sodic soil comes into contact with non-saline water, water molecules are drawn in between the clay platelets causing the clay to swell to such an extent that clay platelets are separated from the aggregate, which is known as dispersion. As a result these soils rapidly erode, forming tunnels and deep gullies, which can cause severe damage to infrastructure and buildings. Consequently erosion arising from dispersive soils is a much greater risk in urban areas as compared to other forms of erosion, which as discussed below, are more problematic in agricultural areas.

Dispersive soils cannot be differentiated from other soils through normal soil testing processes. It is known however that in Tasmania dispersive soils are generally associated with soils derived from Triassic sandstone or Permian mudstone and the general extent of dispersive soils in Tasmania is known, although not specifically mapped. Within Southern Tasmania dispersive soils occur in all Municipal Areas. Tunnel erosion has been observed at numerous locations around Cygnet, North Bruny Island, Bridgewater, New Norfolk, Tea Tree, the Tasman Peninsula and Collinsvale (NRM South 2005).

In almost all cases, tunnel erosion results from some form of disturbance, which allows rainwater to come into direct contact with dispersive soils. Activities that increase the risk of exposing dispersive subsoils to rainfall include removal of topsoil, subsoil excavations, supply of services by trenches, construction of roads and culverts in dispersive soils and dam construction. Changes to hydrology such as culverts, runoff from hardened areas and ponding of rainfall may also increase the risk of tunnel erosion.

7.2 Planning Implications

Given the difficulty in repairing tunnel erosion, management effort should be focused on prevention of tunnel formation through increased understanding and awareness of the issues associated with construction and development on dispersive soils. The risk of initiating tunnel erosion during construction or development of land containing dispersive soils can be minimised by identification and avoidance of disturbance to areas of dispersive soils, reducing the ponding of water, keeping dispersive soils buried under topsoil and maintenance of vegetation cover.

DPIPWE has released a guidelines document for *Dispersive Soils and their Management Guidelines for Landholders, Planners and Engineers* which can assist with soil and water management on development and construction sites. Soil and Water Management on Building and Construction Sites Fact Sheets have also been released by the Derwent Estuary Program in conjunction with NRM South to provide further guidance for developers.

Avoidance of development on dispersive soils is unrealistic given their extent within the region.

8. Erosion

8.1 Overview

Other soil related hazards include, the many different types of wind and water erosion, which potentially occur whenever surface soil is exposed to winds and rain. Sheet, rill, gully and stream bank erosion are the most active forms of water erosion. Sheet erosion occurs when water breaks down exposed finer topsoil particles, causing it to slide away and create the subsequent, and most widely recognised, rill and gully type erosion. Whilst stream bank erosion occurs on the edge of water channels, when water flow causes the banks to erode, or when there is a rapid loss of flow that causes the bank to break and slump.

While soil erosion is a natural process in the landscape, accelerated erosion occurs as a result of human intervention in natural systems. The potential for wind or water erosion exists for most soils in the region under extremely wet or windy conditions and/or under management practices that increase the risk of erosion, such as excessive working of the soil or removal of surface cover. The longer the period of time that soil is in a loose state without surface cover, the greater the risk of erosion (NRM South 2005). Dryland grazing areas are prone to moderate sheet, gully and tunnel erosion, particularly on dry north-facing slopes or sodic duplex soils. There has been a recent increase in the number of farmers protecting vulnerable north-facing slopes, but severe erosion can still be found in some areas of the Southern Midlands and Derwent Valley. The Central Plateau has some of the worst soil erosion in the State as a result of past over-grazing and the impacts of rabbits. Alpine areas are particularly susceptible to sheet erosion because of very high rainfall, low temperatures and the impacts of heavy snow and frost cover over long periods.

There is no formal legislation in Tasmania covering soil conservation, as adopted in mainland states (e.g. the South Australian *Soil Conservation and Land Care Act 1989*). However, soil conservation is implemented indirectly through various legislative and non-regulatory measures.

The Department of Primary Industries, Parks, Water & Environment, along with extensive farmer and community group consultation, have released soil management guidelines for Tasmanian farmers which is a non-regulatory document outlining general management recommendations for conservation of Tasmanian agricultural soils. Several community groups have developed soil management plans for specific areas and catchments within the region.

Existing resource management and catchment management plans highlight local threats to the soil resource in an anecdotal manner but provide little objective assessment of severity, extent or cost of the problem. Forestry Tasmania has initiated a methodology to identify the susceptibility of specific soil types to erosion and the appropriate management requirements needed. Soil surveys are routinely undertaken prior to developing forestry plantations in order to identify that the site is capable of supporting such land use. No such methodology exists for agricultural soils.

8.2 Planning Implications

Soil erosion is a natural process in the landscape. Accelerated erosion occurs as a result of human intervention in natural systems, often through vegetation clearance or soil cultivation. The texture contrast soils and deep sands that are extensive throughout the region are particularly susceptible to erosion by wind and water.

Because of the underlying risk, that most soils are susceptible to erosion, land use planning responses to soil erosion hazards should generally be focused on mitigation during and post construction/development.

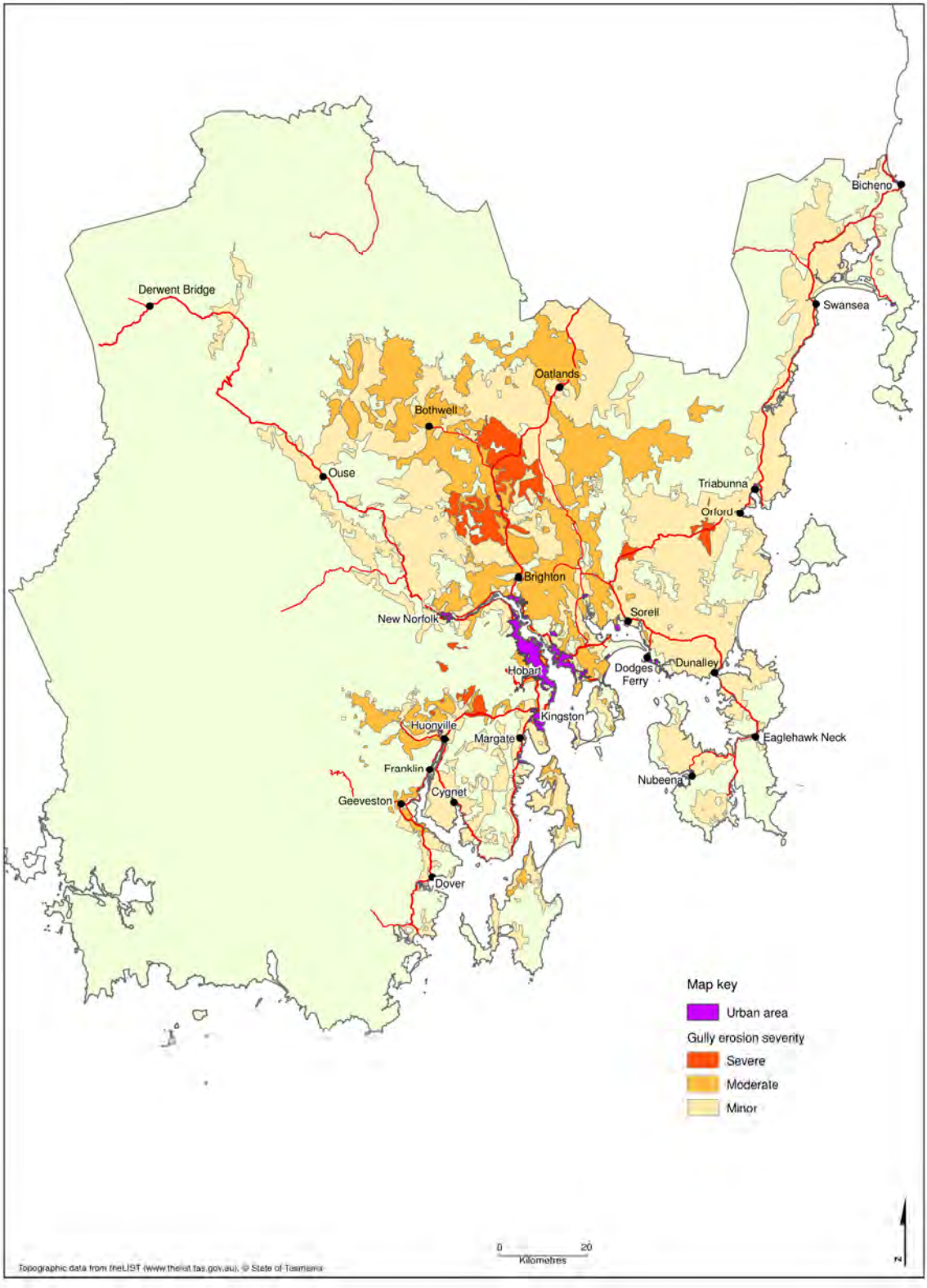


Figure 5: Gully Erosion Potential in Southern Tasmania (map available separately)

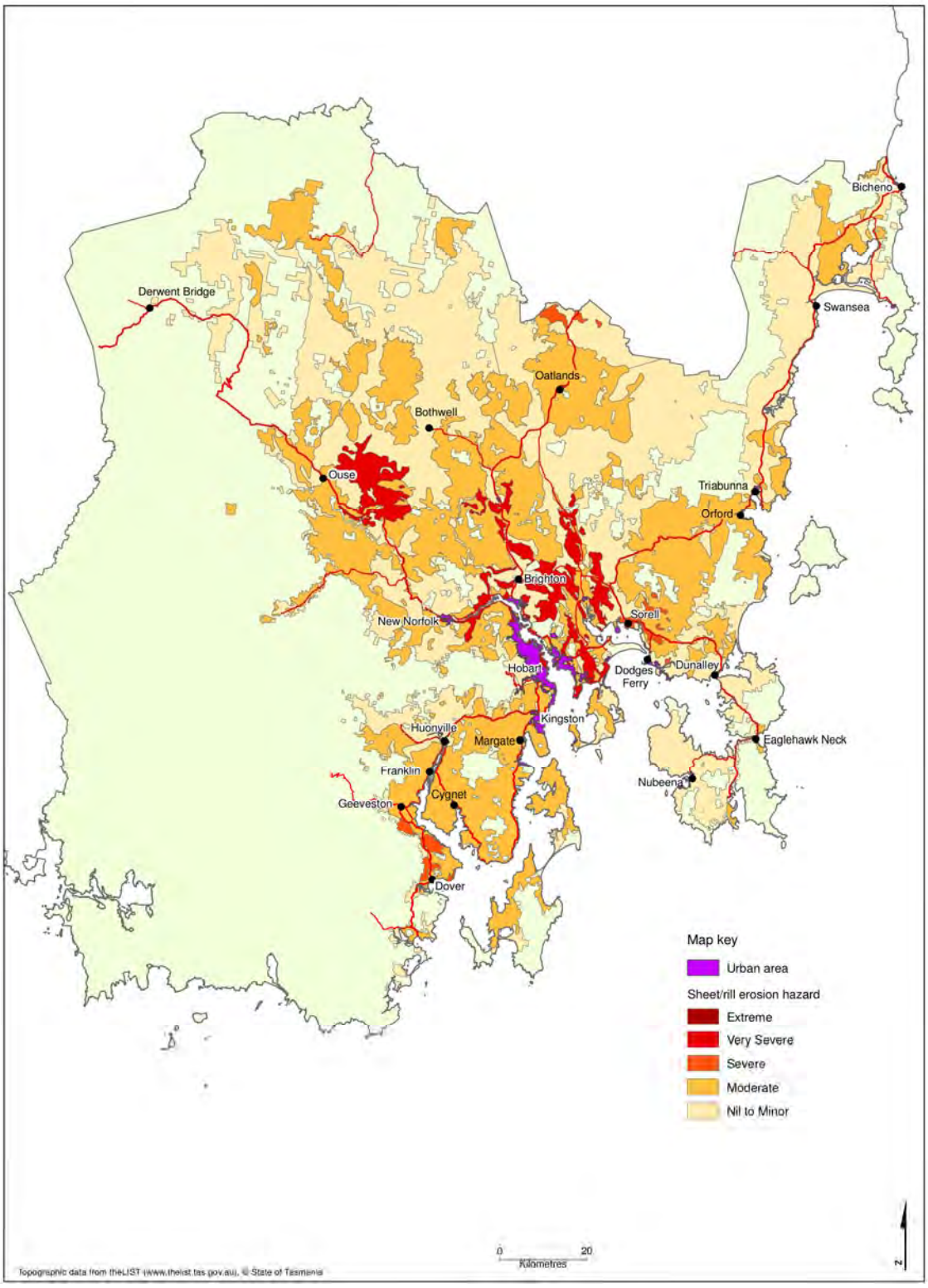


Figure 6: Sheet/Rill Erosion Potential in Southern Tasmania (map available separately)

9. Contaminated Land

9.1 Background

Contaminated land is defined as an area of land (including water in, on or under land) that is a 'contaminated site' if the following are invoked:

- The land contains a pollutant in a concentration above naturally occurring levels, which is, or is likely to be causing serious or material environmental harm or environmental nuisance; or
- The land contains a pollutant in a concentration above naturally occurring levels, which is likely to cause serious or material environmental harm or environmental nuisance in the future if not managed appropriately.

Contaminated land can result from current or historic land use activities at a site, such as refuse disposal, petroleum storage, timber treatment plants, heavy industry and gas works. The potential for damage to ecosystems or to human health can be significant, and the financial costs of cleaning up a site can be high. At present use and development of, or adjacent to, potentially contaminated land must not proceed unless an assessment has been carried out to determine any risk to human health or the environment in accordance with the *National Environmental Protection Measure 1999*. Experience has shown that some industrial activities have a higher probability of contaminating a site, including activities such as oil production and storage, and chemical manufacturing and formulation. Any commercial, mining, industrial or agricultural site has the potential to be contaminated, however some activities intrinsically give rise to contamination more frequently than others.

The issue of contaminated land was highlighted at Lutana in Hobart, where soil had been contaminated by particles of cadmium, lead and zinc blown from the nearby zinc refinery (Resource Planning and Development Commission 2004). The number of suspected, but not confirmed, contaminated sites in Tasmania is unknown. As an indication of the potential scale of the problem in 1995, there were about 1600 underground storage tanks containing either petrol, distillate or aviation fuel in Tasmania (Resource Planning and Development Commission 2004). Most of these tanks are at petrol stations. In conjunction with the numerous types of other activities that can potentially contaminate a site, the total number of potentially contaminated sites in Tasmania (i.e. suspected but not confirmed to be contaminated) is in the order of many hundreds.

9.2 Legislative & Governance Context

In Tasmania, the management of contaminated sites is shared by the Environment Division of the Department of Primary Industries, Parks, Water and Environment and local Councils. Under this framework, the Contaminated Sites Unit (CSU) of the Environment Division regulates contaminated sites that pose a significant risk of harm to human health and/or the environment under the *Environmental Management and Pollution Control Act 1994*. Other contaminated sites that do not pose a significant risk of harm to human health or the environment, and therefore are suitable for the current or approved use, are managed by local councils through the planning process. For guidance in relation to best practice management of land and groundwater contamination, the Contaminated Sites Unit refers to the National Environment Protection (Assessment of Site Contamination) Measure, 1999 (NEPM). Under Section 12A of the Tasmanian *State Policies and Projects Act 1993*, the NEPM has been adopted as state policy.

9.3 Planning Implications

Guidelines and potential development control provisions are being prepared by the Contaminated Sites Unit in regard to how specific applications for use and development on potentially contaminated sites are dealt with. The Regional Land Use Framework will need to incorporate the broader principles and policies underlying these guidelines and provisions.

Above and beyond this, settlement planning will need to consider the suitability of areas proposed for new residential growth in terms of broader scale land contamination, for example, the conversion of underutilised industrial land to residential purposes.

10. Salinity

10.1 Background

NRM South defines salinity as "…the accumulation of excessive salts in land and water at sufficient levels to have an impact on human and natural assets." There are two types of salinisation: natural and secondary. Natural salinity occurs in closed drainage basins where salt is retained and accumulated for long periods, compared to open drainage basins, where salt is rapidly returned to the sea. Naturally occurring salinity is evident in some areas within Southern Midlands. Secondary salinisation occurs as a result of human intervention in natural processes and it is this, which is of primary relevance to the Regional Land Use Framework.

High soil salinity has a number of consequences that are of concern in a land and water management context:

- The adverse effects of salt on plant growth;
- The effect on water quality, whether surface water or ground water, particularly if it is needed for domestic or industrial uses, for stock water, or if it flows into major watercourses or storage bodies;
- The adverse affects on fresh-water dependent ecosystems as a result of degradation in water quality;
- Low vegetation cover can expose areas to high erosion rates;
- The saturation of soils with solutions high in sodium can result in the development of sodic soils, as the sodium cations replace calcium and magnesium ions on the clays; and
- High saline soils have the potential to mobilise heavy metals and other potentially toxic substances in soils (Charman and Murphy 2000: 240).

Increases in salinity in soils can only occur if a saline groundwater system receives extra water, a salt store is mobilised, or a new source of salt is adding salt to the soil or water. Where there is a salt store or saline groundwater, any process which increases the availability of water in the soil can increase the leakage of water to groundwater, and flush salt out into surface waters or soil systems (NRM South, 2005).

There are approximately 10,700 ha of land affected by systems known to contain salinity within Southern Tasmania, which is equivalent to 1.8% of the agricultural land in the region. The percentage of salt-affected land is much higher in cleared agricultural land than in areas with native vegetation. Areas known to be affected by salinity are the Derwent Catchment, upstream of Hobart, and the Coal River Valley. The area of salt affected land in the region is expected to increase by 1.5% per annum. This has implications for the future water supply in Hobart and the surrounding areas. Processes occurring within the region attributing to further increases in salinity include tree decline, the collection and concentration of saline water in farm dams and the dispersal of this water and the proposed significant increase in wastewater for irrigation (NRM South 2005).

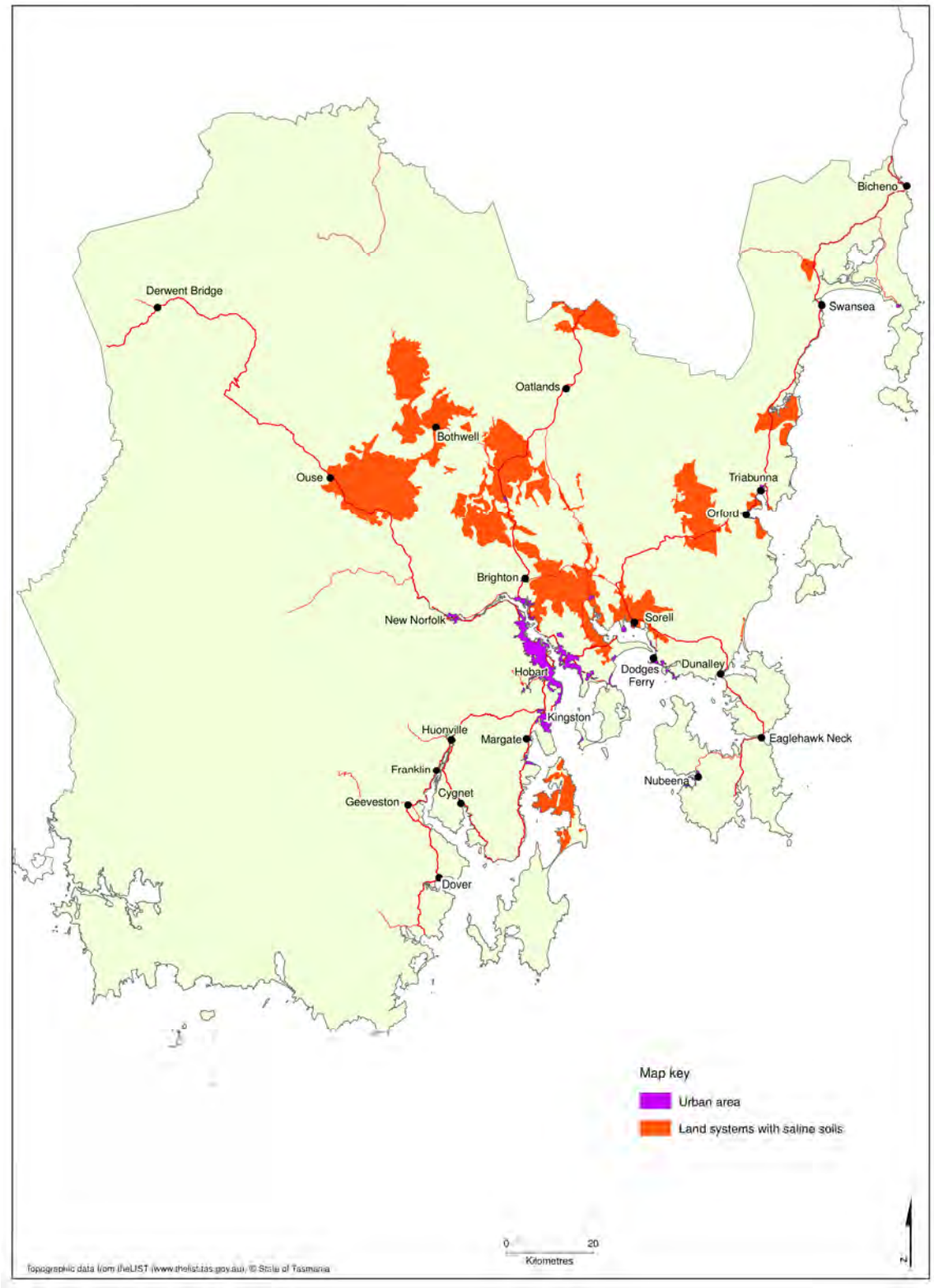


Figure 7: Land Systems with Saline Soils in Southern Tasmania (map available separately)

10.2 Planning Implications

There are a number of key land use and management factors which are generally seen as the cause of the development of secondary salinisation:

- In dryland areas the change from native tree vegetation to grazing land after clearing;
- The clearance of native vegetation on elevated recharge areas resulting in increased groundwater flow to lower elevated areas, causing a rise in water table;
- Arable land use, particularly that involving cultivated fallows where, for most of the season, the land lacks an actively growing and transpiring crop to take up rainfall, resulting in a rise in the water table;
- Irrigation of soils, particularly dryland soils. The amount of irrigation is critical, as irrigation can raise the level of saline water tables and recycle fresh water that is already saline.
- In urban areas salinity can occur when deep rooted native vegetation is cleared and replaced with shallow rooted garden plants and lawns, creating an inbalance in the water cycle by allowing larger amounts of water to escape into the underlying groundwater.

Planning therefore needs to take into account the risk of salinity with clearance of native vegetation, particularly where it is proposed on a large scale and on elevated recharge areas (for example urban salinity in Greater Hobart has been largely minimised by the retention of native vegetation on the hill tops). In addition the planning of irrigation infrastructure and the associated management required of irrigation water users should take into account the risk as well. It is acknowledged that at present such management of the risk is already undertaken by land owners utilising irrigation for agricultural production.

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the 12 Southern Councils and the Sullivans Cove Waterfront Authority

Southern Tasmania Industrial Land Study

Stage 1 Final Report

STCA

December 2011

SGS Economics & Planning

This report has been prepared for:

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Executive Summary

The key aim of this study is to provide for a 15-year supply of industrially zoned land within the new pending planning schemes and to identify longer term industrial land within strategic planning documents.

Stage 1 aims to assess the supply of vacant industrial land in the study area and compares this with demand for industrial land over a 5, 15 and 30 year period. The outcomes of Stage 1 are estimates of any shortfalls and/or oversupplies of industrial land for industrial uses by type.

Stage 2 aims to identify and assess options for potential future new and/or expanded sites for locally significant industrial land clusters, regionally significant industrial land clusters and sites of major industrial activity.

This report presents the findings of Stage 1 and includes conclusions and recommendations for consideration in Stage 2 of the study.

Economic Profile

The Southern Tasmanian regional economy is vitally important to the State. There are an estimated 94,000 jobs in the region with 92% located in Greater Hobart and 47% in Hobart municipality alone. In the Southern Region, the Forestry, Fishing and Agriculture industry contributes significantly to the region's employment profile.

From 2001 to 2006 the manufacturing sector has seen a loss of employment. The decline in terms of employment is largely a result of the rise of China and increased outsourcing, which takes advantages of wage disparities between Australia and the rising Asian economies. This trend in manufacturing is expected to continue into the future. However, analysis of recent turnover data (2007 to 2009) indicates that local production and productivity have continued to increase in this sector.

Compared to the national employment profile, the region has relative strengths in the food and beverages manufacturing, wood and paper processing and the textile and clothing industries.

Glenorchy continues to be the industrial centre of Southern Tasmania. The key competitive industries are manufacturing, electricity, gas, water and waste services, construction, wholesale trade and transport, postal and warehousing.

Brighton has developed at a rapid pace to be the transport and warehousing hub of Greater Hobart.

Clarence has a mixed industrial base. Clarence is experiencing a shift towards service industries, in line with the national trend. Similarly, Kingborough too is becoming more service orientated.

Hobart has a high concentration of public administration and advanced business services in the city. As the city becomes increasingly service orientated, industries that require a lot of affordable

land, such as manufacturing, are being pushed outwards towards the fringes of the metropolitan area.

The economic base of the Huon Valley continues to rely on the agricultural sector, comprising of forestry, which has been in decline, and aquaculture which continues to expand. Tasman municipality too has a strong agricultural sector within which aquaculture and commercial fishing play a key role. The Derwent Valley continues to rely on the paper processing industry (Norske Skog).

Comparative analysis of employment by industry in the region identifies the key growth industries to be agriculture, aquaculture, some niche manufacturing industries, wholesale and transport.

Growth in manufacturing is primarily driven by growth in productivity either by technological adaptation or raising the skills of the workforce, with overall employment falling despite growth in turnover.

The native logging industry in Southern Tasmania has been going through a period of structural decline and repositioning. As such, wood processing and paper manufacturing have been consequently affected. Anecdotally, the decline of the industry has levelled off recently.

Transport and warehousing, especially in Brighton is predicted to experience sustained growth. Relocation of the rail yards from Hobart to Brighton will further drive land demand for transport and warehousing businesses in the Brighton area.

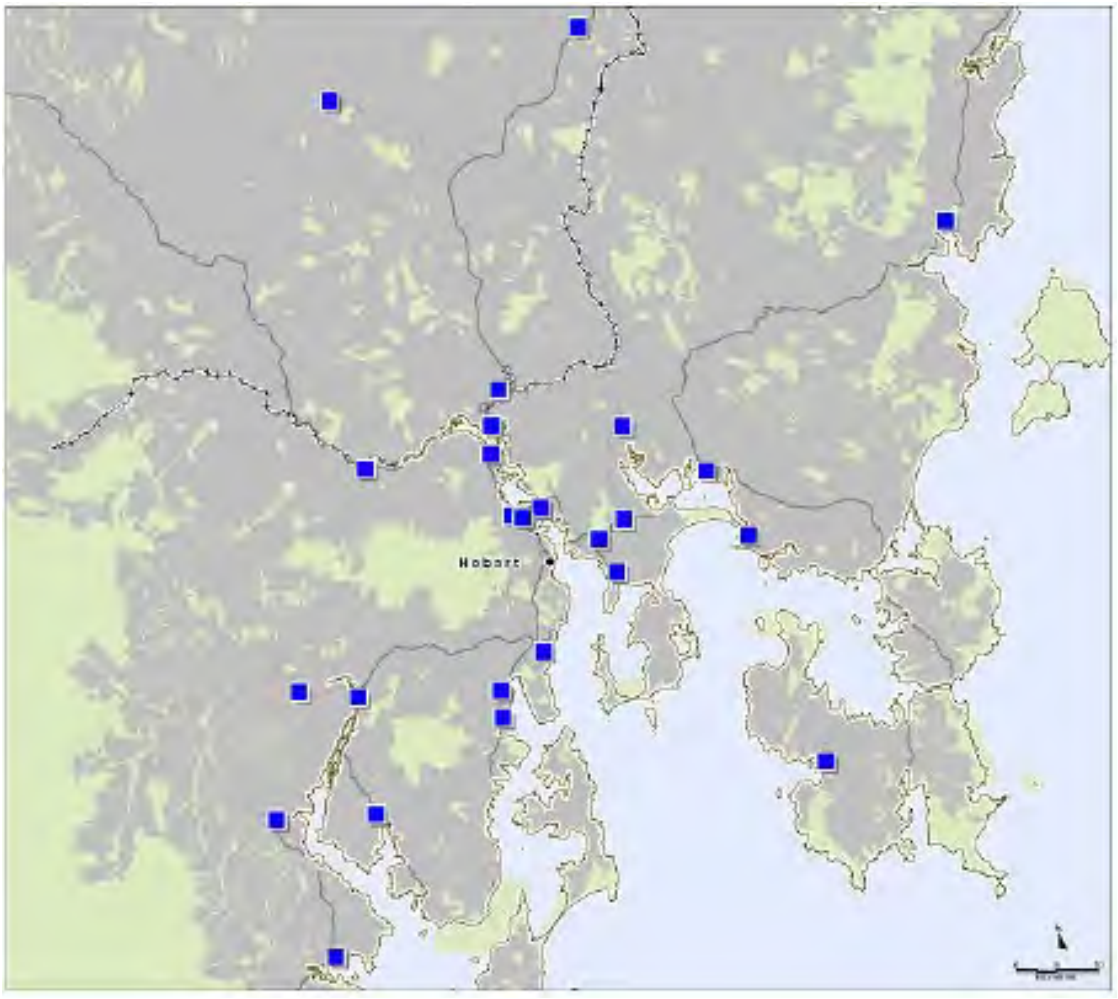
Industrial Land Use Patterns

In the *STCA Land Use Strategy for Southern Tasmania (2011)* Industrial Activity is defined as:

"...the manufacturing, assembling, processing, storage and distribution of products and goods. It can include wholesaling and retailing of goods and may include some uses associated with primary production."

As noted in *Making the Right Connections: Industrial Land Availability* there are currently nine major export oriented industrial sites. Other industrial estates are spread throughout the region. The following map highlights the key existing industrial estates in Southern Tasmania.

Figure 1 Industrial Estates in Southern Tasmania



* Table 5 on pages 41, 42 contains a complete overview of all industrial precincts and their relative sizes
Source: SGS (2011)

Key issues in providing new industrial land and in developing industrial uses include; land use conflicts, climate change, environmental challenges, the roll-out of the regional irrigation schemes and industrial specific needs.

Local service industries are primarily population driven. Demographic changes and trends in income and household expenditure patterns largely determine the growth of these industries and consequently, their demand for industrial land. Land use planning for local service industries should primarily take place at the local level. It is however important for municipalities to understand what is happening in nearby Councils and collaborate where useful. This is especially true in urbanised areas where Councils may not be able to accommodate demand within their municipality, resulting in local service industries spilling over into nearby areas.

Export industries involve industries that export their products outside the region to other parts of the state, to the mainland or overseas. Export oriented industries, and their demand for land, are largely driven by national and global market opportunities and international terms of trade. It

includes; most primary product processing and basic material processing, larger scale or specialised manufacturing, and larger centralised distribution hubs. Export oriented industries include support industries and services to export industries. Increasingly, export oriented industrial firms are small and medium-sized firms and firms with activities that are of a light industrial nature. These export oriented firms may not need to locate at sites that are suitable for major impact or heavy industrial production, which was characteristic for the traditional export oriented industries.

Planning for major export oriented industries can be complex. Land demand by major export oriented industries is both infrequent and unpredictable. It is infrequent in the sense that it involves one-off major investments that may only occur once every ten or twenty years. It is unpredictable in the sense that it is uncertain exactly when this demand will occur. Rezoning extensive areas of land in anticipation of demand that may or may not materialise may be an inefficient approach. A more cost-effective approach would be to identify potential locations for industrial land zoning, so as to ensure the land is available for rezoning and in the interim used in a way that does not prevent future industrial use. Further, it is important to ensure planning processes run smoothly and as quickly as possible in order to effectively accommodate demand *when* it occurs. Current mechanisms are projects of State and regional significance and combined permit and amendment process (Section 43 A).

Demand for Industrial Land

The industrial land demand projections are based on recent research compiled for the Department of Economic Development, Tourism and the Arts (DEDTA). Compared to earlier research undertaken in 2006 and 2008, the methodology has been revised on a number of key points.

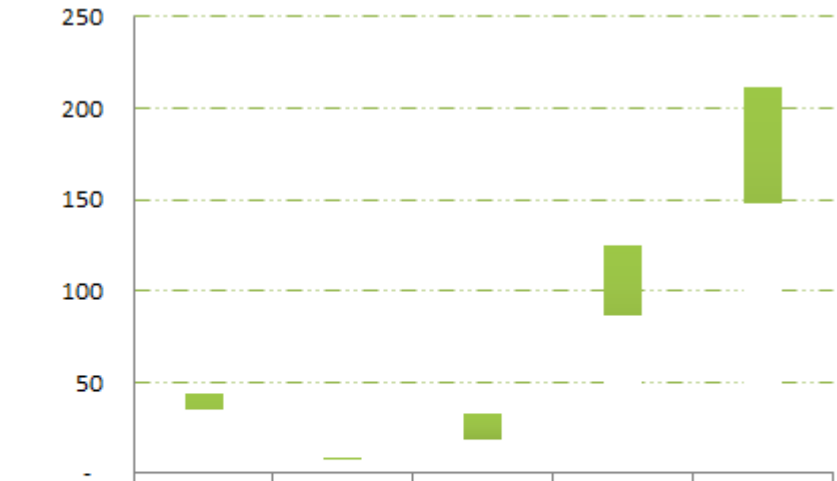
The updated industrial land demand projections no longer include industrial uses on agricultural properties and mining and resource sites. The projections are for industrial zoned land only. The new projections make a distinction between four industrial types of activity:

- **Local service industries**, which are population driven;
- **Export oriented industries**, which are driven by market opportunities to export to the mainland and overseas. The uptake of the irrigation schemes and resulting agricultural transition and growth of export clusters are key determinants;
- **Transport, warehousing and wholesales**, which are intermediate industries driven by both population and export growth and trend to gain higher efficiencies with Just-in-Time (JiT) distribution processes. In the previous study this industry was distributed between local service and export oriented industries;
- **Bulky goods retailing,** driven by population growth and the sector specific characteristics most notably the matured life cycle of this subsector.

Two scenarios were developed for projecting the future demand of industrial land in Tasmania over the next 30 years. Both scenarios are based on plausible assumptions about the state's future. One scenario provides land estimates according to a low scenario and the other according to a high scenario. The scenarios provide a range (between low and high) within which future actual land demand is expected to lie.

For the medium-term (2011 to 2026), industrial land demand in Southern Tasmania is expected to lie between 148 and 212 hectares.

Figure 2 Industrial Land Demand by Category – Medium-term (in ha)



	Local service	Bulky Goods	Export	Transport & Warehousing	Total
High Scenario	44	9	33	125	212
Low Scenario	35	7	19	86	148

Land demand totals for Southern Tasmania

Source: SGS (2011)

For comparison, Table 1 shows the total industrial land demand projections for the three Tasmanian regions and Tasmania as a whole.

Table 1 Summary of Industrial Land Demand Projections by Region (in ha), 2011-2041

	2011-2016		2011-2026		2011-2041	
Range	*Low*	*High*	*Low*	*High*	*Low*	*High*
North-West	30	42	94	136	210	301
Northern	28	40	88	127	194	277
Southern	47	66	148	212	328	467
Tasmania	105	148	330	474	732	1,046

Source: SGS (2011)

In addition, land demand projections are provided at the local level for local service industries (see report).

Vacant and Suitable Industrial Land

The land suitability analysis has significantly narrowed the available supply of vacant and suitable industrial land in Southern Tasmania. The suitability of vacant land for industrial use was investigated for all sites in terms of slope (average gradient of less than 10% is deemed suitable), nearby sensitive uses such as residential and natural conservation areas and risks from sea level rise. The initially vacant land supply of 199 hectares or 94 parcels has been diminished to **141 hectares** or 67 parcels.

Comparison of Demand for Land with Vacant and Suitable Supply

In general terms, current supply is sufficient to meet demand over the next five years, without taking account of site location and lot size. In the medium-term however, there is a projected shortfall of industrial land for the next fifteen years (2011-2026).

When planning for industrial land, the aim should be to accommodate demand for local service industries locally wherever possible. Most municipalities have sufficient land to accommodate local industries. However, a number of municipalities, mostly the strongly urbanised areas, have insufficient land to meet local service industry demand (Table 2). If it is not possible to create more industrial land or to make better use of existing land, this demand will 'flow over' into nearby municipalities.

Table 2 Supply and Demand by Local Service Industries (in ha)

	2011	2011-2026		2011-2026	
	Land Supply	**Demand for local service industries**		**Shortfalls**	
		low	high	low	high
Brighton	6.7	1.6	1.7		
Clarence	81.1	4.4	5.5		
Derwent Valley	0.6	0.7	0.8		
Glenorchy	0.8	7.7	9.6	-6.9	-8.8
Hobart	0	11.7	14.5	-11.7	-14.5
Kingborough	3.6	4.8	6	-1.2	-2.4
Sorell	0.3	1.5	1.8	-1.2	-1.5
Central Highlands	15.2	0.1	0.1		
Glamorgan-Spring Bay	2.3	0.9	1.1		
Huon Valley	23	1.8	2.2		
Southern Midlands	7	0.2	0.2		
Tasman	0	0.1	0.2	-0.1	-0.2
Grand total	**141**	**36**	**44**	**-21**	**-27**

Source: SGS, 2011

Demand for land by export oriented industries and transport and warehousing needs to be accommodated at the regional level. Further, it should be noted that the Greater Hobart area, where 92% of the current economic activity takes place, should be earmarked as the preferred area for most of these industries to be located. Greater Hobart has relatively good transport connections interstate and internationally, as well as a large and skilled work force, supporting institutions and a service industry base. Those industries that rely on agriculture and natural resources would benefit from locating in the more regional municipalities of Southern Tasmania.

The expected shortfall of industrial land for export oriented industries and transport and warehousing over the next 15 years would up to 57 hectares when considering all available land in the entire region. When considering that the majority of demand (92%) would occur within Greater Hobart, then the **shortfall** of land in Greater Hobart is expected to be **34 to 88 hectares**. For the regional areas in Southern Tasmania there is in principle no shortfall of industrial land for export industries and transport and warehousing.

In short, the following list summarises the issues and tasks that need to be addressed in **Stage 2** of this study:

- Shortfalls of local industrial land to accommodate future demand for local service industries over the period 2011-2026 in:
    - Glenorchy
    - Kingborough
    - Sorell
    - Hobart and
    - minor shortfalls in Tasman.

- Potential shortfalls for local service industries based on current lot sizes and competing demand from transport and warehousing and export oriented industries in Brighton.

- Shortfalls of regionally significant industrial land to accommodate future demand for transport & warehousing and export oriented industries of between 34 and 88 hectares. Of this total, between **7 and 18 hectares would be for export oriented industries** and **27 to 70 hectares for transport & warehousing**. The additional land needs should primarily be catered for within Greater Hobart.

- Identified potential future locations for industrial development in this report, including[1]:
    - Clarence (Kennedy Road and adjacent to the Hobart International Airport)
    - Brighton (New industrial park adjacent to new Intermodal Transport Hub)
    - Huon Valley (Potential for new industrial land in Huonville – as identified in Huon Valley Land Use and Development Strategy).

[1] In addition, SGS will consider sites that have been identified as part of a survey amongst all Councils as part of the Industrial land Demand Study (2011-2041) for DEDTA, and any other sites that may be suggested as part of the Stage 2 process.

- Accessibility and road infrastructure capacity to regionally significant industrial land supplies in Clarence and elsewhere.

- Identify and consider, in broad terms only, potential sites to accommodate long term industrial land demand (30 year horizon) of between 188 and 326 hectares.

1 Introduction

1.1 Background

The Southern Tasmania Industrial Land study is an initiative by the Southern Tasmanian Councils Authority (STCA) and the twelve municipalities it represents.

Examinations as part of the Southern Regional Land Use Strategy (SRLUS) indicate:

- There is an apparent shortage of industrial land within the region, which may manifest within the short to medium term;
- Many existing industrial sites are constrained by surrounding land uses; and
- The availability of sufficient and suitable industrial zoned land is critical to the economic performance and prosperity of the region.

1.2 Aim

The key aim of this study is to provide for a 15-year supply of industrially zoned land within the new pending planning schemes and to identify longer term industrial land within strategic planning documents.

Stage 1 aims to assess the supply of vacant industrial land in the study area and compares this with demand for industrial land over a 5, 15 and 30 year period. The outcomes of Stage 1 are estimates of any shortfalls and/or oversupplies of industrial land for industrial uses by type.

Stage 2 aims to identify and assess options for potential future new and/or expanded sites for locally significant industrial land clusters, regionally significant industrial land clusters and sites of major industrial activity. Stage 2 will provide a detailed site analysis and spatial definition of preferred regionally significant industrial land clusters. This analysis is envisaged to inform the allocation of industrial land zoning for the new planning schemes. The outcome of Stage 2 is a regional industrial land strategy.

This report presents the findings of Stage 1 and includes conclusions and recommendations for consideration in Stage 2 of the study.

1.3 Remainder of this Report

Section 2 provides a socio-economic background to the study area and to industrial development in the study area.

Section 3 provides a summary and interpretation of the results of the Industrial Land Demand Study for Tasmania (2011-2041). SGS submitted the draft report of this study in September 2011.

Section 4 presents the results of the Industrial Land Audit which SGS undertook to investigate, estimate, confirm and assess the supply of vacant and suitable industrial land that is available in Southern Tasmania.

Finally, Section 5 provides a comparison of demand for and supply of vacant industrial land over the next 5, 15 and 30 years. It identifies shortfalls of land by location and by type of industry. It also lists a number of issues that need to be addressed in Stage 2 of this study.

2 Regional Context

This section provides a regional overview of Southern Tasmania in relation to industrial land use and includes a regional economic profile, existing industrial estates in Southern Tasmania, industrial land use challenges and issues of infrastructure and investment. The section is based on a review of existing studies, strategies and policies that affect industrial land development and use and regional infrastructure provision in the Southern Tasmania Councils Authority (STCA) area. Appendix A provides an overview of the documents that were reviewed.

In addition, a range of statistical data has been sourced.

2.1 Regional Context

2.1.1 Population and Skills Base

Southern Tasmania was estimated to have 241,000 residents in 2006, comprising approximately 48% of the State's total population. Southern Tasmania has had historically low population growth when compared to mainland centres. From 2001 to 2008 the region's population growth was 0.9%. per annum. It is expected that moderate population growth will continue in future years. The rate of growth will be influenced by fertility, mortality and migration. The population is ageing with a median age of 39.6 years in 2006, an increase from a median of 34.1 in 2001. The ageing population and slow to moderate growth rates present a challenge to the region, which increasingly finds it difficult to source skilled workers for key industries such as advanced manufacturing (STCA *Regional Land Use Strategy for Southern Tasmania 2011*).

Three aspects of the skills base of Southern Tasmania were explored by SGS's previous studies. First, secondary education levels were compared to both the regional and Australia wide averages. Second, the levels of advanced education in Southern Tasmania were compared to Australia. Third, the distribution of employment by job classification was compared, where appropriate to the regional and national economies. These three steps identified any significant disparities between the national and regional economies in terms of human capital.

Base levels of education provide some of the skills required to grow an economy. Graduating Secondary school from year 10 onwards is considered the base level of education throughout Australia. Legislation dictates that no child can leave school, training or some apprenticeship until the age of 17.

Comparisons of national and regional base education levels reveal that Southern Tasmania has a relatively low skilled population, with the exception of Hobart and Kingborough. Brighton has the lowest levels of base education, with almost 20% of the population under the national average of people who have at least a year 12 education, shown in Figure 3.

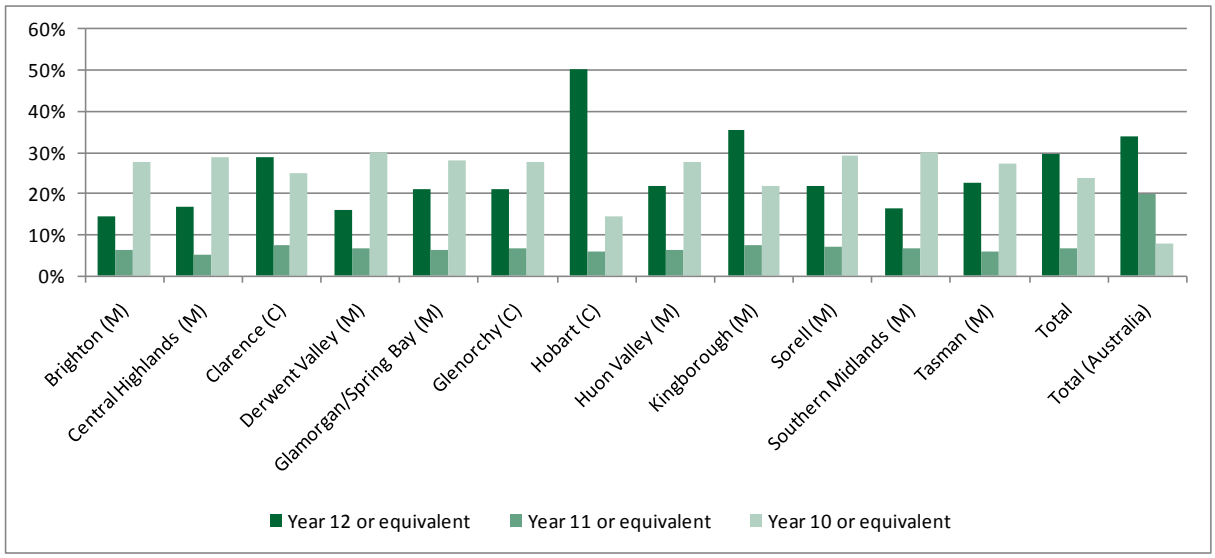
The higher levels of advanced education evident in Hobart stems from the type of employment that tends to occur in capital cities. High value, knowledge intensive jobs are mainly located within cities due to the benefits of economies of scope and scale, which is also known as agglomeration benefits. These jobs are also comparatively highly paid. In order to access these jobs prospective employees usually require a higher level of education. In Tasmania, people can generally afford to live close to their work. Due to these two factors (type of employment and location of employment) it is expected to have higher levels of education and a more advanced workforce.

Low levels of education are not necessarily a problem for a region. Whether or not it is a problem depends entirely on the comparative advantage and future strategic aspirations of the region. For example, if a rural area currently dependent on agriculture was strategically targeting a high value, complex form of manufacturing for growth that industry would require specialised workers. If low levels of education are present in an area or the education is not in line with the skills required to grow that form of manufacturing the industry may struggle to grow.

Generally speaking, the increased international competition with countries that offer lower wages poses a continuous risk to the regional economy. Diversifying into higher value added industries is seen as a strategic necessity. The skills base in Southern Tasmania is an ongoing point of concern for the Tasmanian government. Any attempt to move into higher value added industries requires a re-alignment of the skills with the region. Addressing skills is crucial in altering the composition of an economy.

The differences in the levels of schooling attained throughout the region are not necessarily an indication of a drawback for growth of a region. Dynamics of specific areas need to be accounted for when ascertaining whether or not a region requires higher levels of formal education.

Figure 3 Proportion of Population and Highest Level of Schooling, 2006

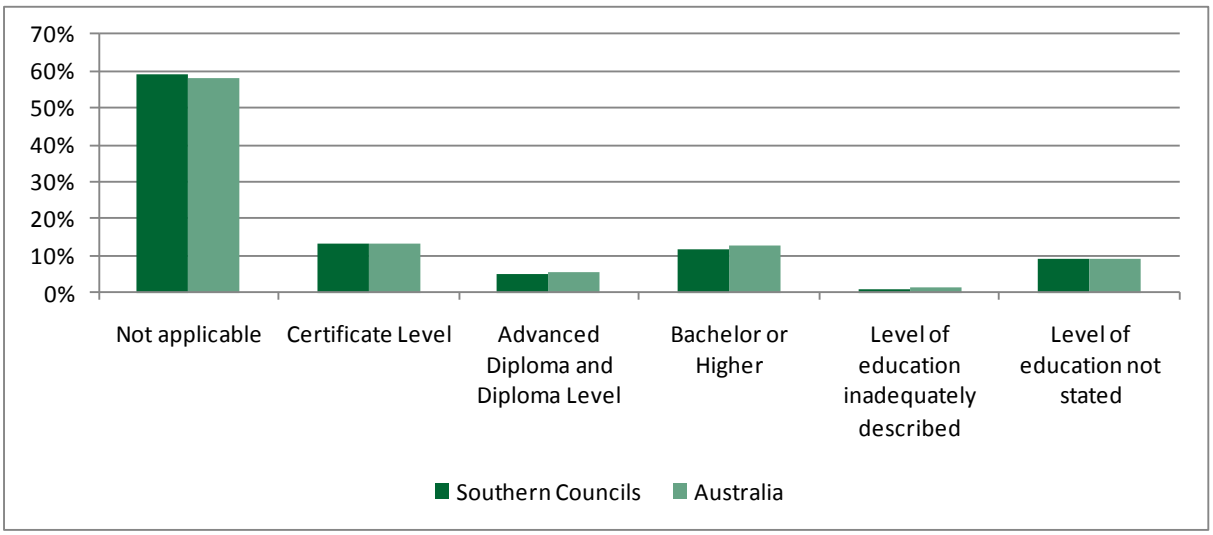


Source: ABS, Census (2006).

Figure 4 shows the share of higher education by type, comparing the Southern Tasmania region with the national average. As is illustrated, there is little difference in higher education attainment between the two.

The figure demonstrates that post-secondary education is taken up at a fairly high rate. A conservative estimation (which assumes that those cited as "not stated" and "inadequately described" did not participate in higher education) estimates that 30% of the population sought some further level of education or training.

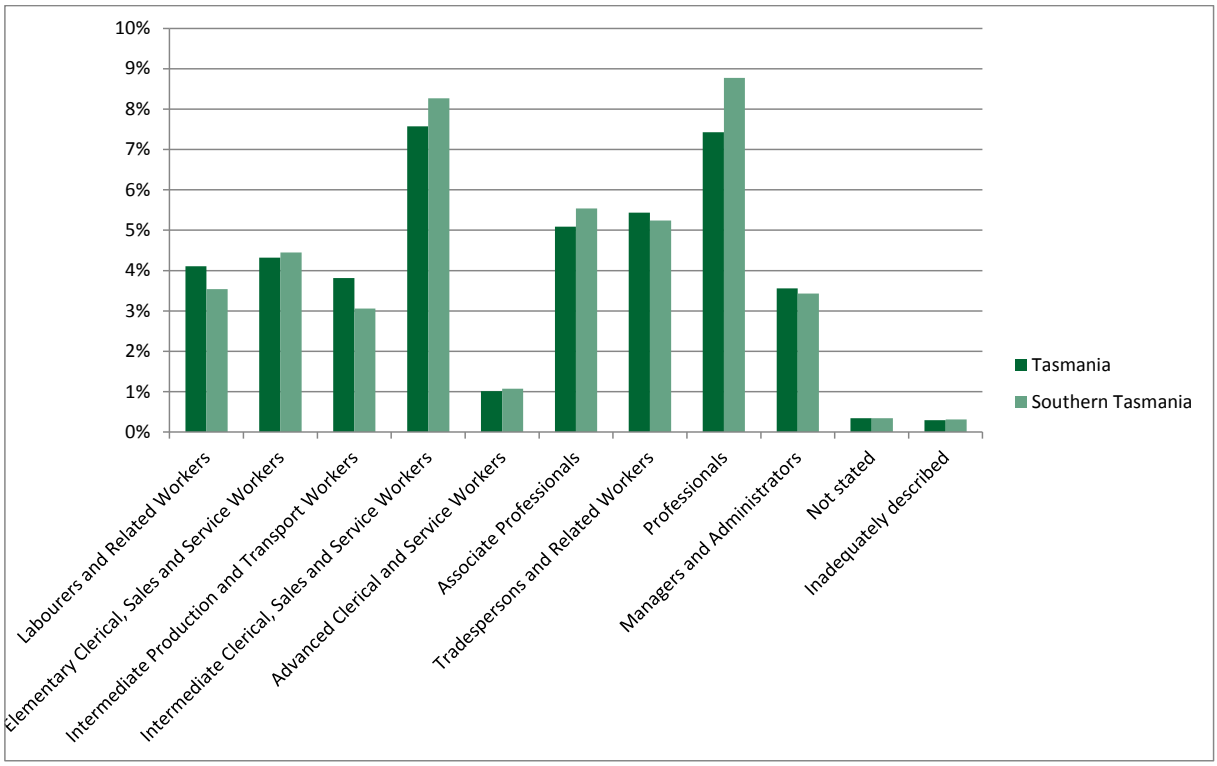
Figure 4 Post-Secondary Education Levels, 2006



Source: ABS, Census (2006).

A strong relationship between higher education attainment and occupation type is evident when comparing the national and regional employment profiles. Much like the levels of higher education, there is not a significant disparity between the nation and the region (Figure 5).

Figure 5 Share of Employment by Occupation Type, 2006



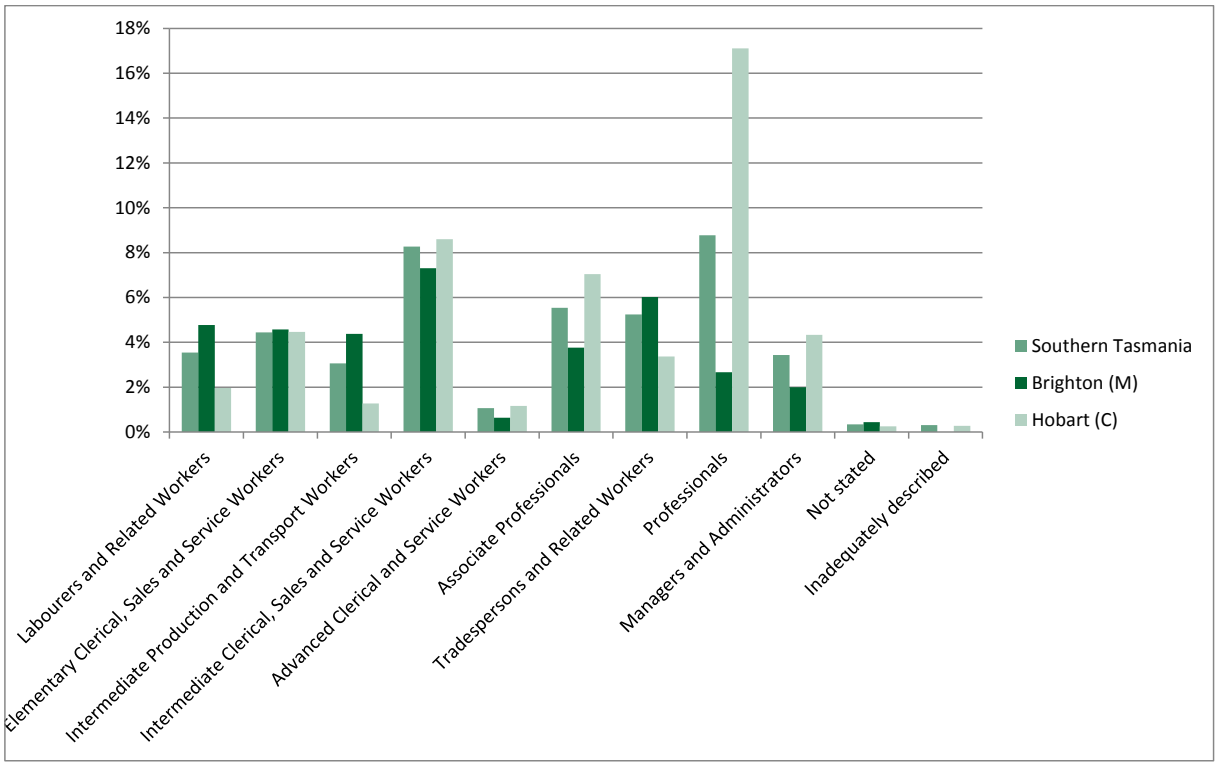
Source: ABS, Census (2006).

While at a regional level occupation type mirrors national patterns, at an LGA level this is not the case. For example, comparing Brighton, which had the lowest levels of year 12 education, with the well education population of Hobart and the national average highlights the disparities within the region.

The levels of education relate to the types of employment found within the LGA. Hobart, with its highly educated population would have strategic advantages for professional employment relative to Brighton and the national average (see Figure 6).

The relationship would be similar when comparing any rural region with an urbanised area and does not indicate that there is a disadvantage to Brighton. What the figure does indicate is that the region, as a whole is diverse and has many different economic factors impacting on it.

Figure 6 Shares of Occupations by Type, 2006



Source: ABS, Census (2006).

2.1.2 Employment and Industry

The region's economy is vitally important to the State. There are an estimated 94,000 jobs in the region with 92% located in Greater Hobart and 47% in Hobart municipality alone. In the Southern Region the Forestry, Fishing and Agriculture industry significantly contributes to the region's employment profile. Other dominant industries of employment include Retail Trade (16% of the region's employment) and Health and Community Services (13%), followed by Government Administration and Defence (11.5%), Education (8.8%), Property and Business Services (8.5%), Accommodation, Cafes and Restaurants (5.7%) and Construction (5.1%). In comparison Manufacturing comprises 4.7% of the region's employment, Transport and Storage comprises 3.5% and Wholesale Trade comprises 3.4% of the employment profile.

From 2001 to 2006 employment growth was strongest in Government Administration and Defence, adding 3,250 jobs. The Manufacturing, Wholesale Trade and Agriculture, Forestry and Fishing sectors saw a loss of employment over the same period. The manufacturing sector saw the largest loss of employment with 499 jobs lost between 2001 and 2006 (STCA *Regional Land Use Strategy for Southern Tasmania 2011).* However, analysis of recent turnover data (2007 to 2009) indicates that production and productivity continue to increase in these sectors (see section 2.2.2).

2.2 Industrial Development

2.2.1 Industrial Specialisation

Employment by industry data provides an understanding of the economic strengths and specialisations of regions.

Relative employment comparisons between regions can be made through using the Location Quotient (LQ) technique. The LQ measures the proportion of employment in certain industries relative to the proportions in other regions. In the following LQ analysis the Southern Statistical District (SD) will be compared to Australia as a whole and the Local Government Areas (LGA's) of the Southern region.

If an industry has an LQ of 1 there is an equal share of employment between national and regional employment for a particular industry. A value above 1 indicates a greater proportion, whereas a LQ value of less than 1 represents a relatively lower share of employment for that industry compared to the national average.

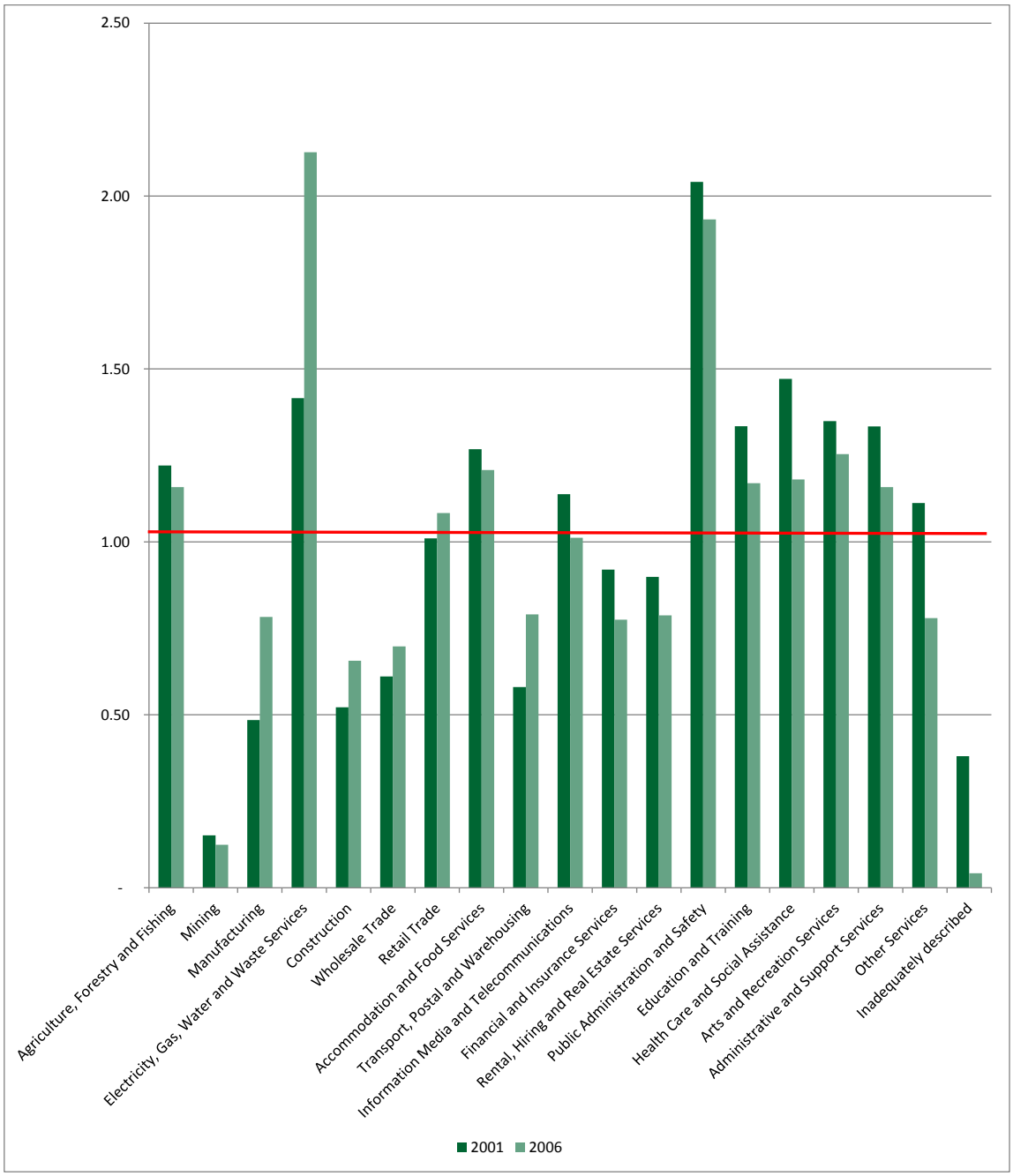
This analysis implicitly incorporates the attributes of a region. The attributes or characteristics of a region enable comparative advantages. Economies, due to their physical, technological and intellectual characteristics can have cost, productivity and other strategic advantages relative to other economies. This is widely considered to be one of the origins of international trade and in an increasingly global economy dependent on trade it can be considered one of the drivers of which industries locate and thrive in economies. The theory of comparative advantage generally applies to entire economies rather than specific regions within a country, but the theory and application of the theory can be applied to regions as well as entire economies.

These advantages lead to differing proportions of employment in a region, which is revealed through the LQ analysis. When the value is greater than 1 it is an indication that a region is fairly specialised and has a competitive advantage in that field of industry over other regions. Generally speaking, a region is a net exporter if the location quotient is high (that is >1), and a net importer if the location quotient is low (that is <1).

Southern Tasmania Measured Against Australia

The figure below (Figure 7) details the LQ between the SD and the whole of Australia over the past two census periods (2001 and 2006). Results are split by industry. Using this analysis the relative strengths of the region lie in agriculture, utility services, accommodation, the public service, education, healthcare, the arts and administration services.

Figure 7 Location Quotients for Southern Tasmania, 2001 & 2006



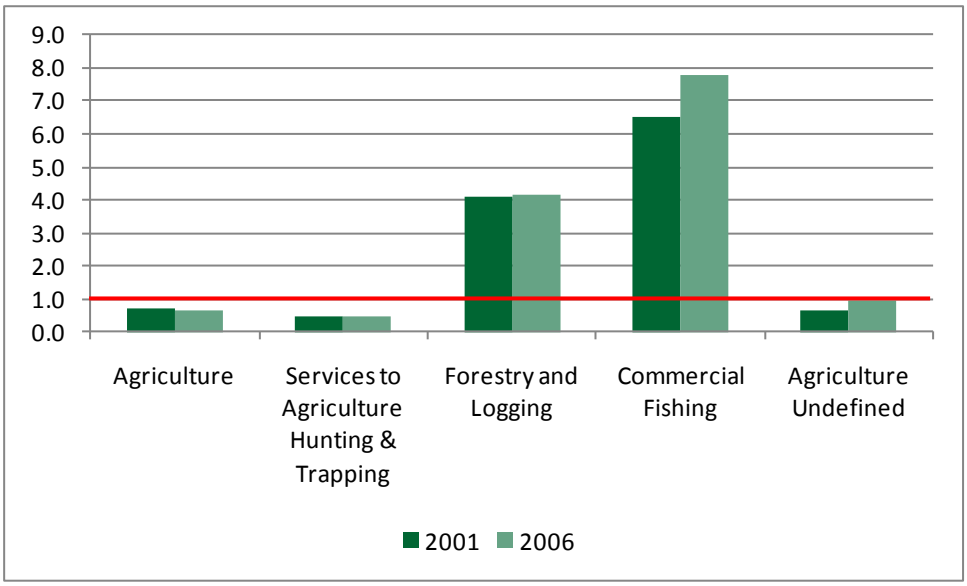
* Location quotients against Australia

Source: ABS, Census (2001 and 2006).

Agriculture, being a key strength of the region requires further, in depth analysis for the purposes of industrial land demand. Decoupling the industries down into a more detailed classification, which splits the industry into smaller components, reveals that not all sub-industries outperform Australia. Forestry and logging and commercial fishing are the two key sub-industries of the region.

The relative proportions of employment in those industries are most evident when comparing Australia against Southern Tasmania. The full breakdown of agriculture is shown in Figure 8.

Figure 8 Agricultural Location Quotients for Southern Tasmania, 2001 & 2006



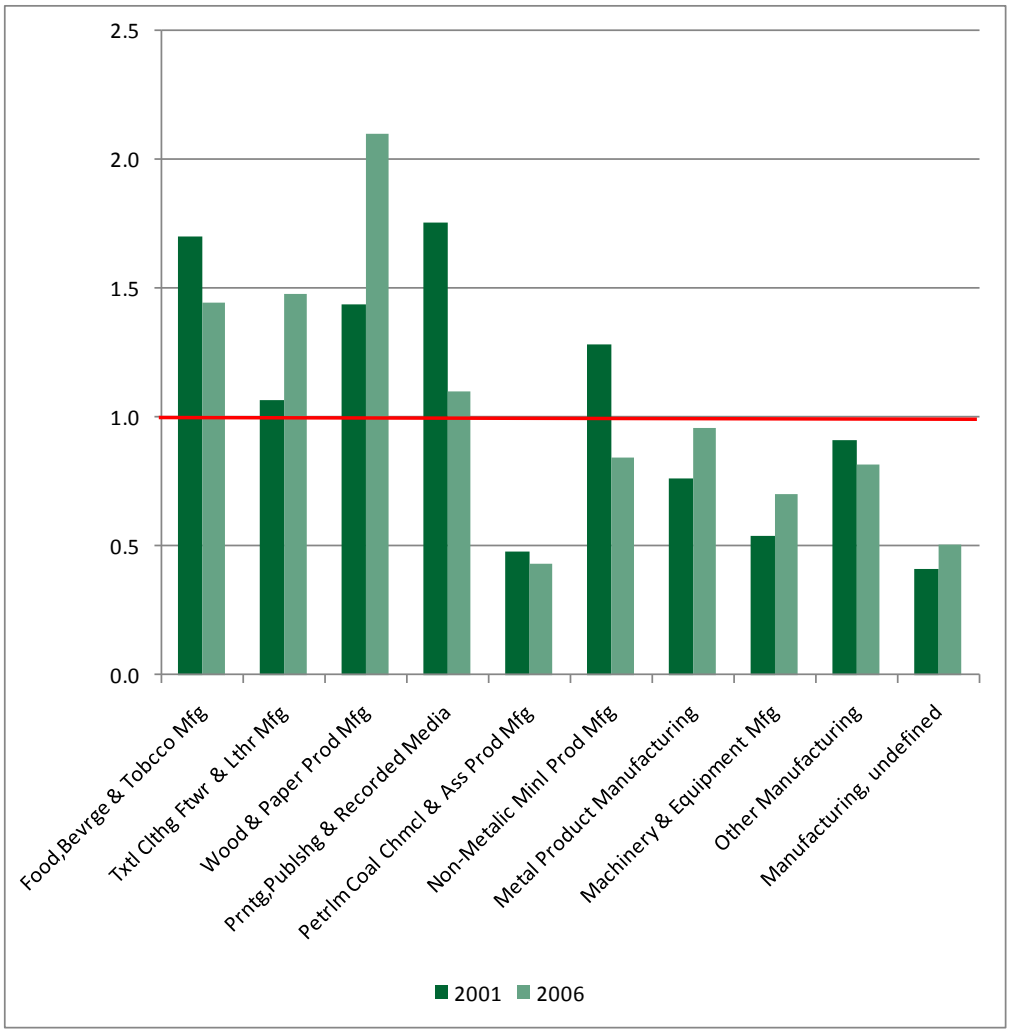
* Compared to Australia

Source: ABS, Census (2001 and 2006)

Manufacturing, whilst not outperforming the national proportion of employment (see Figure 7), does have a significant presence in some areas of Southern Tasmania (see the Appendix for a LQ analysis for each LGA within Southern Tasmania). For this reason manufacturing has also been split to reveal a finer level of detail. Compared to the national employment proportions the region has its strengths in food and beverage manufacturing, wood and paper and textile and clothing industries, which are shown in Figure 9.

This manufacturing comparison was done as manufacturing represents a significant proportion of income and employment for the region. Manufacturing activity is a key determinant for industrial land demand and therefore cannot be excluded from in-depth analysis regardless of the LQ for the industry.

Figure 9 Manufacturing Location Quotients for the Southern Tasmania, 2001 & 2006



* Compared to Australia

Source: ABS, Census (2001 and 2006)

Following the identification of the regional LQ's relative to Australia a further breakdown of local government areas (LGA's) within the study area reveals which LGA's contribute to these comparative advantages and in what way.

Glenorchy

Glenorchy continues to be the industrial centre of Southern Tasmania as a whole. Key industries in the municipality are:

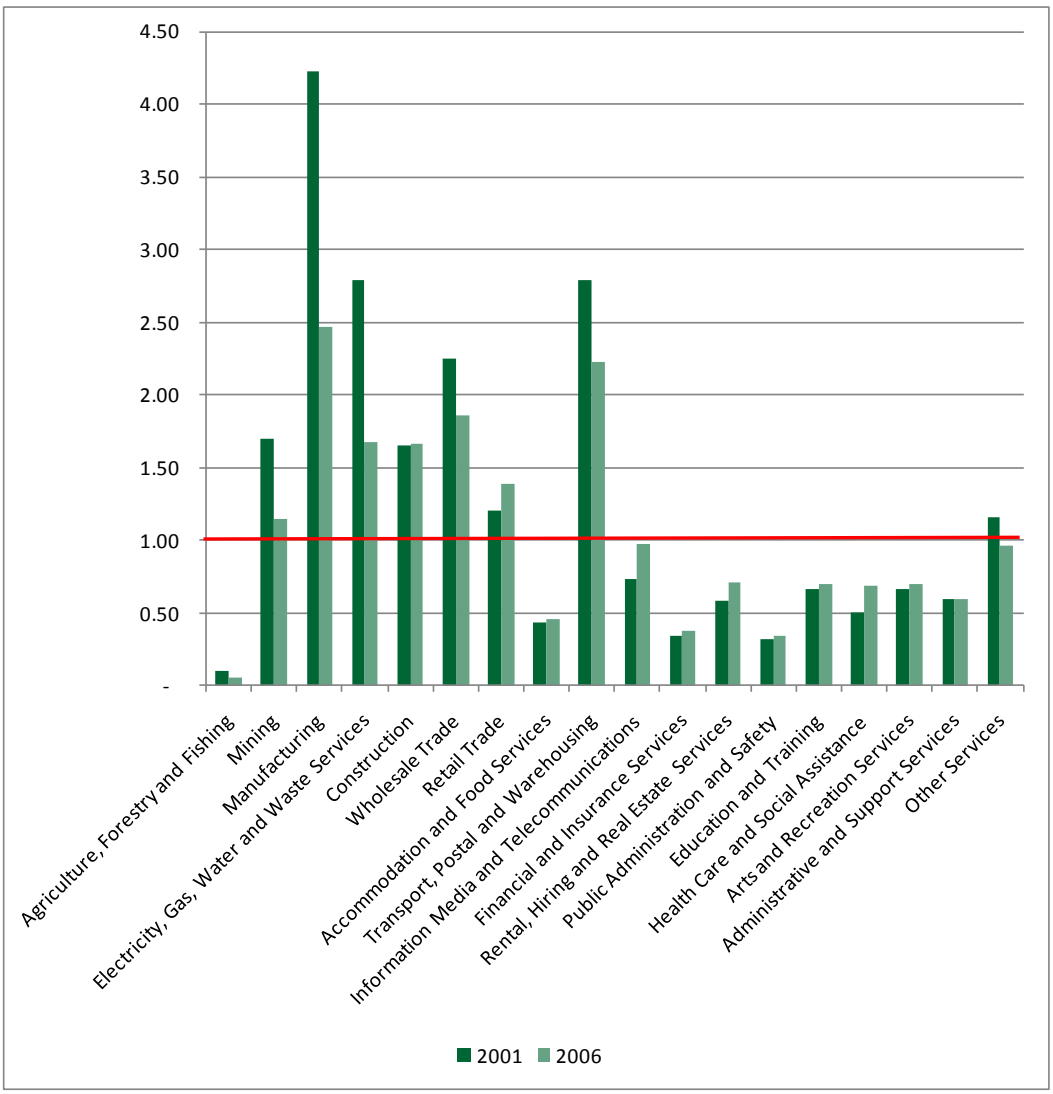
1. Manufacturing;
2. Electricity, gas, water and waste services;
3. Construction;
4. Wholesale trade, and

5. Transport, postal and warehousing.

Most of these industries experienced a downturn relative to the Southern region as a whole, which can be seen from the reduction in the LQ from 2001 to 2006 (see Figure 10).

At the national level manufacturing has declined in terms of employment with the rise of China and increased outsourcing, which takes advantages of wage disparities between advanced, Western Economies and the rising Asian Economies. This trend in manufacturing is expected to continue into the future as more manufacturing jobs are lost due to wage differences and more recently a highly valued Australian dollar.

Figure 10 Location Quotients for Glenorchy, 2001 & 2006



* Compared to Southern Tasmania

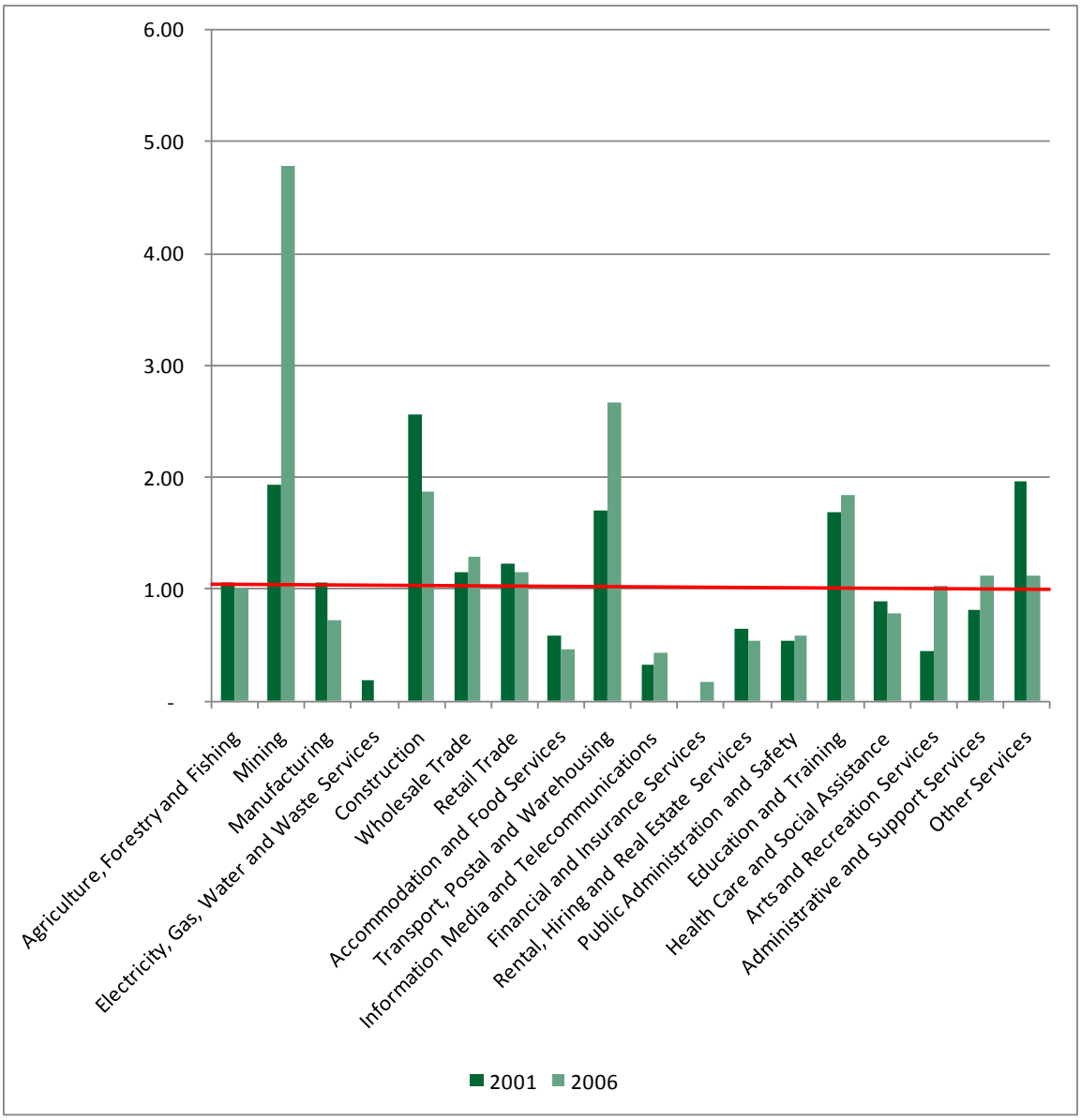
Source: ABS, Census (2001 and 2006)

Brighton

Transport is a significant employer in Brighton and has grown strongly over time. The vast majority of this transport employment is in the road transport industry (Figure 12) due to the strategic location and available infrastructure corridors.

Employment in this industry is expected to expand in the future due to the relocation of the rail yards from Hobart to Brighton. This may result in further employment increases because of the increased rail freight requiring supporting road freight transport and storage.

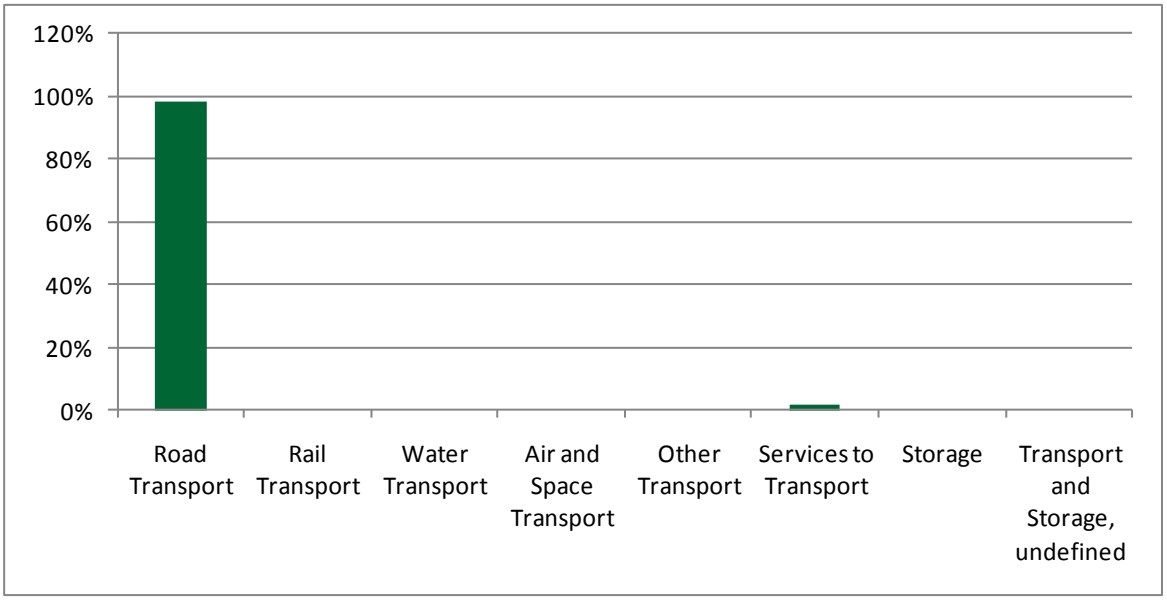
Figure 11 Location Quotients for Brighton, 2001 & 2006



* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Figure 12 Employment in Transport Industry of Brighton, 2006

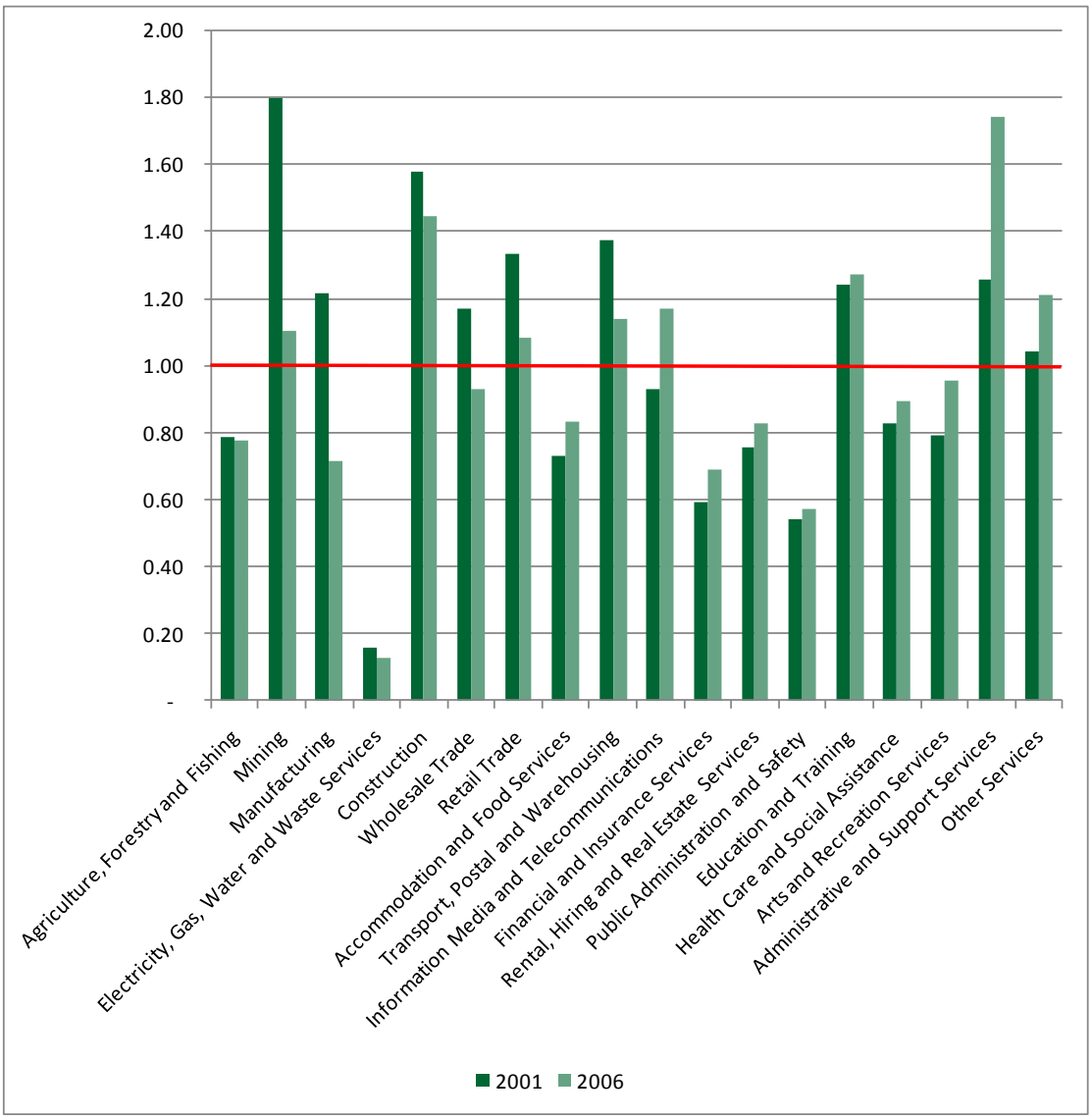


Source: ABS, Census (2006)

Clarence

Clarence has a mixed industrial base. It has many competitive industries, but none that are relatively large. Industries such as Mining, Manufacturing, Construction and others that were the cornerstones of the local economy have declined in significance from 2001 to 2006. The only industry that has experienced substantial growth is Administrative and Support Services. Clarence is experiencing a relative shift towards service industries, in line with the national trend. The LQ for Clarence is shown below in Figure 13.

Figure 13 Location Quotienst for Clarence, 2001 & 2006



* Compared to Southern Tasmania

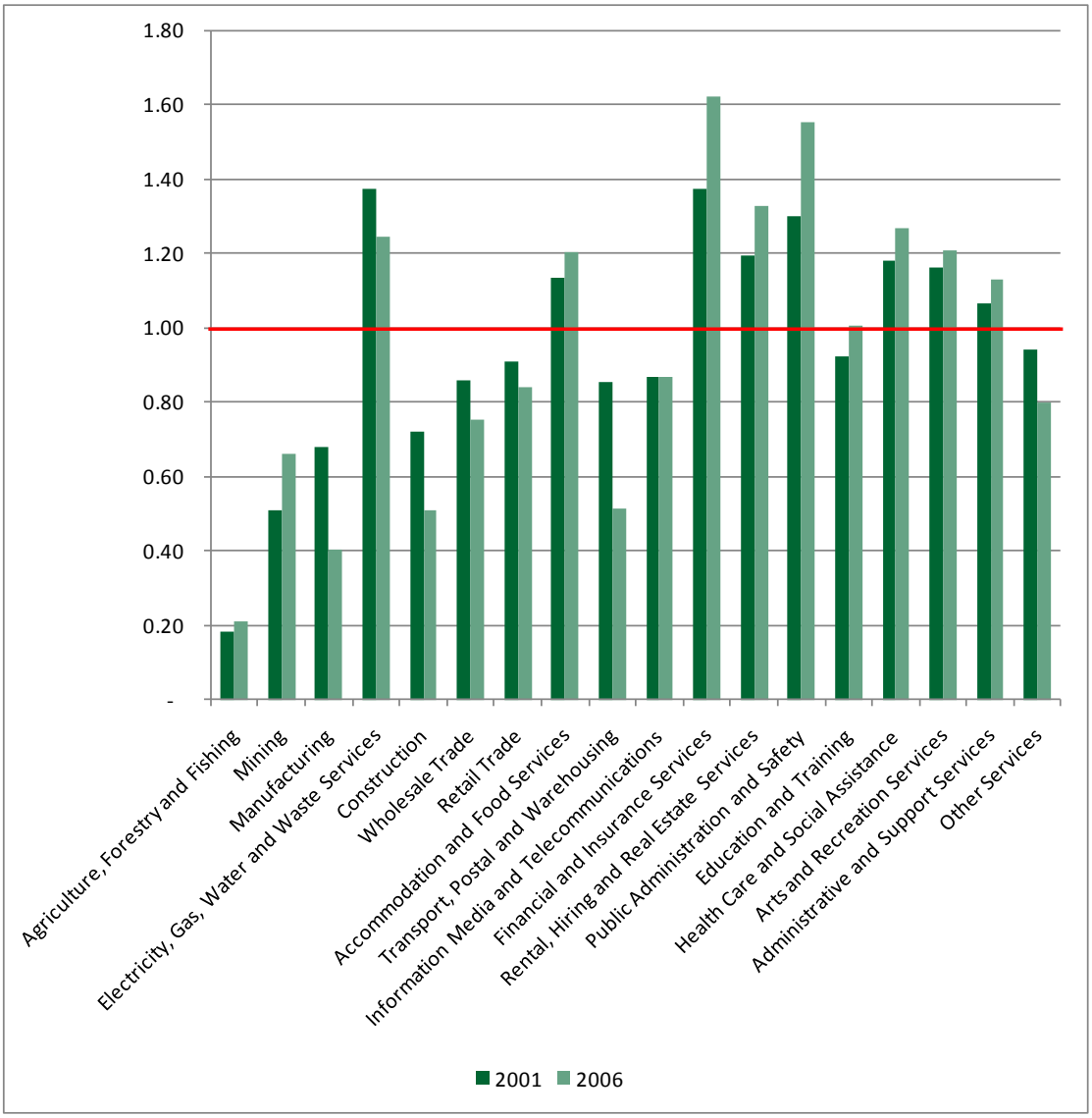
Source: ABS, Census (2001 and 2006)

Hobart

Being the capital of Tasmania there is a high concentration of public administration and advanced business services in the city. This is evident in the LQ analysis below (Figure 14). These services have grown in share over the study period (2001-2006). Transport has decreased dramatically over the study period and is expected to decrease further as the rail yards are relocated to Brighton in the near future.

As a city, which is becoming increasingly service orientated, Hobart's industries that require a lot of affordable land, such as Manufacturing, are decreasing in their importance to the city's economy.

Figure 14 Location Quotients for Hobart, 2001 & 2006



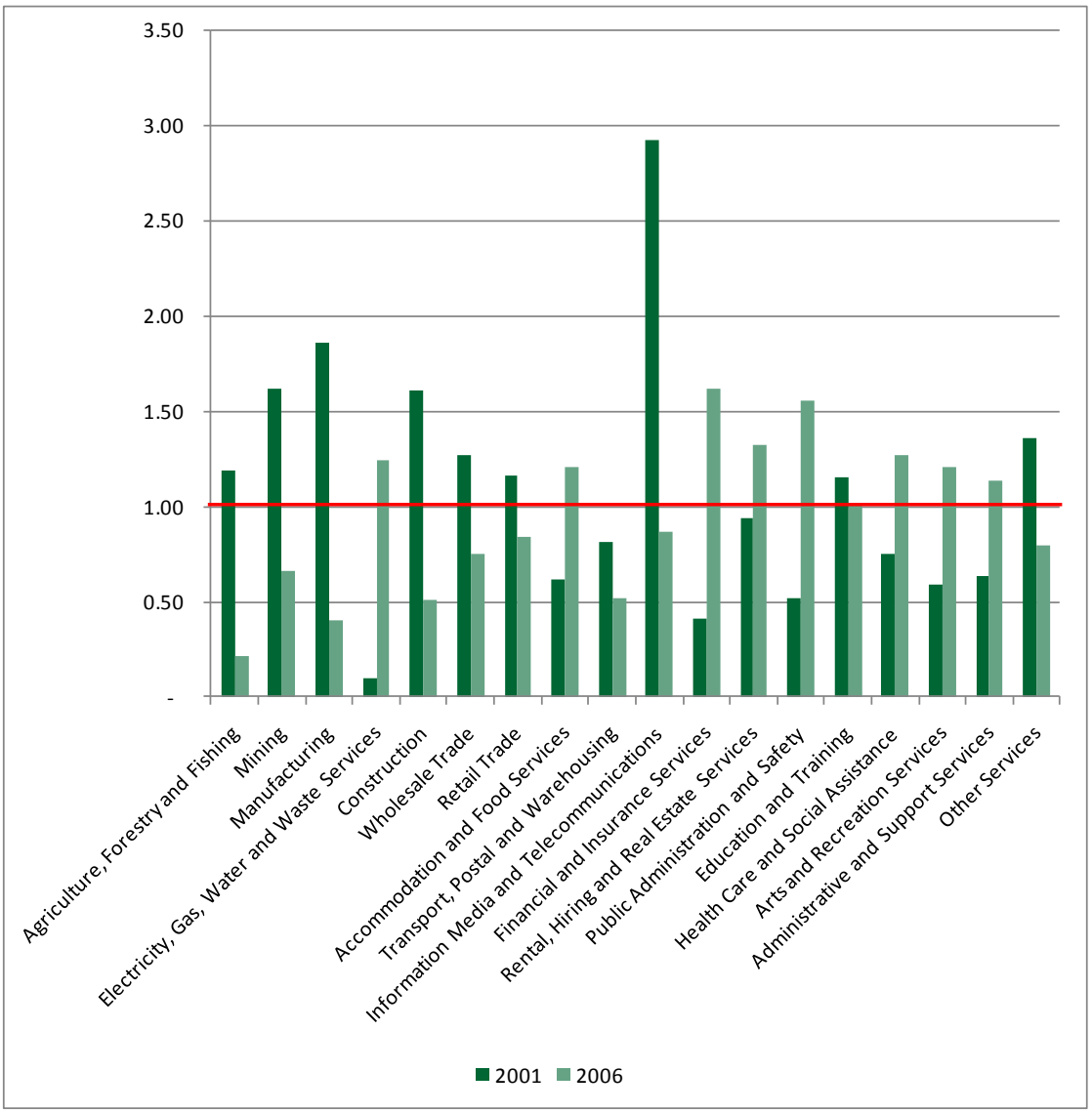
* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Kingborough

The economy of Kingborough changed over the study period. Traditional industries such as Agriculture, Mining, Manufacturing and Construction have decreased significantly in their importance to the regional economy. In contrast, the modern service based industries have grown substantially, suggesting Kingborough is transforming into a more modern industrialised economy. The LQ for Kingborough is shown in Figure 15.

Figure 15 Location Quotients for Kingborough, 2001 & 2006



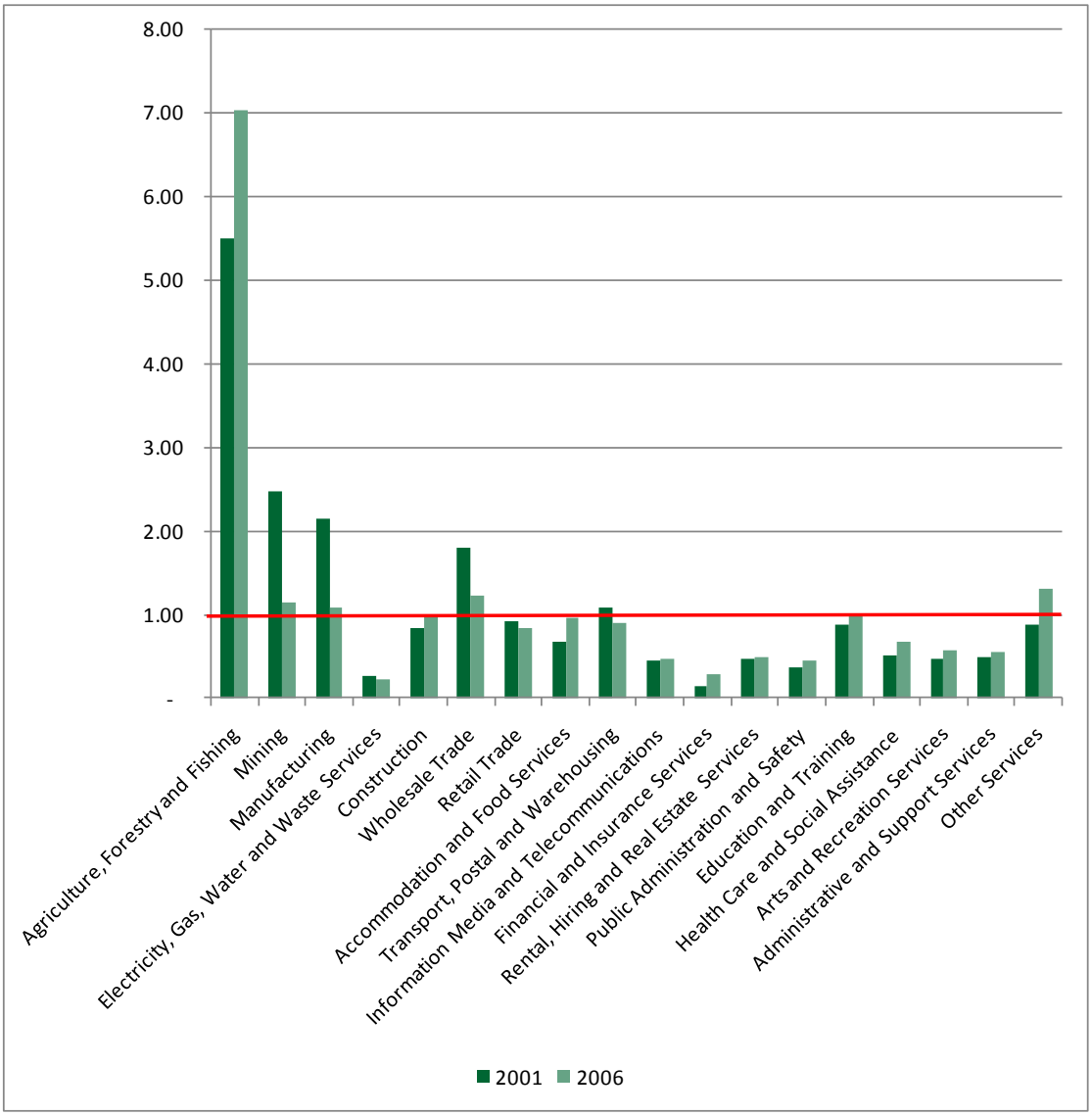
* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Huon Valley

Agriculture represents a significant share of employment for Huon Valley. The municipality is the most agriculturally orientated of Southern Tasmania.

Figure 16 Location Quotients for Huon Valley, 2001 & 2006



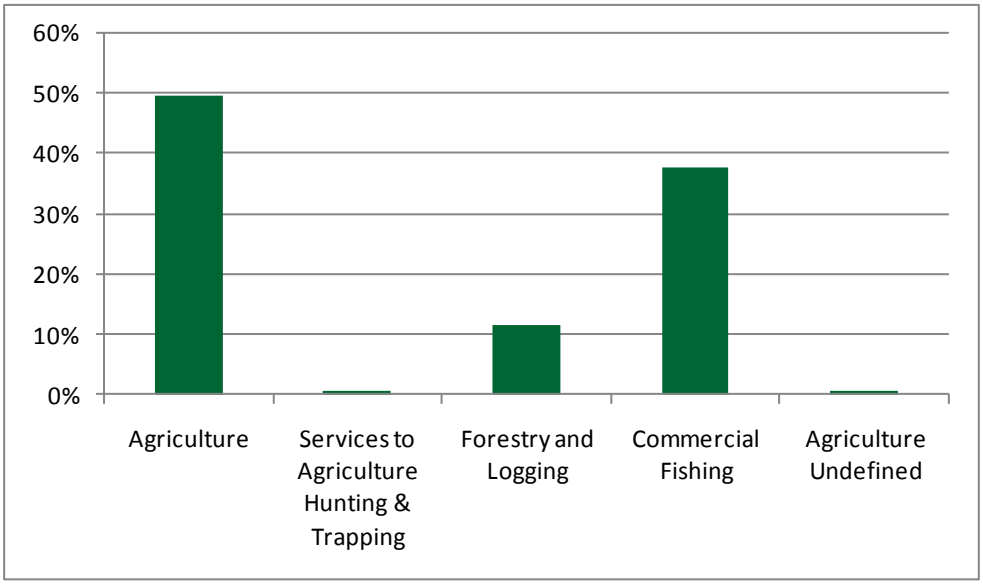
* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

As the region is heavily orientated toward agriculture the industry has been broken down to a finer level of detail to reveal which sub-industries have a significant share of employment. Agriculture and commercial fishing (aquaculture) are the strong employment drawers of the industry, shown in Figure 17.

Commercial fishing which mostly consists of aquaculture is growing strongly all over Southern Tasmania and it is expected to draw a greater share of employment in the future.

Figure 17 Distribution of Agricultural Employment in Huon Valley, 2006

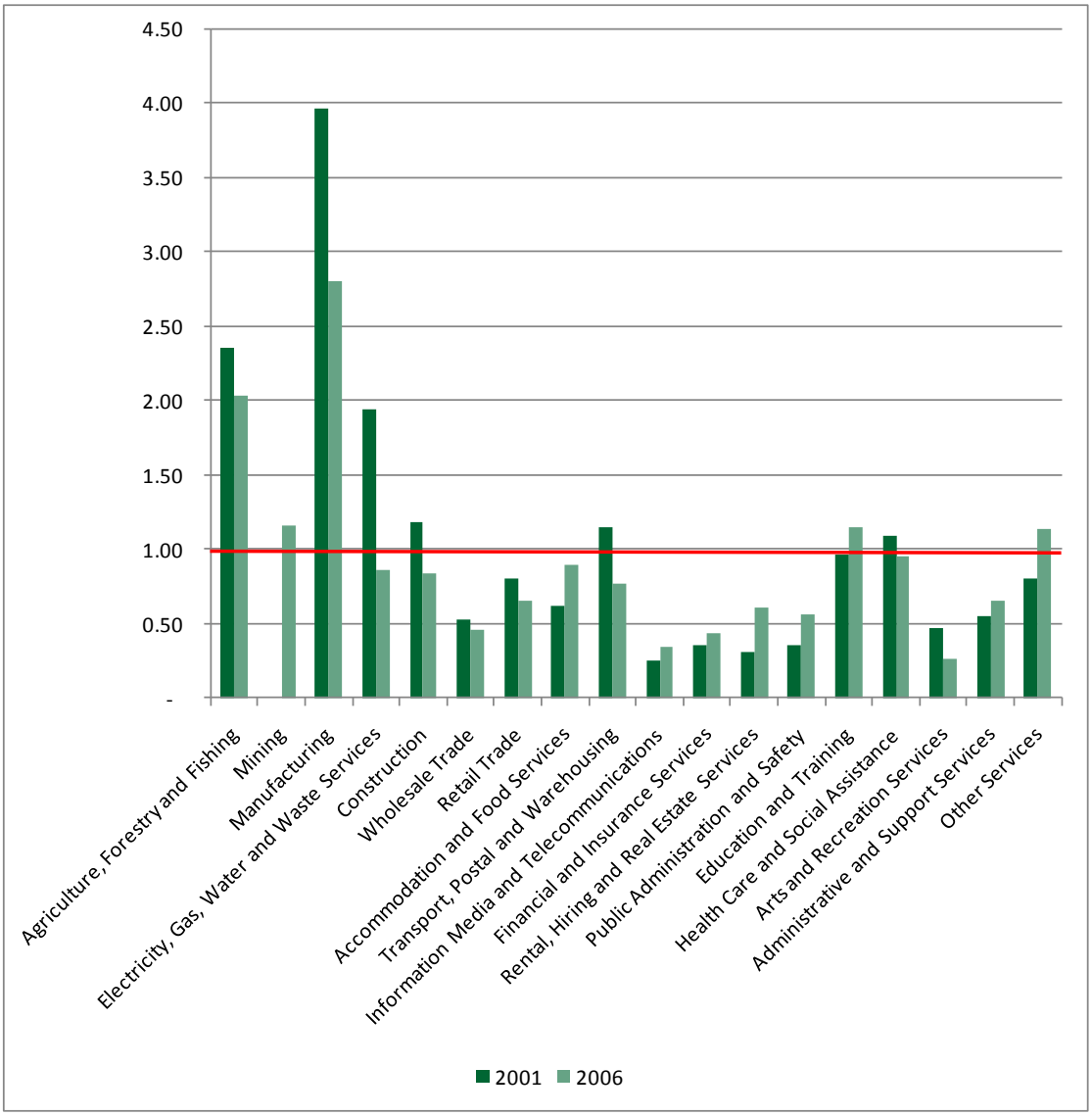


Source: ABS, Census (2006)

Derwent Valley

In the Derwent Valley the manufacturing industry is an important contributor to the local economic base. The paper mill is a large manufacturer and important employer. The importance of this industry has reduced over time evidenced by a reduction in the LQ of manufacturing between 2001 and 2006 (Figure 18). This employment reduction is attributable to decline in production at the Norske Skog paper processing plant in New Norfolk.

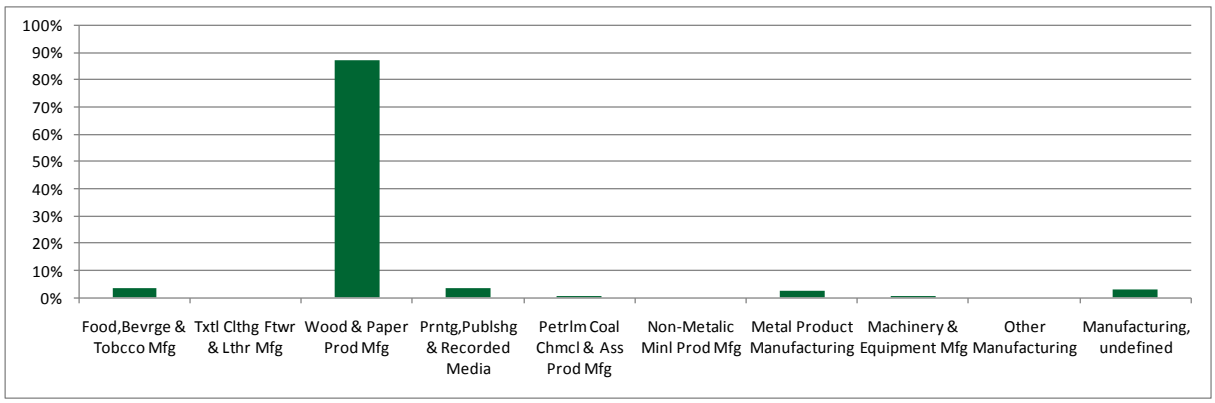
Figure 18 Location Quotients for Derwent Valley, 2001 & 2006



* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Figure 19 Distribution of Manufacturing Employment in Derwent Valley, 2006



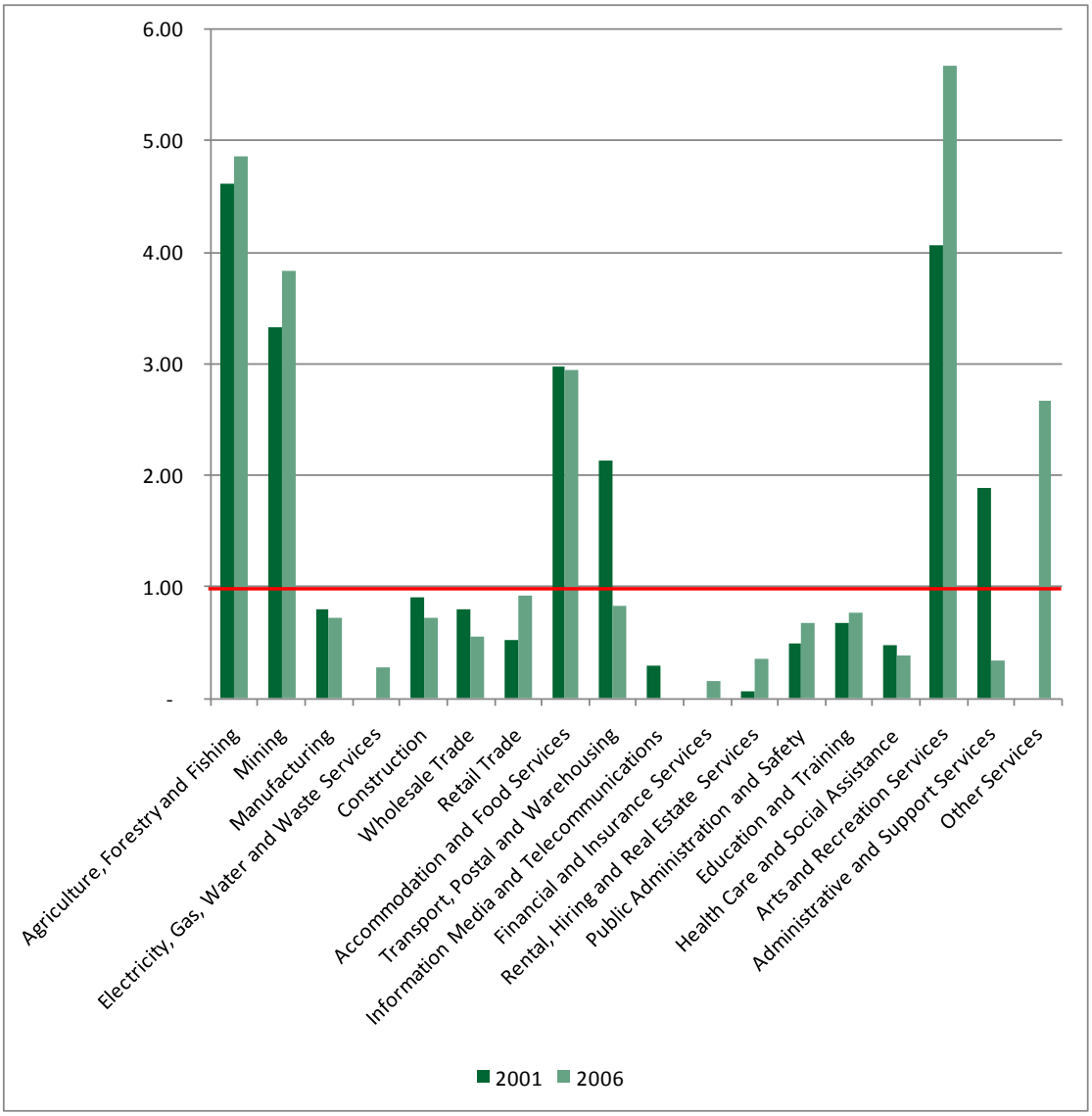
Source: ABS, Census (2001 and 2006)

The other section of Derwent Valleys economy the relatively out performs the southern councils is agriculture. Much like the Manufacturing industry explained above, agriculture is no longer as important to the area in 2006 as it was in 2001. Breaking the agricultural industry down to the next level reveals that there is a significant proportion of forestry and logging within the region.

Tasman

Tasman municipality too has a strong agricultural sector within which aquaculture plays a key role. A significant share of the municipalities in the Southern region is agriculturally oriented.

Figure 20 Location Quotients for Tasman, 2001 & 2006

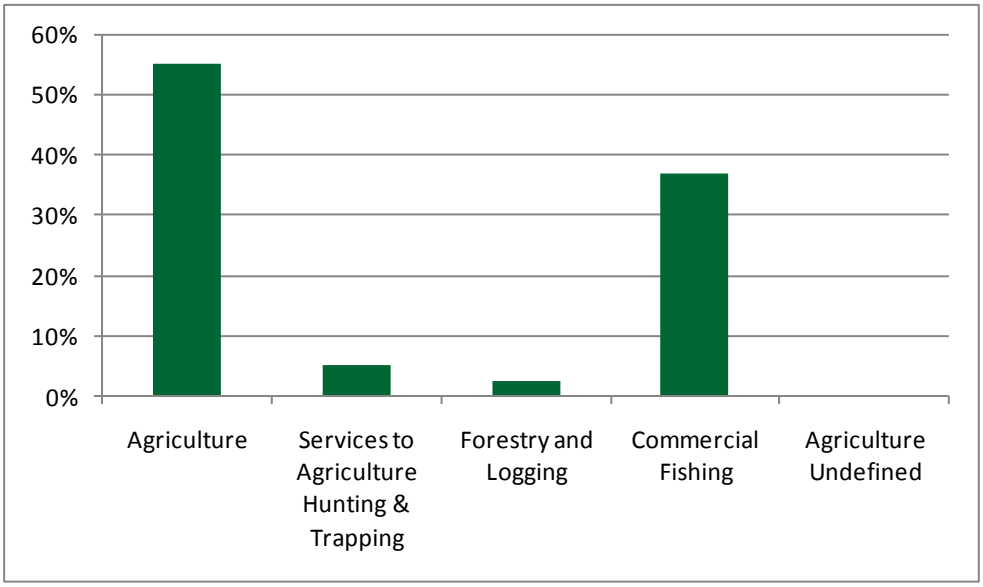


* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Tasman is not the only municipality that has relative strength in agriculture; others include the Central Highlands, Glamorgan, Huon Valley, Sorell and Southern Midlands. Tasman has a strong and growing aquaculture industry, shown in Figure 21.

Figure 21 Distribution of Agricultural Employment in Tasman, 2006

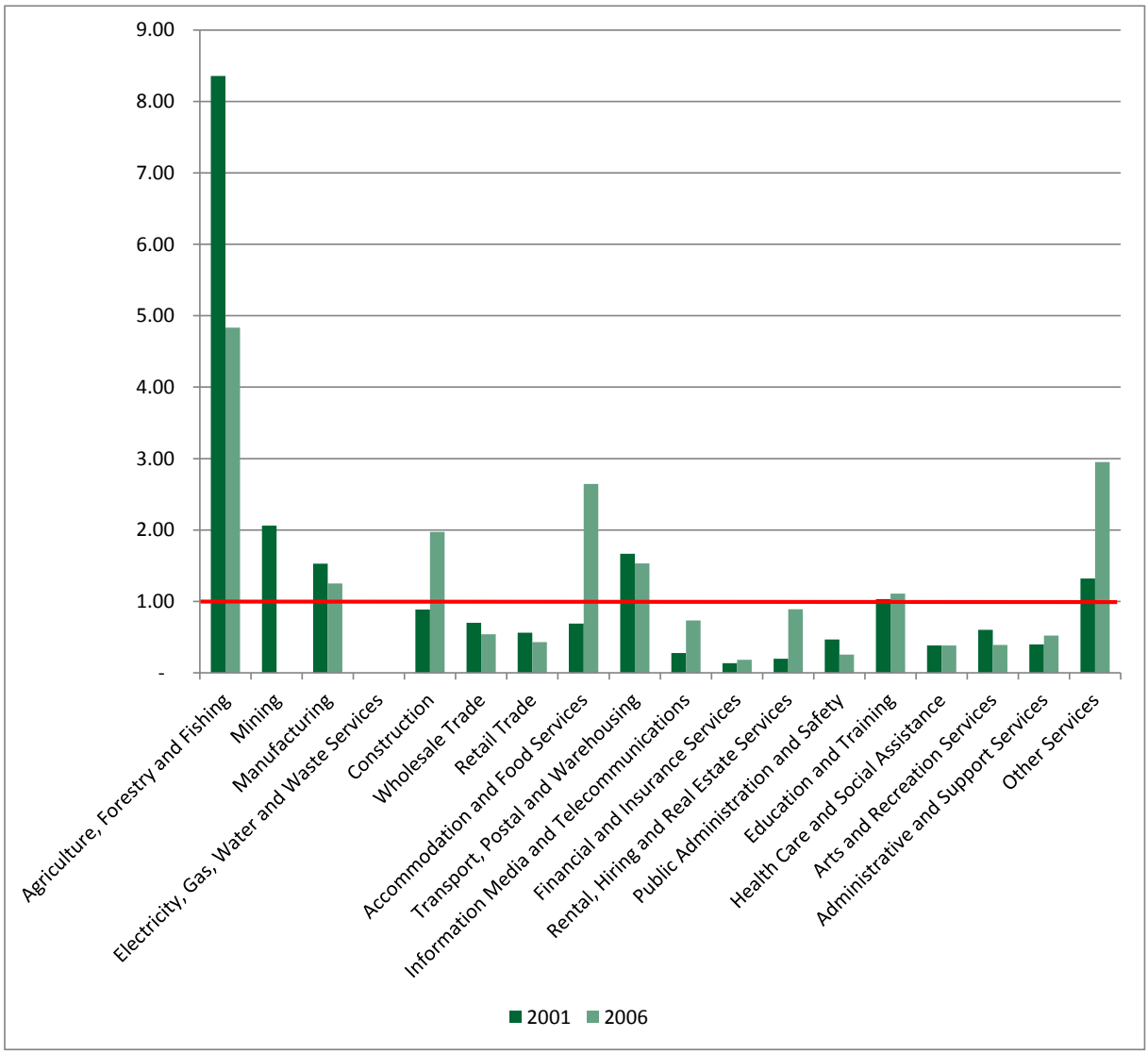


Source: ABS, Census (2006)

Southern Midlands

The local economy of the Southern Midlands too is driven by a strong agricultural sector. The figure below shows the strong concentration of employment in the agricultural sector. It is foreshadowed that the roll-out of the regional irrigation scheme will further strengthen the sector in the future. As with the other councils, employment in forestry would have dropped since 2006. Transport and warehousing is another important industrial activity.

Figure 22 Location Quotients for Southern Midlands, 2001 & 2006



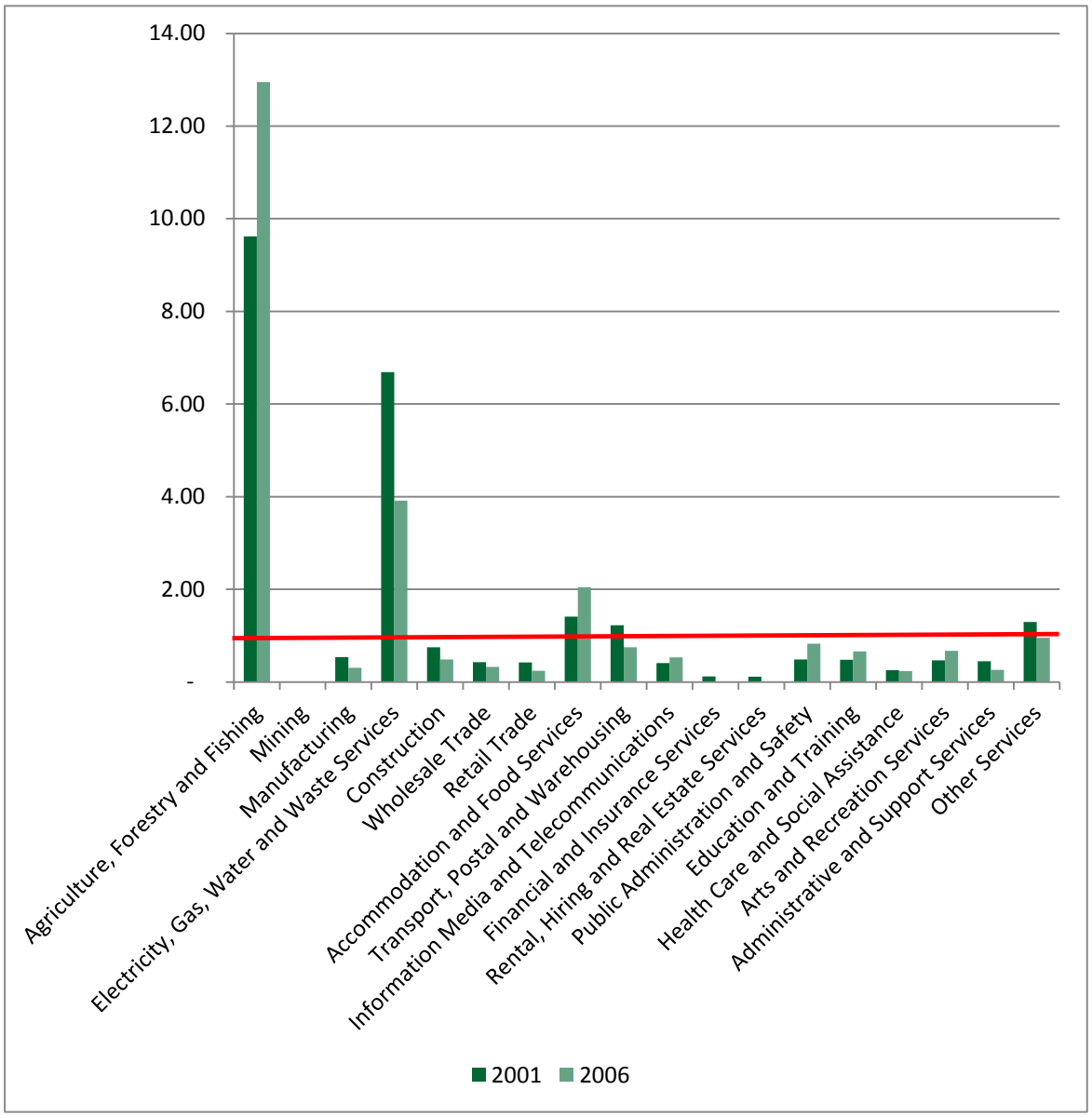
* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Central Highlands

Central Highlands has a high share of employment in the agricultural sector and the utilities industry (hydroelectricity generation).

Figure 23 Location Quotients for Central Highlands, 2001 &2006



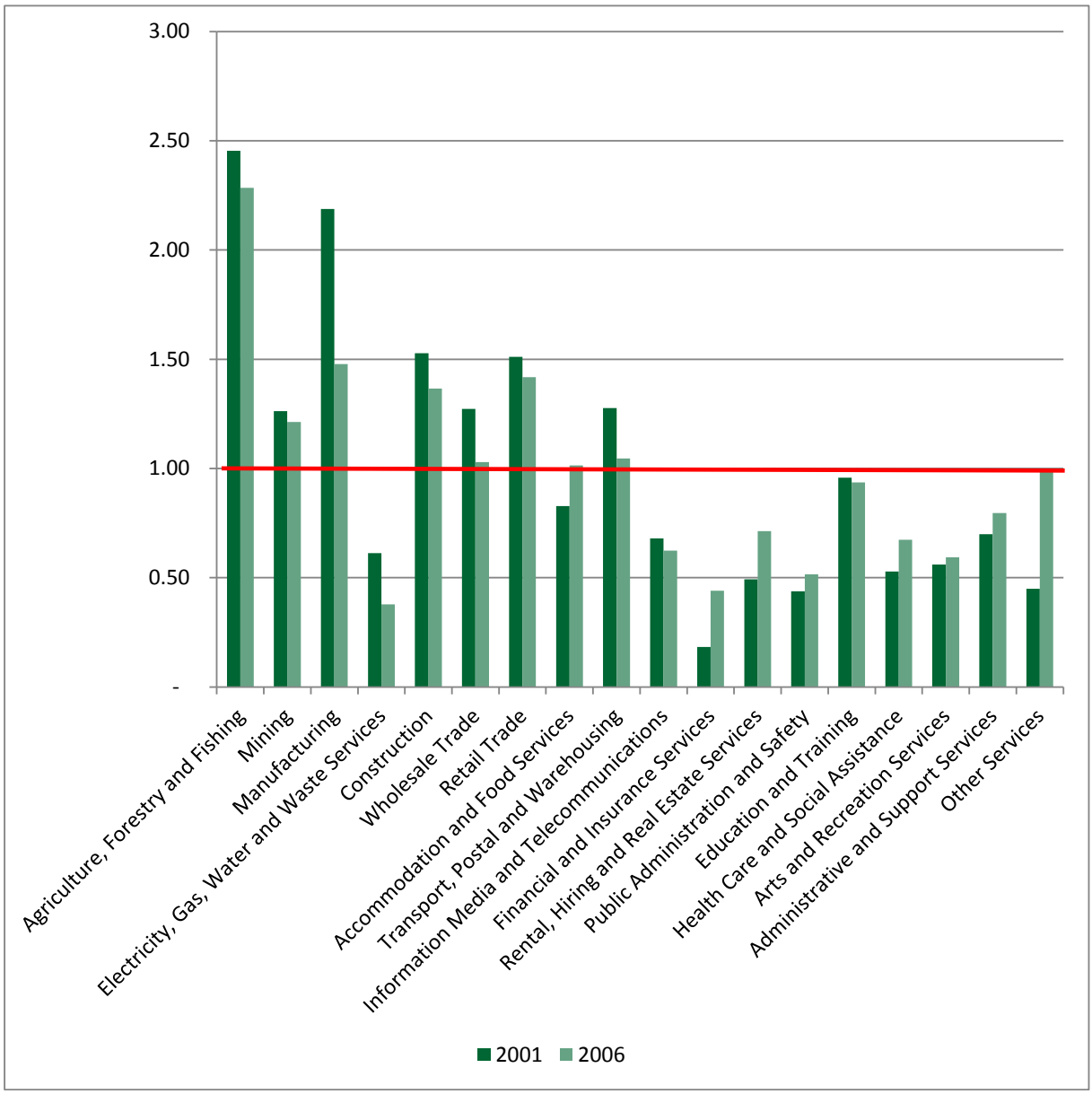
* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Sorell

Sorell has a fairly diversified economy. Important industries are agriculture, manufacturing (food processing), construction, wholesale and retail trade.

Figure 24 Location Quotients for Sorell, 2001 & 2006



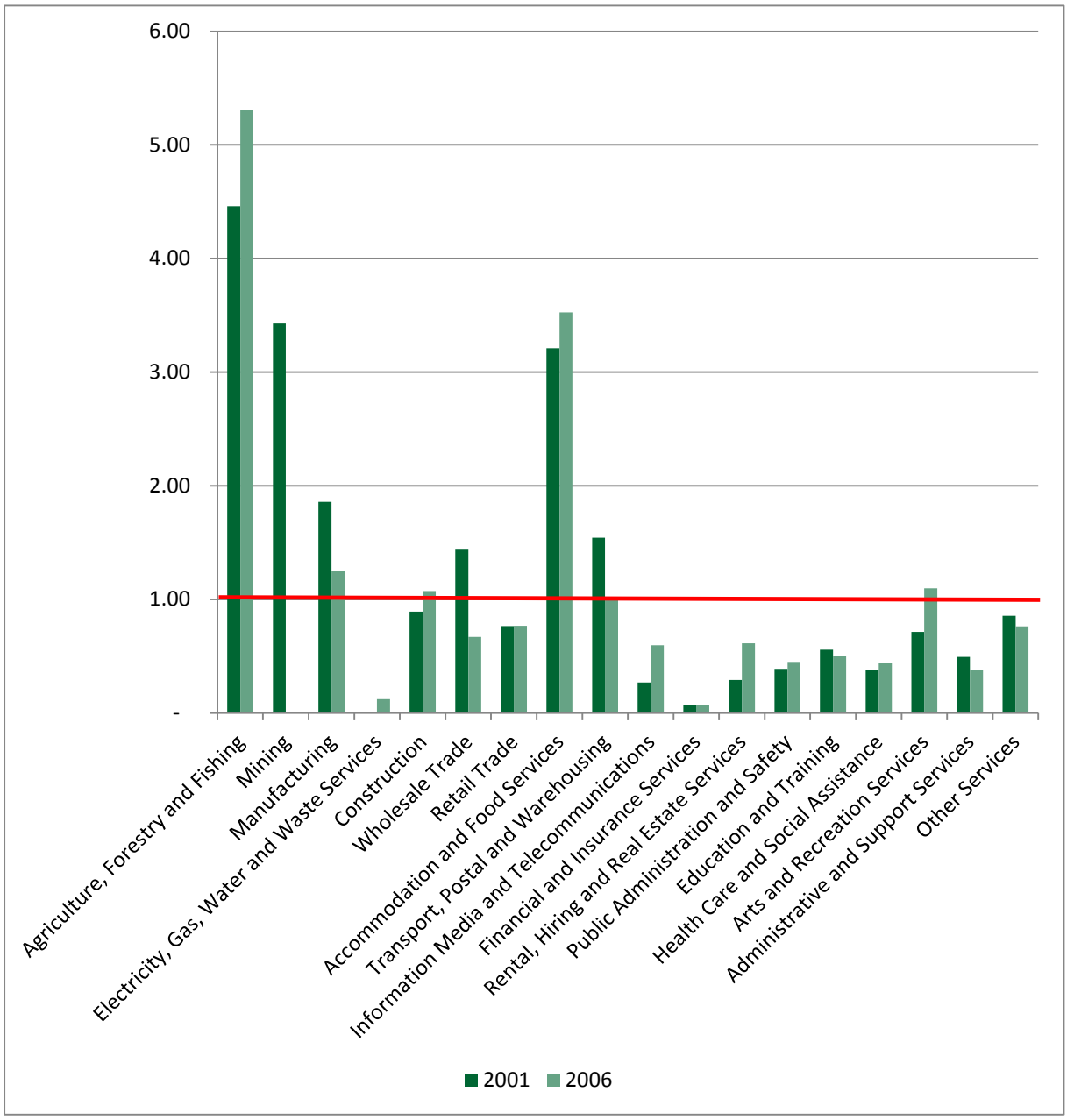
* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

Glamorgan-Spring Bay

The economy of Glamorgan-Spring Bay is highly specialised in agriculture, forestry and fishing and accommodation and food services (reflecting the tourism industry).

Figure 25 Location Quotients for Glamorgan-Spring Bay, 2001 & 2006



* Compared to Southern Tasmania

Source: ABS, Census (2001 and 2006)

2.2.2 Turnover and production

Changes to industrial land demand are ultimately contingent on which industries are performing well and those that are underperforming or in outright decline. Monitoring changes in the turnover of industries reveals those industries that are doing well and which are in decline, thus allowing a robust indication of which industries may require more land for industrial purposes in the future.

Overall changes in turnover for the region during the financial years of 2007-2008 and 2008-2009 were positive with the region experiencing an estimated 8% growth in turnover. This positive change was not shared by all industries. Table 4 shows the change in turnover for all industries at the broad level.

Table 3 Estimated Industry Growth in Turnover, 2007-08 to 2008-09

Industry	Turnover 07-08 (Thousands)	Turnover 08-09 (Thousands)	Change
Agriculture, Forestry and Fishing	$ 351,675	$ 370,300	5.3%
Mining	$ 413	$ 1,275	209.1%
Manufacturing	$ 118,125	$ 129,825	9.9%
Electricity, Gas, Water and Waste Services	$ -	$ 938	0.0%
Construction	$ 88,263	$ 100,738	14.1%
Wholesale Trade	$ 24,225	$ 38,775	60.1%
Retail Trade	$ 218,813	$ 219,563	0.3%
Accommodation and Food Services	$ 66,713	$ 94,350	41.4%
Transport, Postal and Warehousing	$ 46,613	$ 52,313	12.2%
Information Media and Telecommunications	$ 2,288	$ 12,825	460.7%
Financial and Insurance Services	$ 18,488	$ 15,550	-15.9%
Rental, Hiring and Real Estate Services	$ 27,200	$ 30,450	11.9%
Professional, Scientific and Technical Services	$ 42,125	$ 45,013	6.9%
Administrative and Support Services	$ 5,288	$ 3,638	-31.2%
Public Administration and Safety	$ 1,050	$ 1,050	0.0%
Education and Training	$ 788	$ 750	-4.8%
Health Care and Social Assistance	$ 28,088	$ 18,263	-35.0%
Arts and Recreation Services	$ 5,263	$ 6,113	16.2%
Other Services	$ 25,200	$ 23,288	-7.6%
Not Classified	$ 10,988	$ 3,725	-66.1%
Total	$ 1,081,600	$ 1,168,738	8.1%

* Turnover estimates are based on number of businesses per turnover category and the mean turnover per business for each category.

Source: SGS (2011), based on ABS (cat no. 8165.0)

The Global Financial Crisis had its peak economic impact in the last quarter of 2008 when international credit markets froze and uncertainty was strangling economies. The second financial

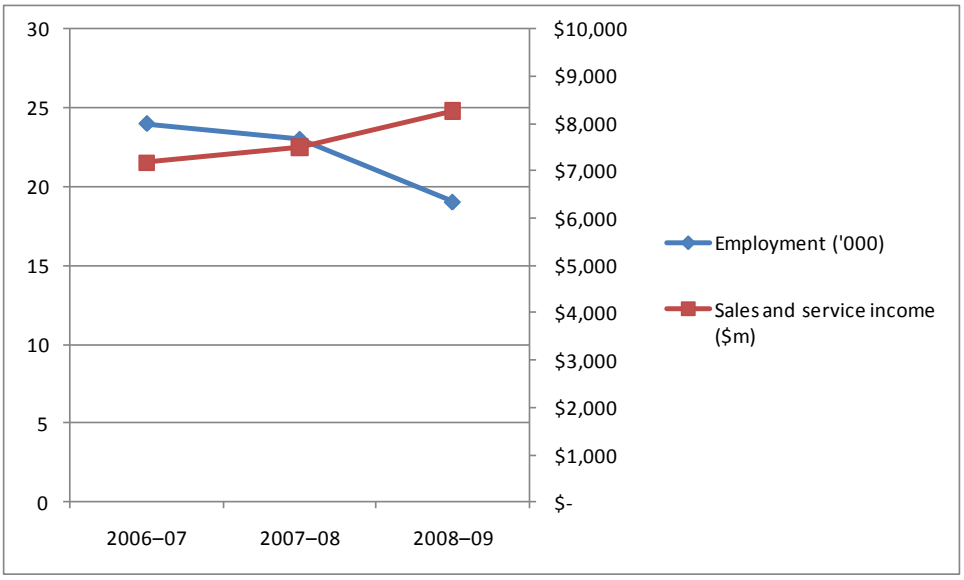
year (08-09) included in the above table includes this period, thus capturing the changes to industries during the Global Financial Crisis.

The following industries should be particularly noted given their strong turnover growth:

- Agriculture, Forestry and Fishing (5%);
- Manufacturing (10%);
- Constructions (14%);
- Wholesale trade (60%), and
- Transport, Postal and Warehousing (12%).

It is important to note that manufacturing experiencing turnover growth does not necessarily indicate an increase in employment within that industry. Industries in Australia, particularly in manufacturing are becoming less labour intensive and increasingly orientated toward high-value added products and processes. The figure below (Figure 26) illustrates this point as it shows a drop in manufacturing employment in Tasmania between 2006-07 and 2008-09, whilst incomes from sales and services increased. This trend is also seen at the national level.

Figure 26 Manufacturing employment and sales and service income in Tasmania



Source: ABS, Cat,o. 8155.0

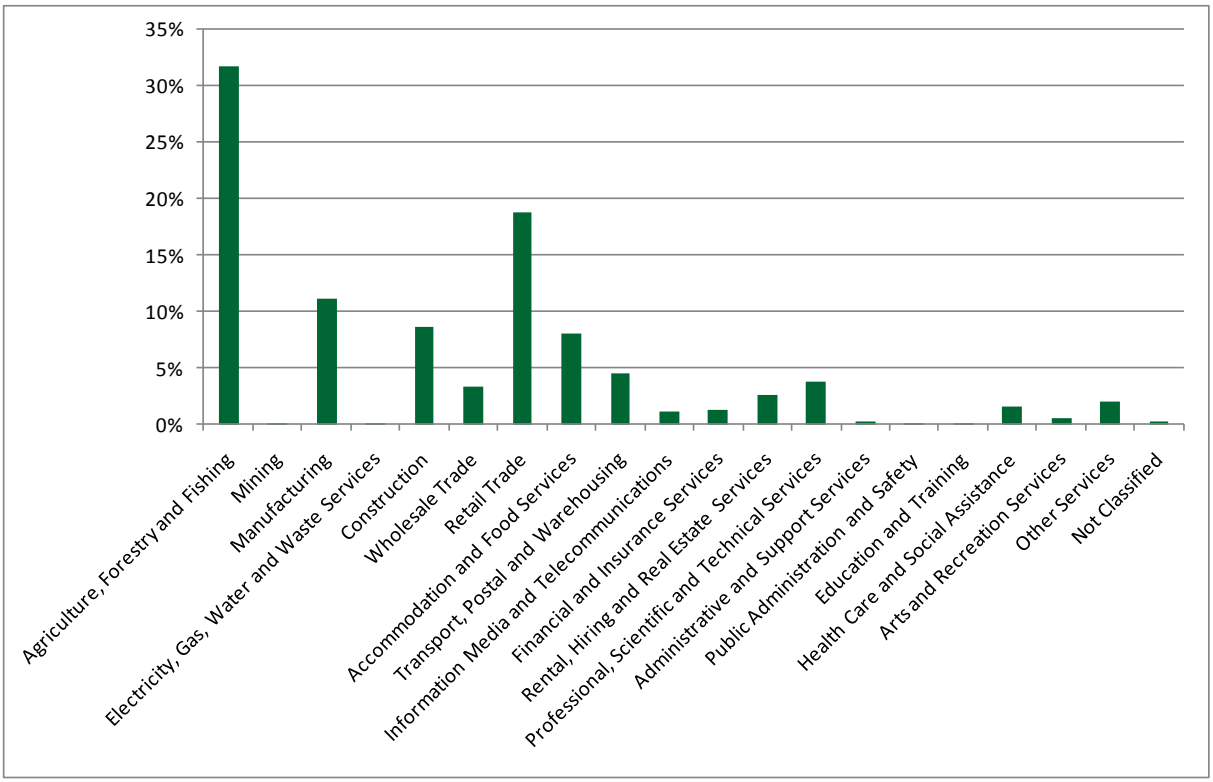
The regional economy was not immune to the forces of the Global Financial Crisis. Financial institutions around the world experienced reductions in business activity due to uncertainty and institutional insolvency. This many have contributed to the reduction in Financial Services of 16% between the two comparison periods.

Using the above analysis of growth industries it is also informative to look at the shares of turnover by industry to the regional economy, which will reveal the regions that contribute most to overall turnover. Clearly, agriculture contributes the most to the regional economy, with 32% of the total

regional turnover. Most of the municipalities in Southern Tasmania are strongly agriculturally oriented. The abundance of productive land in some areas leaves a large amount of land that can be used for agricultural purposes, thus leading to the large share of production, shown in Figure 27 and explained above.

The urban centre of Hobart and to a lesser extent Glenorchy and Clarence represent by far the largest share of turnover by LGA's (see Table 4). Hobart, Glenorchy and Clarence collectively represent the vast majority of turnover in the region. The urban areas are also home to many head offices, including some larger agriculture, forestry and fishing businesses, such as Tassal.

Figure 27 Share of Turnover by Industry, 2008-09



Source: SGS (2011), based on ABS (cat no. 8165.0)

Table 4 Share of Southern Councils Turnover, 2008-09

LGA Proportion of Turnover	Share
Brighton	1.8%
Clarence	12.4%
Derwent Valley	1.0%
Glenorchy	25.2%
Hobart	43.6%
Kingborough	6.6%
Sorell	1.9%
Central Highlands	0.8%
Glamorgan/Spring Bay	1.4%
Huon Valley	4.0%
Southern Midlands	0.9%
Tasman	0.5%
Total	100.0%

Source: SGS (2011), based on ABS (cat no. 8165.0)

Hobart, Glenorchy and Clarence represent over three quarters of regional turnover (illustrated in Table 4).

2.2.3 Conclusions

Comparative analysis of employment by industry in the region and the local areas show the key industries. The key growth industries have been identified to be agriculture, aquaculture, manufacturing (food processing), wholesale trade and transport.

As the aquaculture industry matures there is likely to be additional land demand. Depending on the level of expansion in this industry the supporting businesses in transport and manufacturing (specifically food processing) may experience increased activity in some regions.

Growth in manufacturing is primarily driven by growth in productivity either by technological adaptation or raising the skills of the workforce, with overall employment falling despite the growth in turnover. The native logging industry in Southern Tasmania has been going through a period of structural decline and repositioning. Wood processing and paper manufacturing have been consequently affected. There are anecdotal signs the decline of the industry has levelled off.

Transport, especially within Brighton is predicted to experience sustained growth. Relocation of the rail yards from Hobart to Brighton will further drive demand for land by transport and warehousing businesses in the Brighton area.

2.3 Industrial Land Use

As defined in the *STCA Draft Land Use Strategy for Southern Tasmania (Draft 2011)* Industrial Activity is defined as:

> *"...the manufacturing, assembling, processing, storage and distribution of products and goods. It can include wholesaling and retailing of goods and may include some uses associated with primary production."*

There is a wide variety amongst industrial land uses in Southern Tasmania, with different focus on industry scope. There is a mix of manufacturing businesses focusing on the processing of regional produce, manufacturing for local industry and consumers, warehousing, depots and bulky goods retailers. There is diversity in the scale and focus of the customers, for example there are local service industries as well as export orientated industries. Each has different requirements that require differing levels of infrastructure and land requirements.

2.3.1 Existing Industry Estates

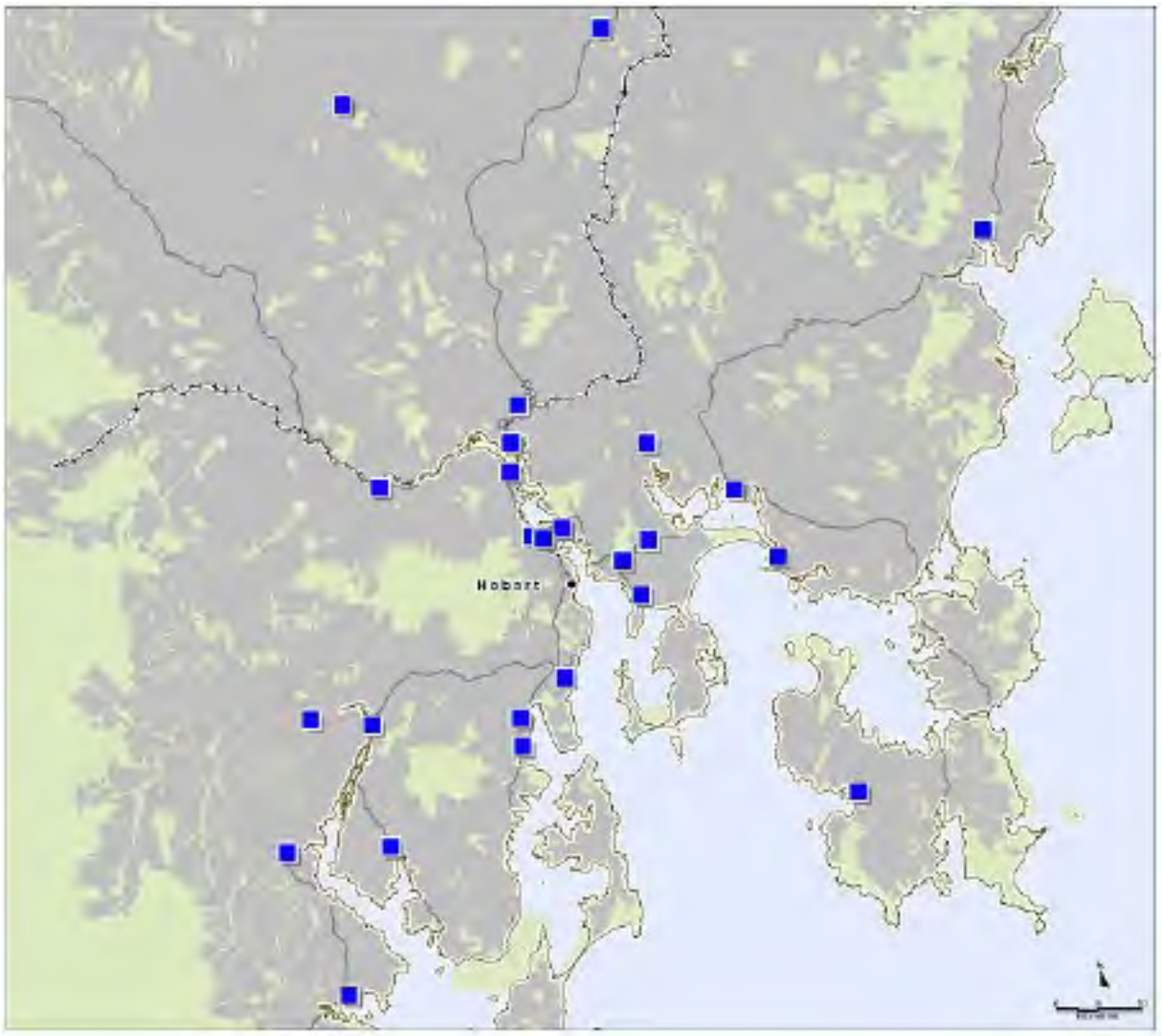
As noted in *Making the Right Connections: Industrial Land Availability* there are currently nine major export oriented industrial sites:

- Boyer (Norske Skøg – paper and pulp processing)
- Whitestone Point, Austins Ferry (timber mills) *currently under consideration to be redeveloped, possibly for alternative uses*
- Claremont (Cadbury – chocolate manufacturing)
- Prince of Wales Bay, Glenorchy (Incat – catamaran construction)
- Lutana (Nyrstar – Zinc Processing)
- Margate/Electrona in Kingborough (ship building & aquaculture)
- Southwood, Huon Valley (Integrated timber processing project –veneer mill)
- Triabunna (Wood chip mill and port facilities), which has recently been sold and may be redeveloped in the medium term into a eco-tourism destination[2]
- Brighton Transport Hub (new location of rail yards, intermodal hub)

Other industrial estates are spread throughout the region. The following map (Figure 28) highlights the key existing industrial estates in Southern Tasmania.

[2] http://www.theage.com.au/national/greenies-buy-woodchip-mill-20110713-1he6h.html?from=age_sb

Figure 28 Industrial Estates in Southern Tasmania



Source: SGS (2011)

There is nearly 3,500 hectares of industrial zoned land in Southern Tasmania. Table 5 is an overview of all the industrial estates and their total land areas. The data is sourced from the Valuer General's land use database.

Table 5 Industrial Precincts in Southern Tasmania, by land area

(see next page)

Municipality	Precinct		hectares
Bridgewater	Boral Quarry		234
	Brighton Industrial Hub		322
	Cove Hill		68
Clarence	Cambridge (incl Kennedy Dr)		257
	Mornington		115
	Risdon Vale (Scotts Road)		158
	Rokeby (Droughty Point Rd)		87
	Seven Mile Beach		85
Central Highlands	Bothwell		16
Derwent Valley	Boyer (paper mill)		710
	Maydena		30
	New Norfolk		19
Glenorchy	Austins ferry (Whitestone Drive)	Closed, may be rezoned	36
	Claremont (Cadbury)		34
	Derwent Park	includes Nyrstar	92
	Dowsing Point (Technology Park)		13
	Glenorchy (dispersed sites)		67
	Goodwood		7
	Montrose		6
	Moonah		54
	New Town (incl part of Selfs Point)		6
Glam. Spring Bay	Bicheno (the Gulch)		68
	Swansea		10
	Triabunna (woodchip mill and remaining	97% is woodchip mill site	395
Hobart	New Town / Selfs Point		21
	North Hobart		5
	Regatta Point (Queens Domain)		29
	Sullivans Cove (including Macquarie Point		47
Huon Valley	Cygnet		37
	Dover		37
	Geeveston		42
	Huonville and remainder		36
	Port Huon		62
Kingborough	Baretta		9
	Electrona (Pothana Road)		34
	Huntingfield		22
	Kingston (Firthside plus Tinderbox)		11
	Margate		32
Southern Midlands	Oatlands		23
Sorell	Carlton (Joseph Road)		2
	Dunalley		0
	Sorell (Giblin Drive)		5
Tasman	Nubeena (incl White Beach)		67
TOTAL			**3,409**

* Includes Ranelagh, Grove, Glen Huon and Southport. Excludes Southwood which is not industrial zoned land
Source: Valuer General's land use database (2011)

2.3.2 Opportunities and Challenges

There are a number of key issues in providing new industrial land and development of associated industries. These include land use conflicts, environmental challenges, population and employment challenges and emerging trends in the industry.

Land Use Conflicts

As discussed in *Clarence City Industrial Development Strategy, Brighton Structure Plan, Huon Valley Land Use and Development Strategy and the STCA Draft Land Use Strategy*, some currently zoned industrial areas and potential locations face a number of land use conflicts. This includes proximity to existing residential areas, poor geography and isolation from resources and transport connections. In existing and historic areas of industrial land zones, there is often a conflict with nearby residential and commercial areas. Historically, industrial sites were planned close to labour resources, i.e. urban areas. Over time, the urban areas expanded and grew even closer around industrial sites, which were often used for heavy manufacturing. The historical sites are therefore mostly limited in terms of potential development and expansion of industrial land and uses. This conflict is particularly evident in Glenorchy and Hobart.

In a number of locations further development of industry is inappropriate due to local topography, as industrial land requires flat land or land that is not too steep. Generally speaking, the average site slope should not exceed 10%.

Climate Change

A key issue facing the region is that presented by the changing climate. This is highlighted in The *Regional Land Use Strategy for Southern Tasmania* as well as a number of other strategic documents. Some of the key changes include rise of sea-level, water availability and changes to local flora and fauna. With upcoming initiatives this might change the suitability of heavy polluting industries but might also present key opportunities through the investment and development of cleaner energy infrastructure. There is also a potential for changes to expand agricultural production stemming from change in temperatures and changes in rainfall patterns, which might affect local food processing and manufacturing plants. Further, under climate change scenarios Tasmania is projected to be less affected by droughts and extreme weather events than many mainland agricultural areas. This would make Tasmania comparatively more attractive for agricultural production. Anecdotal evidence suggests more producers are expanding their production to Tasmania.

Regional Irrigation Schemes

The roll-out of the regional irrigation schemes in Tasmania has the ability to transform extensive agricultural areas into intensive agricultural areas. Although this development is expected to affect the northern parts of the State more than the South, the Southern Midlands are expected to benefit particularly as well as parts of Clarence and Sorell. One of the positive flow-on effects will be increased food and beverage processing and increased transport and storage of farm produce.

Proposed Industry Locations

A number of reviewed documents and strategies identify proposed locations for new industrial zoned land. This includes:

- Clarence (Kennedy Road and adjacent to the Hobart International Airport)
- Brighton (New industrial park adjacent to new Intermodal Transport Hub)
- Huon Valley (Potential for new industrial land in Huonville – as identified *Huon Valley Land Use and Development Strategy*)

Significant growth is expected in a number of key locations due to their strategic position. This includes the proposed rezoning of land in Kennedy Road area adjacent to the Hobart International Airport, where industry can leverage off the strategic advantage of the proximity to the Airport for time sensitive and high value goods.

Demand for industrial land adjacent to the Brighton Freight/Transport Hub is expected to remain strong due to the locational advantages offered at the intermodal hub.

Emerging Trends and Types of Industry

There have been a range of structural changes in the traditional light and heavy manufacturing sectors in Australia that have occurred over the past 20 years. Some of these changes and trends are expected to continue in the coming years. These changes include the focus on higher value products, emphasis on co-location and clustering of industry, changes in development pattern and changes in industry.

Industry restructuring has and may continue to affect the size of the wood processing industry. Gunns, traditionally a key manufacturing in this industry has shifted its focus towards plantation forestry. As a result the growth and size of the timber industry in Southern Tasmania has seen dramatic change in recent years, as exemplified by the issues relating to the Triabunna site and the closure of the Austins Ferry (Glenorchy) site.

Several other important trends are influencing demand for industrial land. An important trend has been the relocation of large, heavy industrial and low value-added manufacturing activities to low cost countries in the Asia-Pacific, while other industrial activities increasingly focus on high value adding processes. Industries in Australia are becoming less labour intensive and focussed at high value-adding processes.

Another trend that has been visible for about twenty years is the establishment of groups of small and medium sized, often specialised, firms that form clusters. In a geographic sense too, these companies tend to cluster in order to facilitate just-in-time and flexible production and logistic processes. These processes are often operating on a 24/7 basis. The maritime cluster in Prince of Wales Bay is an example of an industrial cluster.

Co-location is becoming increasingly important for many industries. This is particularly important through the breakdown of the vertically integrated companies to a series of independent companies that value add at each step of a supply chain. Industry clustering allows the development of scale and lower costs for industry, it also attracts employees and enables high value knowledge sharing and industry innovation.

This trend has also resulted in the growth of the transport and logistics sector. Before, large industrial conglomerates would operate the entire value-chain in-house. Now, increasingly the value-chain comprises a range of small and specialised suppliers, in which transport and logistics too have become a separate and recognisable link in the production chain.

Improved and stricter environmental and land use regulations have fostered the development of industrial uses that are environmentally more sustainable.

Another trend should be added to this overview. At the metropolitan level there is a trend of ***geographic replacement*** which involves high impact and transport oriented uses relocating to strategically located sites at the fringes of urban systems. These strategic locations are on main transport corridors, preferably multi-modal, and with sufficient buffer from residential and other sensitive uses. The land they vacate is re-occupied by smaller scale often light industrial uses.

Historically, industries located near or in key urban centres with minimal or no buffer from residential areas. Tighter environmental and pollution controls as well as improved strategic planning with proper use and development standards continue to develop and to become more prescriptive. As a result, it is becoming ever less attractive for manufacturing and transport-oriented firms to locate within urban boundaries and residential areas. These industries increasingly move to strategic locations at the fringes of urban systems.

This trend is clearly visible in the context of Greater Hobart, where Glenorchy has historically fulfilled the role of the key industrial hub and to some extent continues to fulfil that role. With the development of the Brighton Industrial Estate and the industrial estate in Cambridge and the Airport Business Parks, many larger manufacturing, heavy impact and transport oriented firms are establishing in these new areas, that are much better suited for the types of activities these firms are associated with. As for Glenorchy, large and traditional manufacturing industries are one by one relocating from the City to the fringe, overseas or closing down (often as a result of global market pressures). Blundstone and Juicy Isle are two key examples, as well as the upcoming closure of the Gunns plant in Austins Ferry. Other closures of manufacturing plants since the 1990s in Glenorchy include Richardson Meats, ACI Glass, Textile Industries Australia, Humes, Stanley Tools and Sanitarium (GCC, 2010).

This geographic replacement trend opens up some opportunities for other industrial uses that remain within the urban system: local service industries. Local service industries are population driven: demand for construction, trades, car repair and other services are primarily driven by the size of the local market, i.e. population.

Key residential concentrations, such as Glenorchy, are the preferred location for local service firms because they provide close access to the market. Population profiles and projections help to understand and quantify future demand for land for local service industries.

More demand for smaller and medium sized lots and opportunities for co-location

To reflect recent changes in industry that has come through structural and international change, industries are requiring different land and services to meet the changing needs of industries. As the *Industrial Activity* report highlights there has been a reduced demand for larger industrial sites, with increased use of technology. This has also resulted in lower demand for labour due to technological innovation and productivity gains. It is also noted that many industrial uses also require on-site ancillary functions, such as a head office and sales, functions that are non-industrial.

The aquaculture in Huon Valley and Kingborough has developed to niche and high value export orientated products that. Currently aquaculture industry is dispersed with some processing plants in the Huon Valley, Margate and Cambridge near the airport. The ongoing development of this industry may require the development of industrial land in Huon, Channel and Kingborough areas.

Growth industries will continue to be the food and beverage processing industry, and provide a strong base for regional manufacturing. Typically this is focussed on regional produce and located near the produce. Some processing industries will continue to be located on farm properties where the produce is grown, while other such as the Cadbury processing plant will be located in regionally strategic locations.

2.3.3 Industrial Land Use Patterns

Local service industries are primarily population driven. Demographic changes and trends in income and household expenditure patterns largely determine the growth of these industries and consequently, their demand for industrial land.

Export industries involve industries that export their products to outside the region; to other parts of the state, to the mainland or overseas. Export oriented industries, and their demand for land, are largely driven by national and global market opportunities and international terms of trade. It includes; most primary product processing and basic material processing, larger scale or specialised manufacturing, and larger centralised distribution hubs. Export oriented industries include support industries and services to export industries.

Location requirements and preferences of local service industries and export oriented industries vary. While local service industries tend to locate close to their market, export oriented industries favour strategically positioned locations close to a skilled labour force, transport corridors, resources or inputs. Lot area requirements differ between local service and export oriented industries as well, with the latter generally requiring larger lots. Location and land requirements also vary by type of industrial activity. Land use planning for local service industries should primarily take place at the local level. It is however important for municipalities to understand what is happening in nearby Council and cooperation is important. This is especially true in urbanised areas where some Council's may not be able to accommodate demand within their municipality, resulting in local service industries spilling over into nearby areas.

Local service industries would generally be located in locally and regionally significant clusters while traditional export oriented industries tend to operate from 'sites of major industrial activity'. Increasingly however, export oriented industrial firms are small and medium-sized firms and firms with activities that are of a light industrial nature. These export oriented firms may not need to locate at sites that are suitable for major impact or heavy industrial production.

Planning for major export oriented industries can be complex. Land demand by major export oriented industries is both infrequent and unpredictable. It is infrequent in the sense that it involves one-off major investments that may only occur once every ten or twenty years. It is unpredictable in the sense that it is uncertain exactly when this demand will occur. Rezoning extensive areas of land in anticipation of demand that may or may not materialise may be an inefficient approach. A more cost-effective approach would be to identify potential locations for industrial land zoning, so as to ensure the land is available for rezoning and in the interim used in a way that does not prevent future industrial use. Further, it is important to ensure planning processes run smoothly and as quickly as possible in order to effectively accommodate demand *when* it occurs.

In general terms, land and location requirements are as follows:

- Local service industries will be accommodated on locally-significant industrial estates. These estates would generally be close to major population centres with good access to arterial roads. The land parcels would be small, generally up to 1,000 to 2,000 sqm. The land needs to be affordable.
- Small and medium sized export oriented industries increasingly operate in clusters, depend on just-in-time supply chains and include non-industrial elements such as R&D, administration and marketing. These industries are best located on regionally significant industrial estates, with good access to key road, rail and air transport as well as an adequately educated workforce. Some uses may require buffer from sensitive uses although most activities would classify as light industrial. Land lots would range from small (<500 sqm) to medium (5 hectares) and some large lots of 5 hectares and more.
    - To various degrees of success local and regional governments in partnerships with private parties have developed industry parks to foster economic growth. There are many examples of business and science parks and 'theme' oriented clusters that have been set up with a strategic aim to foster innovation, incubation and industry

maturing (Witte & McDougall, 2010[3]). The Techno Park in Glenorchy is the only example in Tasmania of a somewhat successful incubator park. Since its' establishment it has now reached a mature stage and is home to established businesses.

- Some successful clusters have established themselves around one or two innovative and growing firms that required their suppliers and service deliverers close-by in order to manage innovative, customer-focused production chains. Often, these clusters have started small and once their merit was recognised, formal systems of Government support get established in order to further prosper and mature the industry. The Silicon Valley is the best known example world-wide. The maritime cluster in Prince of Wales Bay is probably Tasmania's best example.

- Traditional large-scale export oriented industries have quite literally lost ground over the last few decades. Many industries have closed down or moved to countries with low labour costs, most notably China, South Korea, Thailand, India and Malaysia. These industries tend to locate on large scale industrial lots with sufficient area to allow for growth and sufficient buffer from sensitive uses. The lots tend to be located close to the resource base, close to labour and/or close to strategic points in the transport chain. Close to the resource, these industries may be located on rural or special purpose zoned land.

Apart from being local service oriented or export oriented, location and site requirements vary considerable by type of industry as well: a warehouse has other site considerations than, for instance a mineral processing plant.

The overview (over page, Table 6) shows the key site and location requirements for different types of industries. The table has been adapted to reflect specific aspects of Southern Tasmanian situation.

[3] Witte, E. & A. McDougall (2010), "Knowledge Hubs, Innovation Precincts, Technology Parks, Employment Centres – Whatever label you want – They're much more than real estate projects." In: Economic Development Australia (EDA) Volume 4, Number 3.

Table 6 Land, location and access requirements for various activities

Activity Type	Land Requirement	Location/Access
Heavy Manufacturing	• Medium to large sites • Flat land • Large separation buffers • Provision of utilities and ICT • Industry zoning • Competitively priced land	• B-double access • Proximity to freight route • Proximity to container port, rail terminal • Access to supply chain/labour/customers
Light Manufacturing	• Small to large sites • Flat land • Small to medium buffers • Provision of utilities and ICT • Industry/mixed zoning • Competitively priced land	• Truck access • Proximity to freight route • Access to market and labour
Food processing	• Small to medium sites • Flat land • Compatible adjoining industries • Small to medium buffers • Contaminant-free land • Provision of utilities (water/sewer) • Industry zoning • Competitively priced land	• Access to local & (inter)national markets • Proximity to freight route • B-double access • Access to supply chain
Transport & Warehousing	• Large sites • Flat land • Industry zoning • Competitively priced land • Ready site access/egress • Advanced ICT	• B-double access • Access to key freight routes • Direct access to ports/rail/intermodal hub • Proximity to customers
Local Trade Services	• Small sites • Competitively priced land • Minor buffers • Light industry/commercial zoning	• Central to customers
High-tech, Science Park	• Small – medium sites • Commercial/industrial zoning • High amenity • Public/private transport facilities • Advanced ICT	• Access to CBD • Access to research and innovation services
Antarctic industries	• Small to large sites • Commercial/industrial zoning • Advanced ICT	• Proximity to research institutions • Access to Port facilities

Source: based on Planning SA (2007), Metropolitan Adelaide Industrial Land Strategy

2.4 Infrastructure and Investments

The current provision of infrastructure in Southern Tasmania is mixed with areas that are well serviced by the present needs of industry and other areas that require strategic investment in a range of infrastructure. The infrastructure discussed in the reviewed documents includes roads, railways, ports, Hobart Airport, water, electricity and communications.

The *Southern Integrated Transport Plan* aims to provide a strategy that will improve the efficiency of regional transport. The Plan highlights the lack of regional linkages that presently exist. It is highlighted that the Tasman and Arthur Highways are presently inadequate for the current needs of freight and tourists. It is also highlighted that the location of industrial land is best situated at accessible locations that have highway and railway access, and depending on the nature of use, access to port facilities. Transport is an important cost element to industries through (in)efficiency of logistical arrangements and the ability for workers to access and travel to employment.

As discussed in *Background Report: Infrastructure* it is noted that water reservoirs, waste water and storm water systems will face a core challenge through the potential impacts from climate change. This may involve temporary reduced supply in drinking water, and reliable water into Hobart's catchments. Waste water and storm water will face challenges from raised sea-levels which may impact on effluent systems and their ability to transport waste offshore.

The current breakdown of energy from each source in Tasmania includes 73% from Hydro Tasmania, 8% from Gas and 17% from Basslink power. Although current levels are healthy, recent low water catchment levels showed the possible impacts in terms of reduced power production. The current network is characterised by the large number of low capacity generators. Due to forecast growth for power it is envisaged that one major sub-station will need to be constructed per year. There are also other potential changes to the current operation of the network, including the impact from a price on carbon emissions which might drive up demand in hydro power, potential development of wind turbines and potential thermal overloading. To combat some current issues with the network a new 220 kw transmission line has been proposed to connect Hobart provide a better connection for energy.

As highlighted in *Background Report Infrastructure* communications faces significant investment through the National Broadband Network (NBN) Initiative. This is currently under construction by NBN Tasmania and plans to connect 200,000 homes in Tasmania to fibre optic or high-speed broadband over the next 5 years. It is envisaged that this will significantly improve the communication capacities for residents and businesses.

As noted in the *Southern Integrated Transport Plan,* 98% of Tasmania's interstate export volume is carried through sea cargo. The majority of freight activity occurs in the three northern ports of Burnie, Devonport and Launceston. The freight to and from Southern Tasmania is transported by road and rail to and from these northern ports via rail and the Midland Highway. The key transport and storage hub will become the Brighton Transport Hub, once the rail yards relocate from Hobart port to Brighton.

The *Review of Working Port of Hobart* suggests Hobart Port remains a key element for infrastructure in the region. The Antarctic and cruise sector as well as the servicing of the local maritime fleet will remain the key drivers of the Port. The Port will accommodate growth in cruise ships visiting Hobart, and sea travel and transport to and from the Antarctic. It is stated that new development in the Port area should not compromise existing and future port operations.

Currently Tasmania's freight is focused on the road network, with only 6% of freight transported by rail. Roads are critically important for the transportation of goods as well as people for employment. The key road connection between Southern Tasmania to the north and its ports is the Midland Highway which enters Greater Hobart in Brighton. This makes that Brighton is ideally located to act as a transport and industry hub. Some key developments include the concept to construct a new Bridge at the current Bridgewater Bridge crossing. There are also some other road improvements including new roundabouts and improvements to highway junction upgrades.

For freight movement the new integrated transport hub at Brighton already presents a significant change in the movement of goods in the greater Hobart area. The hub will have integrated rail and road access. The hub will help improve the efficiency of the rail freight network, with the slowest section of infrastructure between Bridgewater Bridge and Macquarie Point becoming obsolete after the hub is taken into operation (*Brighton Transport Hub, Development Application)*.

The *Tasmania Urban Passenger Transport* report highlights the current passenger network which provides an important component of the Greater Hobart transport network. A number of key issues face the network including fare structure, dispersed suburbs and abundance of car parking and car use. The fare structure currently charges by zone, the longer the distance the more the cost of the journey; this is highlighted as created a disadvantage for residents in outer areas. This is coupled to the dispersed land use patterns of suburbs and prevalent car use which makes providing a well utilised public transport system difficult. It is acknowledged that the public transport system can play an important role in reducing congestion and emissions that are caused by transport. One proposal includes upgrading of the railway into a rapid transit system (as the relocations of the rail yards will free up the line).

Some regional infrastructure issues as identified in the STCA land use strategy and background reports include:

- Southern Water indicates there are a number of source issues of regional significance, including:
    - A number of especially regional areas experience demands that exceed allocation
    - Weaknesses in the central distribution system, including:
        - Demand in Kingborough that exceeds capacity to maintain water levels in the Ridgeway Dam. This requires a new main. The construction of it which will be constrained by existing buildings, infrastructure and the topography,
        - Demand for an additional transfer main in Margate to boost capacity with potential expansion to Coningham and Kettering
    - Low pressure and potential fire protection issues in elevated areas around Hobart and fringe areas of Clarence.

- There are capacity issues with wastewater, including:

  - Granton and Austins Ferry (trunk lines needed for demand)
  - Treatment plants needed at Prince of Wales Bay, East Risdon, Rosny, Margate and Blackman's Bay
  - Macquarie Point plant
  - Taroona plant is overloaded
  - East Risdon and Margate treatment plants currently exceed licensed flows
  - Lack of stormwater drains across the city
  - Many regional issues including need to relocate treatment sites to more appropriate locations in tourist towns and at capacity waste treatment systems

- It is also noted that key strategic roads require upgrading for future passenger and freight tasks, this includes the Midland Highway.

- Need for a second Hobart to Kingborough electricity transmission line to improve reliability, security and ultimately the transmission supply to areas south of Hobart.

- Rail improvements are required to carry increased freight loads.

Key investments by location include:

- Brighton Freight and Transport Hub
- $3.25 million to recurrent funding to Metro Tasmania to improve urban public transport services
- $750,000 each year to improve park and ride interchanges
- Proposed upgrading of the Bridgewater Bridge
- $190 million upgrade in the Midland Highway
- $31.6 million for the Main North-South Line Rail Capacity improvements, this includes curve and grade easing
- $24 million for rail capacity improvements at Rhyndaston
- $1.1 million for the upgrading of the Boyer Line
- Investment in upgrades to the Hobart International Airport

3 Demand for Industrial Land

This section reports on projections for industrial land demand over the next 5, 15 and 30 years. The industrial land demand projections are based on recent research for the Department of Economic Development, Tourism and the Arts (DEDTA).

The industrial land demand report containing the results of this research is the latest version and follow-up on the Industrial Land Demand for Tasmania, Short to Medium Term Overview that was undertaken in 2006 (with an update in 2008).

3.1 A Revised Methodology

Compared to the earlier research undertaken in 2006 and 2008, the methodology has been revised on a number of key points. The revised industrial land demand projections only include land uses that occupy industrial zoned land, and exclude industrial uses on for instance agricultural land, but include land demand by bulky goods retailing which currently often locates on industrial land.

As a result of, the new industrial land demand projections do no longer include industrial uses on agricultural properties and on mining and resource sites. The projections are for industrial zoned land only. A grey area in that respect is bulky goods retailing. Whether this use should be provided for on industrial zoned land is arguable, and is not determined within the scope of this study. The land demand projections provide land demand estimates for bulky goods retailing as a separate category.

This leads to the second major revision in methodology compared to the earlier study. Over the last decade or so, SGS has collected and entered industrial land use ratios in a database. The data stem from a range of previous studies by SGS on industrial land in metropolitan Melbourne, Sydney and regional cities. The data shows that land use ratios (that is land area per employee) by industry are fairly consistent between different locations. The application of these industry specific data to Tasmania has enabled us to provide industrial land demand projections by four industry categories:

- **Local service industries**, which are population driven;
- **Export oriented industries**, which are driven by market opportunities to export to the mainland and overseas. The uptake of the irrigation schemes and resulting agricultural transition and growth of export clusters are key determinants;
- **Transport, warehousing and wholesales**, which are intermediate industries driven by both population and export growth and trend to gain higher efficiencies with Just-in-Time (JiT) distribution processes. In the previous study this industry was distributed between local service and export oriented industries;
- **Bulky goods retailing** is driven by population growth and the sector specific characteristics most notably the matured life cycle of this subsector.

The previous study made a distinction between local service and export oriented industries only.

The employment projections for local service industries and bulky goods retailing are assumed to be driven by population growth and real income changes. The income projections are age specific and take ageing of the population into account as well as the impacts of compulsory superannuation. The employment projections for export oriented industries are driven by market opportunities for Tasmanian export products. The rate of uptake of the irrigation schemes is a key determinant. The employment projections for wholesale and trade are driven by both local demographic changes (i.e. population growth and real income changes) and export trade.

3.2 Land demand Projections

Two scenarios were developed for projecting the future demand of industrial land in Tasmania over the next 30 years. Both scenarios are based on plausible assumptions about the state's future. One scenario provides land estimates according to a low scenario and the other according to a high scenario. The scenarios provide a range (between low and high) within which future actual land demand is expected to lie.

The low scenario assumes that population growth will follow the medium population growth scenario by Demographic Change Advisory Council of Tasmania (DCAC)[4]. For export oriented industries and transport & warehousing the underlying assumptions are firstly that the uptake and roll-out of the regional irrigation schemes is slower than anticipated. This results in a slower expansion of food processing, transport and warehousing and industries servicing farms.

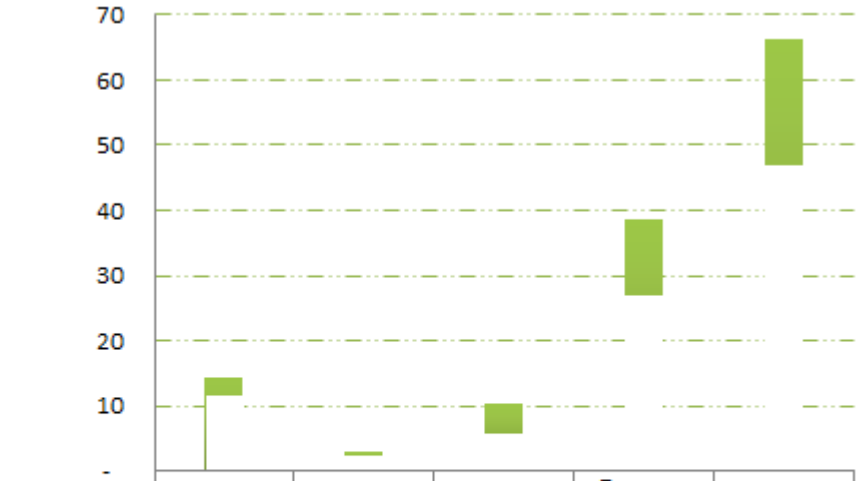
According to the high scenario population growth will be strong and in line with the DCAC high growth scenario. The housing market is assumed to grow moderately to strongly, providing opportunities for the bulky goods industry to grow moderately (slower than over the last decade). The uptake and roll-out of the regional irrigation schemes will be strong, allowing the agricultural industry to increase production and shift to higher margin crops. Food and beverage processing as well as transport and warehousing experience strong growth. The mining sector will continue to grow with new processing facilities being set up in the north-west. Higher value-added manufacturing will expand in certain clusters, most notably the maritime and mining engineering. The wood processing industries will see growth in niche areas such as specialty timbers and processing.

The Industrial Land Demand for Tasmania (2011-2041) report provides a more detailed description of the method used and underlying assumptions.

For the short, medium and long term, the land demand projections for Southern Tasmania are as follows. In the short term industrial land demand for Southern Tasmania is projected to lie between 47 and 66 hectares. The figure below (Figure 29) shows the land demand projections by industrial category.

[4] Comparison of population estimates by ABS with the DCAC projections for 2007-2010 indicates that real population growth in Tasmania was between the medium and high scenario.

Figure 29 Industrial Land Demand by Category (in ha) 2011-2016



	Local service	Bulky Goods	Export	Transport & Warehousing	Total
High Scenario	14	3	10	39	66
Low Scenario	12	2	6	27	47

Totals for Southern Tasmania

Source: SGS (2011)

In the medium term from 2011 to 2026, industrial land demand is expected to lie between 148 and 212 hectares (Figure 30).

Figure 30 Industrial Land Demand by Category (in ha) 2011-2026



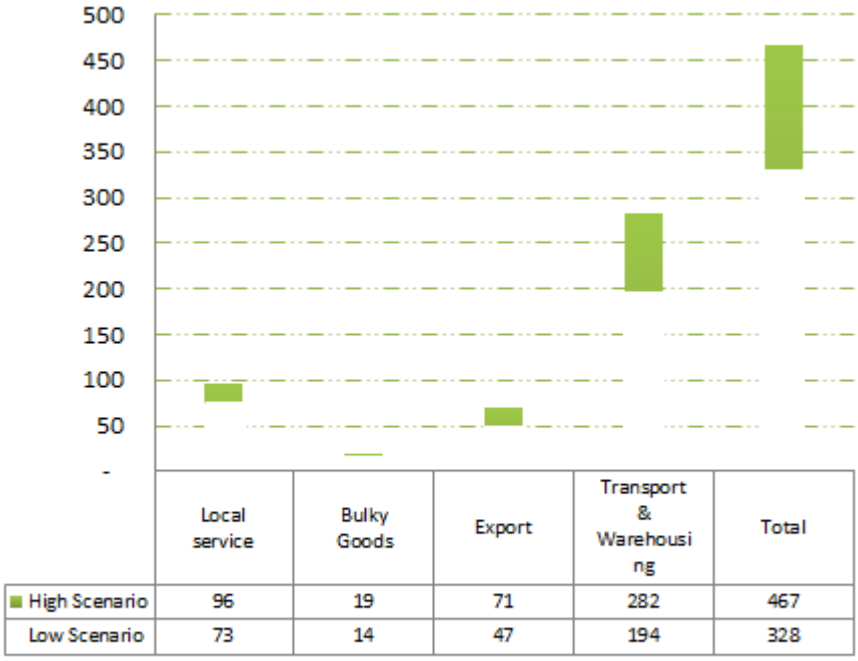
	Local service	Bulky Goods	Export	Transport & Warehousing	Total
High Scenario	44	9	33	125	212
Low Scenario	35	7	19	86	148

Totals for Southern Tasmania

Source: SGS (2011)

For the long term from 2011 to 2041, industrial land demand is expected to lie between 328 and 467 hectares (Figure 31).

Figure 31 Industrial Land Demand by Category (in ha) 2011-2041



Totals for Southern Tasmania

Source: SGS (2011)

By comparison, the table below shows the total industrial land demand projections for the three Tasmanian regions and Tasmania as a whole (Table 7).

Table 7 Summary of Industrial Land Demand Projections by Region

	2011-2016		2011-2026		2011-2041	
Range	*Low*	*High*	*Low*	*High*	*Low*	*High*
North-West	30	42	94	136	210	301
Northern	28	40	88	127	194	277
Southern	47	66	148	212	328	467
Tasmania	105	148	330	474	732	1,046

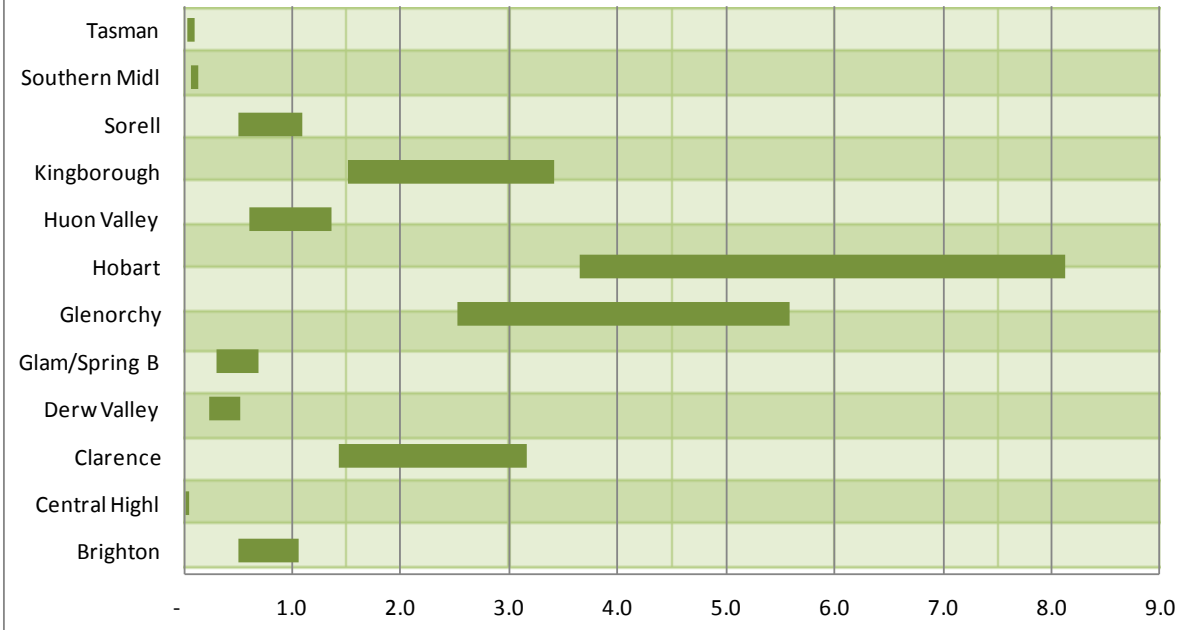
Source: SGS (2011)

The above land demand estimates include local service industries. Planning for export oriented industries, transport and warehousing and bulky goods retailing has a significant regional planning component to it. These sites should be planned for at the regional level, based on cooperation between Councils with the aim to provide the best possible sites and foster economic growth of the entire region.

Local service industries are predominantly planned for at the local level. The key exceptions to that being strongly urbanised municipalities where there is little or no space left to create additional industrial land, and where there is often pressure to convert existing industrial land to other higher value uses such as residential or commercial. In Southern Tasmania this is mainly the case in Hobart and Glenorchy, where some demand can be accommodated by infill development, densification or uptake of vacated heavy manufacturing sites. The remainder of the demand will increasingly 'flow over' into adjacent municipalities with sufficient industrial land available, such as Clarence and Brighton. As part of a survey conducted amongst the Southern Councils, the Hobart City Council response indicated that the impression exists that some of the light industrial (car related) light industries are increasingly being pushed out of the City (DEDTA, 2011).

In order to assist municipalities in their land use planning, land demand for local service industries were also calculated at the local level. The figures below show land demand for local service industries for the short (Figure 32), medium (Figure 33) and long term (Figure 34).

Figure 32 Industrial Land Demand for Local Service Industries, 2011-2016



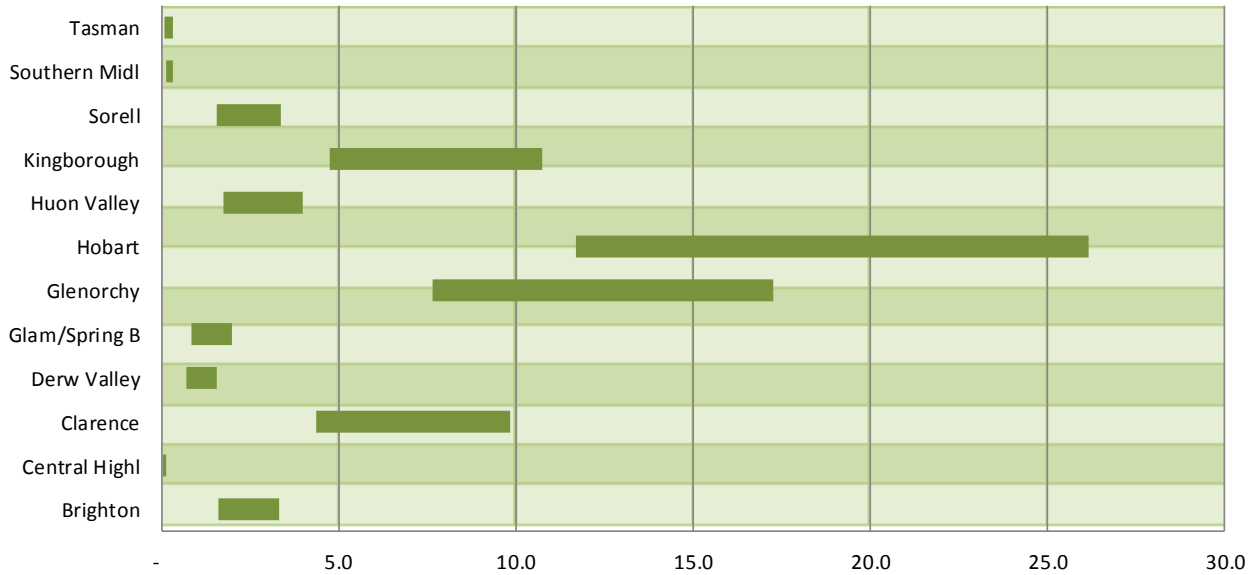
	Brighton	Central Highl	Clarence	Derw Valley	Glam/Spring B	Glenorchy	Hobart	Huon Valley	Kingborough	Sorell	Southern Midl	Tasman
Low	0.5	0.0	1.4	0.2	0.3	2.5	3.6	0.6	1.5	0.5	0.1	0.0
High	0.5	0.0	1.7	0.3	0.4	3.1	4.5	0.7	1.9	0.6	0.1	0.1

Source: SGS (2011)

In the short term, land demand for local service industries is highest in Glenorchy and Hobart, between 6.1 hectares and 7.6 hectares. Because of the limited availability of industrial land, a significant share of this demand may need to be accommodated elsewhere in a nearby municipality. Kingborough is expected to experience demand of between 1.5 and 1.9 hectares, while Clarence is expected to experience demand of between 1.4 and 1.7 hectares.

The patterns for the medium and long term are similar to the short term, but in a different order of magnitude (Figure 33).

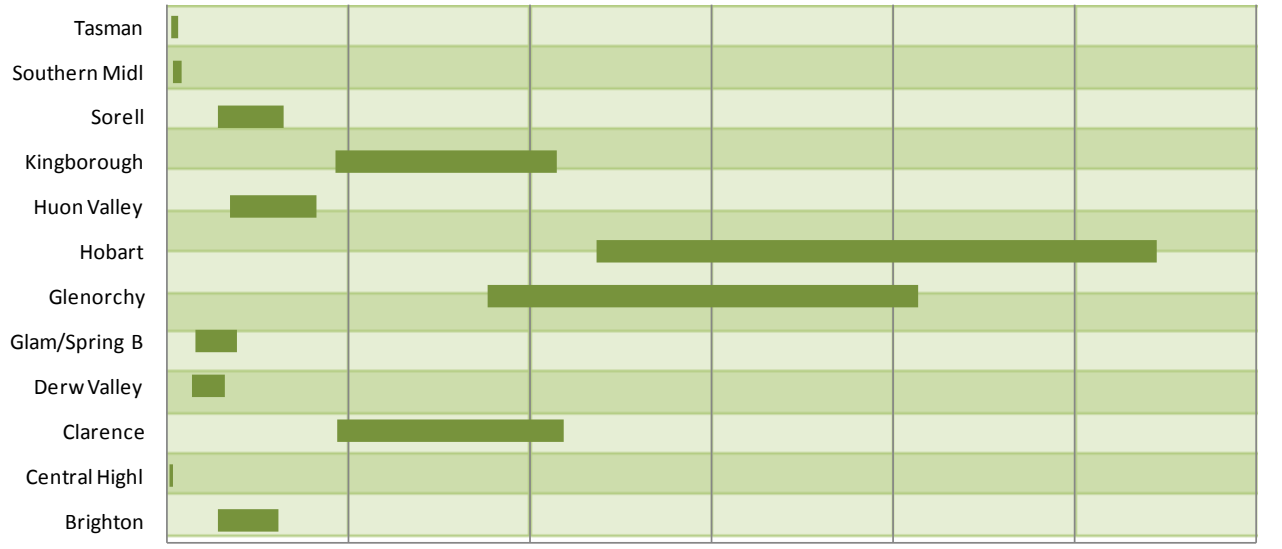
Figure 33 Industrial Land Demand for Local Service Industries, 2011-2026



	Brighton	Central Highl	Clarence	Derw Valley	Glam/Spring B	Glenorchy	Hobart	Huon Valley	Kingborough	Sorell	Southern Midl	Tasman
Low	1.6	0.1	4.4	0.7	0.9	7.7	11.7	1.8	4.8	1.5	0.2	0.1
High	1.7	0.1	5.5	0.8	1.1	9.6	14.5	2.2	6.0	1.8	0.2	0.2

Source: SGS (2011)

Figure 34 Industrial Land Demand for Local Service Industries, 2011-2041



	Brighton	Central Highl	Clarence	Derw Valley	Glam/Spring B	Glenorchy	Hobart	Huon Valley	Kingborough	Sorell	Southern Midl	Tasman
Low	2.9	0.2	9.5	1.4	1.6	17.7	23.7	3.6	9.3	2.9	0.4	0.2
High	3.3	0.2	12.5	1.8	2.2	23.7	30.8	4.7	12.2	3.6	0.5	0.5

Source: SGS (2011)

4 Vacant Industrial Land

This section identifies the type, quantity and location of the available vacant industrial land in Southern Tasmania.

4.1 Vacant Land Verification Process

In order to determine the supply of vacant industrial land an approach was adopted to ensure the estimates are as correct as possible. As part of earlier assignment work regarding industrial land by SGS it was found that some data sources were inconsistent in regards to the current supply of vacant land. The existing supply of vacant industrial land is of course always a representation of the situation at a given moment. The supply changes as a result of uptake of vacant land, land becoming vacant again after being used and as a result of more land rezoning.

The greatest inconsistency in vacant land data existed between the General Valuer's data and Clarence City Council data. The data of both sources were compiled at the parcel level and any duplications were removed.

The next step involved the verification process of all the potential vacant industrial land lots in Southern Tasmania. The first step of verification consisted of an examination of aerial imaging of these parcels (10cm resolution and accurate to 30cm, images taken in April 2011). For some parcels for which the imaging was not available, the List satellite images were used (dated March 2010). This step resulted in parcels being eliminated as being 'vacant'. The current use of a number of parcels remained 'unsure' after this step.

The supply of potential vacant parcels were also presented to Council planning representatives during a meeting (19 September 2011) and email follow up for confirmation. As a result, more parcels were definitive eliminated as being 'not vacant' or confirmed being 'vacant'. This step also resulted in a number of parcels being added by the municipalities as being currently 'vacant'.

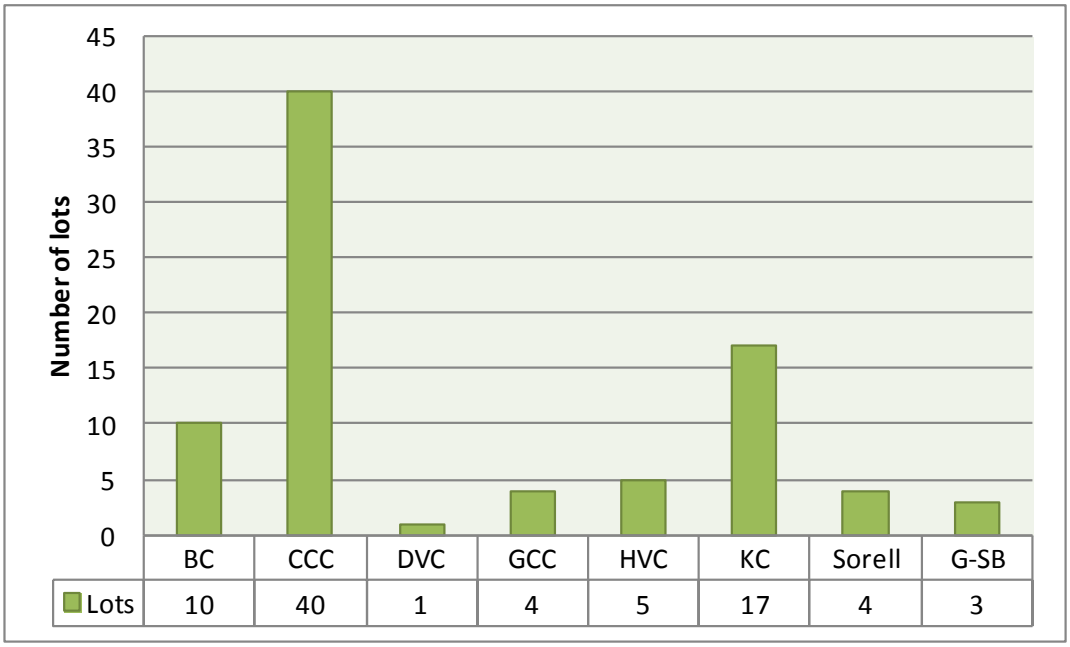
The last step consisted of site visits to a handful of parcels of which the current use was still 'unsure'. After this final step, all parcels had been definitely confirmed as being 'vacant' or 'not vacant'.

The verification process has resulted in updated estimates of existing vacant industrial land in Southern Tasmania. In total, it is estimated there are 84 vacant industrial parcels comprising a total land area of 176 hectares. The majority of vacant land is situated within the municipality of Clarence.

The figures below show that most vacant lots (Figure 35) and the majority of the vacant land area (Figure 36) is located in Clarence City Council, followed by Kingborough Council and Brighton Council. In terms of vacant land area, significant areas are also still available in Huon Valley Council.

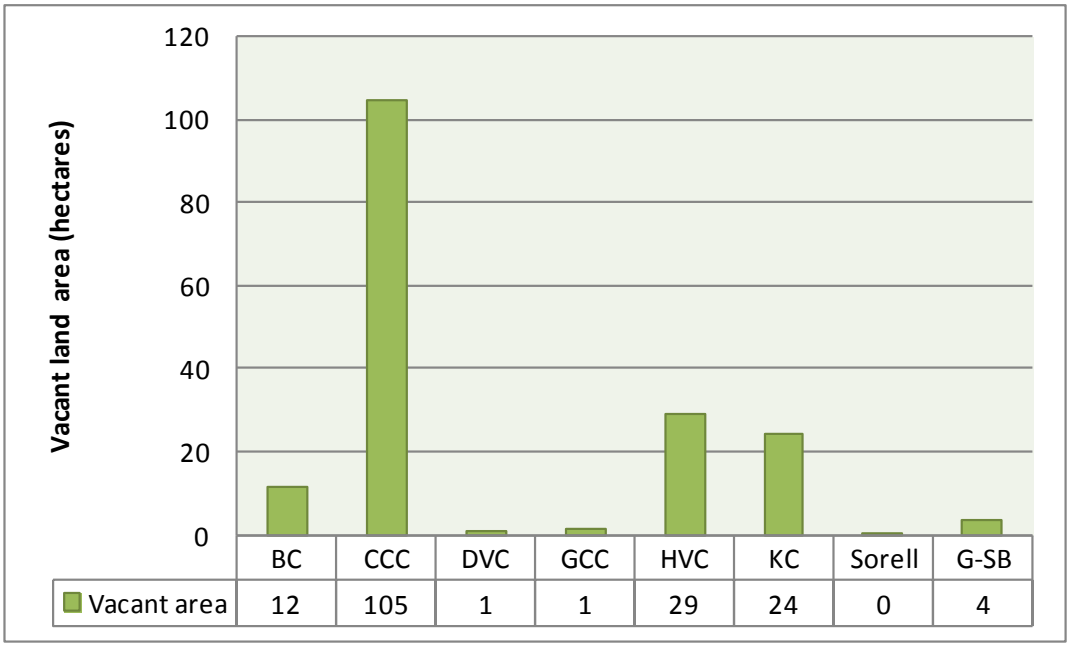
Four municipalities have no vacant industrial land available, being Hobart, Tasman, Southern Midlands and Central Highlands. In Hobart all industrial land has been taken up, with no opportunity increase industrial zoned land. Tasman, Southern Midlands and Central Highlands would most likely have the opportunity to rezone land to industrial if there was a demonstrated need.

Figure 35 Vacant Industrial Land Parcels by Council, 2011



BC= Brighton Council; CCC= Clarence City Council; DVC= Derwent Valley Council, GCC= Glenorchy City Council, HVC Huon Valley Council; KB= Kingborough Council; G-SB= Glamorgan-Spring Bay Council
Source: SGS (2011)

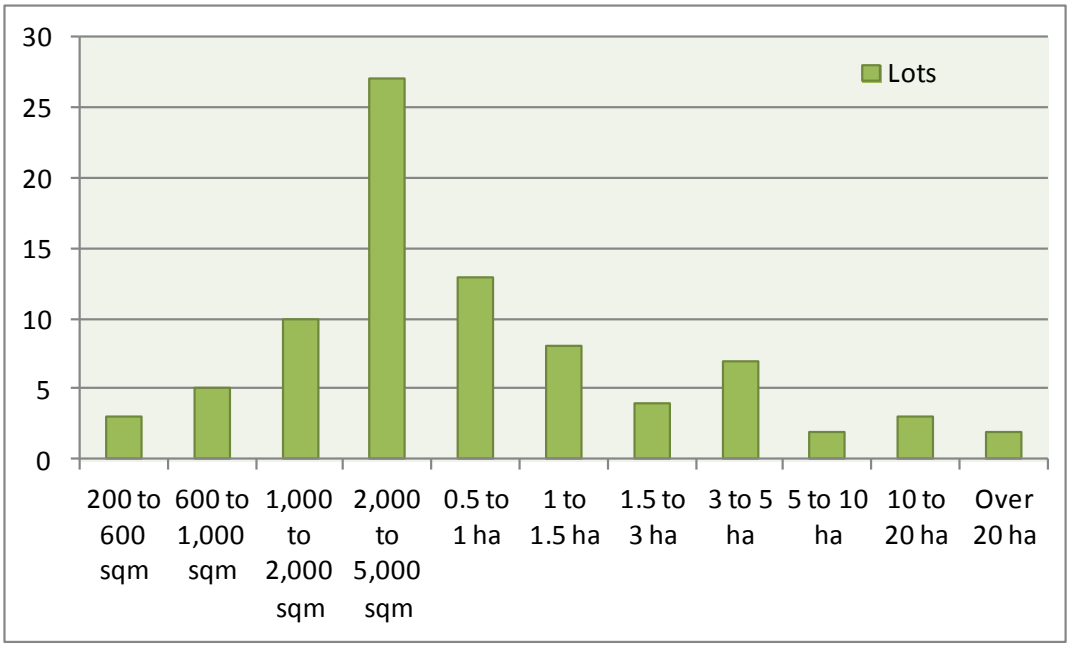
Figure 36 Vacant Industrial Land Area by Council, 2011



Source: SGS (2011)

The lot size of the vacant parcels varies considerably from 370 sqm in Margate to 26 hectares at Kennedy Drive (part of the Aerodrome site). The figure below (Figure 37) shows the distribution of the number of lots by lot size.

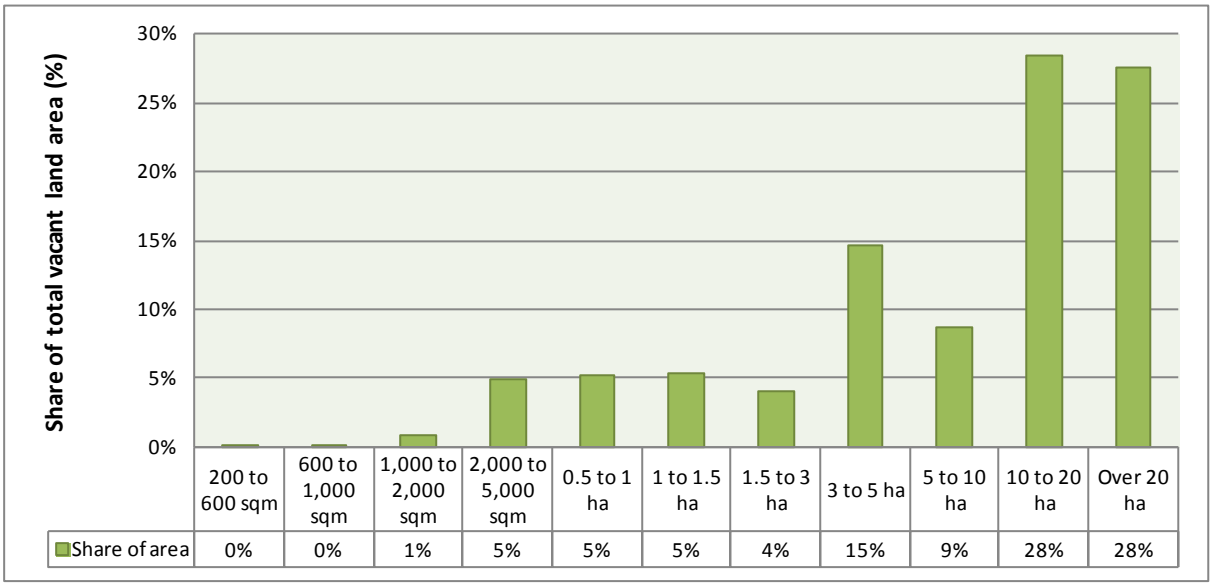
Figure 37 Vacant Industrial Land Parcels by Lot Size, 2011



Source: SGS (2011)

The larger lots, with areas of 10 to 20 hectares and over 20 hectares, represent 56% of the total vacant land stock. In sum the large lots are nearly 99 hectares. The figure below demonstrates this by displaying the share of land area by lot size (Figure 38). Small lots, with areas of up to 5,000 sqm represent 6% of the total vacant land stock or just below 11 hectares.

Figure 38 Vacant Land by Parcel Size (% of total vacant stock), 2001



	200 to 600 sqm	600 to 1,000 sqm	1,000 to 2,000 sqm	2,000 to 5,000 sqm	0.5 to 1 ha	1 to 1.5 ha	1.5 to 3 ha	3 to 5 ha	5 to 10 ha	10 to 20 ha	Over 20 ha
Share of area	0%	0%	1%	5%	5%	5%	4%	15%	9%	28%	28%

Source: SGS (2011)

4.2 Assessment of Vacant Industrial Land

This section describes the available vacant land by municipality in some detail:

- Firstly, this section reports on the location of vacant land using GIS maps.
- Second, there will be a discussion on the suitability of land given its slope and how it is situated in relation to infrastructure and sensitive uses. Regarding the slope of the land, SGS has calculated the average slope for each lot[5]. Generally speaking, a slope of 10% or more makes the land unsuitable for industrial uses. Slopes between 5% and 10% are less preferable for many uses. Sensitive uses have been categorised based on the current zoning of the land. Land zonings that are not seen as potentially conflicting with industrial uses have not been categorised and are displayed in grey. The sensitive land categories are:
    - Residential (including future residential)
    - Community facilities, including some parks and foreshores
    - Environmental protection, including natural areas with conservation values
    - Heritage, areas with heritage values

[5] The average slope is generally a good indicator of the steepness of the land. However, in some cases a slope is concentrated in a minor area of the parcel, and in those cases the measure used here may provide an inaccurate interpretation of the suitability of the land.

    - Tourism, land areas with primary tourism uses, including vineyards open to visitation and tastings
    - Water supply and conservation, drinking water catchment areas and protected waters
- Thirdly, it provides an assessment of the suitability of the vacant lots for either local service industries, export oriented industries, transport and warehousing and bulky goods retailing.

The second stage of this project will look closer at potential future locations for industrial use. Potential sites for future industrial use are therefore not shown on the maps in this section.

4.2.1 Brighton Vacant and Suitable Industrial Land Assessment

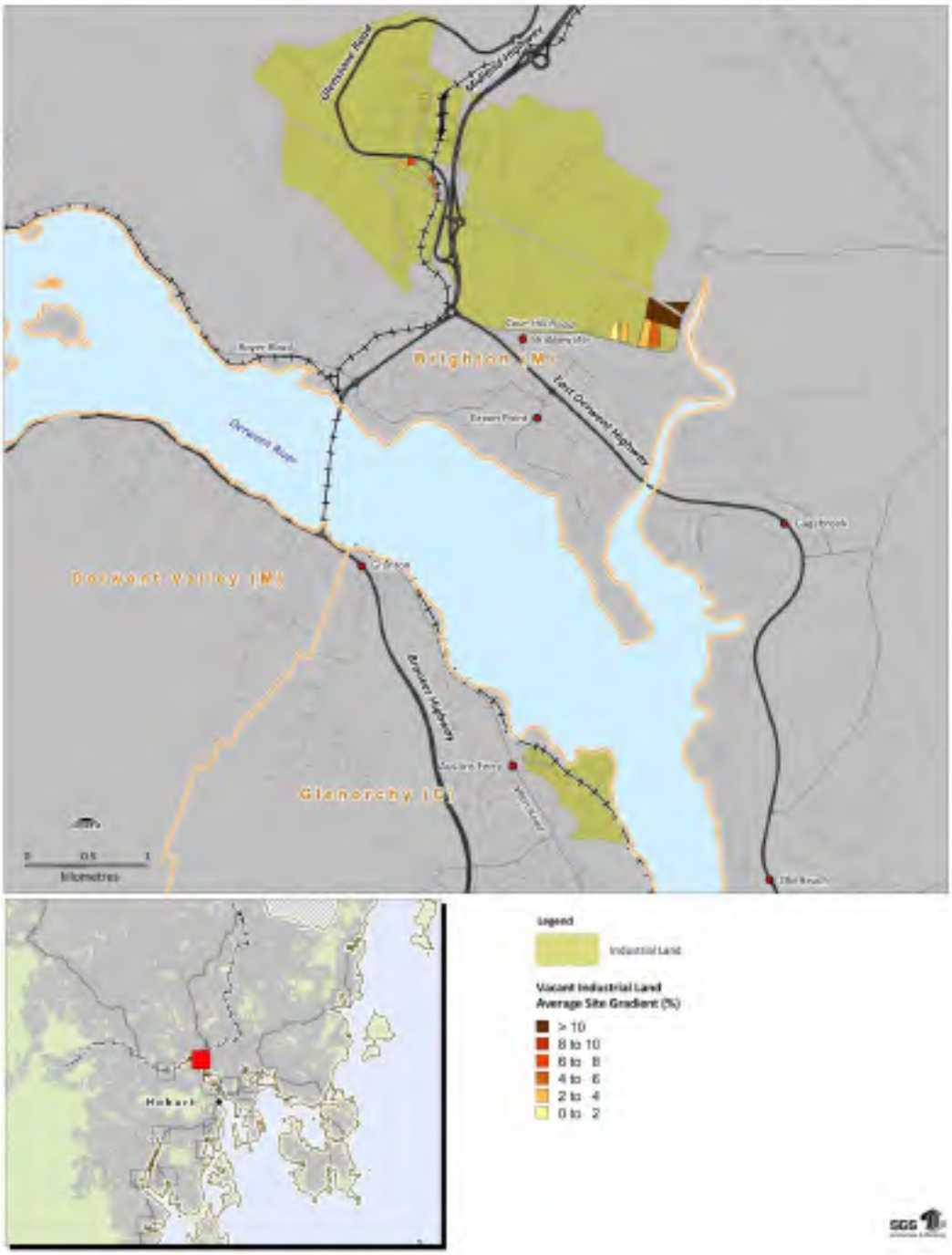
At the time of preparing this report there were 10 industrial lots listed as being vacant, in sum adding to 11.6 hectares of land. Five lots representing 1.5 hectares are situated in the Brighton Industrial Hub and the remaining five parcels, 10 hectares, in the Cove Hill area.

The vacant parcels in the Brighton Industrial Hub each have an area of between 2,000 sqm and 5,000 sqm. The average slope of these parcels is below 5% and should in that respect, be suitable for most industrial uses.

Figure 39 (next page) provides a map that locates the vacant parcels and shows their average slopes.

The vacant parcels in the Cove Hill area range from 8,500 sqm to 4.9 hectares. One parcel of 1.5 hectares has an average slope of 5.8% which may impact somewhat on its suitability for industrial use. The 4.8 hectare parcel has an average slope of 11% and is therefore less suitable for industrial activities. In total there is 6.6 hectares of vacant land with an average slope of less than 10%.

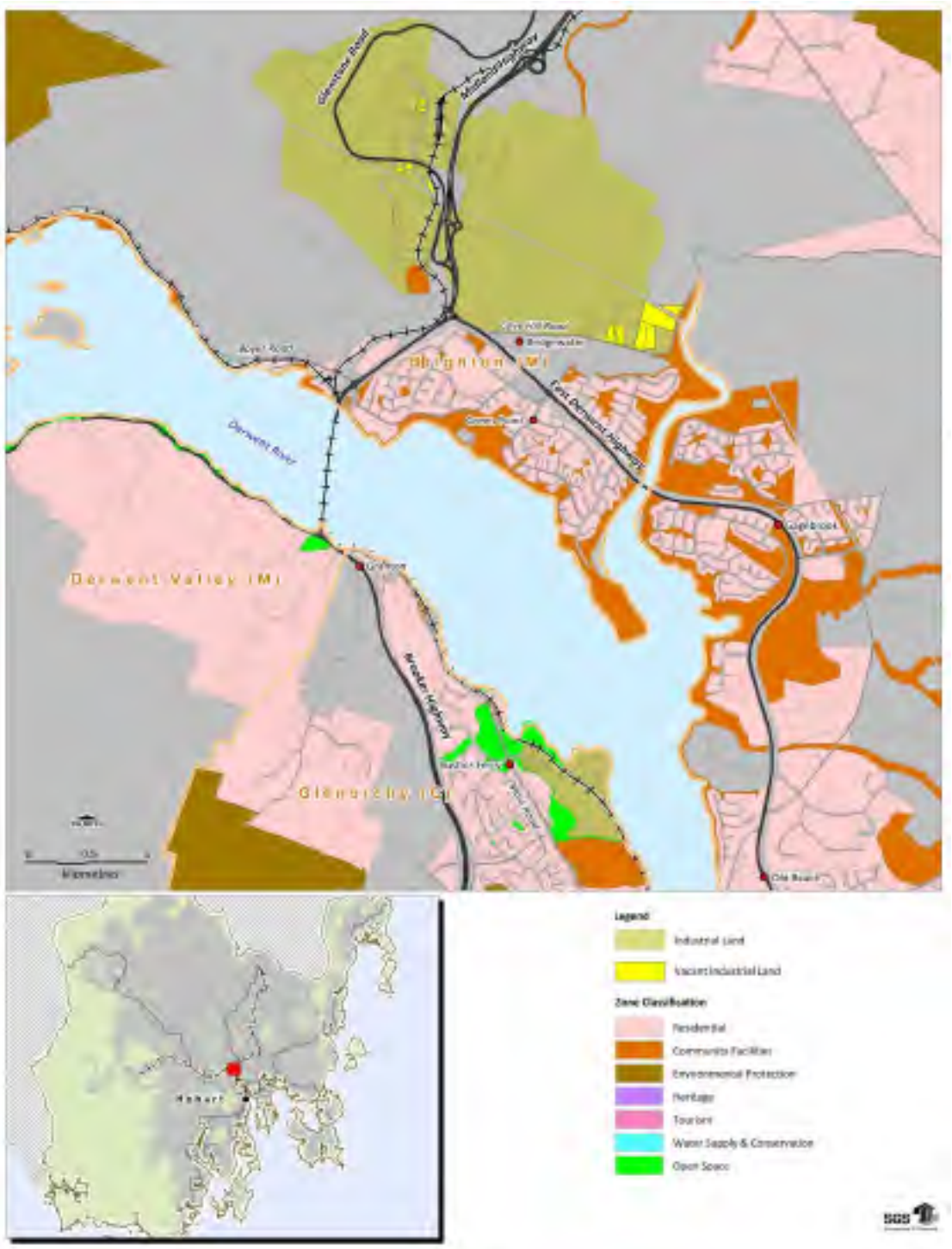
Figure 39 Vacant Industrial Land in Brighton and Parcel Land Gradients



The vacant parcels in Brighton are generally well located in relation to road access. The parcels in the Brighton Industrial Hub are also close to rail access. The parcels at Cove Hill connect to the Midlands Highway via Cove Hill Road.

The parcels are largely situated with sufficient buffer from sensitive uses (Figure 40). The land categorised 'community facilities' involves a little used area. The assessment shows that 6.6 hectares or 9 parcels are suitable for industrial use in terms of slope and nearby uses.

Figure 40 Vacant Industrial Land in Brighton and Nearby Sensitive Uses



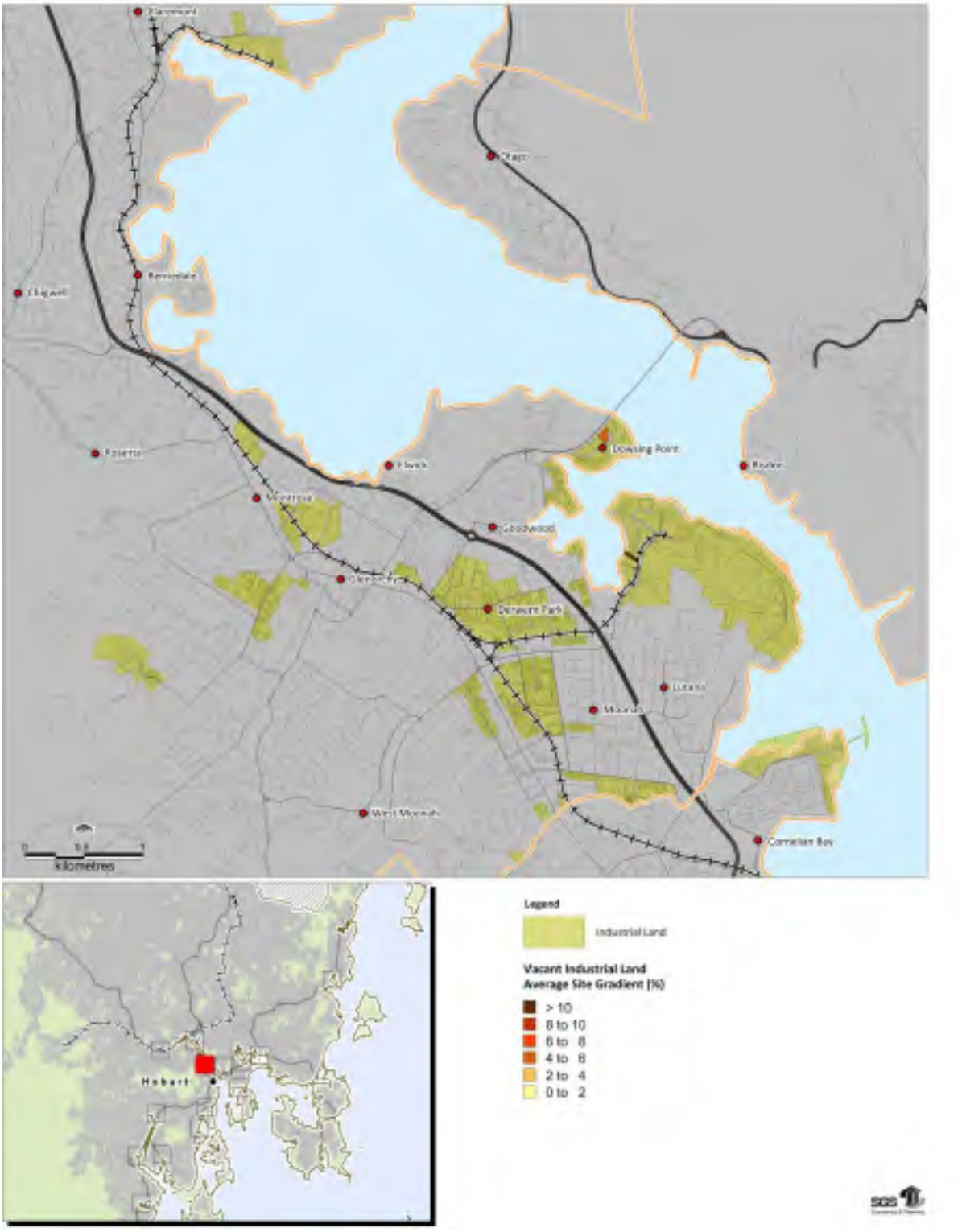
4.2.2 Glenorchy Vacant and Suitable Industrial Land Assessment

Glenorchy is the traditional industrial centre of Greater Hobart. While some larger manufacturers have relocated and/or closed over the last few decades, their vacated parcels have generally been taken up quickly by smaller industrial land users, mostly local service industries. While there are always some industrial vacancies as part of changes and relocations, by and large, most land in Glenorchy has been occupied.

Currently, only four vacant industrial parcels remain (1.2 hectares): two small parcels in the Chapel Street area (between 500 and 700 sqm), one parcel in Prince of Wales Bay (3,700 sqm) and one parcel in the Science & Technology Park (7,000 sqm). The parcels at Chapel Street are currently used as informal parking areas.

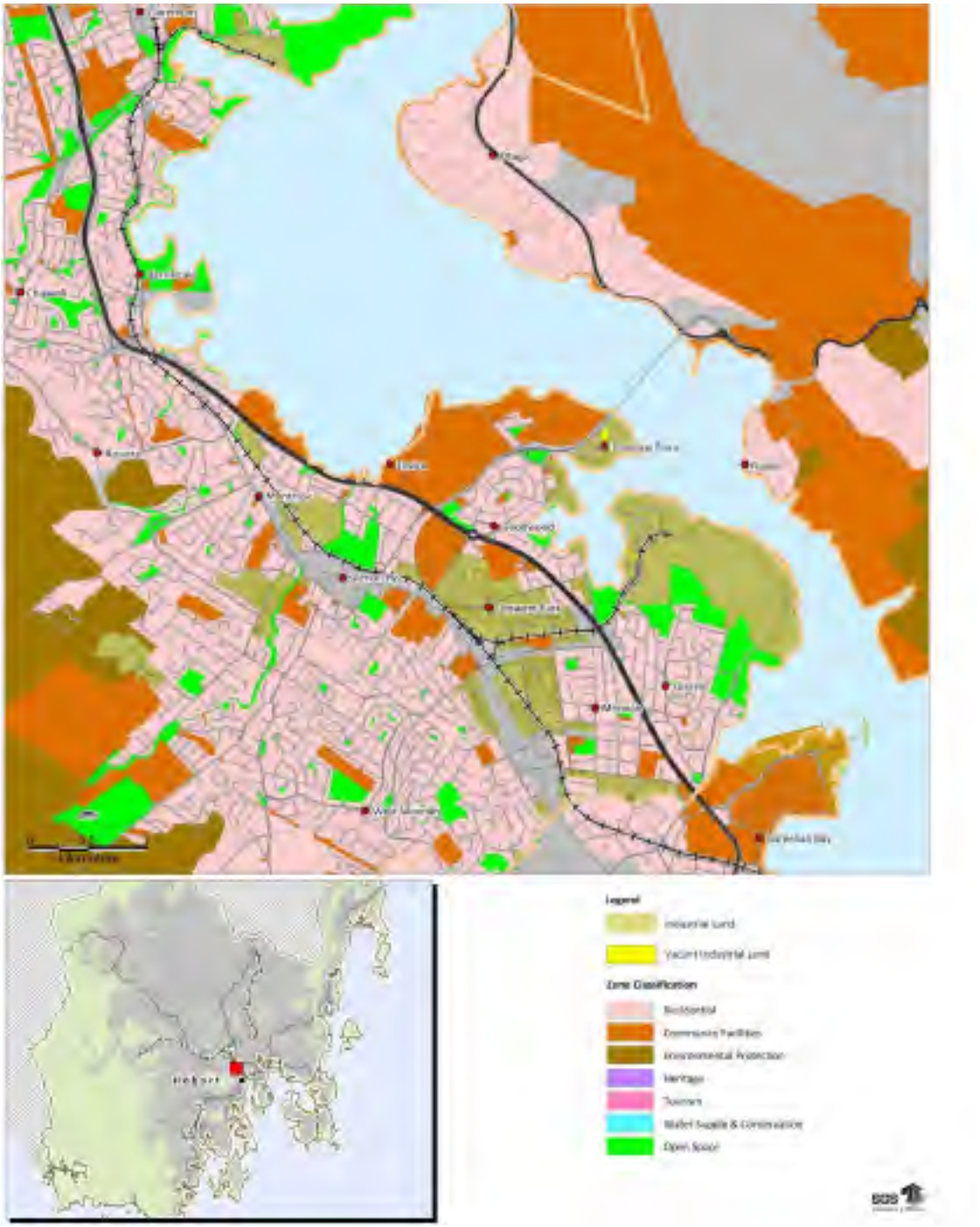
The average slopes of these areas do not restrict their suitability (Figure 41). The parcel in POW Bay has an average slope of 13.6% which limits the useability of the site.

Figure 41 Vacant Industrial Land in Glenorchy and Parcel Land Gradients



All four parcels are located within established industrial areas (Figure 42). The Chapel Street area is close to residential uses and as a result of historically developed land use patterns, there are some residential uses within the Chapel Street precinct, thereby creating some use issues within the industrial precinct.

Figure 42 Vacant Industrial Land in Glenorchy and Nearby Sensitive Uses



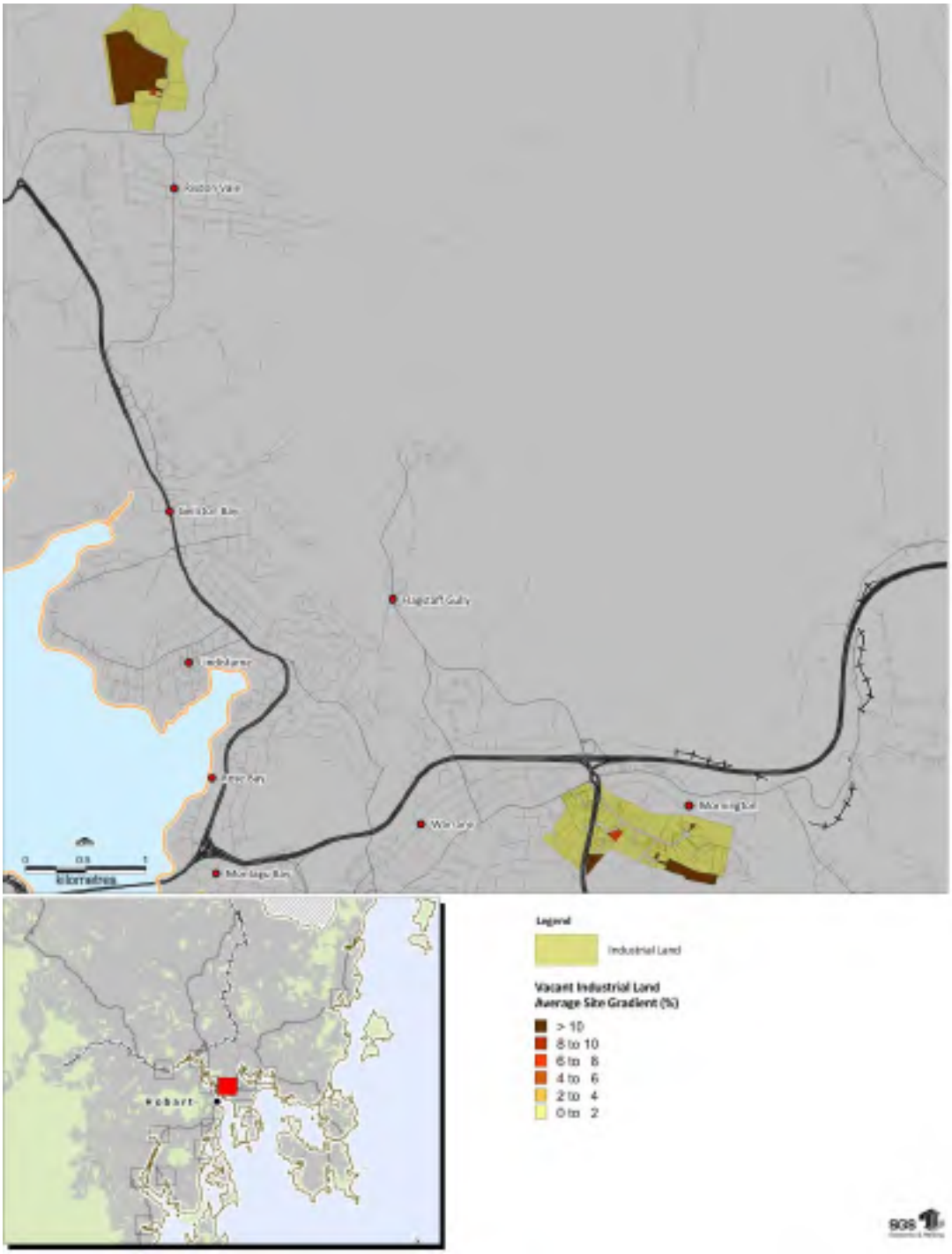
The assessment indicates that 8,128 sqm or 3 parcels are suitable for industrial use in terms of slope and nearby uses. The parcel at POW Bay is constrained by slope.

4.2.3 Clarence Vacant and Suitable Industrial Land Assessment

Clarence is the municipality which currently comprises the most extensive supply of vacant industrial land of 40 parcels and 105 hectares. The vacant land areas and their average slopes are shown in the three following maps for Risdon Vale and Mornington (Figure 43 & Figure 44), Kennedy Drive and surrounds (Figure 45 & Figure 46) and Rokeby (Figure 47 &Figure 48).

At Risdon Vale there are currently two vacant parcels with a total area of 19.8 hectares. The largest parcel has an average slope of 13.1%. At Mornington there are currently seven vacant lots of which two have a slope of greater than 10%. In total there is 4.9 hectares of vacant land with a slope of less than 10% in Risdon Vale and Mornington precincts (Figure 43).

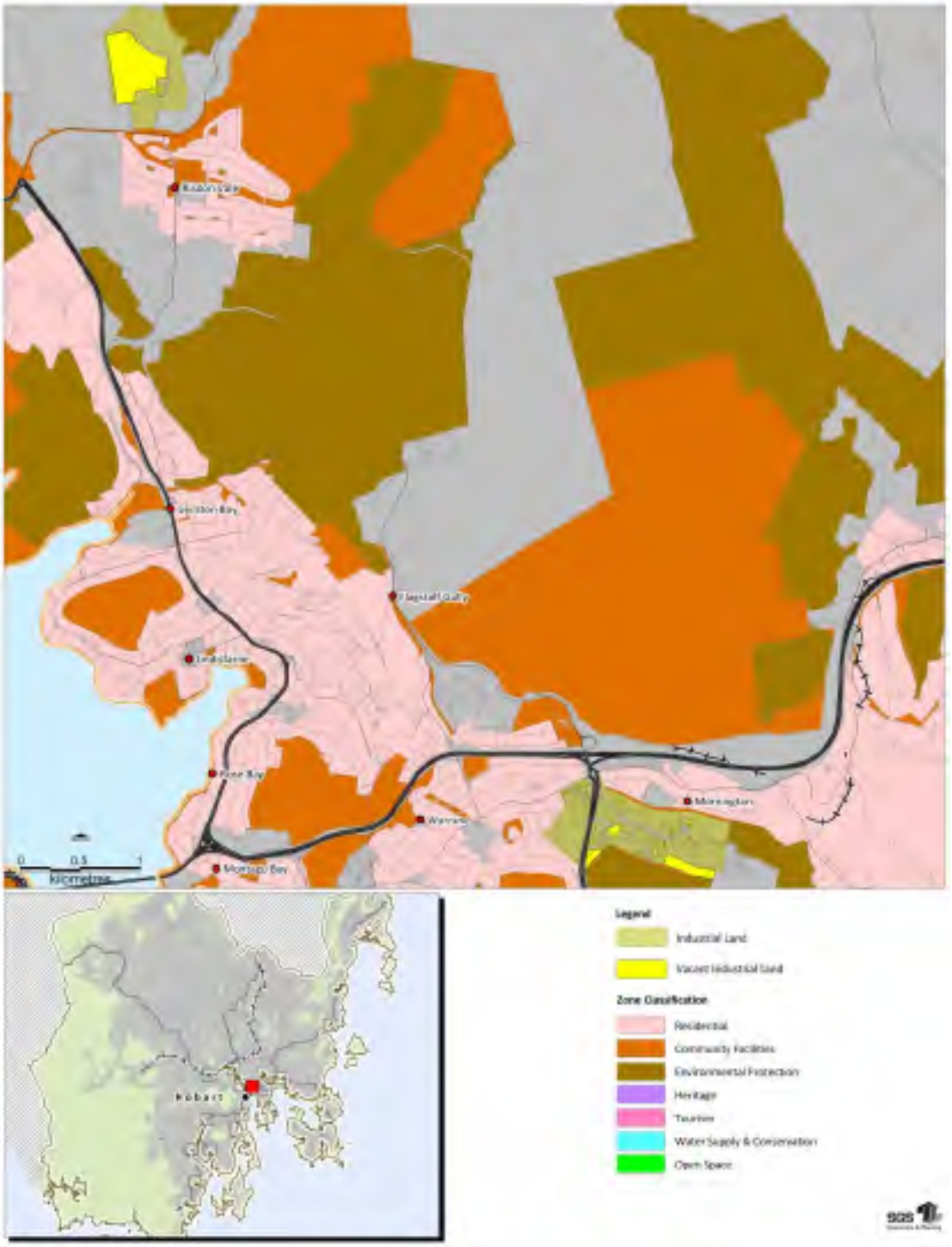
Figure 43 Vacant Industrial Land in Risdon Vale and Mornington, Parcel Land Gradients



The vacant industrial land at Risdon Vale is close to the East Derwent Highway which connects to the Midlands Hwy when heading north and to the Tasman Highway when heading south. The land at Risdon Vale does not border known sensitive uses (Figure 44). The vacant industrial land is close to the Tasman Highway and close to major population concentrations and potential markets. The

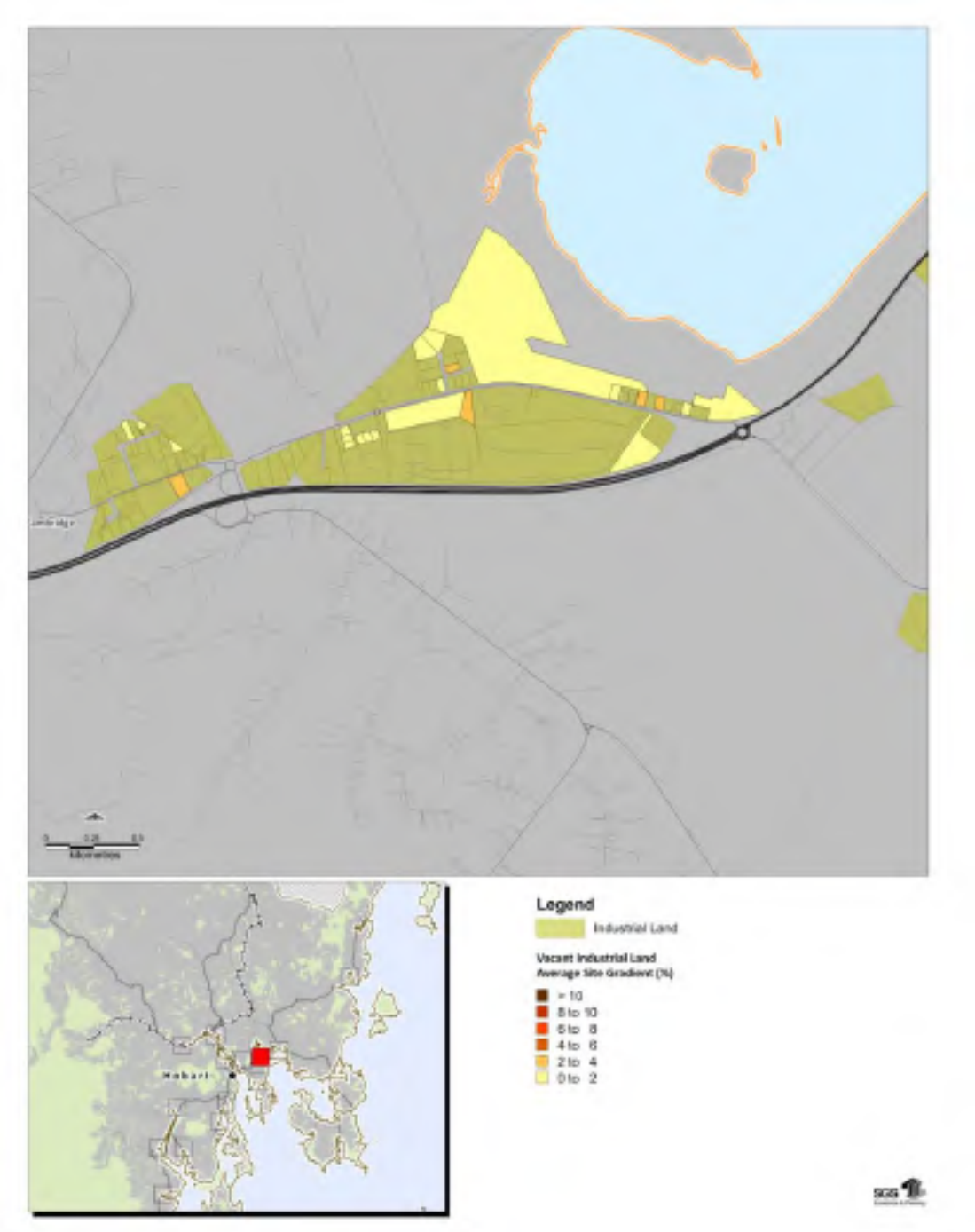
two lots at Mornington that have a slope greater than 10%, also border an area with sensitive natural values (category Environmental Protection).

Figure 44 Vacant Industrial Land in Risdon Vale and Mornington, Nearby Sensitive Uses



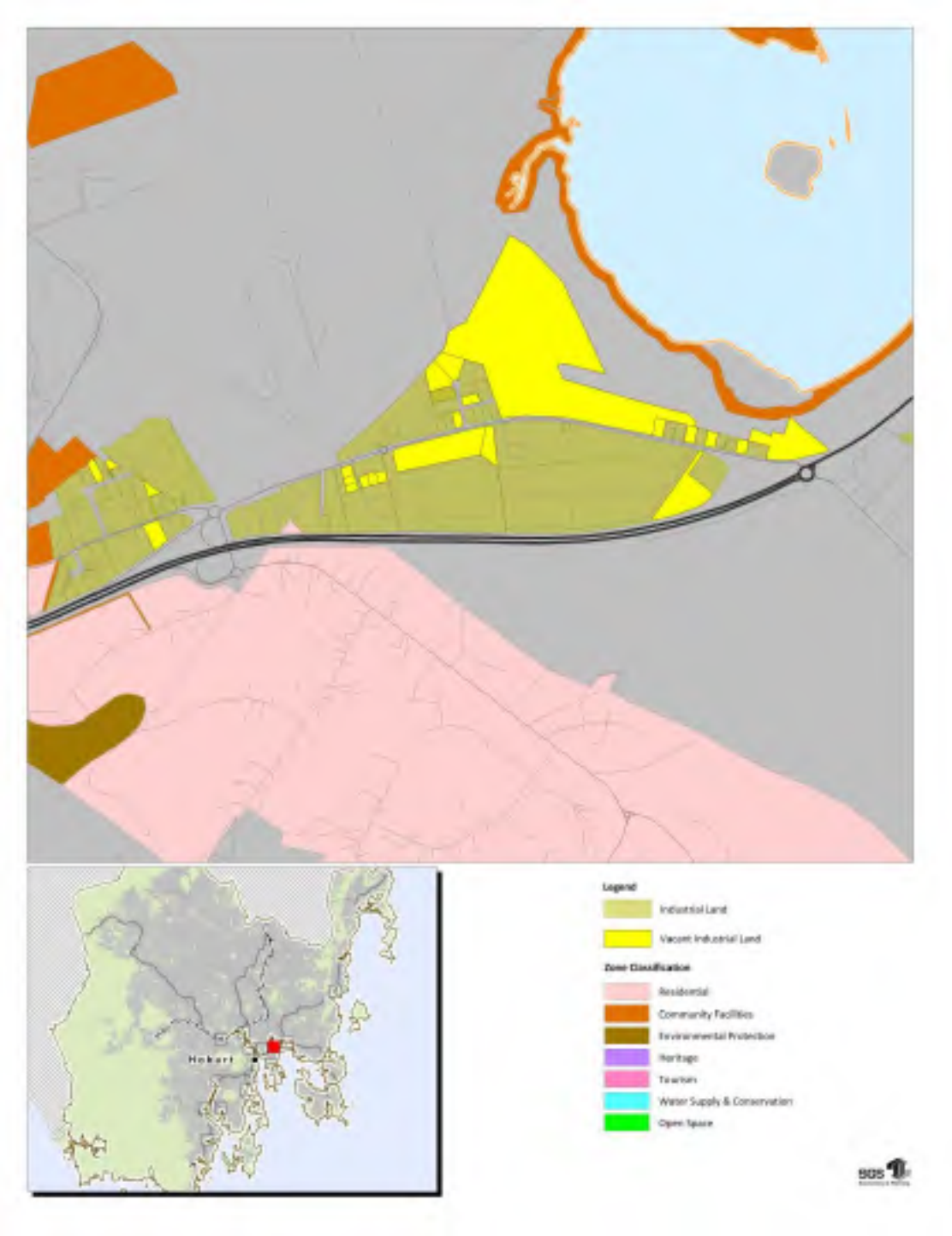
In the Cambridge area, which includes the industrial land at Kennedy Drive there are 23 vacant parcels that in total comprise 38 hectares. One site (the Aerodrome at 115 Kennedy Drive) accounts for 26 hectares. The majority of parcels (18 parcels) are smaller than 5,000 sqm. The industrial land at Cambridge is generally flat and none of the vacant properties have a slope greater than 10% or even 5% (Figure 45).

Figure 45 Vacant Industrial Land around Cambridge, Parcel Land Gradients



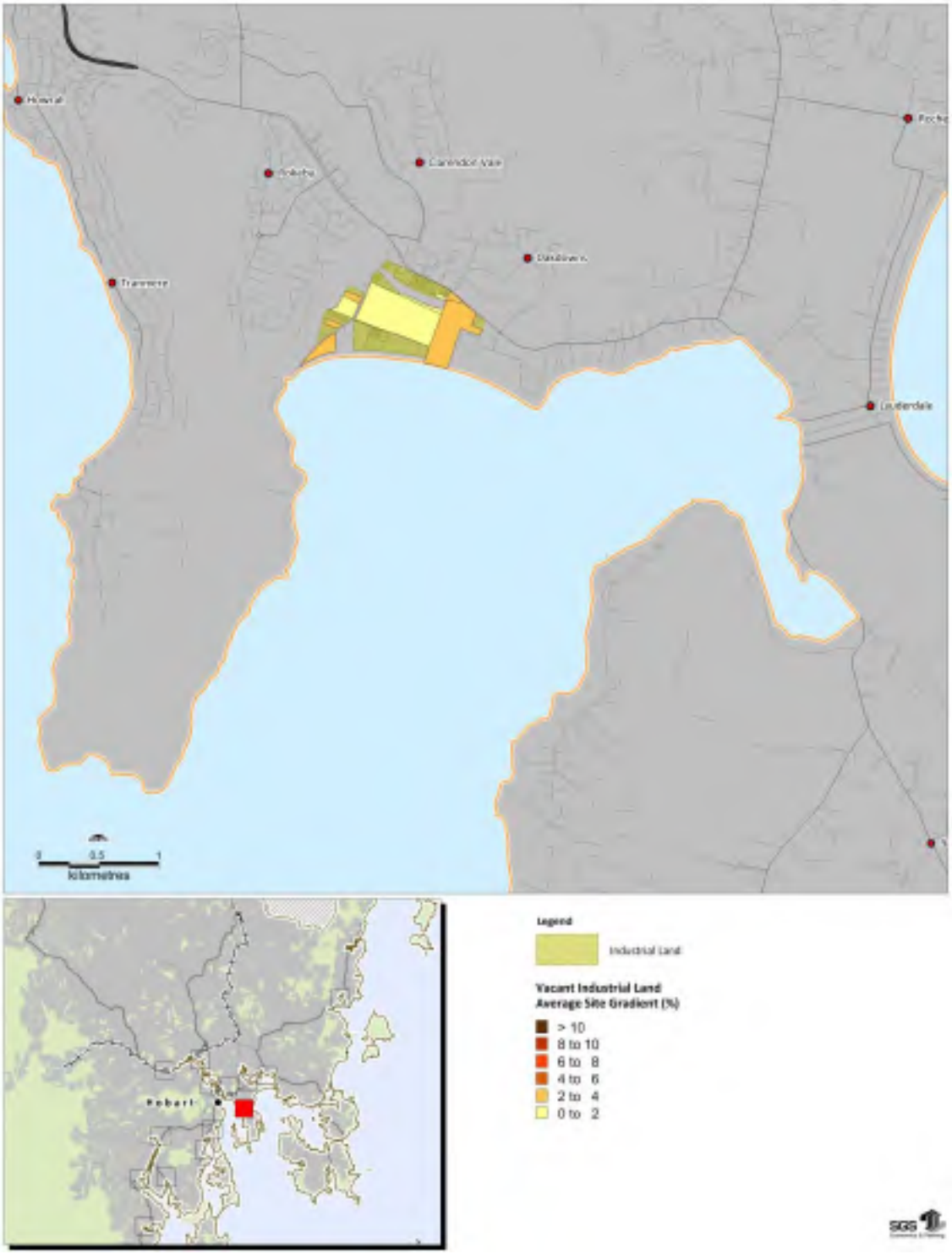
In the Cambridge area there is only one vacant lot that borders a sensitive use area which is in the category Environmental Protection (Figure 46). The total vacant land that is suitable in terms of slope and adjacent uses in Cambridge is 37.7 hectares or 22 parcels.

Figure 46 Vacant Industrial Land around Cambridge, Nearby Sensitive Uses



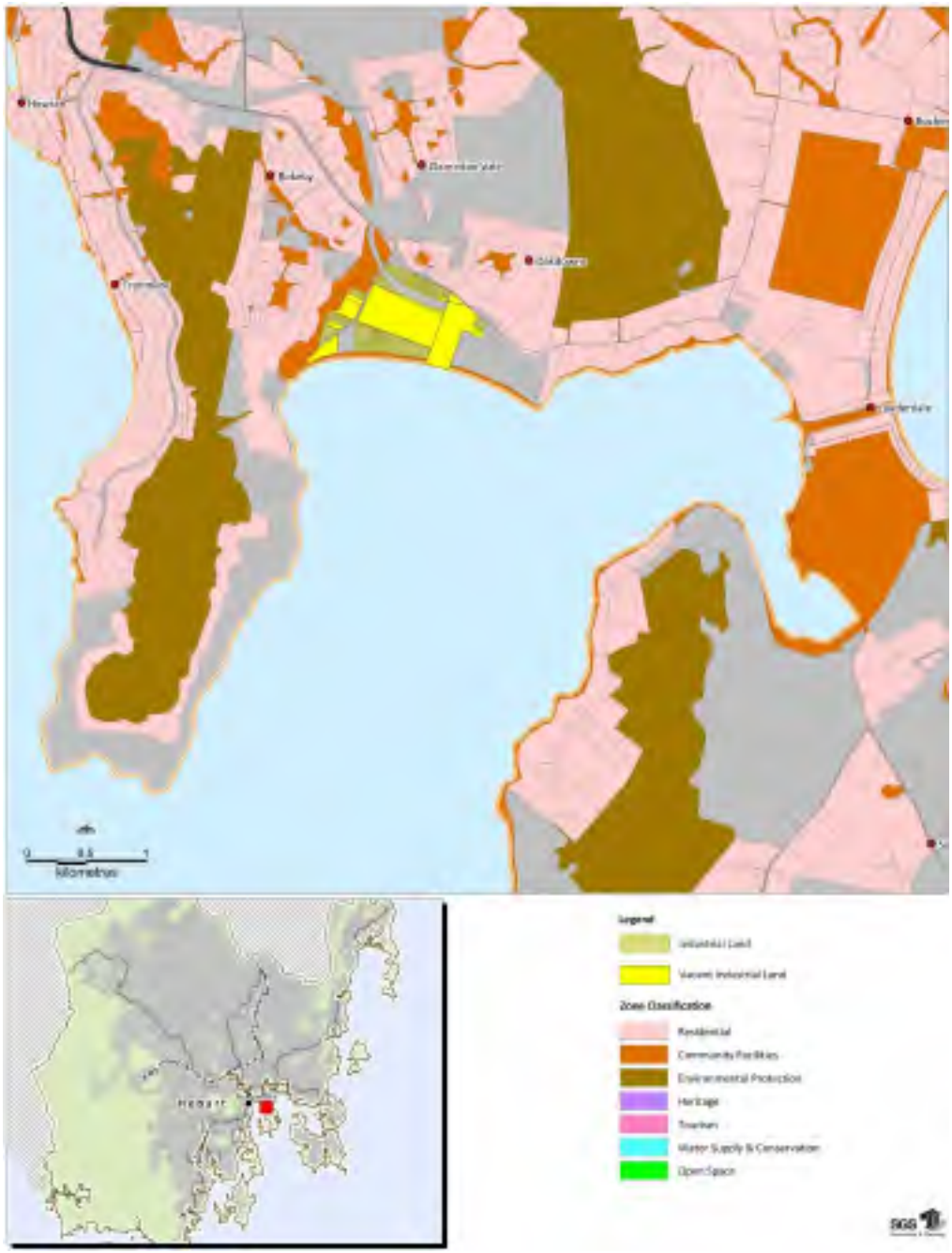
In the Rokeby precinct there are currently 8 vacant industrial parcels with a total land area of 40 hectares. None of this land has an average slope of greater than 10% (Figure 47).

Figure 47 Vacant Industrial Land in Rokeby and Parcel Land Gradients



The vacant land in the Rokeby area is mostly enclosed within the existing industrial precinct (Figure 48). There are three lots that border an area which is categorised as community facilities which may limit the suitability of the land for certain industrial uses. A very small area of one of the very large land parcels borders a sensitive use and should therefore still be regarded as suitable for industrial use (with enough area to create buffer within the site itself). The two remaining parcels represent a total area of 2.8 hectares.

Figure 48 Vacant Industrial Land in Rokeby and Nearby Sensitive Uses



However, there is one large site in the Rokeby area that lies adjacent to the coast and is low lying. Sea level rise modelling shows that the entire area would be flooded in the case of a storm surge and rising sea levels. This is assuming an average sea level rise of 84 cm by 2100 above the mean sea level in 2004 (The List, November 2011). It appears to be comparable to the Lauderdale area in terms of susceptibility to flooding and climate change. This site is therefore regarded as less suitable for industrial uses. This parcel is also adjacent Community uses.

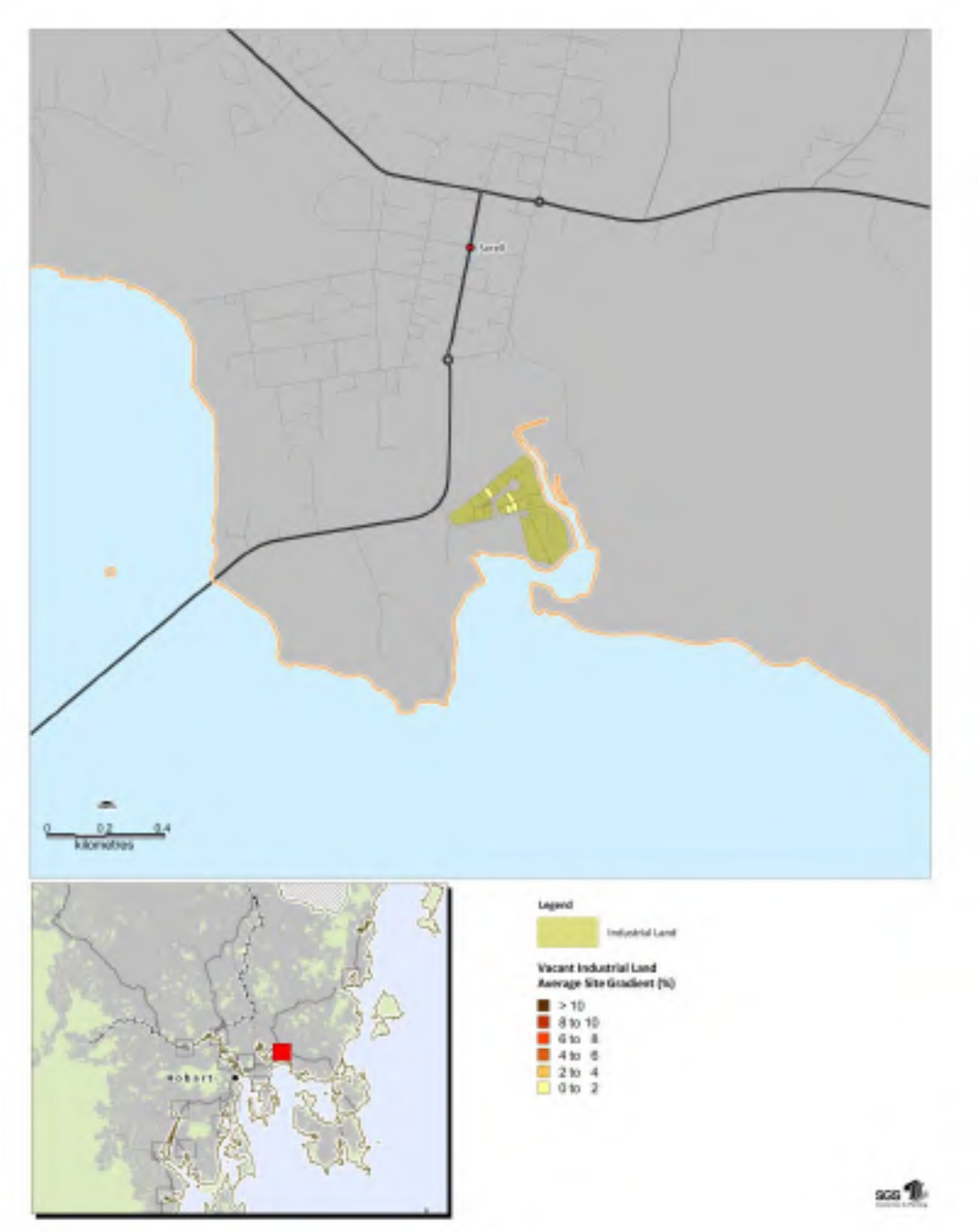
As a result there are 6 parcels in Rokeby that are both vacant and suitable in terms of slope and adjacent uses. These parcels total 37.5 hectares of industrial land.

The overall result for Clarence (consisting of Risdon Vale and Mornington, Kennedy Drive and surrounds, and Rokeby) illustrates that there are 34 vacant lots which are suitable for industrial use in terms of slope, nearby sensitive uses and sea level rise. The total area comprises 80 hectares.

4.2.4 Sorell Vacant and Suitable Industrial Land Assessment

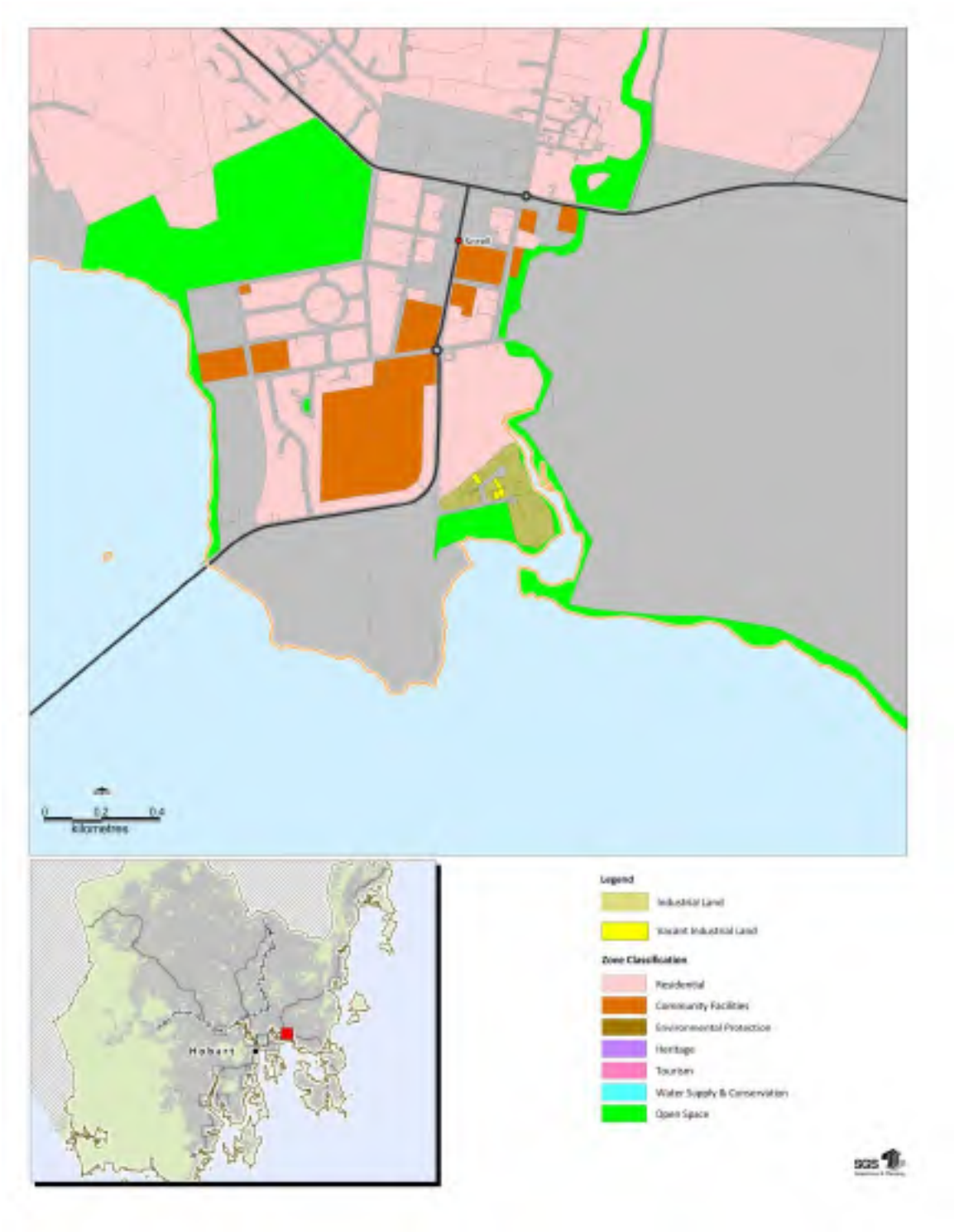
There are currently four vacant industrial lots in Sorell, comprising 2,700 sqm in total. The lot sizes are small and each lot is between 600 and 1,000 sqm. All four lots are generally flat (**Error! eference source not found.**).

Figure 49 Vacant Industrial Land in Sorell, Parcel Land Gradients



All four lots are also contained within an existing industrial precinct. Two of the four parcels are located close to an open space area, but appear to have sufficient buffers (Figure 50).

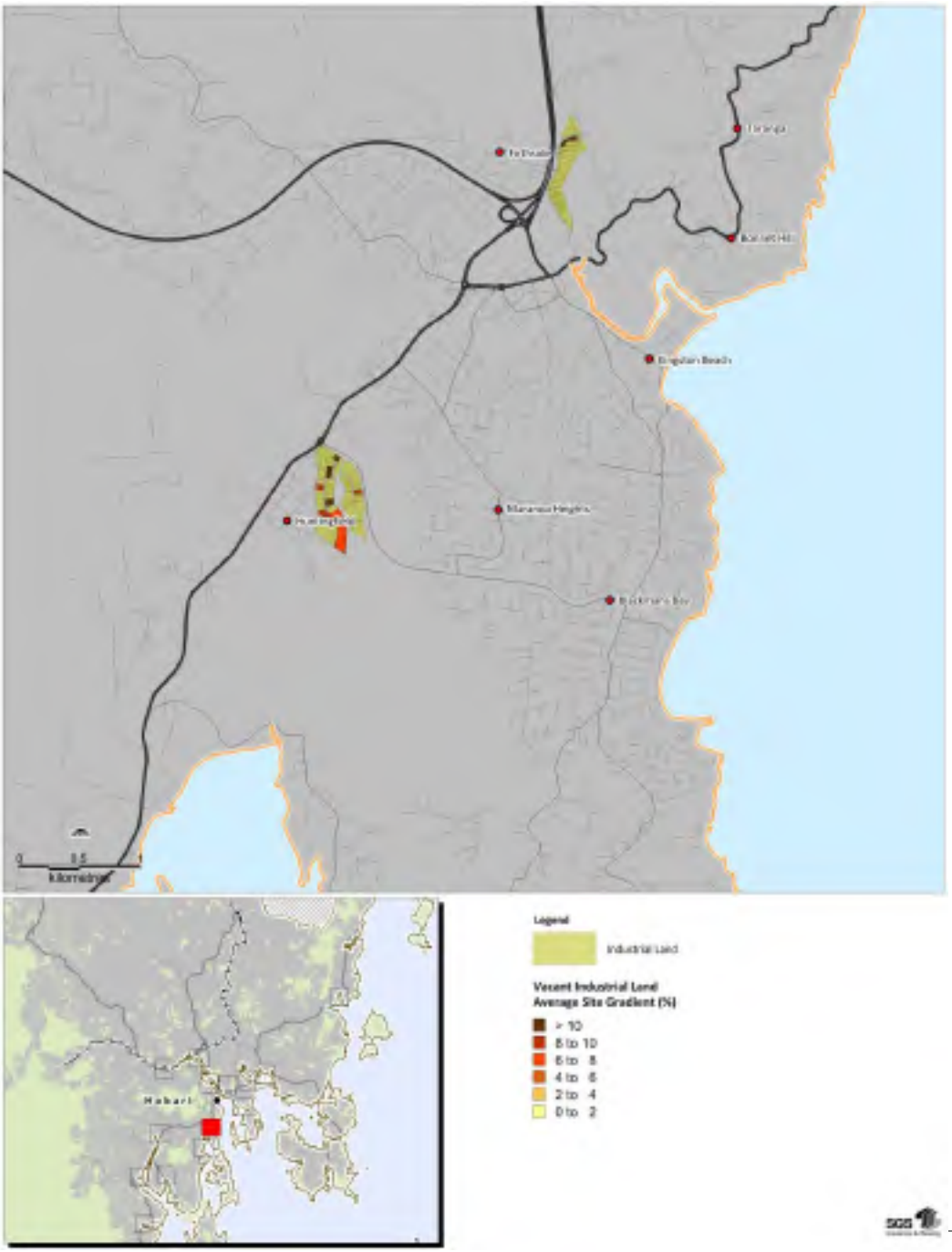
Figure 50 Vacant Industrial Land in Sorell and Nearby Sensitive Uses



4.2.5 Kingborough Vacant and Suitable Industrial Land Assessment

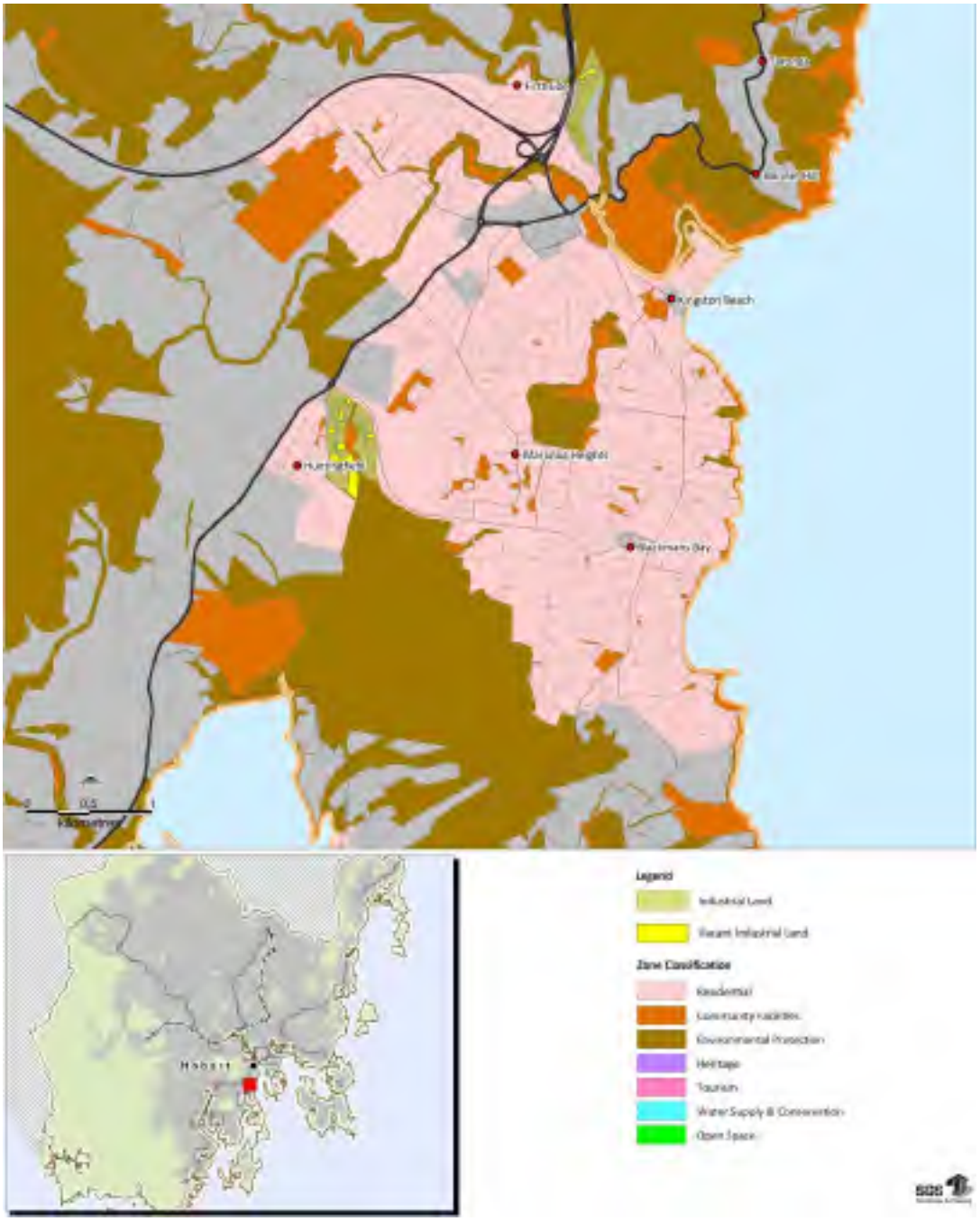
In the Huntingfield and Firthside areas there are currently 11 vacant lots, in total comprising 3.7 hectares. Six parcels, with a total area of 1.3 hectares, have an average slope which is greater than 10%, making them less suitable for industrial use. In addition, there are three lots with an average slope of 8 to 10% and two parcels with a slope of 6 to 8% (Figure 51).

Figure 51 Vacant Industrial Land in Huntingfield and Firthside, Parcel Land Gradients



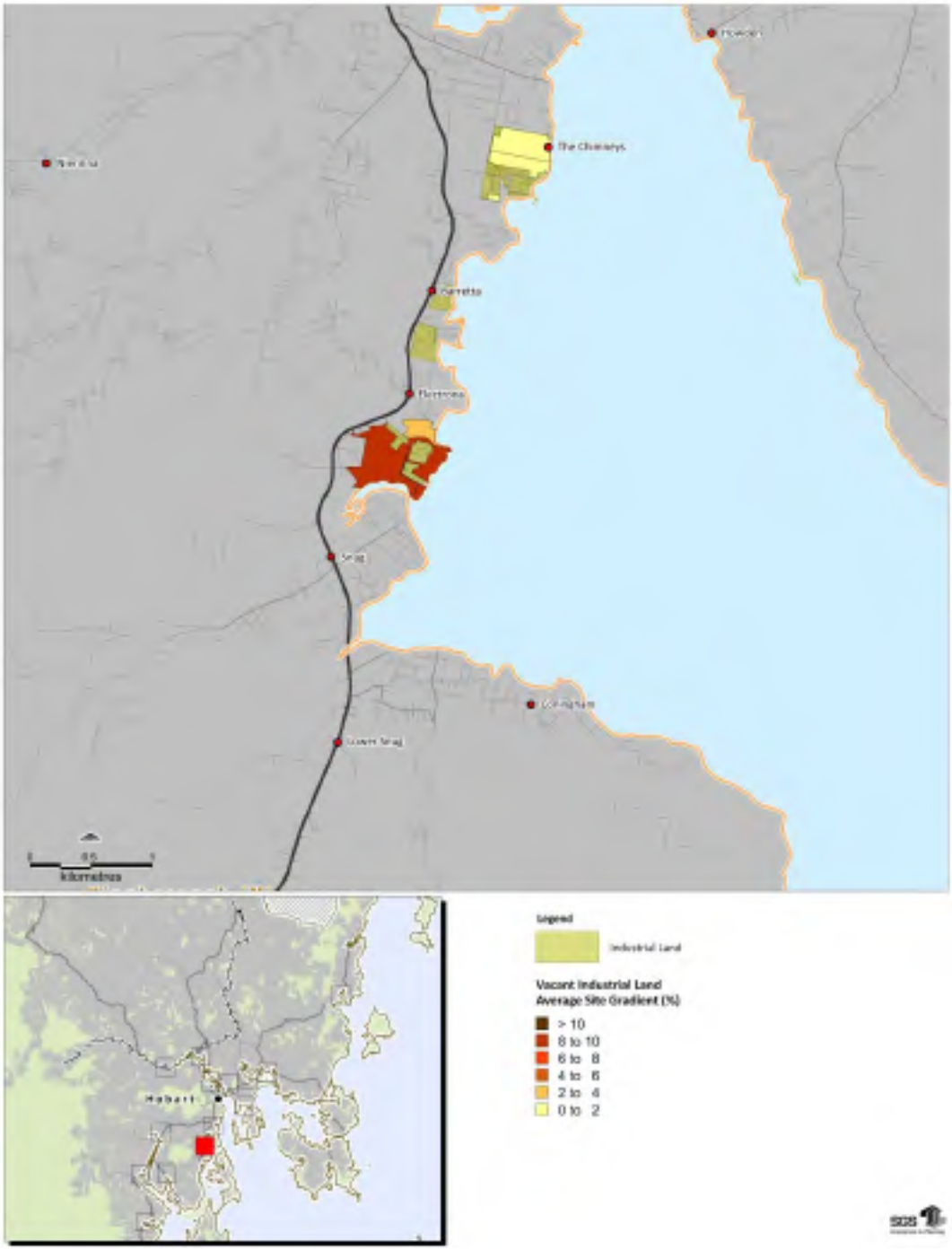
The Huntingfield precinct is closely located to the Peter Murell Reserve, which is a sensitive land use type under the category Environmental Protection. Two large parcels are located adjacent to the reserve, making them less suitable for industrial development, while two parcels are adjacent to residential areas. In total these four parcels, comprise 2.1 hectares. Given the constraints of Huntingfield, only one lot of ~2,500 sqm appears to be suitable for industrial use. A development approval for a transport depot has been issued for this site.

Figure 52 Vacant Industrial Land in Huntingfield and Firthside and Nearby Sensitive Uses



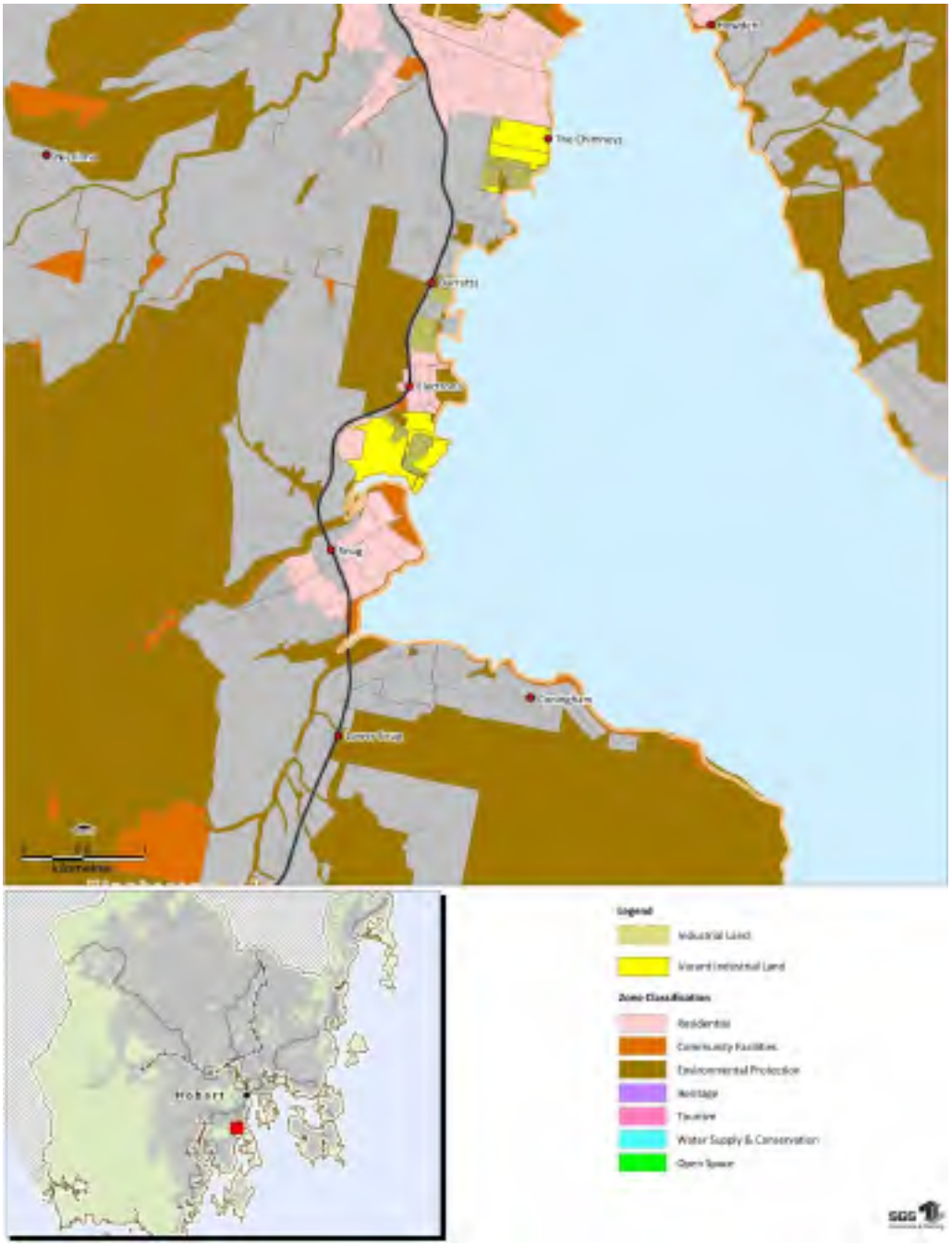
In the Electrona and Margate industrial areas, there are currently six vacant industrial parcels. Both parcels in Electrona are partially developed (around 20%) and have land areas of 3.6 and 4 hectares respectively. Two of the four parcels in Kingborough are also partly developed, but the vast majority remains vacant. In total, the six sites comprise an area of 20 hectares. None of the sites have a slope that is great than 10% (Figure 53).

Figure 53 Vacant Industrial Land in Electrona and Margate, Parcel Land Gradients



Five of the six parcels adjoin residential and environmentally protected land and would therefore be less suitable for industrial development (Figure 54). Council indicates that two of these sites contain a significant share of land with priority vegetation, making them unsuitable for industrial development. Additionally, one of the sites would be difficult to gain access to. As a result, only one site with an area remains largely undeveloped and suitable for industrial use in terms of slope and adjacent uses. This parcel is measures 3.4 hectares.

Figure 54 Vacant Industrial Land in Electrona and Margate and Nearby Sensitive Uses

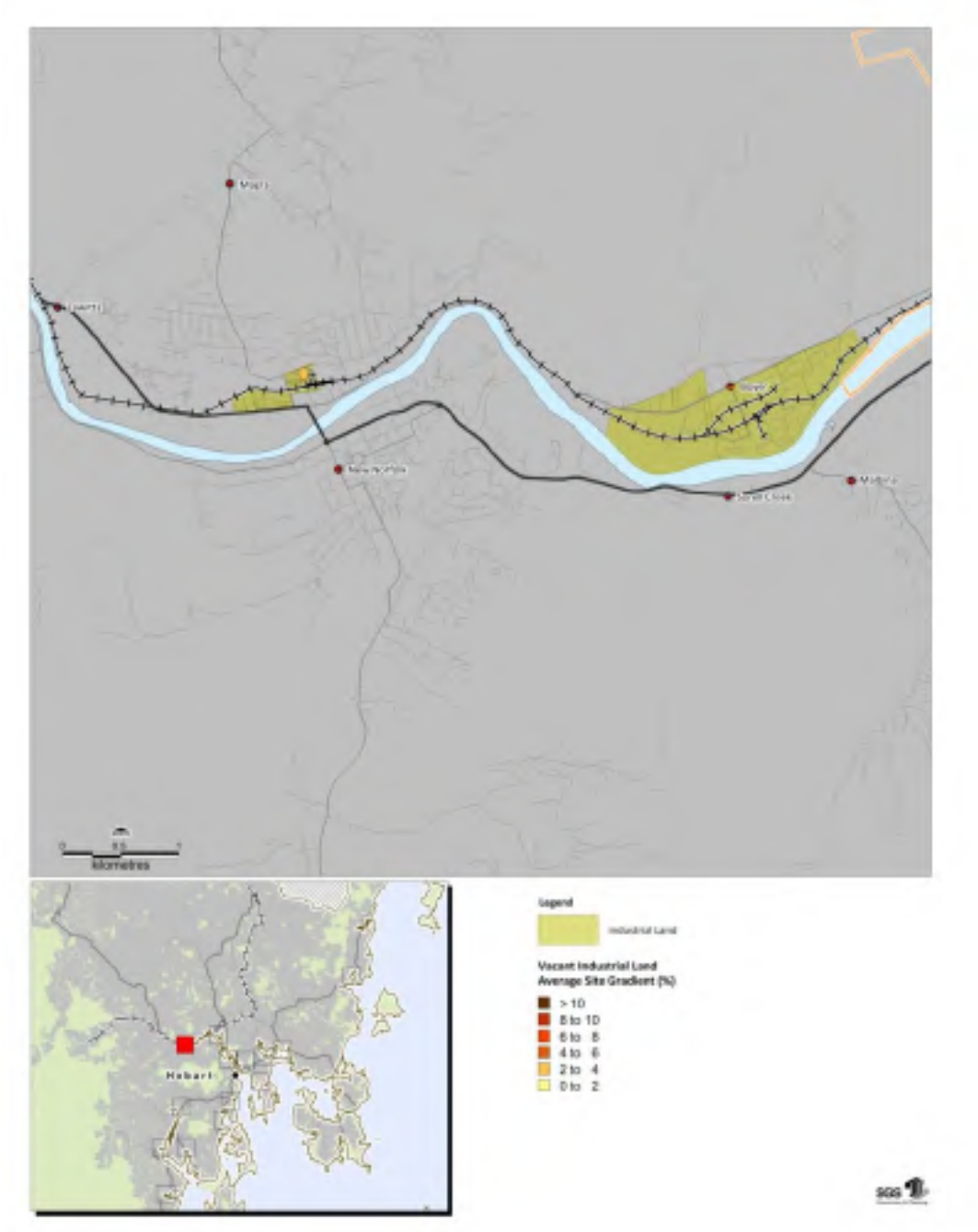


Overall Kingborough has only two vacant and suitable sites (in terms of slope and adjacent uses) for industrial development. These sites have a total area of 3.6 hectares. The smaller of the two lots already has a development permit issued for it.

4.2.6 Derwent Valley Vacant and Suitable Industrial Land Assessment

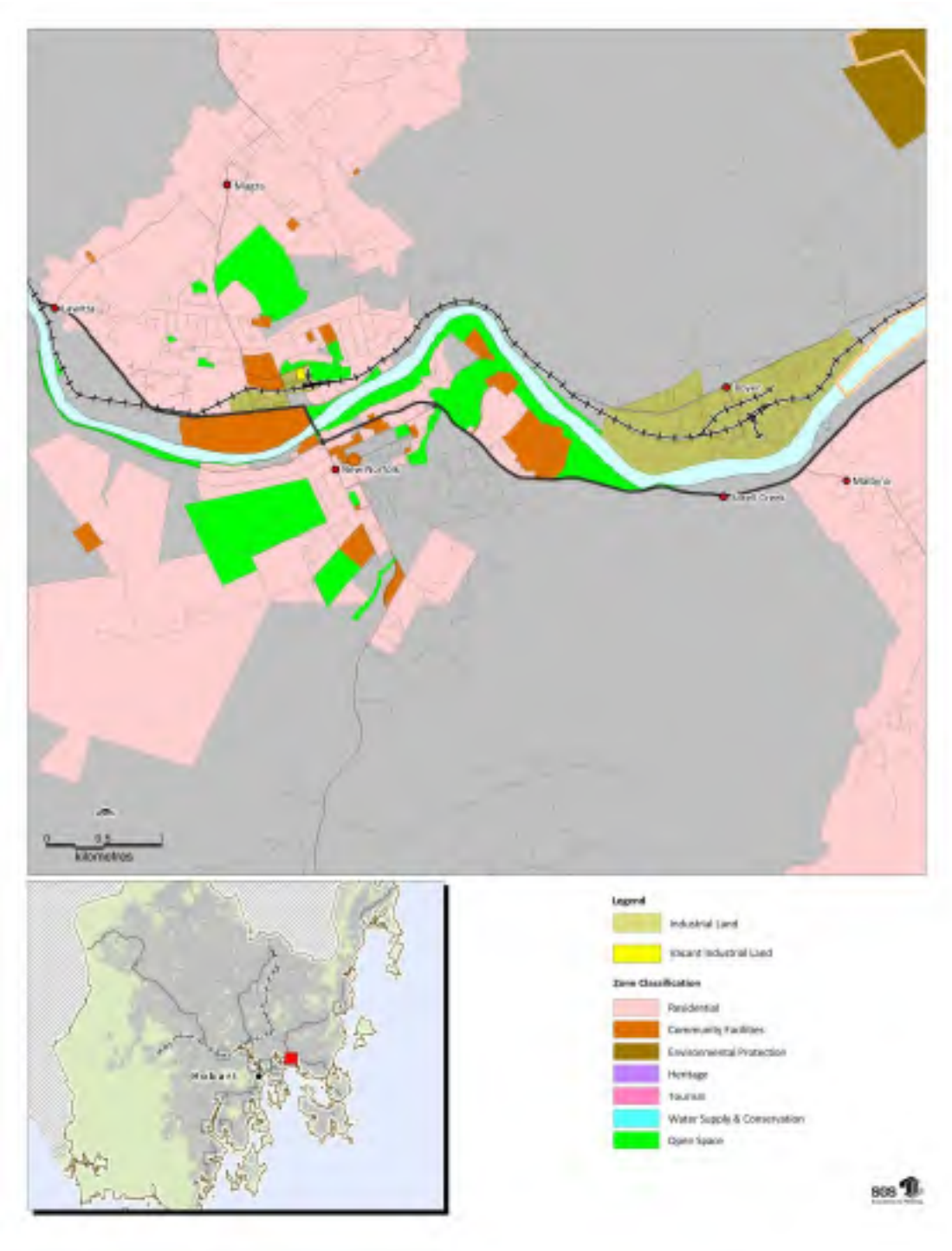
The vast majority of industrial land in the Derwent Valley is situated along the river Derwent near the town of New Norfolk and adjacent to the rail line. There is only one vacant site remaining (Figure 55). This site has a slope of 2 to 4%.

Figure 55 Vacant Industrial Land in Derwent Valley, Parcel Land Gradients



The parcel is situated within an industrial estate with some open space nearby but with sufficient buffer to allow for industrial use (Figure 56).

Figure 56 Vacant Industrial Land in Derwent Valley and Nearby Sensitive Uses

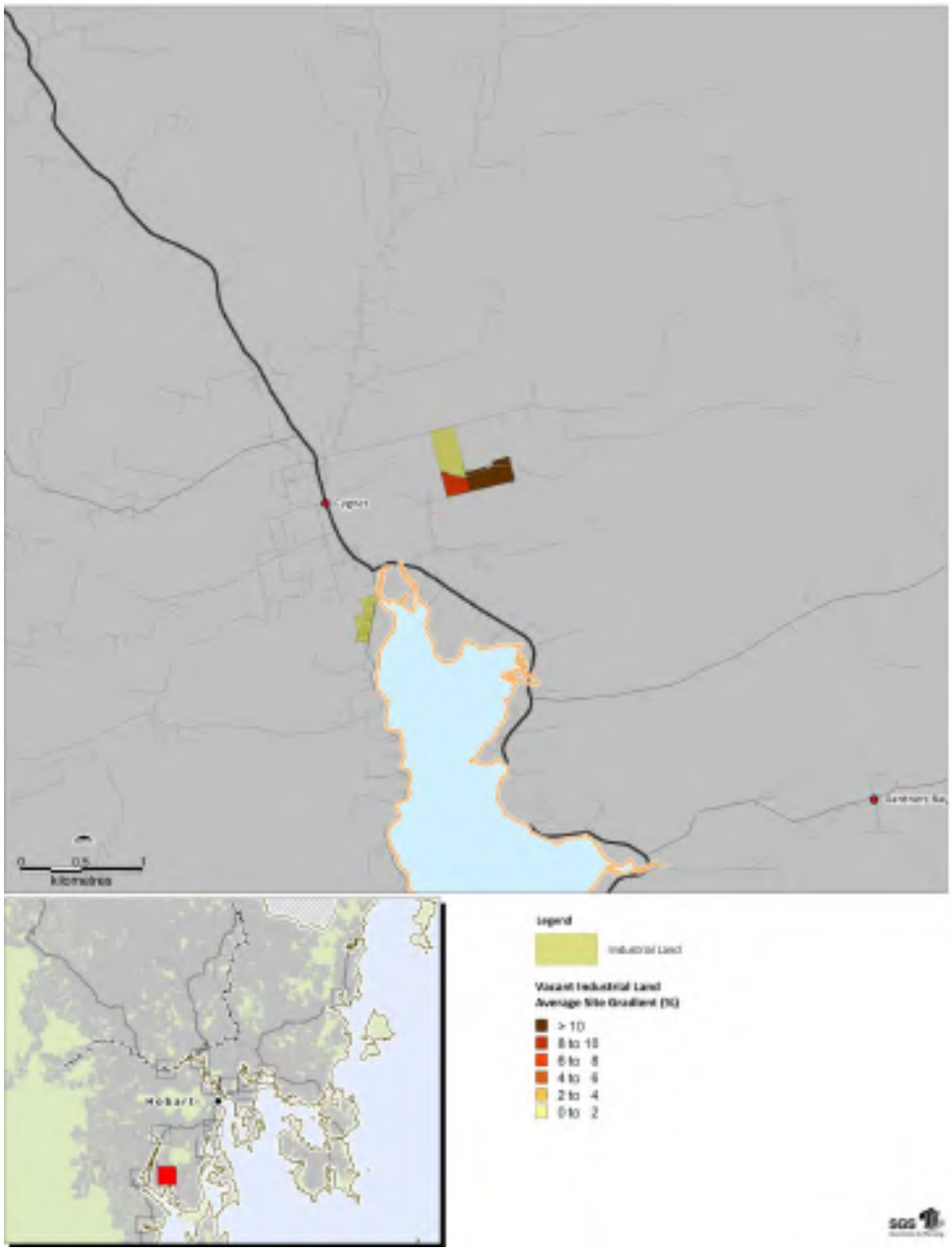


In Derwent Valley there is currently one vacant site, with a total area of 6,400 sqm, suitable for industrial use in terms of slope and nearby uses.

4.2.7 Huon Valley Vacant and Suitable Industrial Land Assessment

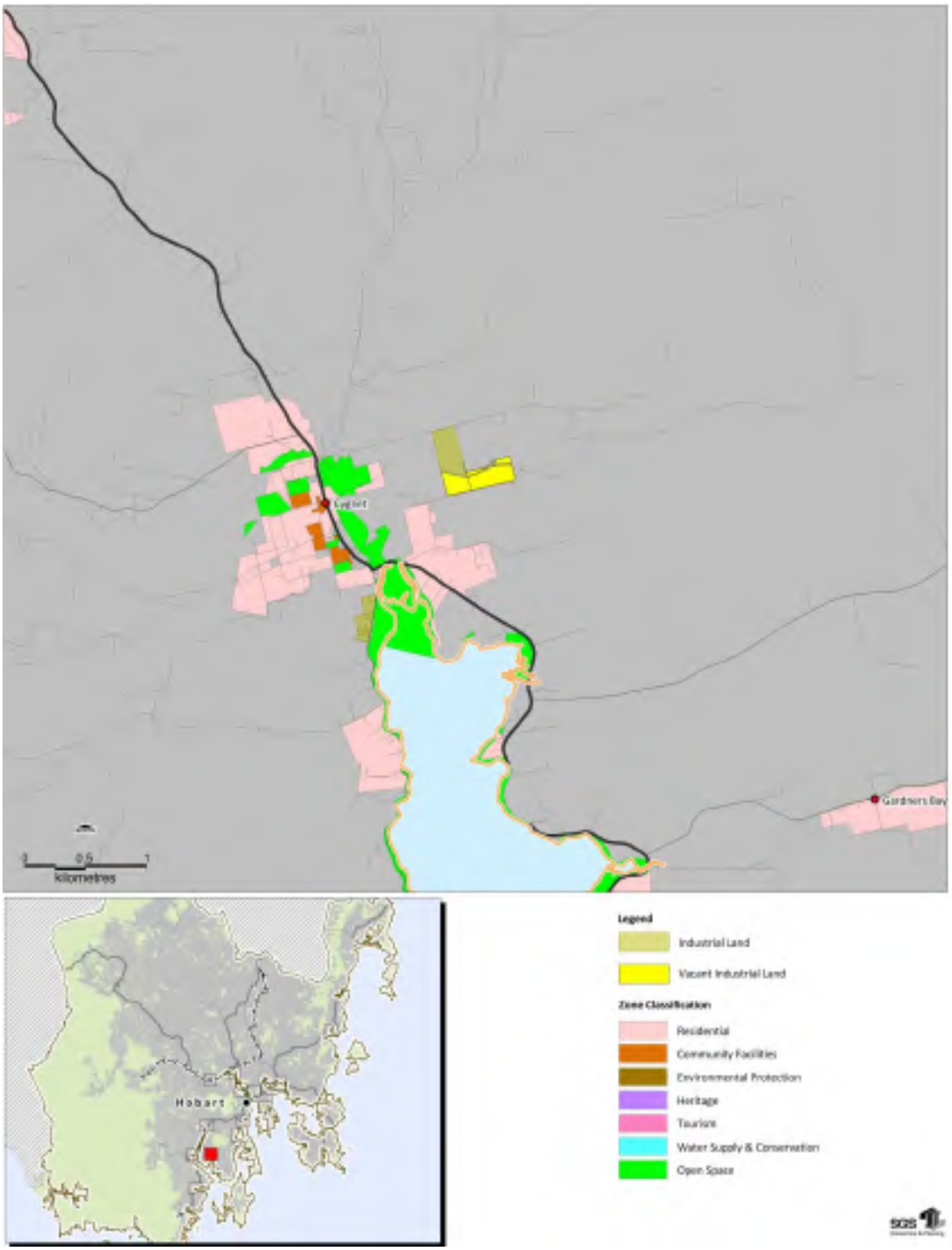
There are five vacant industrial sites in the Huon Valley with a total area of 29 hectares. There are currently no vacant industrial land parcels remaining in Huonville. Three of the sites are located in the Cygnet area. Of these three sites, two have an average slope of more than 10% (12% and 15%) which makes them less suitable for industrial use (Figure 57). The remaining site has a slope of less than 10%, and measures 3 hectares.

Figure 57 Vacant Industrial Land in Cygnet, Parcel Land Gradients



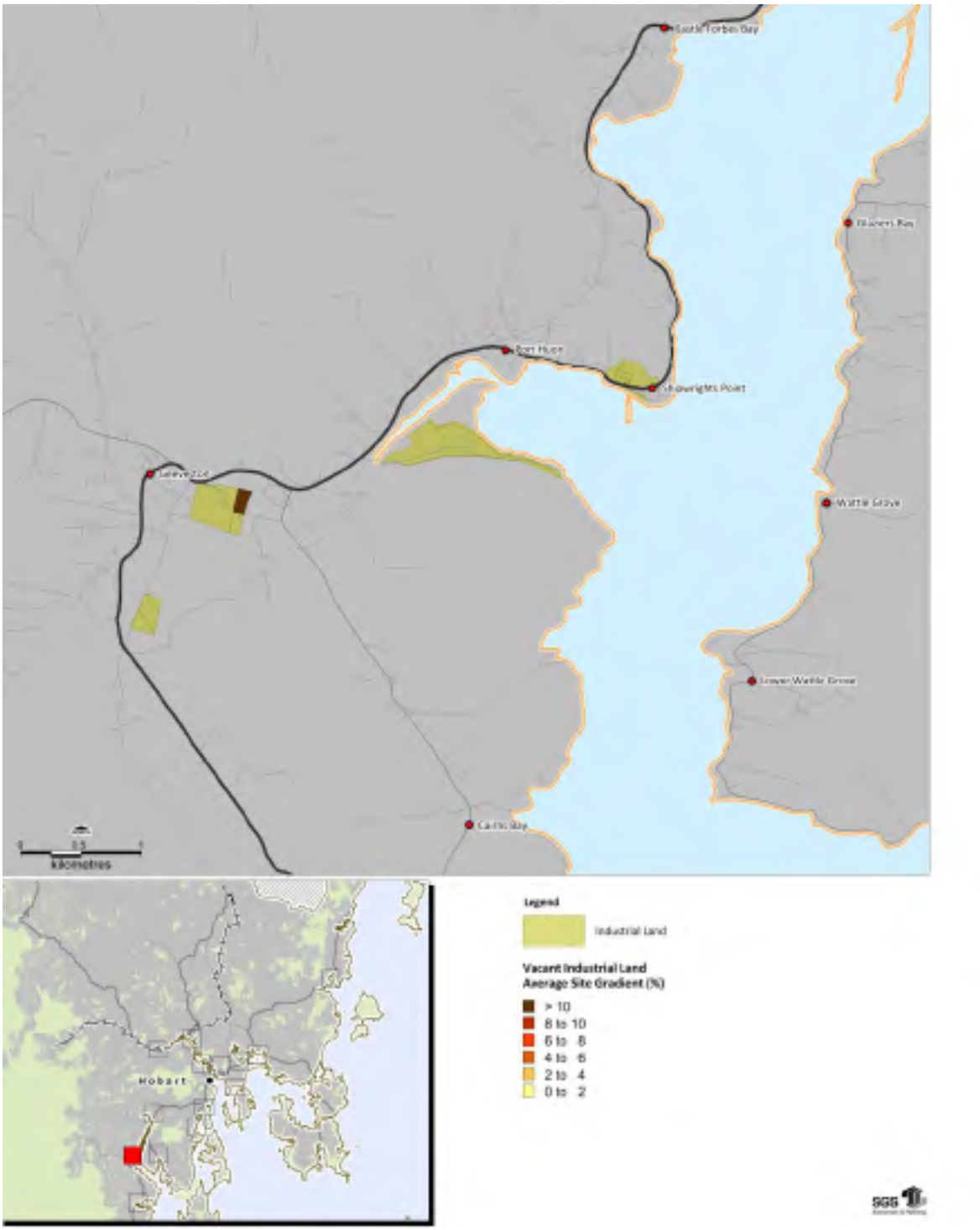
The three sites in Cygnet are located in a mostly agricultural area, at sufficient distance from any sensitive uses (Figure 58).

Figure 58 Vacant Industrial Land in Cygnet and Nearby Sensitive Uses



There is one vacant parcel with a total area of 2 hectares of industrial land in the Geeveston area. This site has an average slope of greater than 10% making the site less suitable for industrial development (Figure 59).

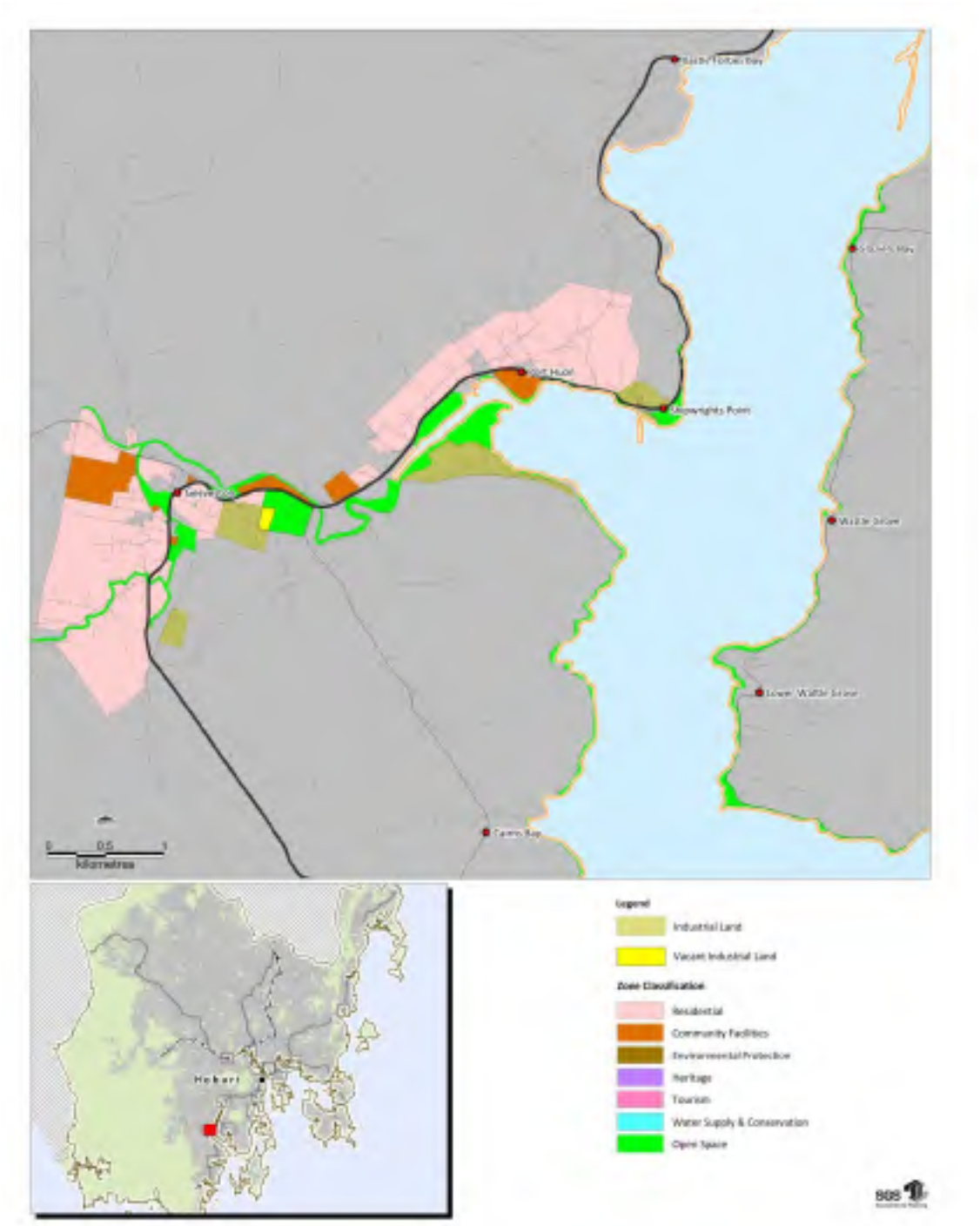
Figure 59 Vacant Industrial Land in Geeveston, Parcel Land Gradients



Source: SGS, 2011

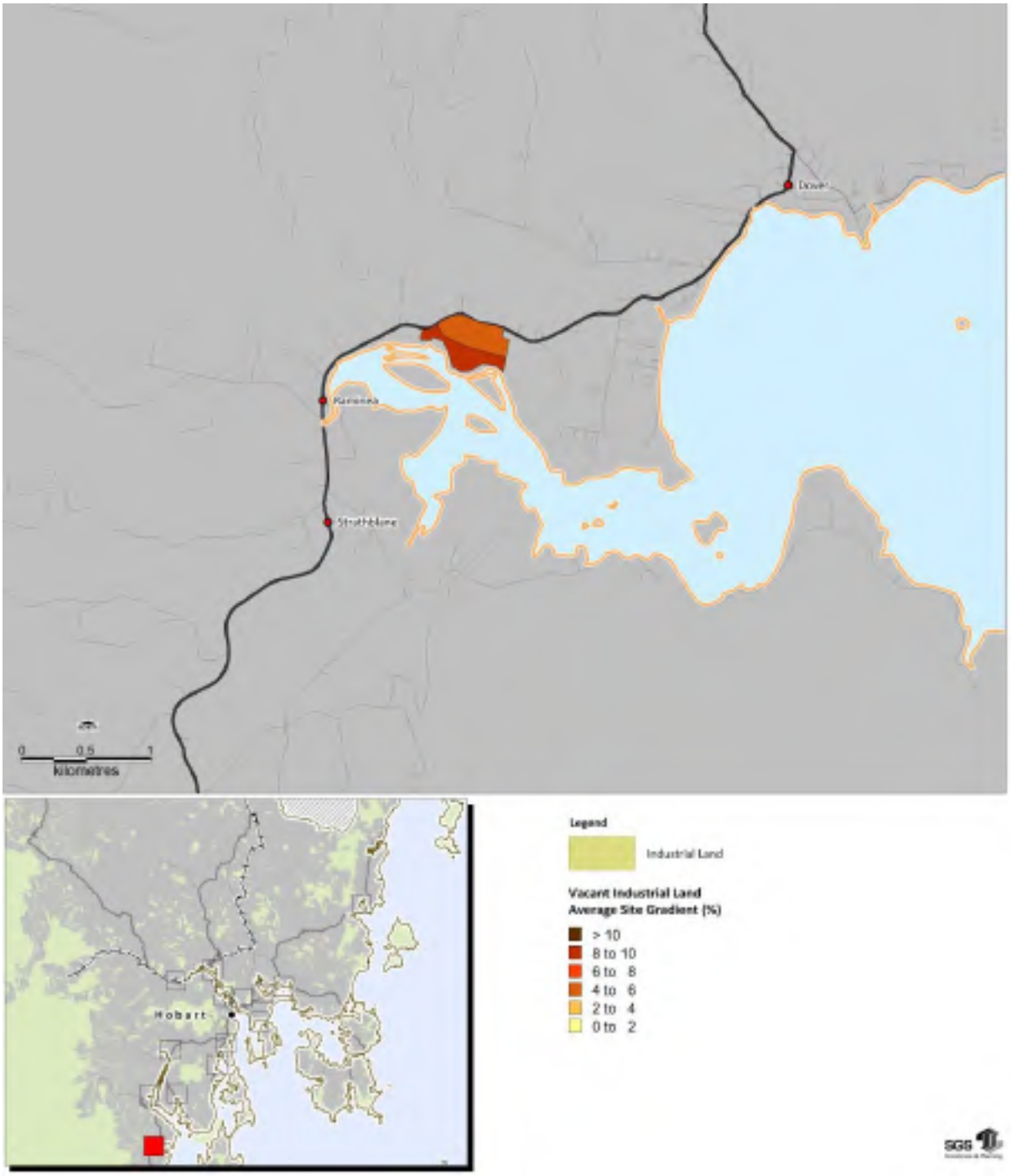
The site in Geeveston is located near a public sportsground, making it less suitable for heavy industrial uses (Figure 60). Based on the analysis, the vacant industrial site in Geeveston is less suitable for industrial development due to slope and adjacent use which would, at the very least make the site unsuitable for heavy industrial use.

Figure 60 Vacant Industrial Land in Geeveston and Nearby Sensitive Uses



In Dover there is one vacant industrial site which was a former saw mill. The site measures 18 hectares and has a slope of 8% to 10% on average which makes it suitable for most industrial uses (Figure 61).

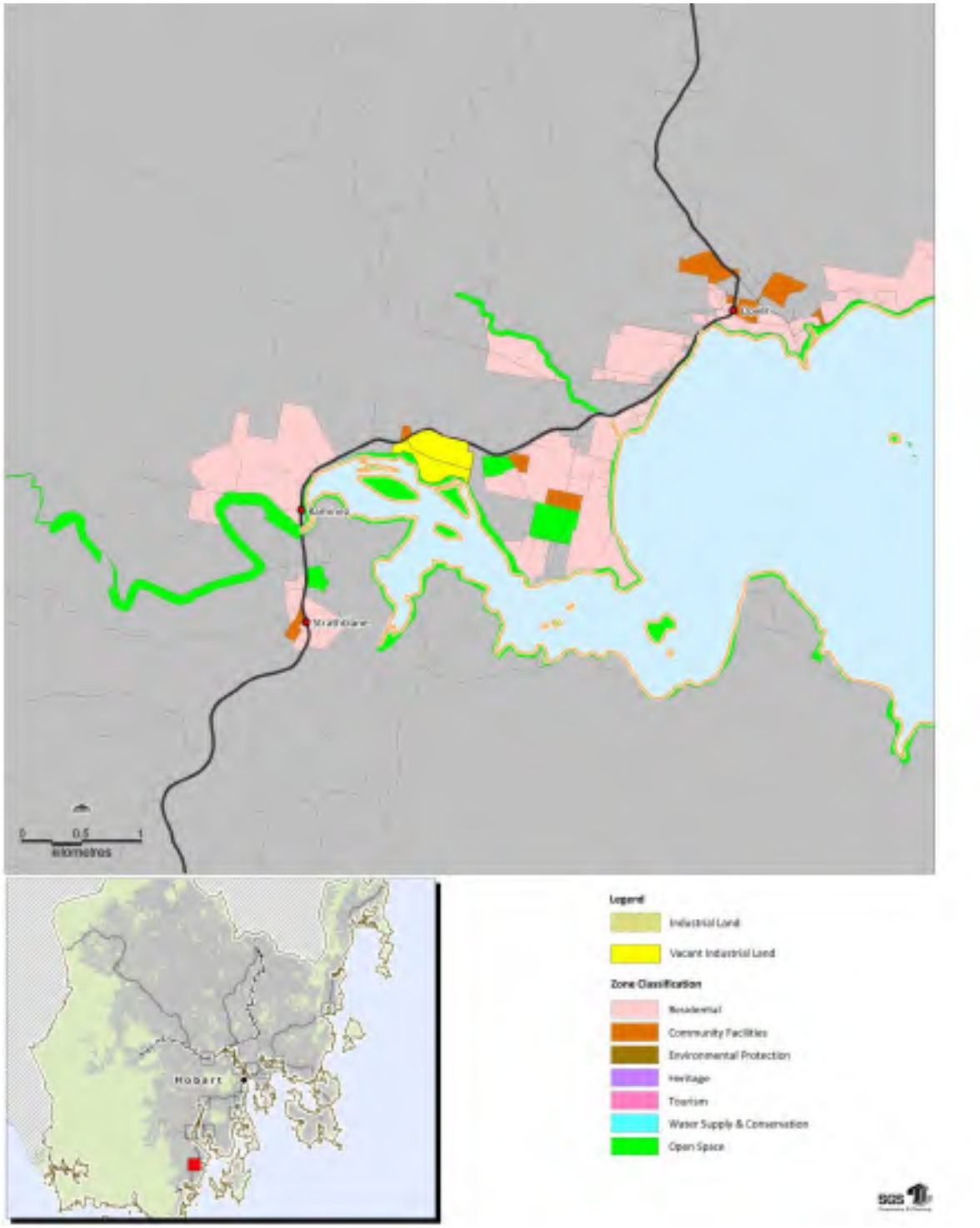
Figure 61 Vacant Industrial Land near Dover, Parcel Land Gradients



Source: SGS, 2011

The site is located close to the waterfront along which there is a strip of open space (Figure 62). The site is sufficiently large to enable an appropriate buffer from the open space area.

Figure 62 Vacant Industrial Land near Dover and Nearby Sensitive Uses



Source: SGS, 2011

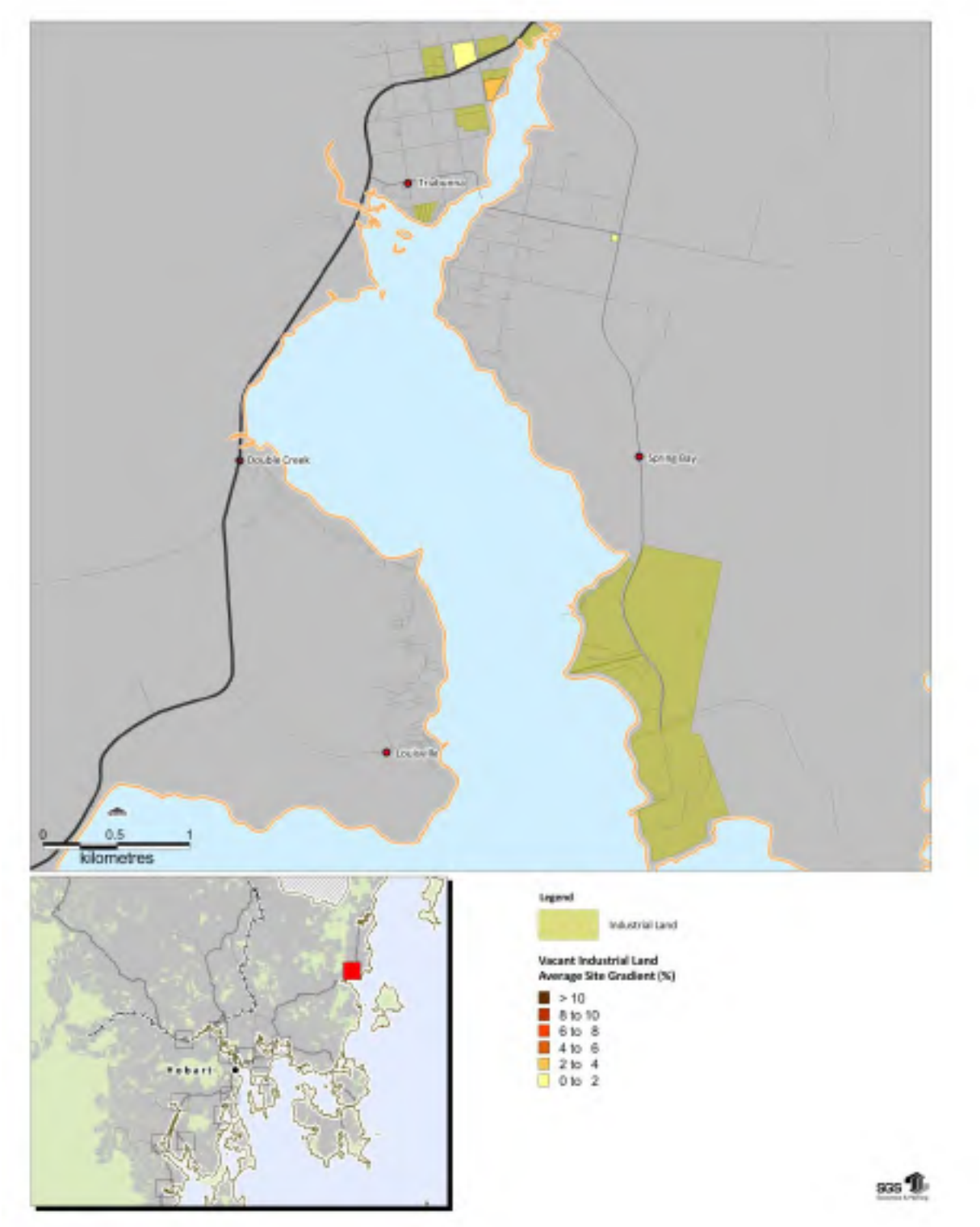
The above analysis shows there are two vacant and suitable industrial parcels in Huon Valley, one in Cygnet and the other in Dover. The two sites comprise a total area of 2.1 hectares. Further, it should be noted that the rezoning of a 20 ha site in Ranelagh to industrial zone has been recently approved (October 2011). This site will be assessed as one of the future industrial sites (Stage 2).

4.2.8 Glamorgan-Spring Bay Vacant and Suitable Industrial Land Assessment

In the Glamorgan-Spring Bay region there are currently three vacant industrial lots in the town of Triabunna. In addition, the future of the Triabunna mill remains uncertain, and could impact on several related local industries.

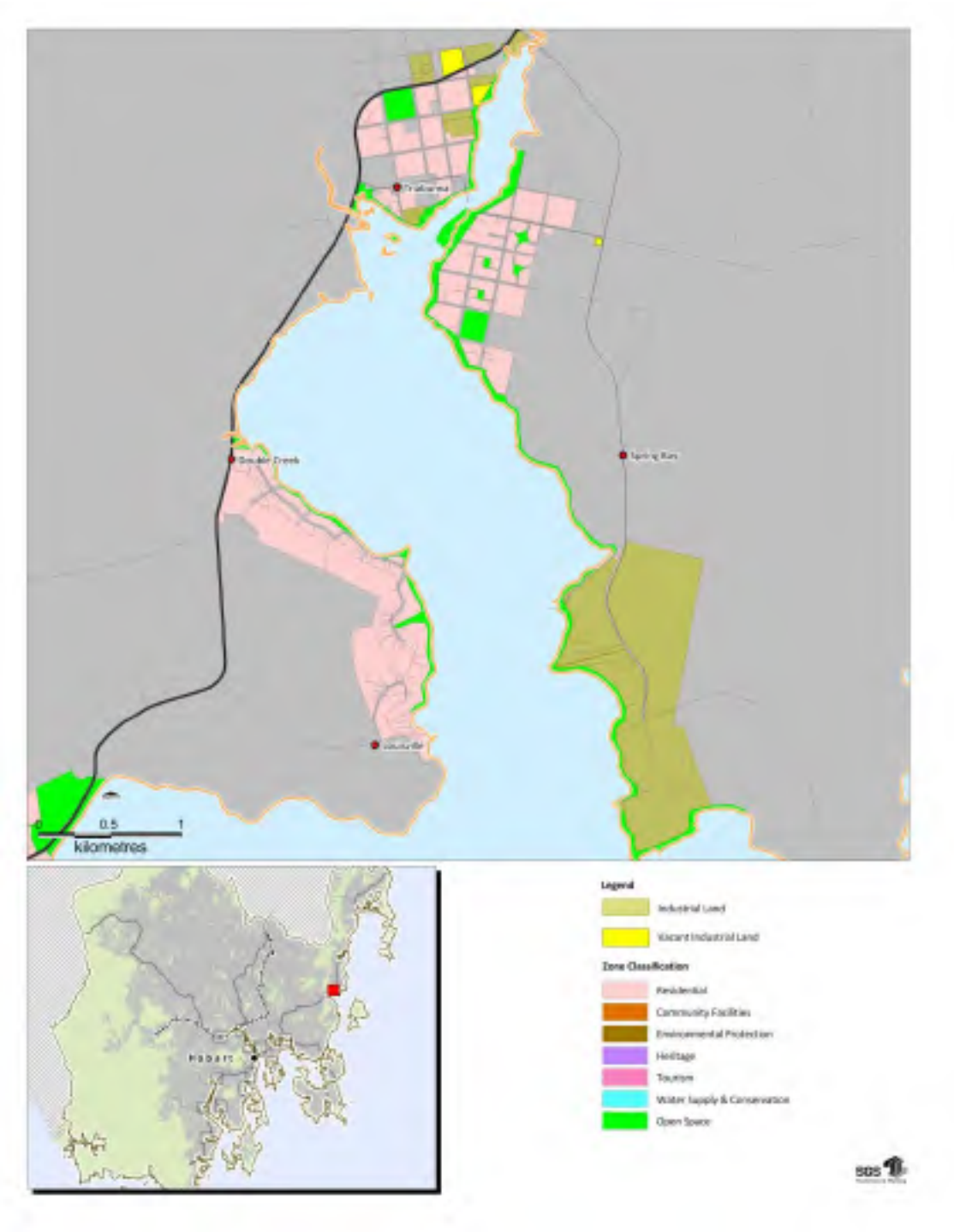
The three vacant lots have a total area of 3.7 hectares with each of the sites having an area between 1 and 1.5 hectares. The three sites all have a slope less than 6%, making them suitable for industrial use from that perspective (Figure 63).

Figure 63 Vacant Industrial Land in Triabunna, Parcel Land Gradients



Two of the three sites are at a sufficient distance from sensitive uses with one of these sites being separated from residential uses by the main highway (Figure 64). This site may be less suitable for heavy industrial uses. The third vacant site is adjacent to a residential area and an open space strip along the waterfront. This site would be less suitable for industrial use.

Figure 64 Vacant Industrial Land in Triabunna and Nearby Sensitive Uses



The above maps show that two of the three vacant sites would be suitable for industrial use in terms of slope and nearby uses. These two sites have a total area of 2.3 hectares.

In addition, there is a large site near the Triabunna mill that would potentially be available for future industrial use. This site will be included in stage 2 of the project.

4.2.9 Central Highlands and Southern Midlands Vacant and Suitable Industrial Land

In addition to the vacant land identified so far, additional information provided after consultation and data analysis shows there is some vacant industrial land available in Bothwell and Oatlands. Because the data were provided at a later instance, the level of detail of assessment is limited. The table below shows the amount of industrial land in Bothwell (Central Highlands) and Oatlands (Southern Midlands).

Table 8 Vacant Industrial Land in Central Highlands and Southern Midlands

	Vacant Industrial Land	Potentially Suitable Vacant
Central Highlands	15.2 ha	15.2 ha
Southern Midlands	7.4 ha	7.0 ha

Source: Central Highlands and Southern Midlands Councils

4.2.10 Overview of Vacant and Suitable Industrial Land

The land suitability analysis has significantly narrowed the available supply of vacant and suitable industrial land in Southern Tasmania. Table 9 illustrates that the initially vacant land supply of 199 hectares or 94 parcels has been diminished to 141 hectares or 67 parcels, once accounting for the slope and nearby uses of individual parcels.

Table 9 Summary of vacant and suitable industrial land

Municipality	Vacant parcels	Vacant area (ha)	Vacant parcels, slope <10%	Vacant area, slope <10%	Vacant parcels, no conflicting uses AND slope <10%	Vacant area, no conflicting uses AND slope <10%
Brighton	10	11.6	9	6.6	9	6.6
Glenorchy	4	11.8	3	0.8	3	0.8
Clarence	40	105.0	37	83.2	34	81.1
Sorell	4	0.3	4	0.3	4	0.3
Kingborough	17	24.4	11	23.1	2	5.7
Derwent Valley	1	0.6	1	0.6	1	0.6
Huon Valley	5	29.2	2	21.1	2	21.1
Glam.-S.Bay	3	3.7	3	3.7	2	2.3
Central Highl.	3	15.2			3	15.2
Southern Midl.	7	7.4			6	7.0
Grant Total	**94**	**198.5**	**70**	**139.4**	**67**	**140.6**

* Municipalities without any vacant industrial land are not shown

Source: SGS (2011)

4.3 Infill Capacity of Existing Land

Of all the municipalities of Southern Tasmania, Glenorchy has the most pressing shortage of industrial land. As part of an experimental exercise, SGS analysed current industrial land use patterns in Glenorchy[6].

As a rule of thumb, the building area to site area ratio for industrial activities (local service and export oriented industries) is 50% or 1:2. This ratio is based on SGS' data collected over a range of land use studies in urban and suburban areas in Victoria.

[6] From the land use database a selection was made on types of businesses (only industrial, workshop and manufacturing sites). Then all sites without building areas were excluded from the analysis. And finally only those localities with more than 20 businesses that meet these criteria were taken into account.

Comparison of Glenorchy's building to site ratio with the SGS database suggests that the intensity of land use in some industrialised areas of Glenorchy is below average. It was calculated that if the building to site ratio was 50% in Glenorchy, there would still be 26 hectares of vacant industrial land available.

Better use of existing land has the potential to increase the capacity of municipalities to accommodate demand for local service industries. This is especially true for those areas that are experiencing a shortfall of land that may restrict local economic development.

5 Comparison of Demand and Supply of Industrial Land

This section demonstrates the shortfalls for industrial land that may be expected over the next fifteen years based on existing supply of industrial land. As a rule of thumb, there should be about 15 years of industrial land available to ensure land prices are not driven up disproportionally.

In general terms, current supply is sufficient to meet demand over the next five years, without taking account of site location and lot size (Table 10). In the medium term however, there is a projected shortfall of between 7 and 71 hectares for the next fifteen years (2011-2026).

Table 10 Supply and demand of vacant industrial land (in ha), 2011 -2041

Comparison Supply and Demand for Industrial Land		
Supply (vacant and suitable industrial land)	**141**	
Demand	*Low*	*High*
- **2011-2016**	47	66
- **2011-2026**	148	212
- **2011-2041**	328	467

Source: SGS, 2011

To provide more industry and location specific results, the following section will compare demand and supply on a more detailed level. The first step of this analysis is to determine, at a local level if there is sufficient land to accommodate local service industries. The next step of the analysis is to show to what extent the remaining vacant land can accommodate projected demand for export oriented industries, transport and warehousing and bulky goods retailing.

5.1 Local Service Industries

When planning for industrial land, the aim should be to accommodate demand for local service industries locally wherever possible. Table 11 compares current vacant and suitable industrial land with the projected demand for land by local service industries. It shows that most municipalities have sufficient land to accommodate local industries. However, a number of municipalities, mostly the strongly urbanised areas, have insufficient land to meet demand by local service industries. If it is not possible to create more industrial land or to make better use of existing land, this demand will 'flow over' into nearby municipalities.

Table 11 Vacant and Suitable Industrial Land with Demand by Local Service Industries (in ha)

	2011	2011-2026		2011-2026	
	Land Supply	**Demand for local service industries**		**Shortfalls**	
		low	high	low	high
Brighton	6.7	1.6	1.7		
Clarence	81.1	4.4	5.5		
Derwent Valley	0.6	0.7	0.8		
Glenorchy	0.8	7.7	9.6	-6.9	-8.8
Hobart	0	11.7	14.5	-11.7	-14.5
Kingborough	3.6	4.8	6	-1.2	-2.4
Sorell	0.3	1.5	1.8	-1.2	-1.5
Central Highlands	15.2	0.1	0.1		
Glamorgan-Spring Bay	2.3	0.9	1.1		
Huon Valley	23	1.8	2.2		
Southern Midlands	7	0.2	0.2		
Tasman	0	0.1	0.2	-0.1	-0.2
Grand total	**140.6**	**35.5**	**43.7**	**-21.1**	**-27.4**

Source: SGS, 2011

Although there is no in principle shortfall, the current lot sizes in Brighton are not necessarily appropriate for local service industries: all parcels are over 2,000 sqm. Consultation with Council has revealed that some land currently zoned commercial is likely to be rezoned to industrial. This may provide growth opportunities for local service industries. This is an issue that will be further investigated in Stage 2 of the project.

Clarence has the most abundant supply of industrial land. Although there is no shortfall of industrial land to meet demand for local service industries, the currently available lot sizes may constrain industries requiring parcels of less than 1,000 sqm. As an indication, approximately 40% of all existing industrial uses operate from lots smaller than 1,000 sqm.

Derwent Valley has sufficient land available to meet demand from local service industries over the next 15 years. Central Highlands and Southern Midlands have sufficient land available to meet local demands over the medium to long term.

Glenorchy has insufficient industrial land available to accommodate projected demand for local service industries. Better use (more intense use) of existing land may enable a higher level of self-containment (see also 4.3 Infill Capacity of Existing Land). Any demand that is not accommodated within Glenorchy will most likely flow over to the nearby municipalities of Brighton and Clarence.

There is sufficient industrial land in Triabunna (Glamorgan-Spring Bay) to accommodate local service industries. However, current lot sizes do not correspond with the average needs of local service industries.

In the Huon Valley there is sufficient industrial land to accommodate local service industries. However, the location and lot sizes of the land do not correspond with the typical needs of local service industries. Recently, the rezoning of approximately 20 hectares of land to industrial was approved. This land is close to the regional centre Huonville and therefore likely well positioned to absorb demand for local service industries. The industrial land in Cygnet (the second centre in the Valley) would need to be subdivided to meet the needs of local service industries.

For Kingborough, the current supply of suitable industrial land may be insufficient to accommodate demand by local service industries. A site has been identified for future industrial use. This site will be assessed in stage two of the study. The available vacant and suitable land does not provide for small lots of less than 2,000 sqm.

For Sorell, the available vacant industrial land is not sufficient to accommodate demand from local service industries over a 15-year timeframe. The shortfall is estimated between 1.2 and 1.5 hectares. So far, no new potential sites for future industrial use have been identified. This issue will be taken up in stage 2 of the study.

Hobart is the most urbanised area of Southern Tasmania and the prime economic centre. As in many other cities, local service industries are pushed towards the fringes of the metropolitan area. The shortfall of industrial land for local service industries is projected to be between 12 and 15 hectares over the next 15 years. Most of this demand will flow over into nearby municipalities with sufficient suitable land; mostly Clarence. While there is little, if any opportunity to create more industrial land in Hobart, it would be important to retain at least some industrial land. It is expected that Hobart, and to some extent Glenorchy will experience a market drive towards higher value uses in these areas and a push to rezone some industrial land to commercial and in some cases to residential.

For the Central Highlands and the Southern Midlands no shortfall is expected over the next 15 years for local service industries. The municipalities indicate there is no demand for industrial land.

Tasman is projected to experience a small shortfall of industrial land to accommodate local service industries. Consultation with Council shows there may be opportunities for future industrial zonings. This will be further investigated in stage 2.

If both Hobart and Glenorchy are not able to accommodate more local service industries through better use of existing land and/or the creation of more industrial land, there is between 19 and 23 hectares of demand for local service industries that would flow over to nearby municipalities, mostly Clarence and some to Brighton (but that is further out from the centre of Greater Hobart and demand would experience competition from export industries and transport and warehousing). Assuming that Clarence and Brighton would accommodate this over flow of demand, there would be no vacant land left in Brighton and between 57 and 63 hectares of industrial land left in

Clarence to accommodate other industrial uses, that is export oriented industries, transport and warehousing and bulky goods retailing.

5.2 Comparison for Other Industries

Table 12 shows the amount of vacant and suitable industrial land by municipality that remains after allowing for demand by local service industries (and over flow demand). It shows that after allowing for demand by local service industries there is between 101 (high demand scenario) and 108 (low demand scenario) hectares of land remaining.

Table 12 Vacant and Suitable Industrial Land after Allowing for Local Service Industries (in ha)

	Supply after allowing for local service industries (2011-2026)	
	low	**high**
Brighton	0.0	0.0
Central Highlands	15.1	15.1
Clarence	63.1	57.2
Derwent Valley	0	0.0
Glamorgan-Spring Bay	1.4	1.2
Glenorchy	0.0	0.0
Hobart	0.0	0.0
Huon Valley	21.2	20.8
Kingborough	0.0	0.0
Sorell	0.0	0.0
Southern Midlands	6.8	6.8
Tasman	0.0	0.0
Grand total	**107.7**	**101.2**

Source: SGS (2011)

The majority of the land, or about two thirds, is located within the municipality of Clarence. A significant amount is also located in the Huon Valley. No land would remain available in Brighton. However, export oriented industries and transport and warehousing may take up the current five vacant hectares before local service industries do: in that case Brighton would experience a shortfall of land for local service industries.

In planning for industrial land for the remaining categories (export oriented industries, transport and warehousing and bulky goods retailing) both export oriented industries and transport and warehousing will be treated preferentially to bulky goods retailing (which does not necessarily need to be accommodated on industrial land). Moreover, most of the demand for bulky goods retailing is likely to be catered for within the Hobart International Airport precinct, which is federal land, and as such development does not need to comply with local planning guidelines.

About 92% of jobs in Southern Tasmania are located in Greater Hobart. It is most likely that this pattern will not change strongly in the future. If excluding land demand for bulky goods retailing, the expected shortfall of industrial land for other industries over the next 15 years would be up to 57 hectares when considering available land in the entire region (*a. Shortfall of Land (Southern Tasmania)* Table 13). When considering that the majority of demand (92%) would occur within Greater Hobart, then the shortfall of land would be between 34 and 88 (*b. Shortfall of Land (Greater Hobart Table 13*). For the regional areas in Southern Tasmania there is in principle no shortfall of industrial land for export industries and transport and warehousing.

Table 13 Land Supply, Demand and Shortfalls for Transport, Warehousing and Export Oriented Industries*

	Low scenario	High scenario
Supply		
- Brighton	0.0	0.0
- Clarence*	63.1	57.2
- Glamorgan-Spring Bay	1.4	1.2
- Huon Valley	21.2	20.8
- Central Highlands	15.1	15.1
- Southern Midlands	6.8	6.8
a. Total Supply	**107.7**	**101.2**
b. Total Supply Greater Hobart	**63.1**	**57.2**
c. Total Supply regional areas outside Greater Hobart	**44.6**	**44.0**
Demand 2011-2026		
- Transport and Warehousing	86	125
- Export Oriented Industries	19	33
Total Demand (100%)	**105**	**158**
Total Demand for Greater Hobart (92%)	**97**	**145**
Total Demand for regional areas (8%)	**8**	**13**
a. Shortfall of land (Southern Tasmania)	**+3**	**-57**
b. Shortfall of land (Greater Hobart)	**-34**	**-88**
c. Shortfall of land (regional areas outside Greater Hobart)	**+37**	**+31**

* After allowing demand for local service industries to be accommodated.

**Assuming Clarence accommodates over flow demand from both Glenorchy and Hobart.

Source: SGS (2011)

In general terms, Brighton and Clarence are best positioned for many regionally-significant industrial sites, most notably transport and warehousing.

Brighton is strategically positioned at the outskirts of Greater Hobart, is along the key transport corridor to the north, and its linked to interstate and international markets via its port. However, there is currently little vacant land remaining.

The Clarence region has good access to the Hobart International Airport, and therefore any development requiring air transport would best be located in Clarence. However, if it is not possible to significantly expand the supply of industrial land in the Brighton area, then Clarence would be the next best location to accommodate a significant share of demand for transport, warehousing and export oriented industries. This would require sufficient access and road capacity between Clarence and the north-south corridor. This issue will need to be addressed in Stage 2 of the study.

Industrial land in the Huon Valley is not optimally located to accommodate significant portions of demand for transport, warehousing and export oriented industries. The Huon Valley is best located to accommodate land demand from industries that are related to the rich resources of the region: timber (which is experiencing decline currently), aquaculture and agriculture. However, transport and warehousing related to these industries could be accommodated in the Huon Valley.

Industrial land in Glamorgan-Spring Bay is located at significant distance from the economic centre of Greater Hobart, with sub-optimal road connections providing access to the region. The industrial land in Triabunna would be suitable for transport, warehousing and export oriented industries associated with aquaculture / commercial fishing, forest industry and activities, and could make use of the local port facilities.

In short, the vast majority of transport, warehousing and export oriented industry activities will expectedly locate in Greater Hobart. Greater Hobart is home to 92% of the region's employment and economic activity, has a relatively skilled labour force and access to transport routes with (indirect) interstate and international connections. Greater Hobart is also where most supporting service industries, government and education institutions are located. Within Greater Hobart there is only land available in Clarence and Brighton. These areas add between 57 and 63 hectares of industrial land suitable for transport, warehousing and export oriented industries, after allowing for local service industries.

When taking the scale of Greater Hobart into account, the total shortfall of industrial land for transport, warehousing and export oriented industries is between 34 to 88 hectares (*row b. Shortfall of land Greater Hobart* Table 13). This figure is after accounting for industries that would locate in regional areas. There is in principle sufficient vacant industrial land in the regional areas of Southern Tasmania.

The ratio between transport, warehousing and export oriented industries land demand is approximately 1:4, with the projected shortfalls shown in the table below (Table 14). It should be noted that better use of existing land (intensification and infill development) may reduce the shortfall somewhat. This would however require State and or regional measures to enable better use of existing land through land redevelopment projects.

Table 14 Shortfalls of Industrial Land in Greater Hobart (in ha)

	Low	High
Shortfall Transport & Warehousing	27	70
Export Oriented Industries	7	18
Total Land Shortfall*	**34**	**88**

*For export oriented industries and transport & warehousing

Source: SGS (2011)

Stage 2 of this study needs to address these shortfalls and identify opportunities for future industrial zoned land to accommodate these needs, primarily within the Greater Hobart area.

In the longer term (to 2041) total demand for industrial land is projected to increase to between 328 to 467 hectares, suggesting an additional need in the order of 187 and 326 hectares of land. Stage 2 of the study needs to consider –in broad terms only- what areas may need to be reserved for industrial use for the very long term (30 years).

5.3 Recommendations and Conclusions

In short, the following list summarises the issues and tasks that need to be addressed in Stage 2 of this study:

- Shortfalls of local industrial land to accommodate future demand for local service industries over the period 2011-2026 in:
    - Glenorchy;
    - Kingborough;
    - Sorell;
    - Hobart; and
    - possible minor shortfalls in Tasman.

- Potential shortfalls for local service industries based on current lot sizes and competing demand from transport and warehousing and export oriented industries in Brighton.

- Shortfalls of regionally significant industrial land to accommodate future demand for transport & warehousing and export oriented industries of between 34 and 88 hectares. Of this total, between 7 and 18 hectares would be for export oriented industries and 27 to 70 hectares for transport & warehousing. The additional land needs should primarily be catered for within Greater Hobart.

- Identified potential future locations for industrial development in this report, including[7]:
    - Clarence (Kennedy Road and adjacent to the Hobart International Airport)
    - Brighton (New industrial park adjacent to new Intermodal Transport Hub)
    - Huon Valley (Potential for new industrial land in Huonville – as identified in Huon Valley Land Use and Development Strategy).

- Accessibility and road infrastructure capacity to regionally significant industrial land supplies in Clarence and elsewhere.

- Identify and consider, in broad terms only, potential sites to accommodate long term industrial land demand (30 year horizon) of between 188 and 326 hectares.

[7] In addition, SGS will consider sites that have been identified as part of a survey amongst all Councils as part of the Industrial land Demand Study (2011-2041) for DEDTA.

Appendix A Documents, Strategies and Policies Review

The following documents were reviewed:

- *Clarence City Industrial Development Strategy, AEC Group (2007)*
- *Draft Hobart Airport Master Plan, Hobart International Airport Pty Ltd, Arup (2009)*
- *Brighton Structure Plan, Brighton Council, Aurecon (2008)*
- *City of Clarence Business Prospectus, Clarence City Council (2008)*
- *Making the right connections: a strategic study of industrial land and infrastructure in*
- *Southern Tasmania, Department of Infrastructure, Energy & Resources (2005)*
- *Region Background Report – Southern Integrated Transport Plan, State of Tasmania & Southern Tasmanian Councils Authority, Department of Infrastructure, Energy & Resources (2006)*
- *Tasmanian Urban Passenger Transport Framework: Future Directions for passenger transport in Tasmania's urban areas, State of Tasmania, Department of Infrastructure, Energy & Resources (2009)*
- *Huon Valley Land Use & Development Strategy, Huon Valley Council, GHD Pty Ltd (2007)*
- *Planning Scheme Review Project: Topic Papers – Infrastructure, Glenorchy City Council, Glenorchy City Council (2008c)*
- *Review of the Working Port of Hobart, Tasports Pty Ltd, Merrick & Associates (2008)*
- *Metropolitan Adelaide Industry Land Use Strategy, Planning SA Government of South Australia (2007)*
- *Economic Impact Assessment of a DFO at the Hobart International Airport, Hobart City Council, SGS Economics and Planning (2006)*
- *Hobart Gaps and Opportunities Analysis, Hobart City Council, SGS Economics and Planning (2006)*
- *Industrial Land Demand Tasmania: Short to Medium Term overview, Department of Economic Development, SGS Economics & Planning Pty Ltd (2008 & 2011)*
- *Draft Southern Tasmania Regional Land Use Strategy.*
- *Southern Tasmania Regional Land Use Strategy Background Report No.12: Industrial Activity, Southern Tasmanian Councils Authority (Sep 2010)*
- *Site investigation report for the Brighton Transport Hub, SKM*
- *Southern Integrated Transport Plan, Department of Infrastructure, Energy & Resources and the Southern, Tasmanian Councils Authority (2010)*
- *Draft Orford-Triabunna Structure Plan.*
- *Draft Huonville Structure Plan.*

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Southern Tasmania
Regional Land Use Strategy

Background Report No.7: Productive Resources

March 2011



This document is detailed supporting information for the Regional Land Use Strategy for Southern Tasmania.

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1. Agriculture

1.1 Background

Tasmania has a long history of agricultural production, varying from beef, sheep, wool and dairying, through to cropping and fruit and vegetable production. Extensive dryland farming dominates the Southern region in terms of area, with grain and fine wool common commodities in the expansive Midlands and Derwent River Valley areas. Discrete areas of intensive agriculture exists in those local areas where access to water combine with reasonable soils. In recent years there has been an increase in the number of tree plantations as forestry moves further away from a reliance on old growth tree resources to plantations. This is considered in a separate section below.

Maintaining and increasing this agricultural productivity is becoming increasingly important at a political level, whilst pressures on agricultural land from competing uses continue to rise. Some current planning schemes do not adequately distinguish significant agricultural land from land more generally described as 'rural'. Current planning scheme zoning, combined with ordinances that do not afford adequate protection to significant agricultural land is causing considerable fettering of the agricultural resource both directly and indirectly through allowing the creation of land use conflict between the agricultural and non agricultural uses.

Whilst Southern Tasmania is not as significant as the other two regions in terms of overall agricultural production, agriculture is still a significant contributor to the region whilst the relative scarcity of highly productive land only serves to increase the importance of such areas at the regional level.

1.2 Legislative and Governance Context

The State Policy for the Protection of Agricultural Land 2009 (PAL) seeks to protect prime agricultural land from conversion to non-agricultural uses. PAL further states that the protection of non-prime agricultural land from conversion to non-agricultural use will be determined through consideration of the local and regional significance of that land for agricultural use. In order to determine 'local significance' it is necessary to understand the region, and in order to determine 'regional significance' it is necessary to understand the State.

Agricultural Land as defined under the PAL Policy 2009 is;

- All land currently in agricultural use; and
- All land with the potential to be used for agriculture.

But excludes;

- Agricultural land that has been zoned for another use;
- Agricultural land that has been developed for another use; or
- Agricultural land unduly restricted for agricultural use by its size, shape and proximity to adjoining non-agricultural use.

Prime Agricultural Land is recognized within PAL as being land classified as Class 1, 2 or 3 under the Tasmanian Land Capability Classification System (TLCCS). It is capable of supporting a wide range of intensive cropping and grazing activities.

However all land identified as Class 1 to 5 under the TLCCS is considered suitable for a range of both cropping and/or grazing pursuits. Class 6 is considered marginally suitable for grazing but unsuitable for cultivation with Class 7 being considered unsuitable for agriculture.

An analysis of the ABS Agricultural data from the 2006 Census provides a snapshot of the variety of agricultural pursuits across the state. The three regions are quite varied in the types of agriculture each region specializes in. This is reflective of the quality of the soil as the growth medium, the variation in climatic conditions across the state (including rainfall, frequency of frosts, seasonal winds etc) and access to irrigation infrastructure.

Currently in Tasmania many agricultural uses are exempt from requiring permits under the *Land Use Planning and Approvals Act 1993*. This is dependent on zoning of the land and the ordinance provisions under the particular planning scheme. In the majority of the rural areas, which are zoned Rural Resource or similar, agricultural activities are exempt from the need for a planning permit. It is often only when significant infrastructure is involved (such as machinery sheds, or processing infrastructure) that applications are required under a local Planning Scheme. This is considered an appropriate level of regulation. There will be occasions where the inclusion of a machinery shed or processing plant will have other impacts, such as increases in traffic, increased water requirements and wastewater issues, impacts on nearby sensitive uses such as dwellings and so forth. Nevertheless the majorities of agricultural uses, if within rural areas, have minimal impact and should not be required to have a permit.

1.3 Agriculture in Southern Tasmania

All data in this section is sourced from the ABS Census. Details on the definition of spatial local areas (SLAs) and Local Government Areas (LGAs) are provided in the Regional Profile report

The issues facing the Southern region are quite different to those issues faced in the North and North West.

The southern region has negligible prime agricultural land, some of which has already been lost through conversion to non-agricultural land uses. The majority of the agricultural land in the south is Class 4, 5 or 6. Whilst these classes of land are not afforded the highest level of protection under PAL, significant areas of agricultural land are still strategically significant to both the region, and local municipalities. The Southern Region has 33% of the total agricultural land in the state, but due to the quality of that land (and also the crops that are most commonly grown in the south), produces only 9% of the overall tonnage of the state's agricultural production (not including livestock). The Southern region, however contributes 19% of the annual agricultural value for the state.

Furthermore the Southern Region also experiences, less consistent rainfall than the remainder of the State, with the Huon Valley, D'entrecasteaux Channel and upper Derwent Valley being the exception to this rule. For the East Coast, Coal River Valley (although consistent and controlled water supply is available through the irrigation scheme) and Midlands areas, rainfall is considerably less than that of the North West Coast and much of the North. This further contributes significantly to the region's differences in agricultural production.

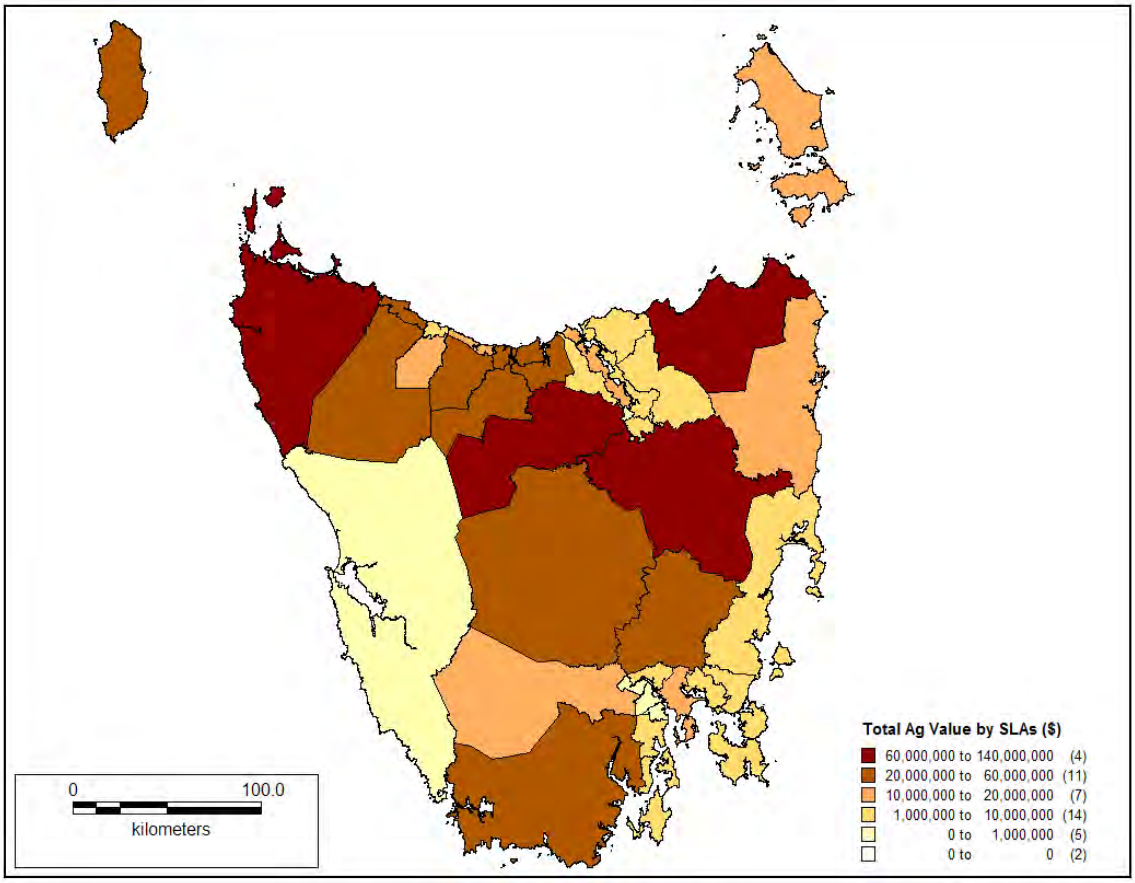


Figure 1: Total value of agricultural production by SLA in Tasmania *(Source: ABS Census 2006)*

1.3.1 Fruit Production

The Southern Region is one of the most significant areas for fruit production with 74% of the State's Orchard Fruit production area constituting 68% of the State's annual fruit production revenue ($59.6 million). The Huon Valley produces by far the most fruit at 25,618 tonnes, with Clarence (1,029 tonnes), Southern Midlands (985 tonnes), Derwent Valley (865 tonnes) and Kingborough (833 tonnes) also contributing notable amounts (ABS Data 2006).

Table 1: Comparison of total fruit production volume against gross value by SLA in Tasmania *(Source ABS Census 2006)*

SLA	Production (tonnes)		SLA	Gross Value of Production ($)
Huon Valley	**25,618**		**Huon Valley**	**25,038,954**
West Tamar– Pt A	3,094		West Tamar– Pt A	4,661,765
Latrobe – Pt B	2,685		Latrobe – Pt B	4,399,418
George Town – Pt B	1,403		George Town – Pt B	3,583,905
Devonport	1,253		**Clarence**	**3,264,903**

Clarence	**1,029**		**Southern Midlands**	**3,045,166**
Southern Midlands	**985**		Latrobe – Pt B	2,175,654
George Town – Pt A	965		Launceston – Pt B	1,767,665
Derwent Valley – Pt B	**865**		Latrobe – Pt A	1,363,304
Latrobe	843		Launceston – Pt C	1,266,957
Kingborough – Pt B	**833**		George Town – Pt A	1,105,032
Launceston – Pt B	666		Devonport	1,084,229
Tasman	**493**		**Tasman**	**987,643**
Kentish	393		**Glamorgan Spring Bay**	**841,420**
Glamorgan Spring Bay	**322**		**Kingborough – Pt B**	**748,860**
Launceston – Pt C	211		**Sorell – Pt A**	**658,138**
Glenorchy	**198**		**Glenorchy**	**546,141**
Sorell – Pt A	**195**		Burnie – Pt B	439,929
Brighton	**132**		**Brighton**	**391,668**
Central Highlands	**95**		**Kingborough – Pt A**	**382,360**
West Tamar – Pt B	95		Kentish	343,623
Derwent Valley – Pt A	**84**		Meander Valley – Pt B	302,202
Burnie – Pt B	75		Central Highlands	247,257
Sorell – Pt B	**64**		**Sorell – Pt B**	**243,766**
Kingborough – Pt A	**57**		West Tamar – Pt B	176,371
Meander Valley – Pt B	34		Central Coast – Pt A	131,382
Central Coast – Pt A	25		**Derwent Valley – Pt A**	**124,334**
Northern Midlands – Pt B	16		Dorset	103,675
Break O'Day	12		Waratah Wynyard – Pt A	88,789
Waratah Wynyard	11		Northern Midlands – Pt B	72,870
Dorset	10		Break O'Day	55,967
Central Coast – Pt B	6		Central Coast – Pt B	19,424
Northern Midlands – Pt A	4		Northern Midlands – Pt A	11,242
King Island	3		Burnie – Pt A	9,747
Flinders	2		King Island	7,818
Burnie	1		Flinders	4,040
Meander Valley – Pt A	1		Meander Valley – Pt A	1,506
Hobart - Remainder	**1**		**Hobart - Remainder**	**1,278**
TOTAL	**42,777**			**59,698,399**

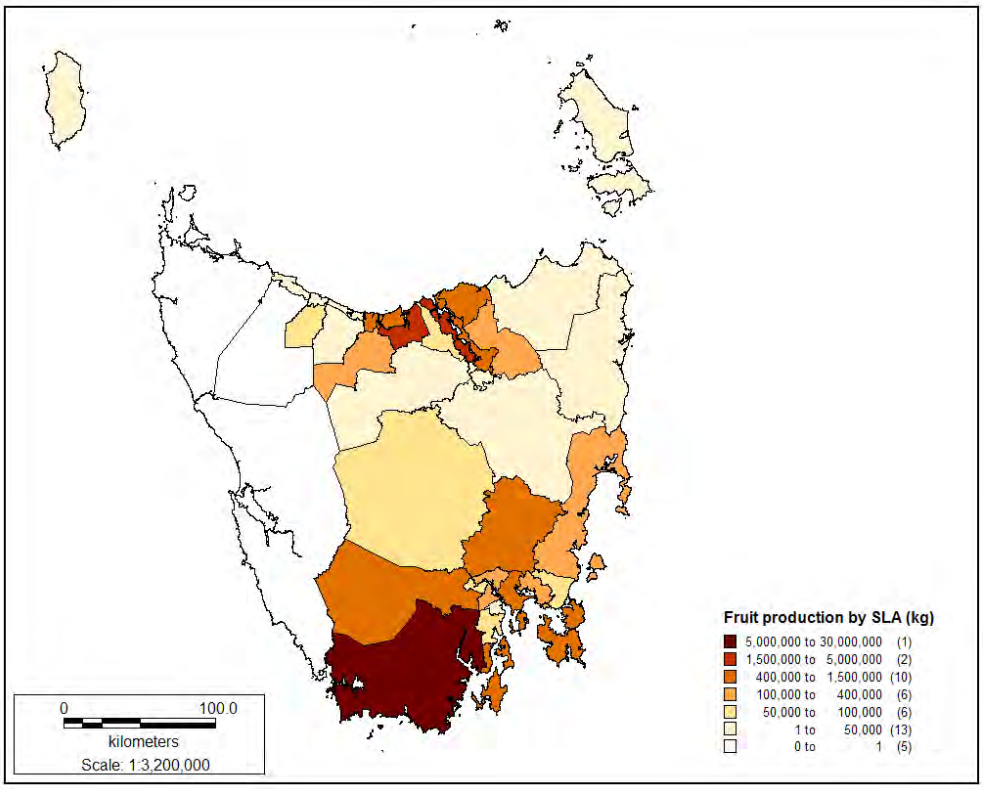


Figure 2: Total Fruit Production Volume by SLA for Tasmania

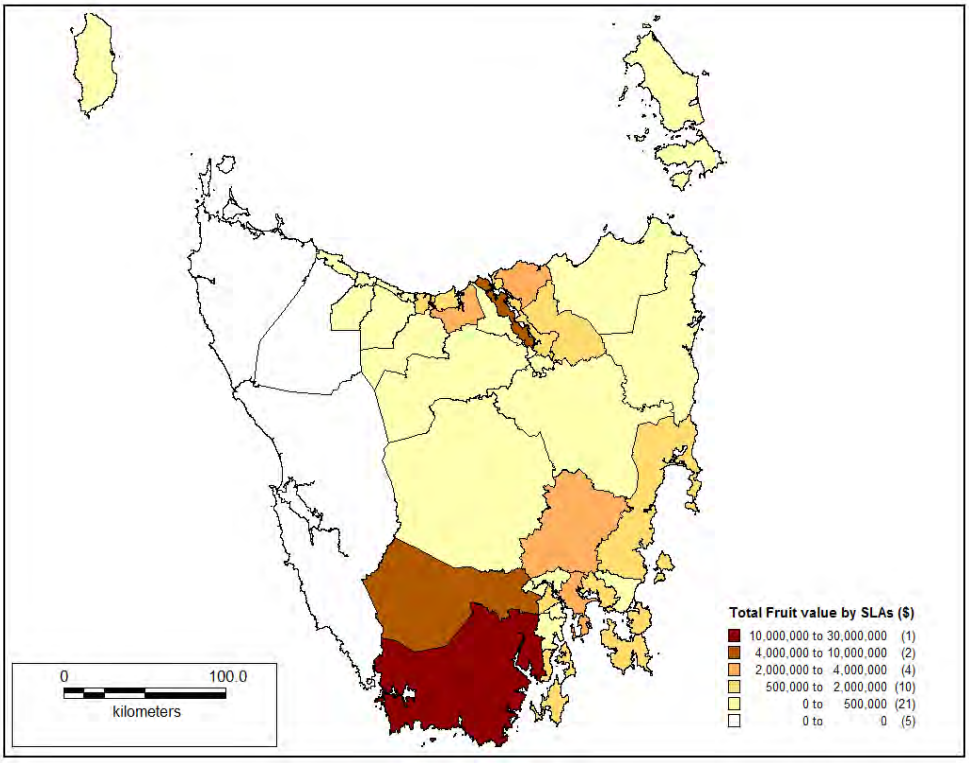


Figure 3: Total Fruit Production Value by SLA in Tasmania (Source: ABS Census 2006)

The type of fruit grown is also quite varied in the region. The Huon Valley produces the majority of the State's pome and stone fruit with 73% of the State's apple tonnage. Overall the Southern Region produces 76% of the State's apples.

The Huon Valley is also notable for its berry production, however the Derwent Valley is the most significant berry producer in terms of area. The Southern Region accounts for 70% of the State's berry fruit production area. Parts of the Coal River Valley, Huon Valley, and Channel region produce grapes for viticulture, which is considered separately below. Production area for the different fruit production is shown in Figures 3 to 5 below.

Fruit production is the second most significant agricultural product for the region in terms of value, after livestock.

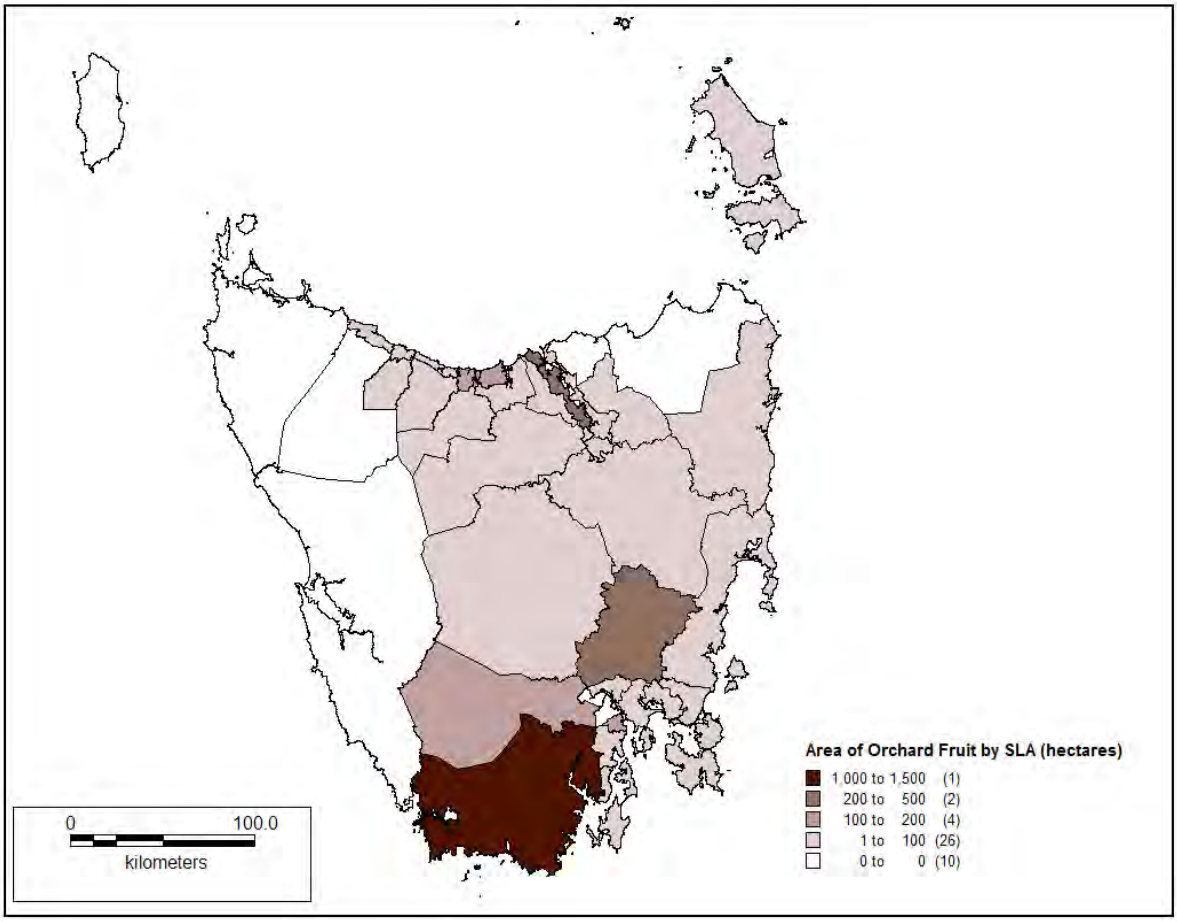


Figure 4: Orchard (Pome & Stone) Fruit Production Area by SLA *(Source: ABS Census 2006)*

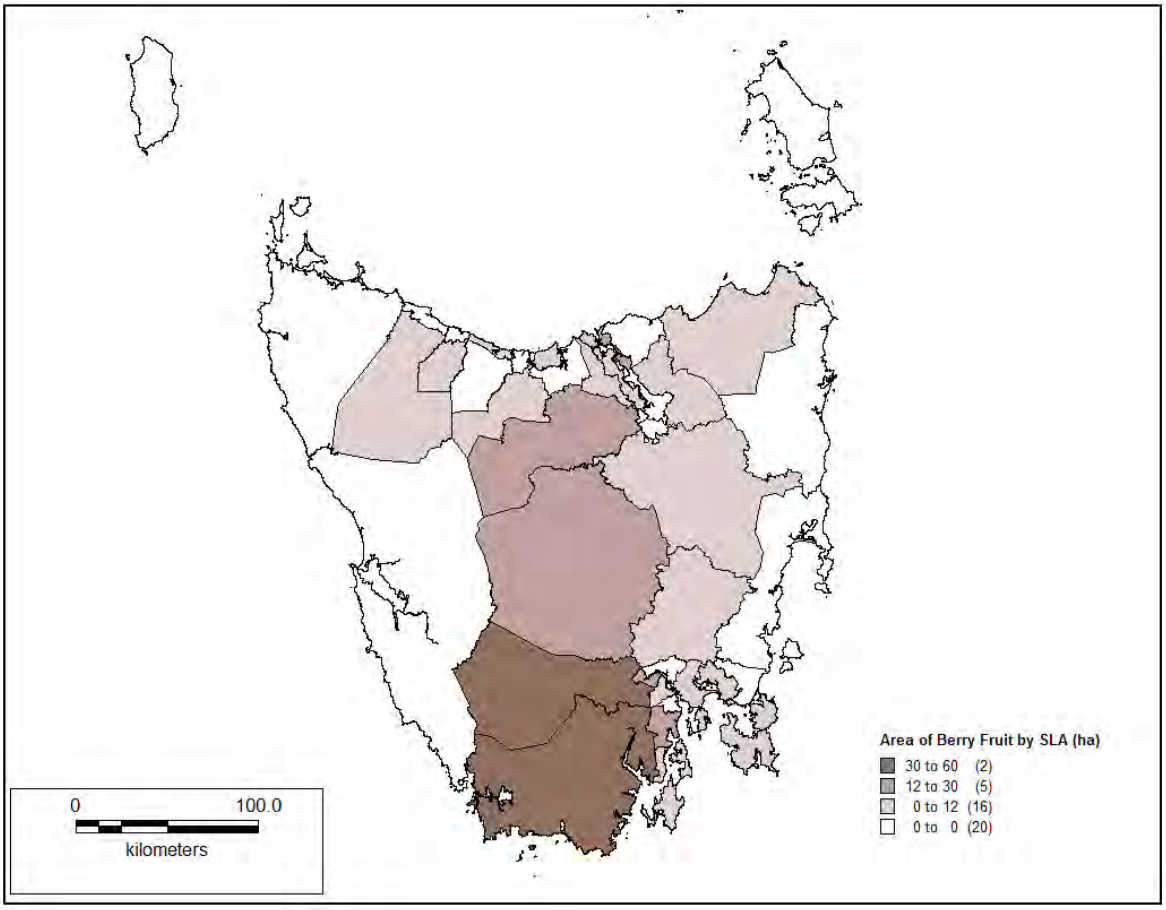


Figure 5: Berry Fruit Production Area by SLA *(Source: ABS Census 2006)*

1.3.2 Vegetable Production

Tasmania produces an extensive range of fresh and processed vegetables with the backbone of the vegetable industry being the potato, making up approximately 70% of vegetable production in the State. Following potatoes, the next most significant vegetable product is onions. Tasmania's contribution to national production on these two vegetables crops is notable, being the 3rd greatest producer behind Victoria and Southern Australia. This is followed by a range of smaller value crops, beans, peas, carrots, broccoli and other vegetables in decreasing order.

The Southern Region produces no onions at any commercial export level however Clarence (20,844 tonnes) and Huon Valley (7,679 tonnes) both contribute to 'other' vegetable production. Whilst the Southern region's tonnages are modest when compared to some of the more productive areas of the State (Central Coast at 96,012 tonnes, Latrobe at 78,804 tonnes and Northern Midlands at 76,728 tonnes) vegetable production in the Southern region is nevertheless a significant contributor to local economies and also important to improved sustainability through self-sufficiency.

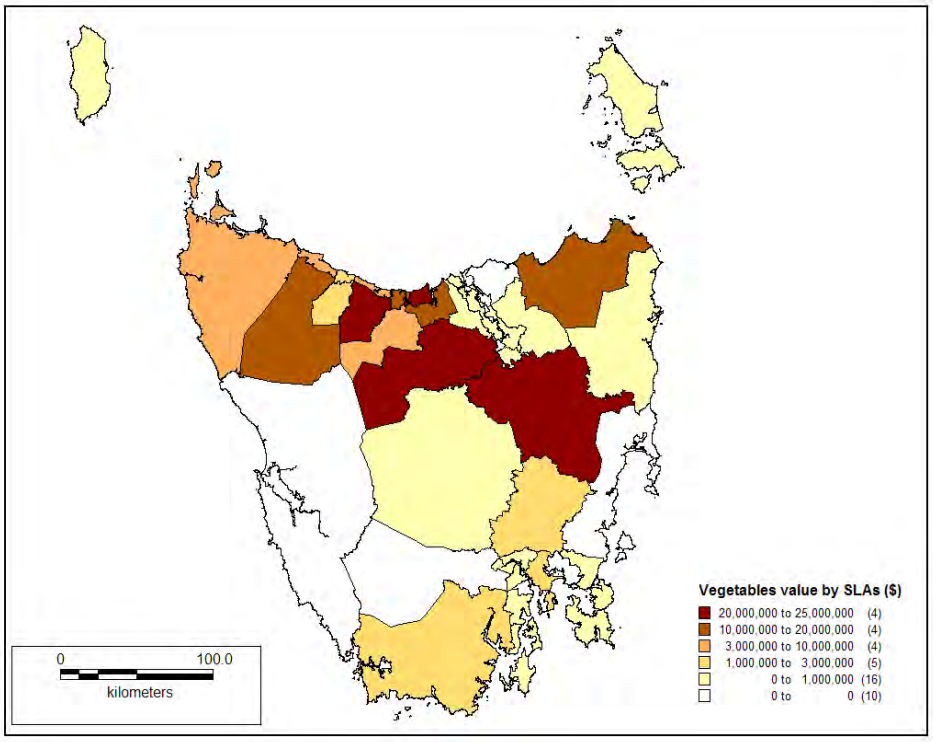


Figure 6: Vegetable Production in value by SLA *(Source: ABS Census 2006)*

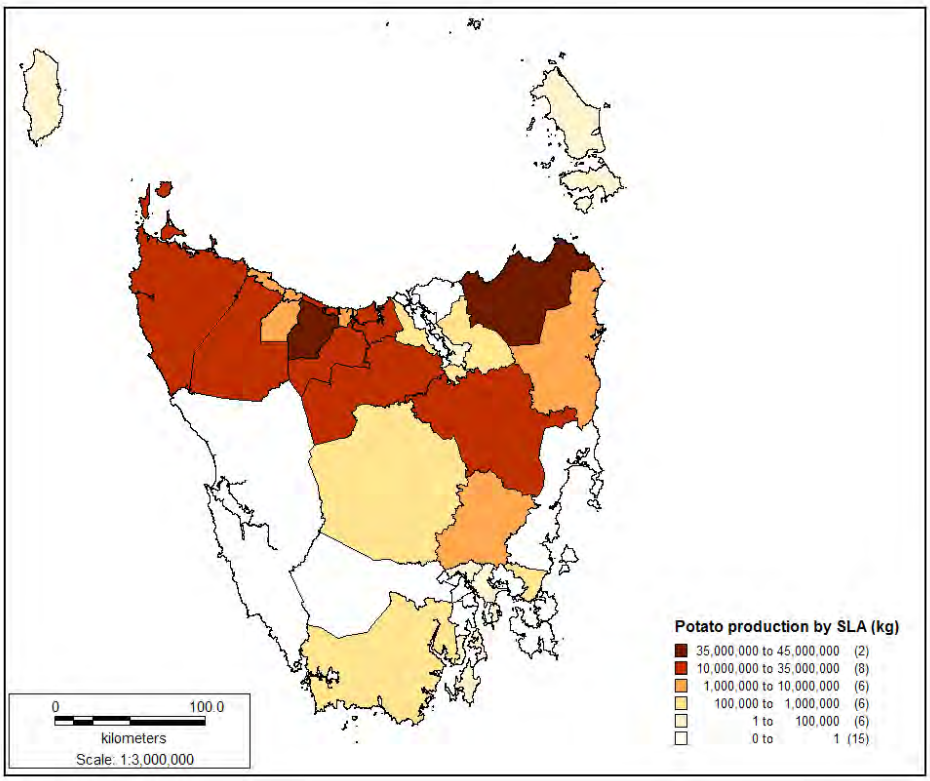


Figure 7: Potato production volumes by SLA *(Source: ABS Census 2006)*

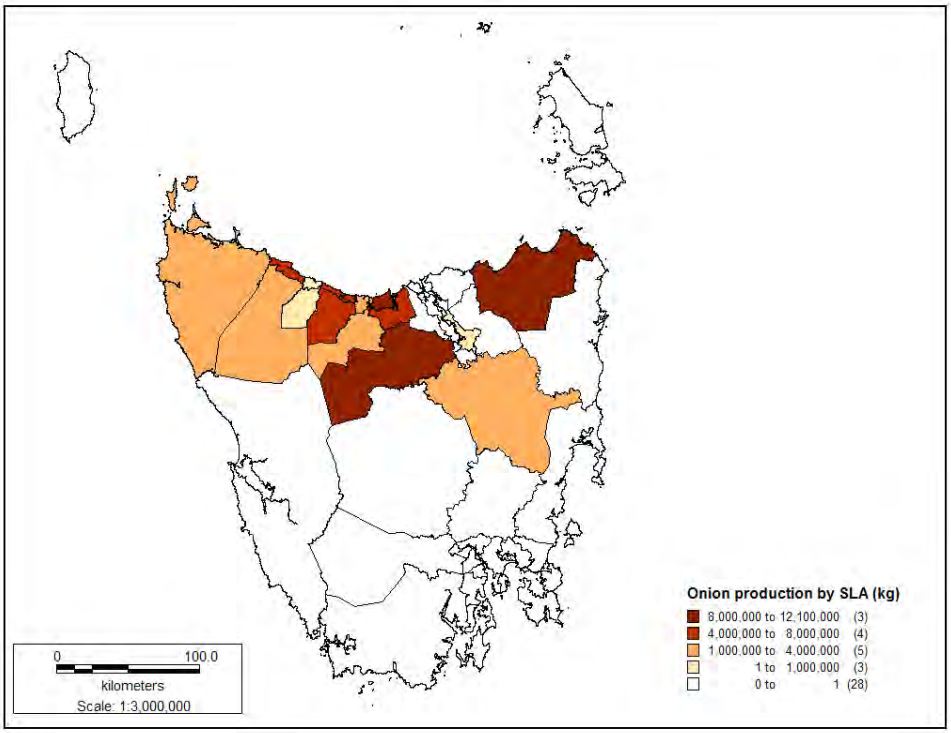


Figure 8: Onion production volumes by SLA *(Source: ABS Census 2006)*

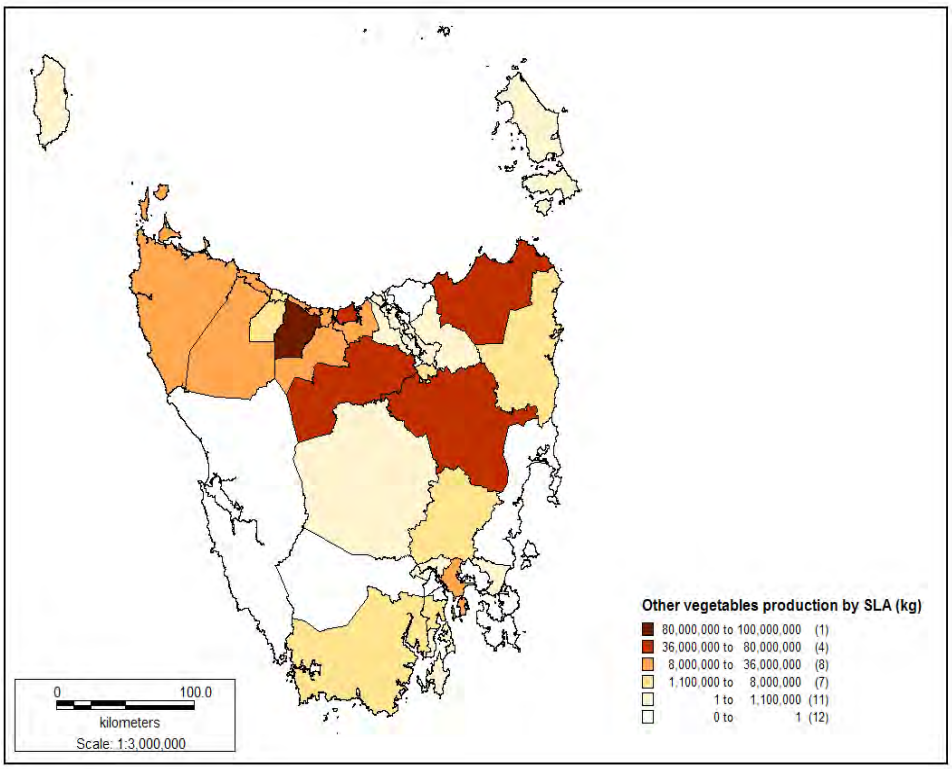


Figure 9: Other vegetable production volumes by SLA *(Source: ABS Census 2006)*

1.3.3 Cereal and Grain Production

The Southern region includes a number of local government areas that contribute significant amounts of cereals for grain production, including Southern Midlands (9,153 tonnes) Clarence (2,095 tonnes) and Brighton (1,784 tonnes). Southern Midlands is the biggest producer in terms of tonnage and value in the southern region and second in the State after Northern Midlands (Pt B). Interestingly while there is a considerable gap in terms of production volume between Southern and Northern Midlands (Pt B) (Northern Midlands Pt B produces 41,121 tonnes in comparison to Southern Midlands 9,153 tonnes), the value difference is not proportionally the same with Northern Midlands Pt B producing $8.6 million per year compared to Southern Midlands' $2.08 million.

On a value per hectare (ha) comparison, Northern Midlands is $209 per ha while Southern Midlands is $227 per ha. Central Highlands and Clarence are next both with comparisons of $209 per hectare. Outside of the southern region the only other area approaching the value per hectare comparison is Meander Valley Pt B with $208. This data indicates that the produce being produced in Southern Tasmania is generally higher quality with a high farm gate value.

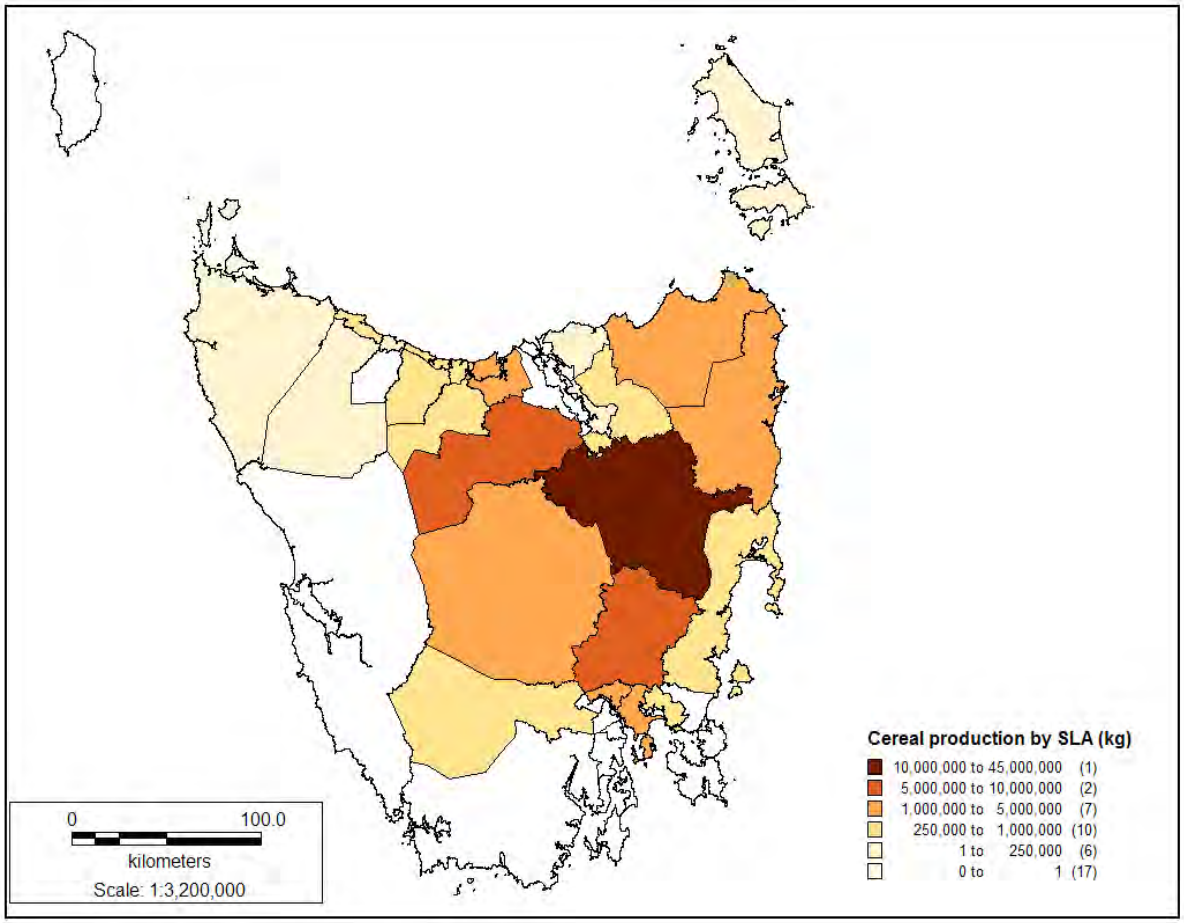


Figure 10: Cereals for grain production volumes by SLA *(Source: ABS Census 2006)*

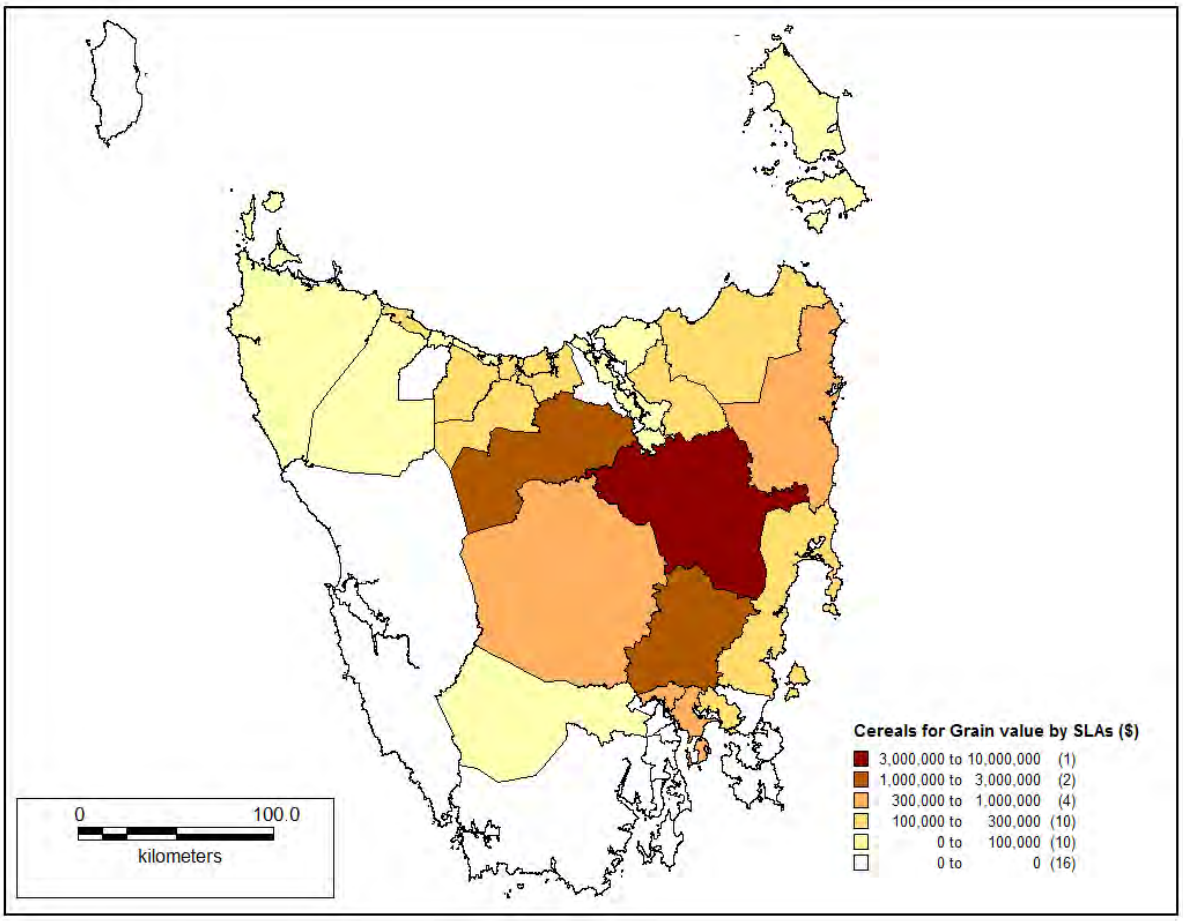


Figure 11: Cereals for grain production Values by SLA *(Source: ABS Census 2006)*

1.3.4 Hay Production

Pasture and cereal crops for hay production is not a significant product within the region. Of the total gross value of production for the State of $67.2 million, Southern Tasmania only produces $8.7 million. Figure 12 below shows the comparison of crop for hay production in value across the State. It is however important to note that this production value does not include hay produced and utilised on site for livestock feed.

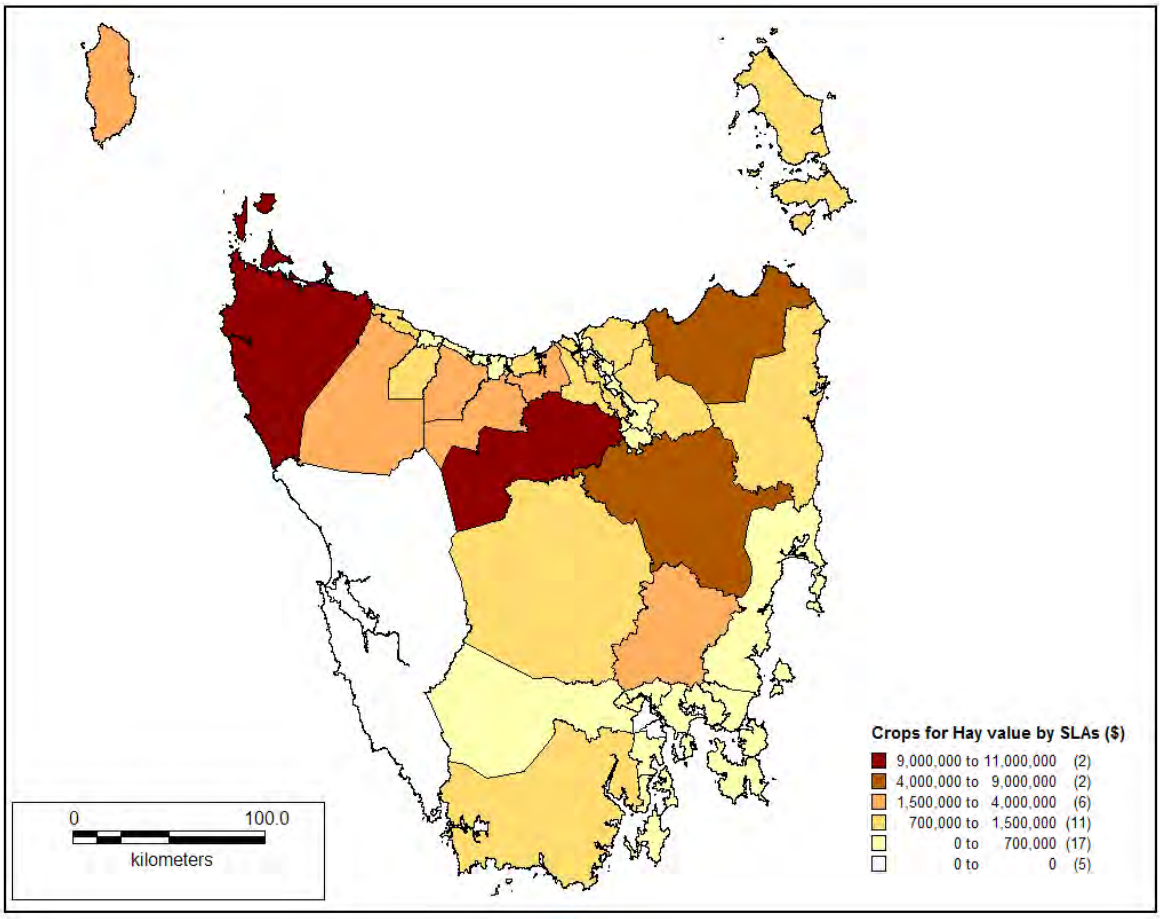


Figure 12: Crops (pasture and cereal for hay production in Value by SLA *(Source: ABS Census 2006)*

1.3.5 Grazing

The region includes significant areas of land used for grazing purposes. This includes the Central Highlands (162,555 ha), Southern Midlands (159,890 ha) and Glamorgan Spring Bay (71,296 ha) as major contributors. The region has close to 500,000ha of grazing land in total making up 38% of the total grazing land in the State. Grazing land in the region is utilised both for livestock and wool production.

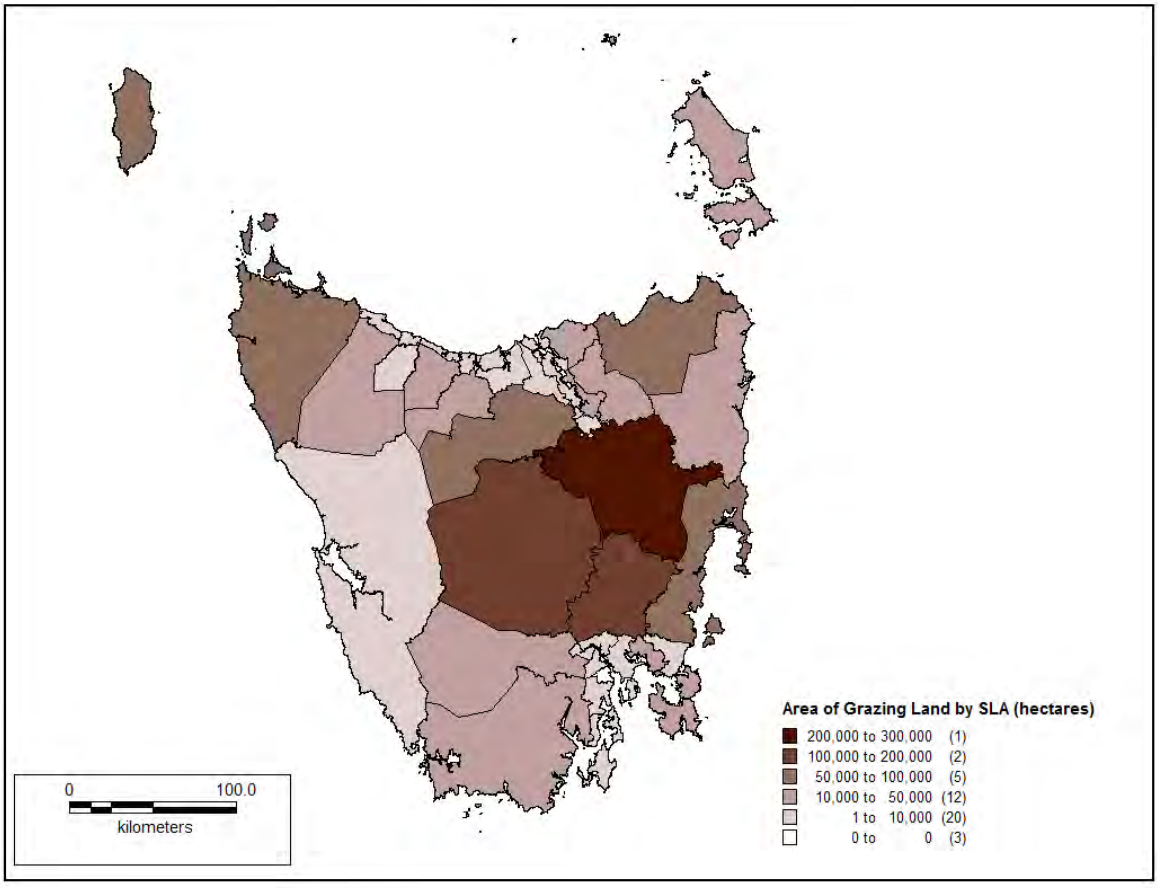


Figure 13: Grazing production area by SLA *(Source: ABS Census 2006)*

1.3.6 Meat Production

The farm gate value of the red meat industry in Tasmania was $212 million for 2006-07, which represents 22% of the States total agricultural production (Department of Primary Industries, Parks, Water and Environment, 2010). Of this, beef dominates the industry accounting for $172 million with lamb and mutton sales accounting for $39 millions or one quarter of the industry's value.

Approximately 65% of Tasmania's beef is exported overseas with Japan being the biggest market, and a further 10% is exported to mainland destinations for finishing and processing. Approximately 35% of Tasmanian sheep meat is exported overseas mainly to the United States and the Middle East. Some live sheep are also exported to the Middle East.

One of the main constraints on expansion of this industry is access to appropriate land as dairy cattle and tree farming industries expand.

The southern region contributes to beef production most prominently in the Central Highlands area ($6,574,332), followed by Southern Midlands ($4,413,829) and Huon Valley ($3,253,913).

The region also contributes to lamb production, with the Southern Midlands having the State's second highest production value at $8,415,426. Glamorgan Spring Bay ($1,470,967) and Clarence ($915,141) also contribute significantly. The Southern Region contributes 21% of the overall value of livestock in the state (this includes sheep, lambs and cattle, pigs, chickens etc. sent for slaughter).

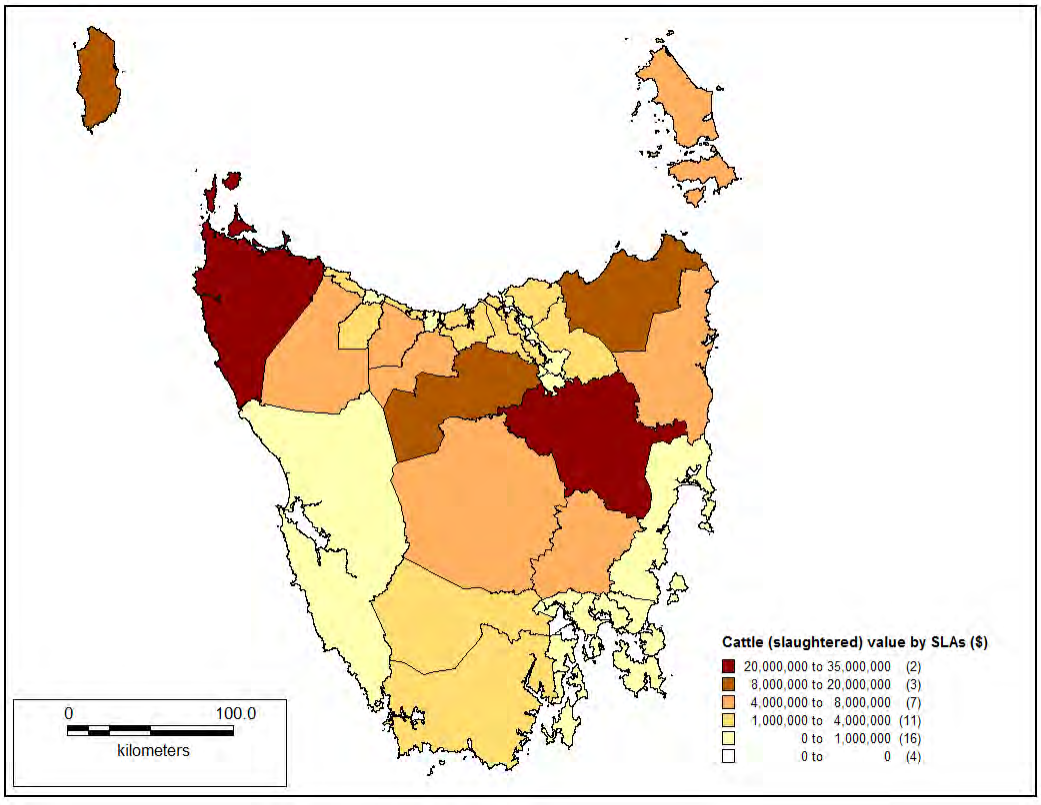


Figure 14: Value of slaughtered cattle by SLA *(Source: ABS Census 2006)*

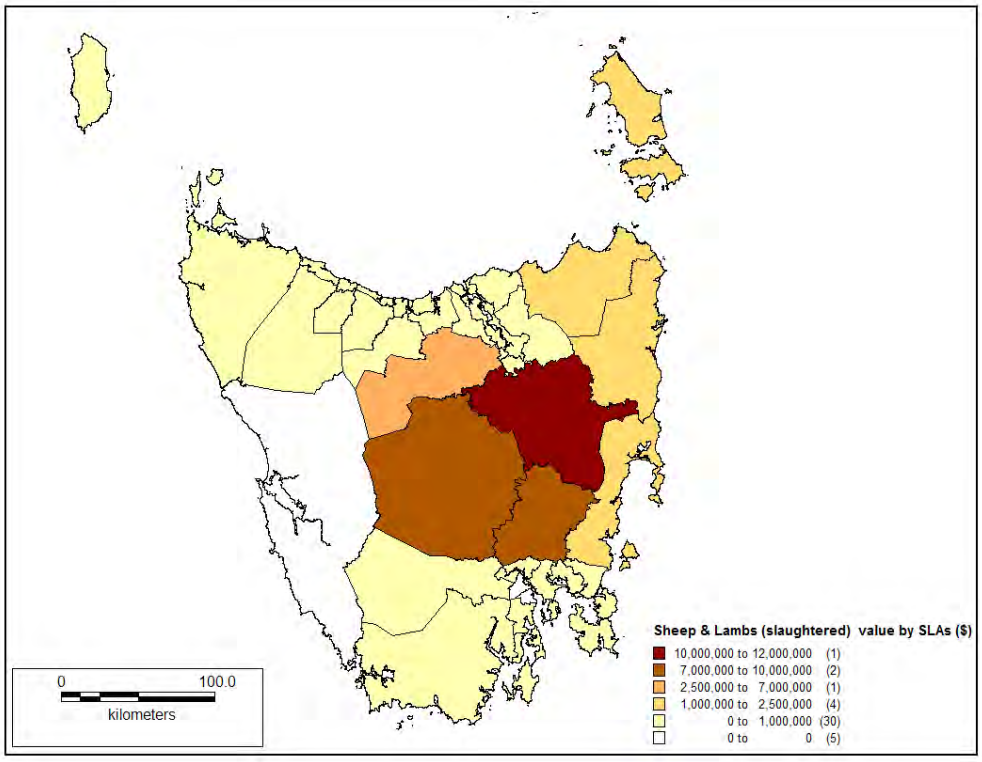


Figure 15: Value of Sheep & Lambs slaughtered by SLA *(Source: ABS Census 2006)*

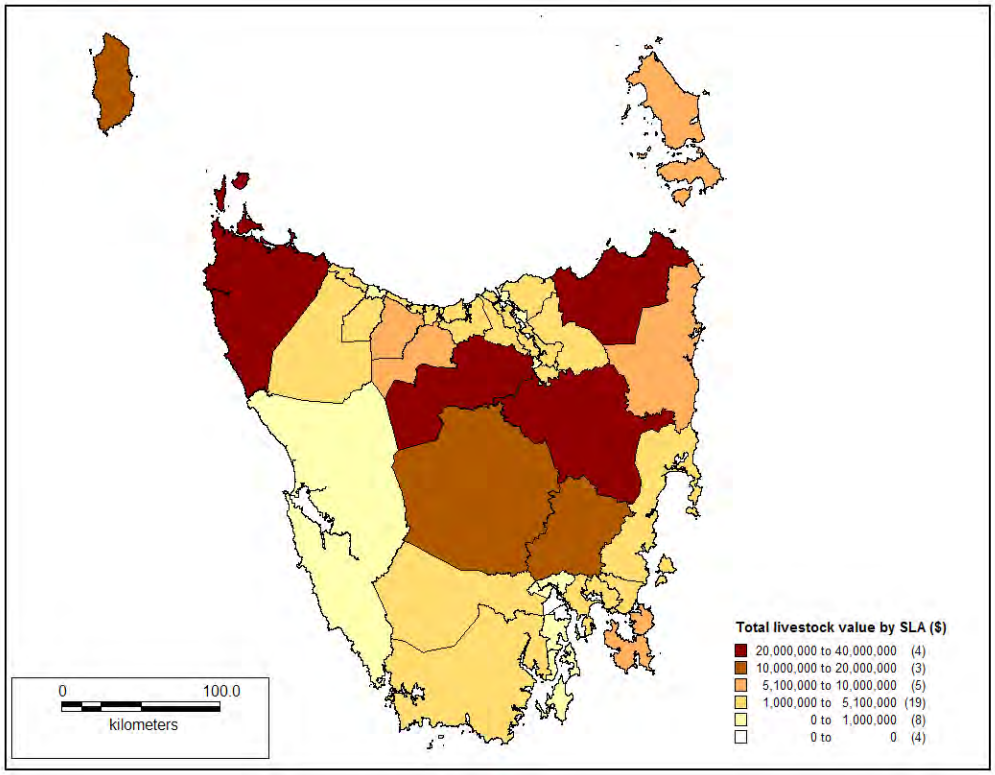


Figure 16: Total value of all livestock slaughtered by SLA *(Source: ABS Census 2006)*

1.3.7 Dairy Industry

Dairying represents 24% of the State's agricultural income. The majority of dairy production occurs on the North West Coast with Southern Tasmania a minor player. The Central Highlands ($2,343,377 million) and Derwent Valley ($1,644,086 million) contributions are sizeable but the region's overall contribution to the State's dairying industry is only 2%.

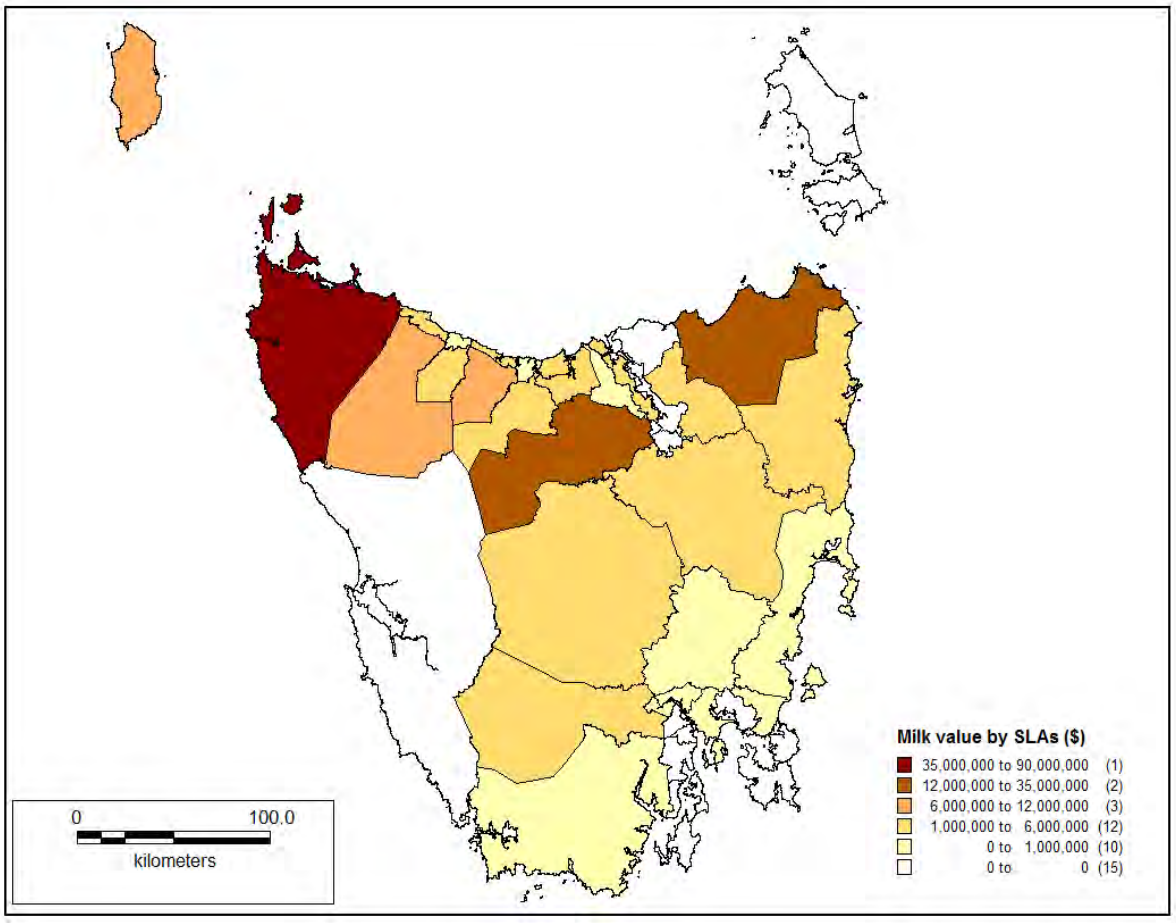


Figure 17: Value of milk production by SLA *(Source: ABS Census 2006)*

1.3.8 Wool Industry

Sheep production for wool accounts for 8% of the total value of agricultural production in Tasmania, with over 95% exported to China, Italy, Czech Republic, India, and Japan and Korea. In the Southern Region, the Southern Midlands ($14,258,309), Central Highlands ($11,327,782) and Glamorgan/Spring Bay ($4,666,769) are three of the top four producers of wool in the State. The Southern Region accounts for 46% of the overall production value of wool to the State.

Tasmania produces some of the world's highest quality superfine wool, notably in the extensive dry-land farming areas where there are poorer quality soils with low rainfall.

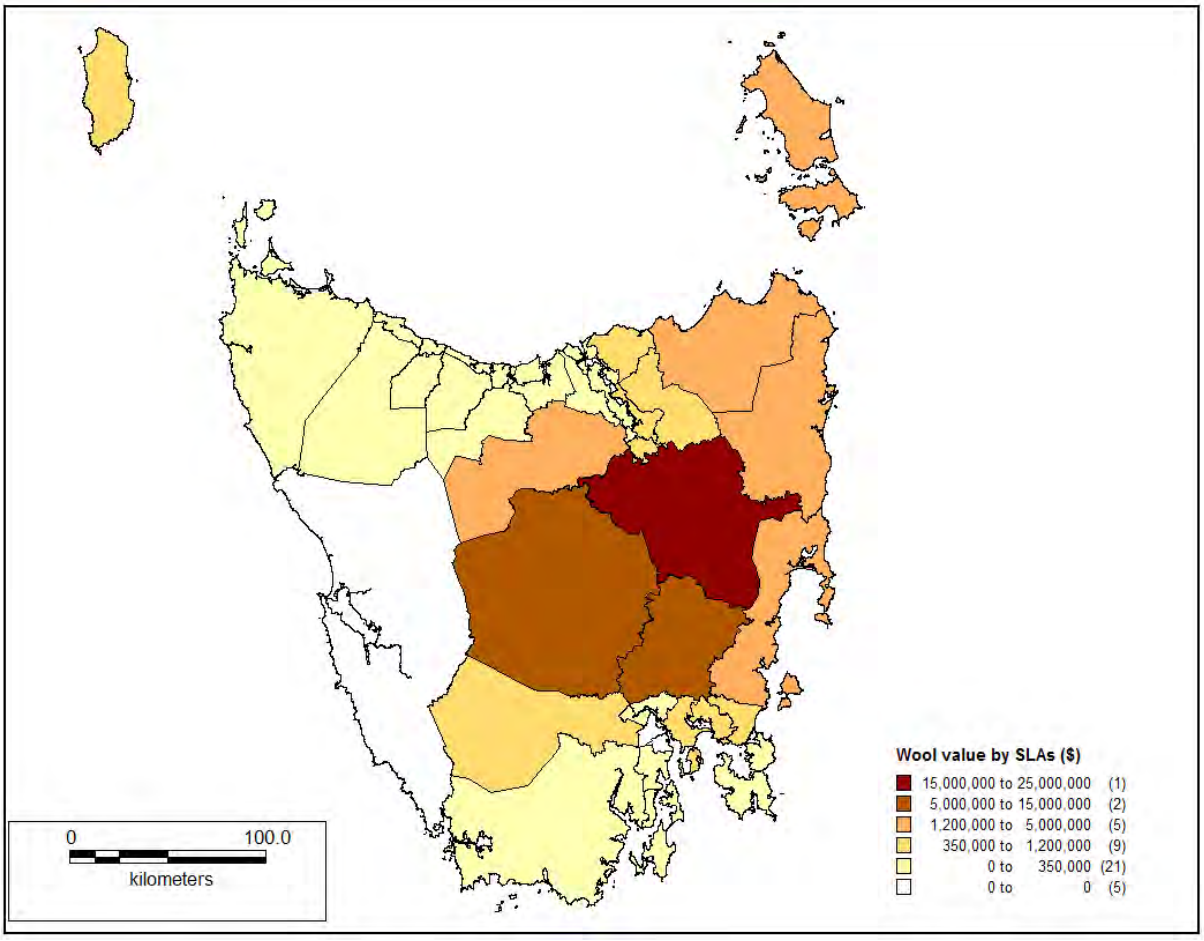


Figure 18: Value of wool production by SLA *(Source: ABS Census 2006)*

1.3.9 Poultry and Egg Production

Data on poultry production in Tasmania is contained within 'other livestock' as there are limited producers in the State (2 main producer) and data is therefore not publicly available due to commercial in confidence reasons. Data on commercial egg production is however available and is shown in Figure 19 below. Kingborough Pt A ($2.56 million) was identified in 2006 as being the second most valuable production area of eggs in Tasmania behind Northern Midlands Pt B ($3.19 million). It is however important to note that since the 2006 census, one of the two major egg producers in Kingborough (Pitts Poultry at Snug) has since closed (Sun Valley at Margate remains) and therefore the value of production in Kingborough Pt A and the southern region in general will likely be less significant following the next census.

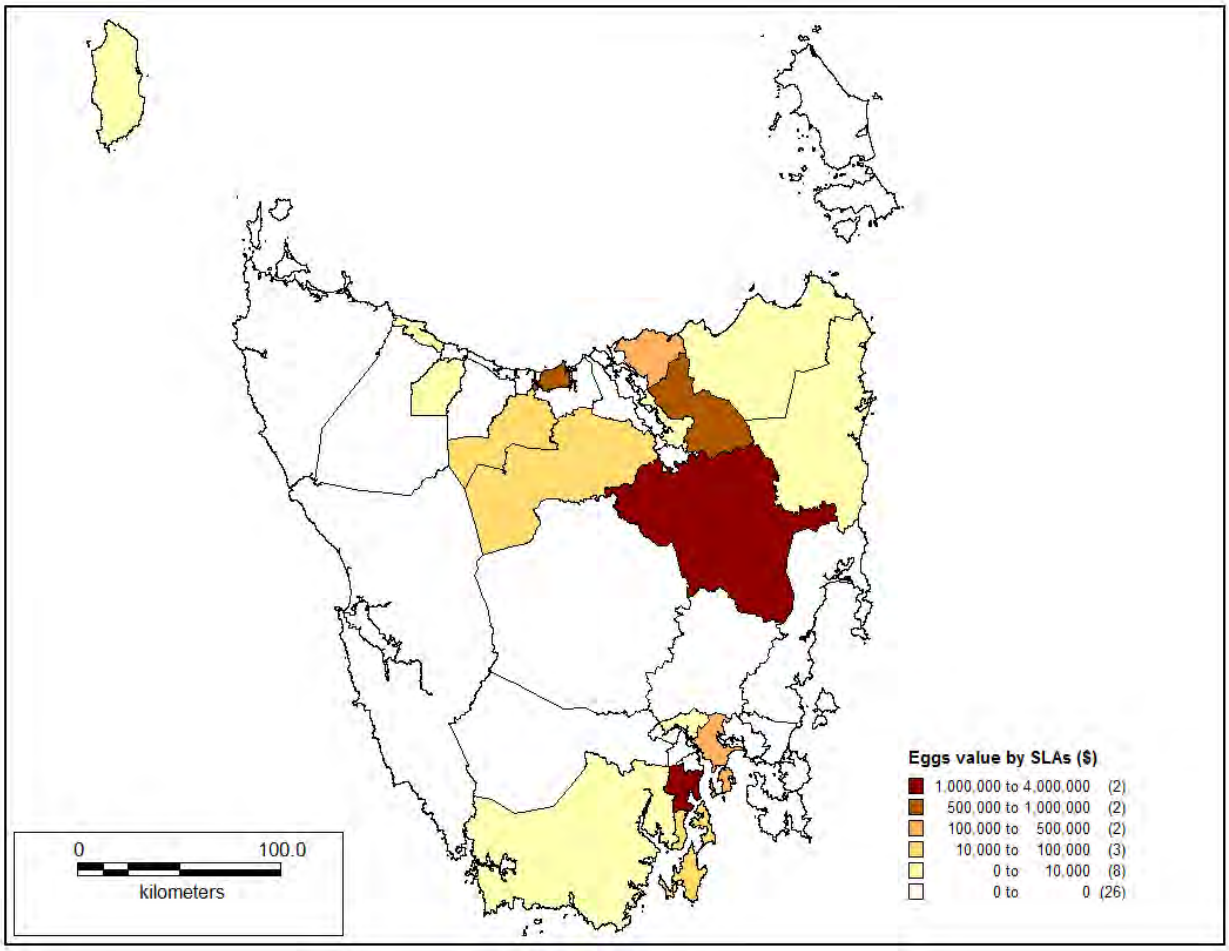


Figure 19: Value of Egg Production by SLA *(Source: ABS Census 2006)*

1.3.10 Hops, Canola, Olives and Nuts

The region contributes 32% of the State's tonnage in hops, canola, olives and nuts where Southern Midlands produces the most at 848 tonnes, (significantly less than the State's top producer Northern Midlands at 3,281 tonnes). Central Highlands produces 638 tonnes and parts of the Derwent Valley 337 tonnes. The tonnage of these products is considerably less that other food based products, reflecting the nature of the goods in question.

Whilst accurate data is not available regarding the value of these products to the overall state economy, the value of "Other Crops", as determined by the ABS, shows that the Southern Region contributes 34% of the value of these products, which include hops, canola, olives and nuts.

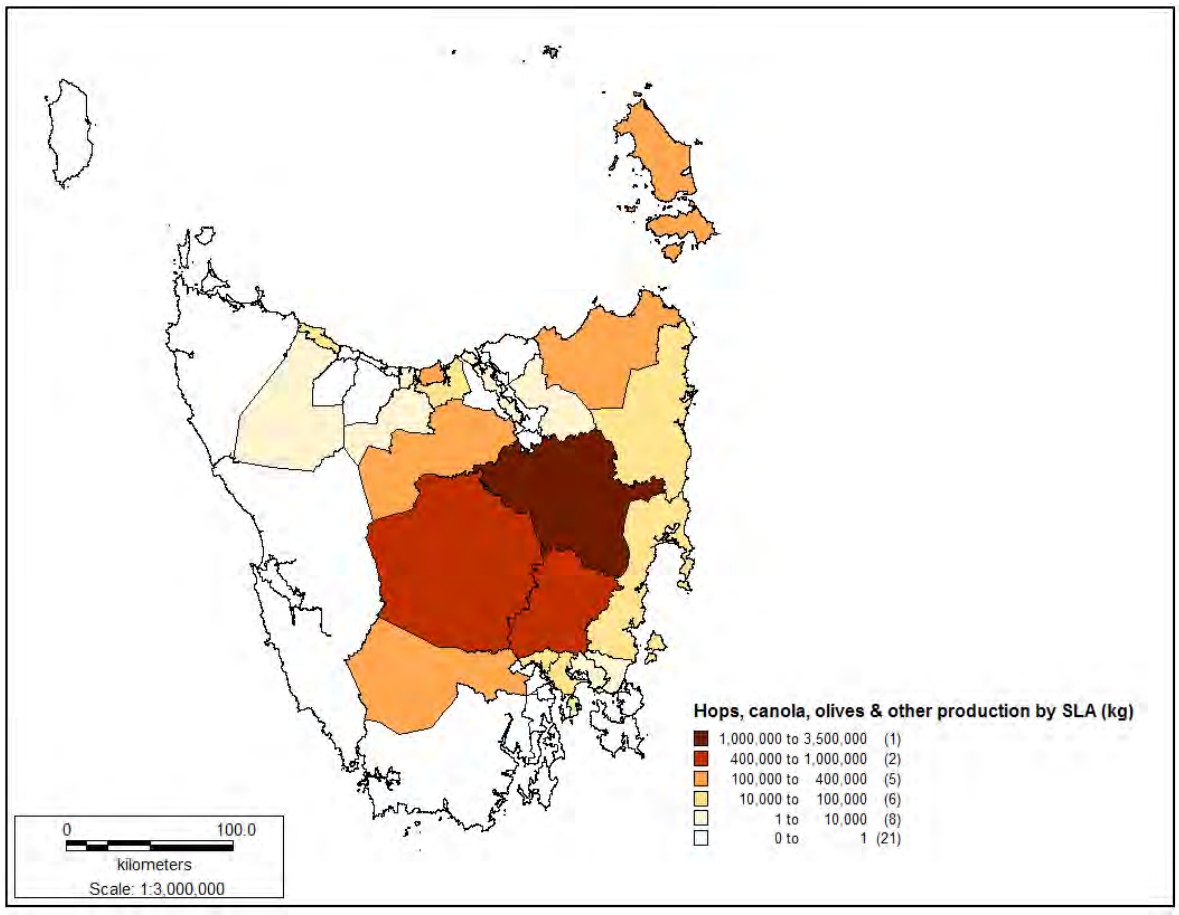


Figure 20: Hops, Canola, Olives and other production volumes by SLA *(Source: ABS Census 2006)*

1.3.11 Poppies

There is limited data on poppy production due to confidentiality and security reasons. However there is data on the amount of area devoted to poppies, which shows that the Southern Region accounts for 15% of the State's poppy production area. Furthermore poppies are included in the ABS other crops data set which also includes lavender, fennel, peppermint and others. Whilst the overall value of these crops is not significant at just over $10 million, the Southern Region does make up 34% of this value.

1.3.12 Nurseries, Flowers and Turf

The State has a robust nursery, flowers and turf industry with a value of over $45 million a year in production value. In the Southern Region, the areas which produce the most of these products include, the Huon Valley (Almost $7 million) and Clarence (Almost $4 million). Overall the Southern Region produces 39% of the value of nurseries, flowers and turf to the State's economy.

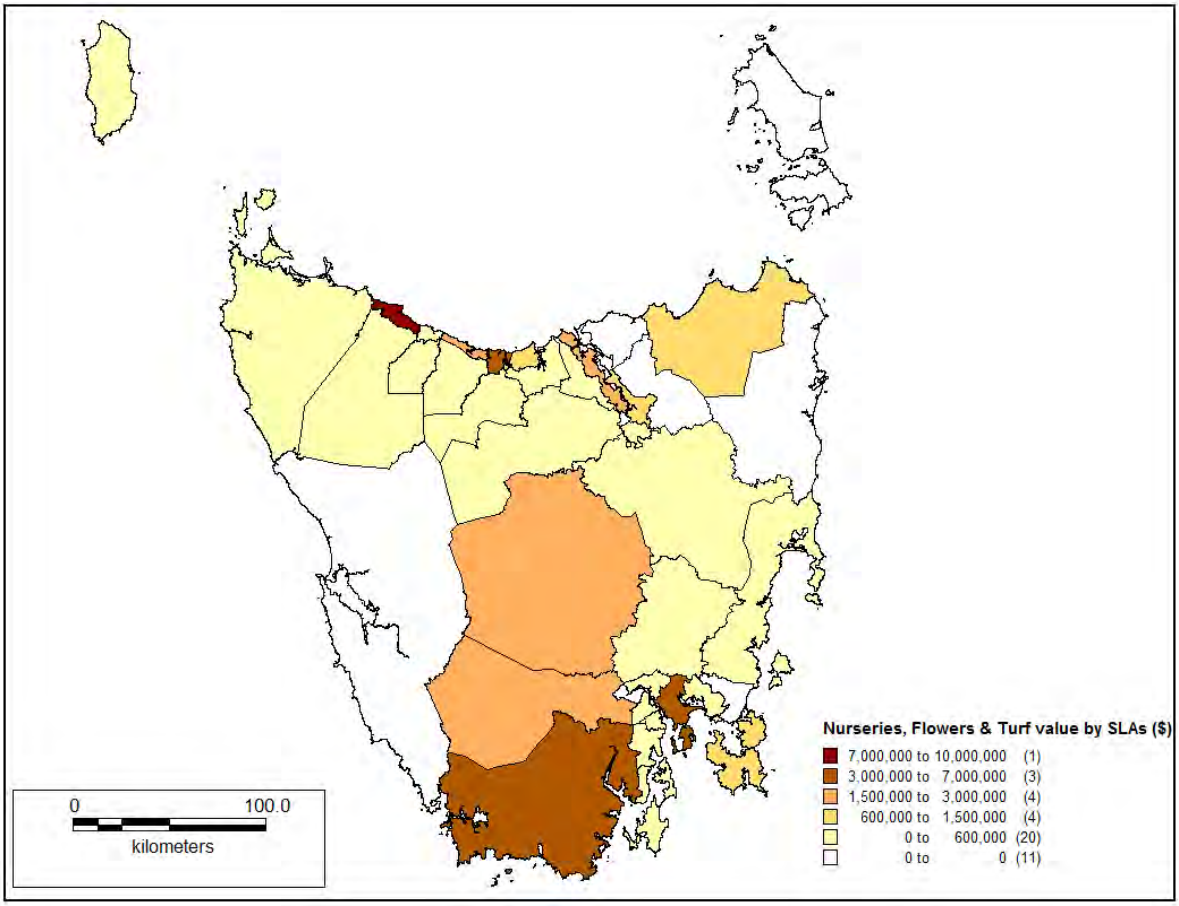


Figure 21: Value of Nurseries, Flowers and Turf production by SLA *(Source: ABS Census 2006)*

1.3.13 Wine

Tasmania is becoming a nationally and internationally recognised wine producing region. Since 1986 the industry has increased significantly, going from 47ha in area across the state to 1549ha in 2009. The majority of vintages are in Pinot Noir and Chardonnay grapes, and to a lesser extent Riesling, Cabernet Sauvignon and Sauvignon Blanc (2010, Wine Tasmania). In the 2006-07 financial year, the value of wine, after packing and processing was $21 million and farm gate value was $13 million. However it must be noted that the success of vineyards is very dependent on yearly grape growing conditions, with a bad year rendering much of the crop worthless. The financial year of 2006/07 can be considered a slightly below average year with a yield of 5571 tonnes from 999ha at the end of 2006. The years of 2003 (6390 tonnes), 2004 (7861 tonnes), and 2008 (9628 tonnes) can be considered good years with the year 2009 a bad year with a yield of 5045 tonnes from 1549ha (Department of Primary Industries, Parks, Water and Environment, Wine Industry Fact Sheet 2009).

The Southern Region has close to 800ha of vineyards, slightly short of the main wine growing area in the northern Region, which has close to 850ha. Despite this significant acreage, the Southern Region only produces 29% of the overall state's wine yield (DPIPWE, Wine Industry Fact Sheet 2009). This is reflective of the quality of land in the southern region as compared to the northern region, as well as the climatic variations between the regions.

The success of Tasmanian wines is dependent on the weather conditions from year to year, but also informed by the overall climate. The excellent quality of various grape varieties for sparkling wine is due to the long, mild growing season created by Tasmania's latitude and maritime climate. The main wine growing regions, (Tamar Valley, Derwent Valley, Coal Valley and East Coast) generally receive lesser rainfall than other parts of the State which can also contributes to quality grape production.

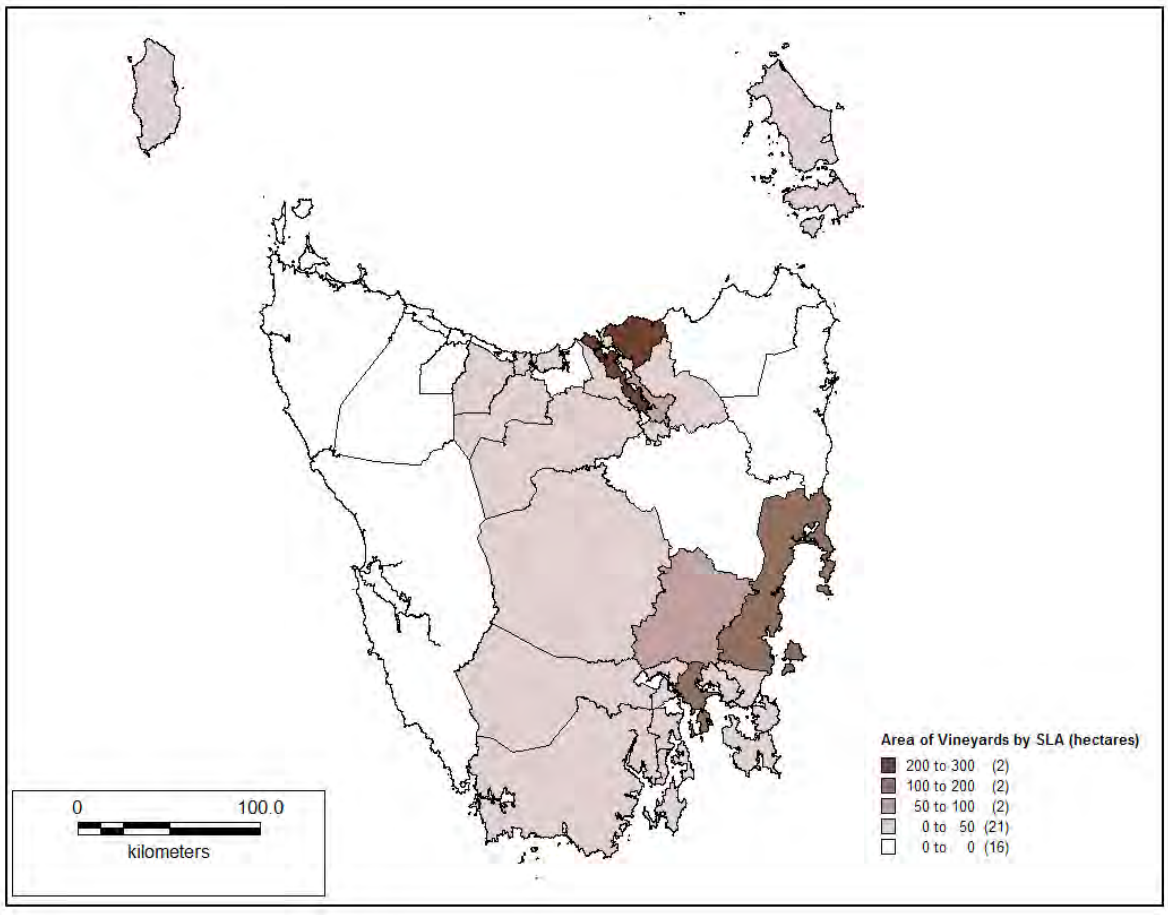


Figure 22: Area of land dedicated to vineyards by SLA *(Source: ABS Census 2006)*

1.3.14 New Crops

As an example of the changing nature of agricultural production in the Southern Region, in recent years, walnut production has become a new player with an orchard of 540ha boasting 180,000 trees being established in the Glamorgan Spring Bay area (Department of Primary Industries, Parks, Water and the Environment, 2010). When the 2006 Census data was collected this orchard was not at maturity and as such would not have been producing or contributing to the agricultural value in the area. In 2009 the first crop of walnuts was maturing with two thirds of the crop exported overseas to Turkey and Germany. The timing of the crop in Tasmania means the walnuts will be mature and ready for export just prior to Christmas, a crucial time for the German market. The cooler climate also produces a nut with a softer shell which is more attractive for consumers.

This is an emerging agricultural business that is likely to have a significant impact on Tasmania's exports. This orchard, (and one in NSW also owned by Websters), is poised to grow 2,500 tonnes by 2012 which is equal to 50% of the Australian walnut consumption market. In the last harvest 800 tonnes of Walnuts were produced, doubling the tonnage from the previous year.

1.3.15 Organics

There is limited information on the organics industry within Tasmania. However data from 2005 indicate that the industry contributes $9 million to the Tasmanian economy. Approximately 65% of produce is for the Tasmanian market, with the remaining 35% for the Australian market. Southern Tasmania accommodates organic farms for apples, cherries, wine grapes and some livestock.

1.3.16 Honey Production

Annual honey production remained relatively constant at 1,000 tonnes. Leatherwood honey, from Leatherwood trees in rainforests in the South and West of the state, make up 65% of the Tasmanian honey industry. Twenty percent of these sales are local, 50% are interstate and a further 30% are overseas. Due to the location of the Leatherwood forest, Leatherwood honey production is an important although specialised industry within the region (Department of Primary Industries, Parks, Water and Environment, 2010).

1.3.17 Irrigation

Tasmania has over 50,000ha of areas of irrigated land with data from 1996/07 indicating the southern region had over 10,000ha of irrigated land. The areas within Southern Tasmania that are irrigated include parts of the East Coast, Coal River, Derwent River area, Kingston coastal areas, Huon River area and parts of the South West Coast.

The total consumption of water for irrigation in Tasmania represents 59% of the total water use for the state (Australian Natural Resources Atlas, 2010). Pasture accounts for 48% of this irrigation area, vegetables 30%, Fruit 5%, Cereals 4% and other crops 13%. As indicated, fruit production is one of the main agricultural pursuits in the Region. Fruit production accounts for a very small percentage of the irrigated land in the State, whereas Vegetable production accounts for 30% of the irrigated area – of which the Southern Region has minimal contribution.

Industry analysis indicates that by 2015 an additional 250,000ML of irrigated water will be required per year which is a 50% increase on existing irrigation supplies (Department of Primary Industries, Parks, Water and Environment, 2010). Whilst this is likely to see an increase in irrigation in the South of the State – particularly in areas such as the Coal River Valley - as a percentage of the state as a whole, this is likely to be considerably less than the irrigated areas in the north and north west.

1.4 Agricultural Production Trends

Agricultural production value has been increasing across all three regions in the past 12 years, although both the North and North-West have seen greater proportionally increases in value than that in the South. See Figure 23 below.

The value of individual agricultural commodities has not however seen a steady rise. Some agricultural commodities have been decreasing in value of production while others have been increasing. For example in the South:

- The value of livestock production has increase from approx $20.5 million to just over $50 million. Information on volume is not available, however this increase in production value would also be resulting from changes in farm gate value. A good example of this is the significant increases in the price of lamb across the same period;
- The value of wool, and cereal for grain production has remained relatively steady, although with fluctuations between periods. The slight increases in value can be attributed to inflationary pressures;
- The value of fruit production has decreased. This correlates with the decrease in volume of fruit production, particularly decreases in pome fruit production;
- The value of vegetable production has increased, while the total volume has decreased. This indicates that the South is producing high value vegetables products (i.e. speciality lettuces from the Coal River Valley); and
- The value of nurseries, cut flowers and turf has increased beyond inflationary pressures.

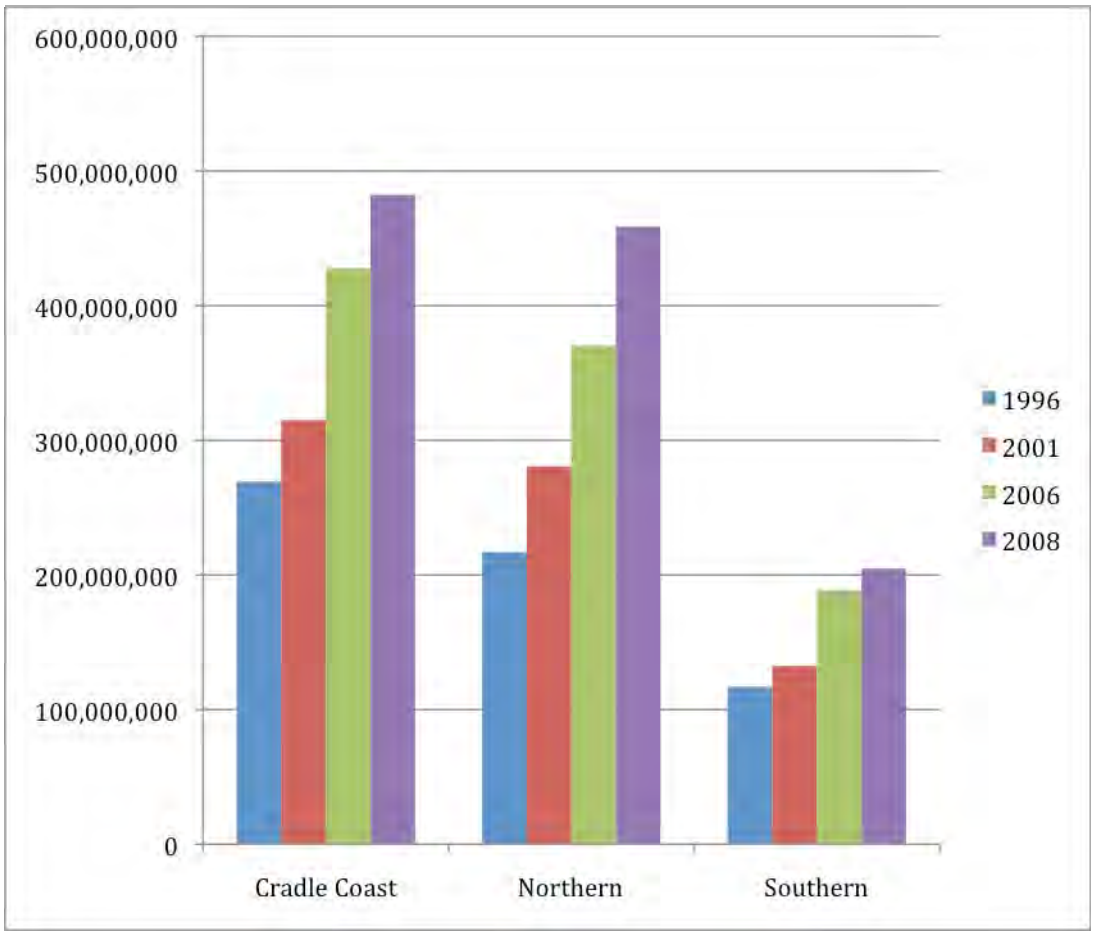


Figure 23: Comparison between time periods of Agricultural Value by Region *(Source: ABS Census & Value of Agricultural Commodities 2008)*

Table 2: Comparison against time periods for value of Agricultural Production by region of selected products *(Source: ABS Census & Value of Agricultural Commodities Produced 2008)*

	1996 Production ($)			2001 Production ($)			2006 Production ($)			2008 Production ($)		
	South	North	N-W	South	North	N-W	South	North	N-W	South	North	N-W
Livestock	20,672,234	42,488,074	37,804,326	20,174,788	63,148,441	68,195,199	53,196,881	114,323,531	84,814,641	50,057,947	96,730,715	82,624,376
Wool	27,568,727	35,077,573	3,031,785	34,404,246	45,009,701	4,170,777	34,697,170	36,650,948	1,962,553	32,408,646	35,958,992	2,836,479
Milk	4,098,570	49,707,654	84,998,798	3,782,012	55,97,648	88,059,428	5,721,061	68,825,533	133,530,994	8,581,129	133,995,987	189,781,786
Vegetables	4,559,895	32,453,603	96,063,712	5,720,298	44,292,072	95,007,092	6,652,822	61,849,500	130,301,778	17,767,100	76,523,337	141,986,699
Hay	3,227,335	12,592,841	11,910,705	6,588,427	16,809,371	14,253,336	8,754,747	32,604,710	25,835,571	8,369,106	32,045,523	2,1738,125
Cereals for grain	2,871,564	10,285,269	1,288,079	2,252,297	10,064,458	875,768	4,081,341	10,890,273	1,351,915	3,860,511	13,542,348	3,498,315
Fruit	38,389,362	7,570,791	7,414,106	40,074,232	13,413,204	8,796,180	40,921,306	13,113,195	5,663,874	55,762,621	30,075,193	8,870,929
Hops	3,944,770	4,115,756	2,550,886	3,354,980	2,582,760	3,149,020	1,931,400	12,61,231	nd	nd	nd	nd
Eggs	183,971	3,376,152	1,244,314	1,302,211	2,419,981	915,165	2,752,359	3,963,314	796,014	3,310,295	5,063,039	1,466,992
Nurseries, cut flowers & turf	3,384,571	1,946,626	2,901,589	4,520,692	2,026,818	5,541,404	13,406,857	5,521,510	21,810,539	15,813,074	10,020,835	13,356,994
Other	8,038,380	17,382,404	20,038,732	10,147,921	25,244,998	26,113,693	16,523,252	20,270,881	21,814,787	8,773,667	24,865,393	133,569,934
Total Agriculture	**116,989,376**	**216,996,740**	**269,220,032**	**132,322,104**	**280,609,452**	**315,077,062**	**188,639,196**	**370,274,626**	**427,882,669**	**204,704,096**	**458,821,362**	**482,186,334**

Table 3: Comparison against time periods for volume of Agricultural Production by region of selected products *(Source: ABS Census)*

	1996 Production (tonnes)			2001 Production (tonnes)			2006 Production (tonnes)		
	South	North	North-West	South	North	North-West	South	North	North-West
Potatoes	4,811	79,066	218,156	8,819	166,028	206,170	3,553	105,269	179,733
Onions	2,254	18,611	70,204	0.9	13,364	28,849	nd	21,811	47,020
Green Peas	6,494	30,992	28,184	3,485	32,726	16,653	27	30,123	6,295
Other Vegetables	3,024	9,724	47,013	4,939	12,886	57,708	2,695	19,869	74,069
Apples	41,031	4,149	7,217	38,328	3,839	10,079	25,090	2,850	4,822
Grapes	158	1,587	33	nd	nd	nd	2,179	3,354	37
Other Fruit	1,652	379	363	1668	262	259	3,717	325	588
Cereals (wheat, oat, barley)	15,117	47,078	5,348	14,807	53,302	4,432	18,726	52,317	6,570
Legumes for Grain	186	455	nd	151	370	99	1,284	2,477	289
Canola	115	64	nd	84	349	5	256	1,094	8
Wool	nd	nd	nd	4,938	7,141	702	nd	nd	nd

N.B: volume data on livestock and other animal based products such as milk and eggs is not available

1.5 Agricultural Production Analysis

The data highlights a number of issues. The type of agricultural production is quite different in the southern region to the two northern regions, which are major producers of a variety of vegetable crops. The better quality agricultural land in the North West, reliable rainfall, local climate and suitable elevation is conducive to large scale high frequency vegetable cropping.

Whilst the Southern Region has the least amount of prime agricultural land, the land is suitable for certain agricultural endeavours. There is a considerable area of extensive agriculture focused on grazing (cattle and wool) and grain production in the Southern Midlands, Central Highlands, Derwent Valley and to a lesser degree Glamorgan Spring Bay. Intensive agriculture also thrives in the region, but in relatively small pockets, and includes high value crops such as berries, stone fruits, pome fruits, walnuts, poppies and wine grapes. Intensive agriculture generally thrives in the more valley based agricultural areas where controlled water supply is more certain: The Huon, Derwent and Coal River valleys.

Table 4: Comparison of the Regional differences between Volume, Area and Value of State Totals

	North West	North	South
Volume	51%	38%	9%
Area	17%	44%	38%
Value ($)	43%	37%	19%

As indicated in Table 4, the Southern region produces a much smaller volume of product compared to the North West and North in proportion to value. That product is nevertheless a significant contribution to the Tasmanian economy. A number of low volume high value crops do well in the Southern region positively skewing the statistics in the above table. Even superfine wool falls into this category, although the area of land required is proportionally much greater to produce a given weight.

The Southern Midlands ($45,803,188 gross value for 2006), Huon Valley ($39,157,605) and Central Highlands ($ 34,958,783) all contribute significant amounts to the state-wide economy. Although, to put these figures into a state-wide perspective, it is noted that the top contributor, Circular Head, contributes more than these three LGSs combined at $139,360,262. The Glenorchy municipal area is notable as having the highest value production per hectare of agricultural land which is reflective of the high value of the Moorilla winery, in that municipality. The value of production per hectare is shown for each SLA in Table 5 and Figure 24 below. What is interesting to note, this value per hectare analysis, is not necessarily indicative of the 'significant agricultural land'. For example land within the midlands area would generally be considered significant because of its importance in wool, livestock and to a lesser degree grain production, however the land required to produce these products is considerable more in ha than some of the more intensive agricultural production associated with such things as fruit production. Understanding the distinct characteristics (physical and production) of individual agricultural districts therefore becomes important.

Table 5: Value of agricultural production per area of agricultural land by SLA in Tasmania *(Source: ABS Census 2006)*

SLA	Value of agricultural product ($)	Total Agricultural Area (ha)	Production value per area ($/ha)
Glenorchy	**902,624**	**48**	**18,746**
Devonport	22,605,276	3,226	7,007
Latrobe – Pt A	35,777,283	8,130	4,401
Latrobe – Pt B	32,681,224	8,664	3,772
Central Coast – Pt A	17,417,022	4,775	3,648
Waratah Wynyard – Pt A	25,542,175	7,116	3,590
Waratah Wynyard – Pt B	31,744,876	11,040	2,785
Central Coast	50,430,725	18,882	2,671
Huon Valley	**39,157,505**	**19,771**	**2,032**
Burnie	4,434,895	2,261	1,959
Clarence	**14,966,033**	**7,705**	**1,941**
Hobart – Remainder	**60,334**	**33**	**1,828**
Circular Head	139,360,252	76,763	1,815
Burnie – Pt B	10,455,665	5,817	1,797
Kentish	2,643,964	19,945	1,326
Derwent Valley – Pt B	**13,548,643**	**10,841**	**1,250**
West Tamar – Pt A	11,600,267	9,291	1,249
Meander Valley – Pt B	101,757,532	83,456	1,219
Dorset	86,096,971	81,160	1,060
Kingborough Pt A	**4,225,471**	**4,126**	**1,024**
Northern Midlands – Pt A	4,330,479	5,270	822
West Tamar – Pt B	4,889,019	6,099	802
Tasman	**5,686,485**	**12,777**	**758**
Derwent Valley – Pt A	**860,010**	**1,140**	**754**
Sorell – Pt B	**578,966**	**8,156**	**696**
George Town – Pt B	9,022,523	13,912	649
George Town – Pt A	1,855,412	2,887	643
Kingborough – Pt B	**2,215,551**	**3,469**	**639**
King Island	30,732,024	59,747	514
Launceston – Pt C	7,796,233	15986	459

Brighton	**2,130,298**	**5,030**	**424**
Northern Midlands – Pt B	109,006,179	281,640	387
Launceston - Pt B	5,353,738	14,772	262
Break O'Day	14,473,152	40,212	260
Sorell – Pt A	**5,450,126**	**15,328**	**334**
Flinders	13,568,885	45,196	302
Southern Midlands	**45,803,188**	**167,536**	**273**
Central Highlands	**34,558,783**	**166,365**	**210**
West Coast	261,663	1,342	195
Meander Valley – Pt A	184,274	1,179	156
Glamorgan Spring Bay	**8,995,679**	**72,425**	**124**
Hobart - Inner	**0**	**0**	**0**
Launceston - Inner	0	0	0
Southern Region	**188,639,196**	**213,000**	**381**
Northern Region	**370,274,626**	**560,000**	**614**
North-West Region	**427,882,669**	**477,000**	**1,879**

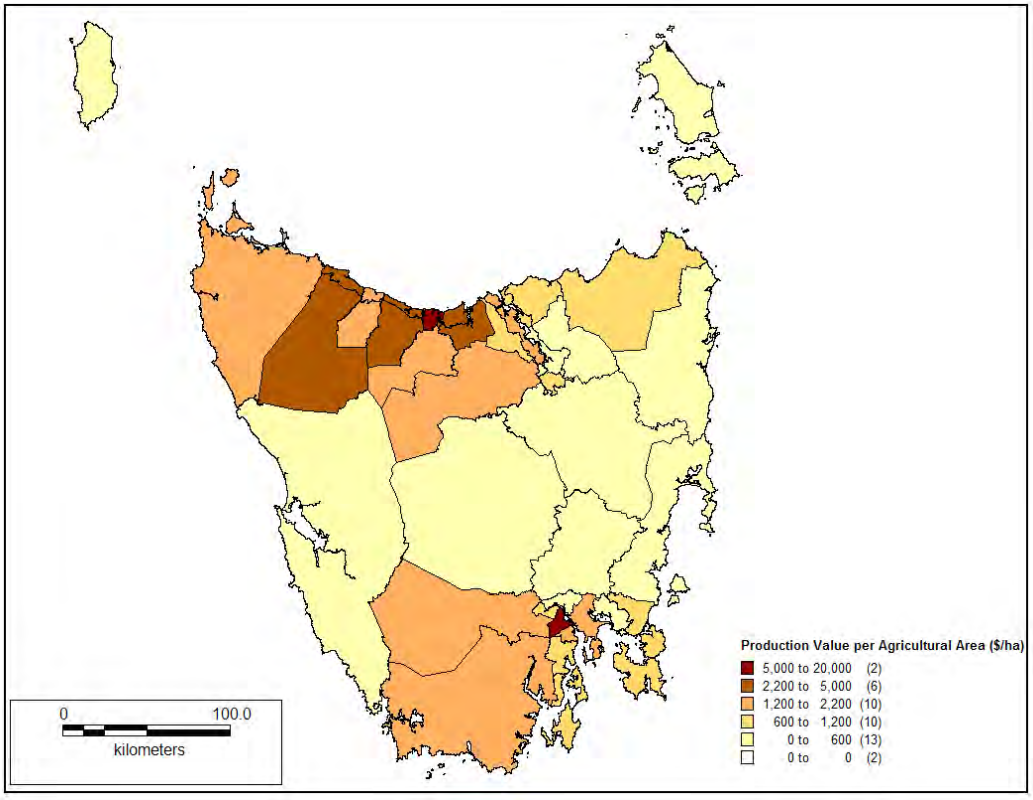


Figure 24: Value of agricultural production per area (ha) of agricultural land

At a regional level, the analysis of the value of agriculture to the region shows that livestock ($53,196,881) is still the greatest earner in the region, followed by fruit production ($40,921,306), wool ($34,697,170) then nurseries, flowers and turf ($18,193,081).

It should be noted that wine grapes are included in the fruit total in this instance by the ABS. Further more full details on poppies cannot be provided for confidentiality reasons, and some emerging crops such as walnuts were not at maturity when this Census data was collected in 2006, so their current (2010) contribution to the economy has not been able to be taken into account.

1.6 Climatic affects on Agricultural Production

There are likely to be significant impacts of a changing climate on agriculture in Tasmania. Generally, increases in temperature are likely to reduce time to crop maturity, leading to changes in crop species and cultivars. This may require relocation of some cropping enterprises and provide a warmer climate for new crops. The Climate Futures Project for Tasmania will be releasing a study on the impact of climate change on agriculture in Tasmania sometime in mid 2010. When available this information should be taken into account in planning for future agricultural production. In the meantime however a precautionary approach should be adopted in protecting agricultural land. This would mean a more conservative approach in allowing subdivision and uses which impact upon agricultural potential.

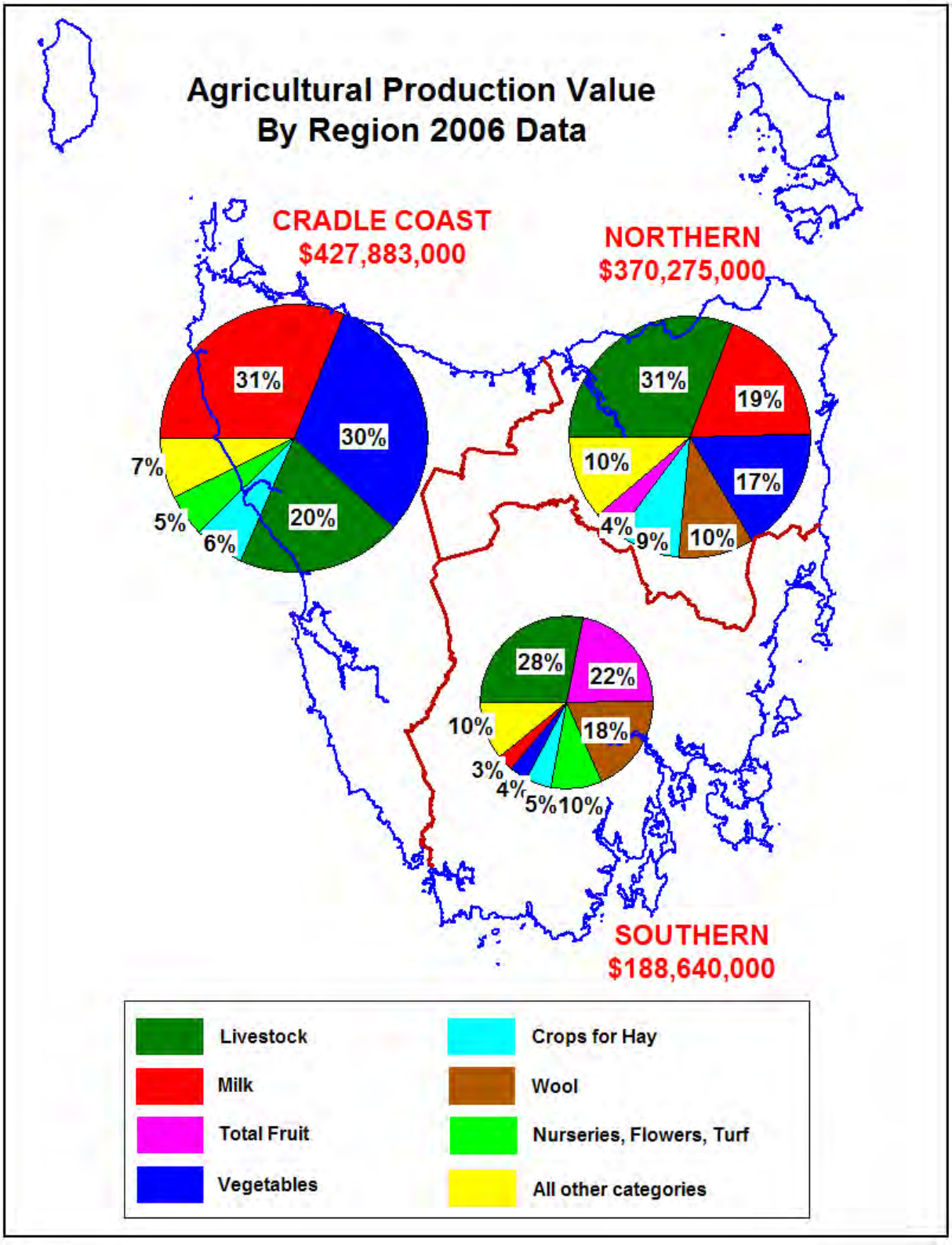


Figure 25: Value of Agricultural Production by Region *(Source: ABS Census 2006)*

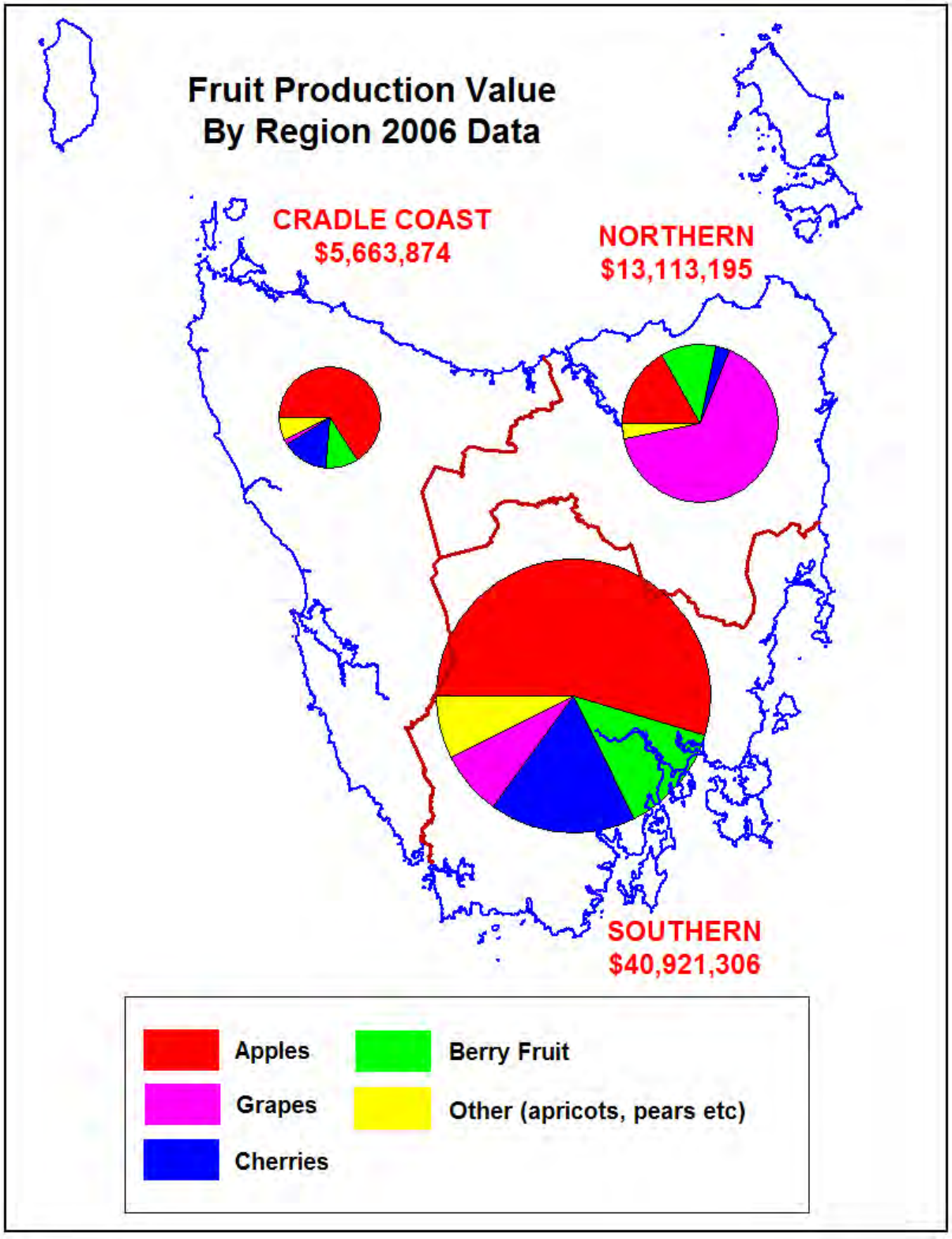


Figure 26: Value of Fruit Production by Region *(Source: ABS Census 2006)*

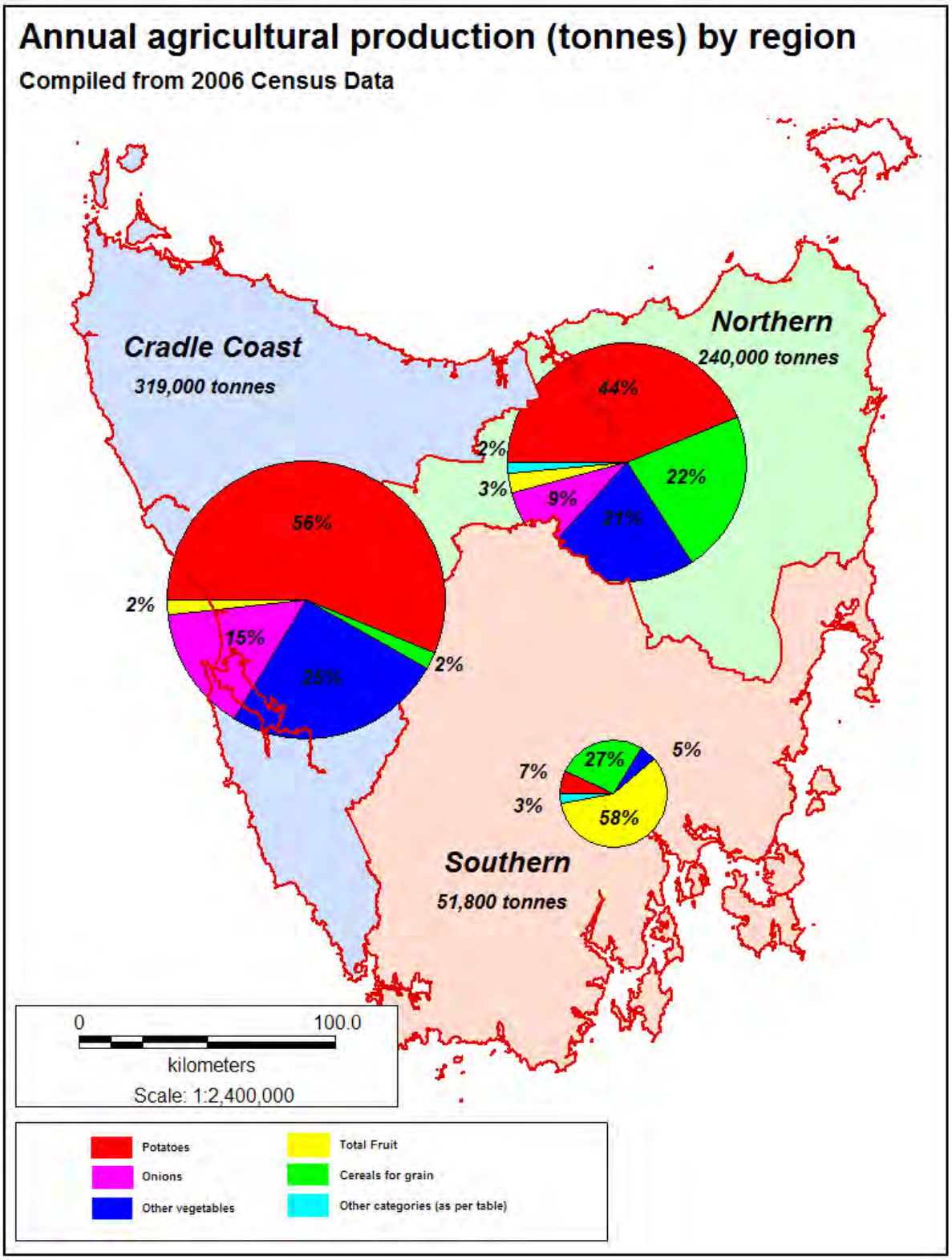
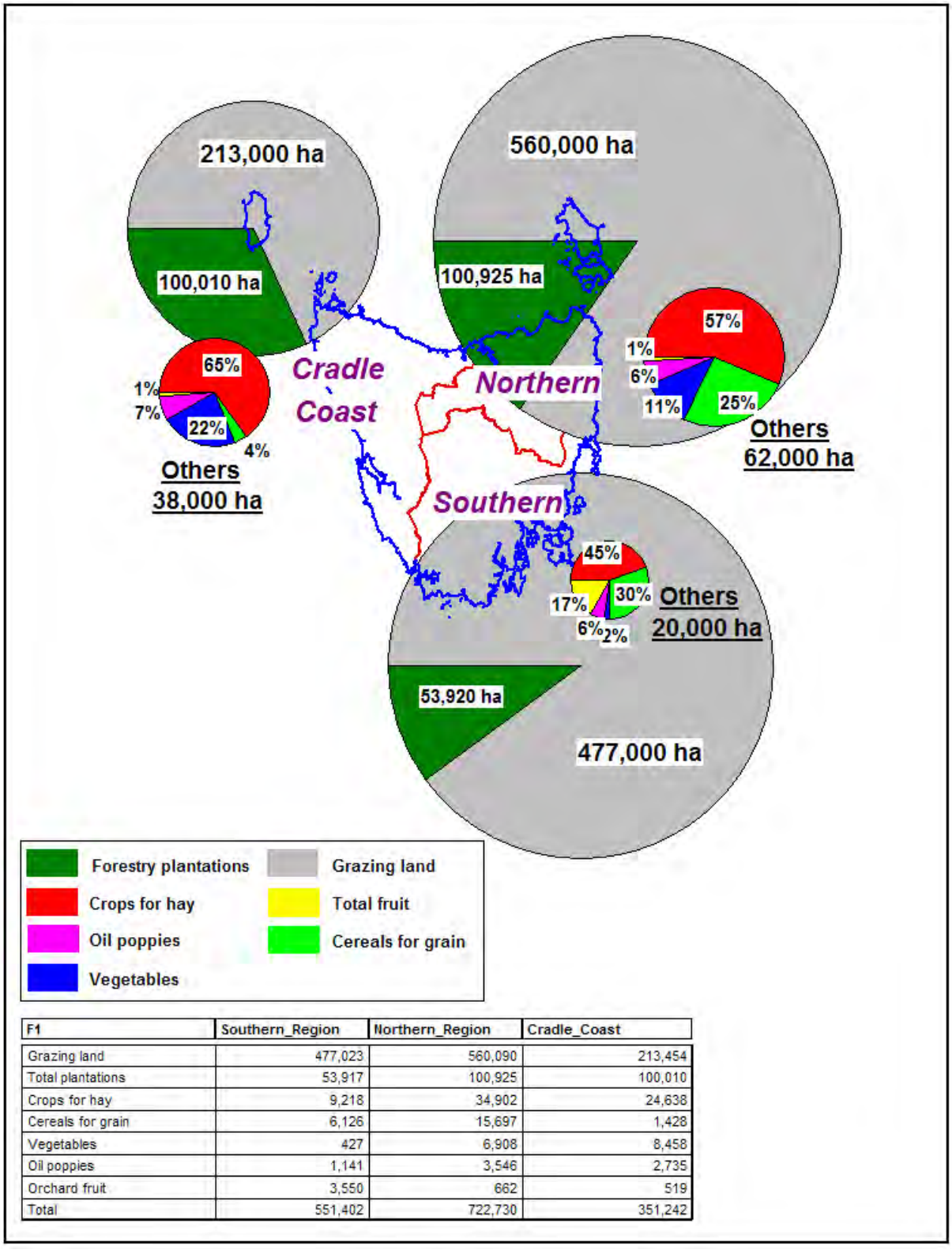


Figure 27: Volume of Agricultural Production by region *(Source: ABS Census 2006)*



F1	Southern_Region	Northern_Region	Cradle_Coast
Grazing land	477,023	560,090	213,454
Total plantations	53,917	100,925	100,010
Crops for hay	9,218	34,902	24,638
Cereals for grain	6,126	15,697	1,428
Vegetables	427	6,908	8,458
Oil poppies	1,141	3,546	2,735
Orchard fruit	3,550	662	519
Total	551,402	722,730	351,242

Figure 28: Land utilised for Agricultural Production by region *(Source: ABS Census 2006)*

1.7 Planning Implications

1.7.1 Zoning

The Protection of Agricultural Land State Policy (PAL) protects all 'Prime Agricultural Land' from conversion to non-agricultural uses and other uses that do not rely on the soil as a growth medium.

In regard to non-prime agricultural land, PAL (Principle 7) states that *the protection of non-prime agricultural land from conversion to non-agricultural use will be determined through consideration of the local and regional significance of that land for agricultural use.*

In order to determined 'local significance' it is necessary to understand the region, and in order to determine 'regional significance' it is necessary to understand the State.

In the South, the concept of splitting agricultural land into prime, and 'non-prime' has no real relevance within the region, as there is no prime agricultural land (with the exception of a handful of minute patches). Nevertheless there are discrete local areas wherein intensive agriculture not only exists, but also thrives.

However the majority of agricultural land in the south is used for extensive (dry-land) agriculture and has a significantly lower production value per hectare in comparison to these intensive local areas, and even greater discrepancy exists when compared to the prime agricultural land found in the other regions of the State.

In order to comply with the State Policy in regard to non-prime agricultural land it is necessary to understand:

- The relative significance of various local areas within the region
- The relative significance of these local areas within the state
- The relative significance of the Southern region within the State and in comparison to the other two regions.

Preliminary documents from the north west of the State indicate that many farming units contain swathes of both prime and non-prime agricultural land. The intention is to treat all agricultural land the same, as the high level of intermixed land makes separation or subdivision difficult.

It would also appear that in the north-west of the State there is a more even graduation through the classes of land from prime to non-prime, with a significant proportion of the non-prime land being at the higher end of the scale. This contrasts with the sharp graduation in the south of the State, from relatively high value non-prime land, located in discrete pockets, to relatively low value non-prime land located over broader areas.

In other words, the non-prime agricultural land in the North West would generally be of greater value (per hectare) to the State than the non-prime agricultural land in the South. In fact, the value of the non-prime agricultural land in the North West is generally likely to approximate the high value non-prime land in the South.

Whilst the Southern Region does not have significant swathes of prime agricultural land, the intensively farmed land it does have is still significant enough at a local, regional and state level, and still warrants a high level of protection from conversion to non-agricultural uses. An Intensive/Significant Agriculture zone should be applied to these areas:

- Land currently zoned as Intensive/Significant Agriculture in existing schemes. These areas correlate to established irrigation and other areas in which intensive agriculture is common. Production value per hectare is to be a key data set used to define these regions, along with soil classification.
- Land subject to a proposed planned irrigation scheme under the Tasmanian Irrigation Development Board. The determination of zone boundaries should be undertaken in conjunction with Phase 3 of the Board's four-phase scheme development process. Any irrigation schemes completing this phase prior to the introduction of the new Planning Schemes should be thus incorporated into them. Subsequent irrigation schemes should be recognised through the planning scheme amendment process.

Other agricultural land in the South should be zoned Rural Resource, which accommodates both agricultural and non-agricultural rural uses. It is however important to note that although rural land is not identified as 'Significant' and not afforded the highest level of protection through specific zoning, the remaining rural land should not be available for open slather subdivision and residential development for a number of reasons:

- Maintaining an overarching residential settlement strategy and ensuring good integration between land use and infrastructure, which in turn minimises the cost to the community both socially and economically;
- Agricultural production on 'non significant' agricultural land may still be important for local economies and communities. It also provides for agricultural production that does not require 'significant' land to occur without taking up precious land resources (i.e. egg production, poultry farms, feedlots, hydroponic based greenhouse production);
- Protecting agricultural land for the future. With potential climate change effects, land that is not 'significant' now, may be in the future;
- Protecting the visual values associated with the rural landscape;
- Minimising the exposure of sensitive residential uses to land hazards and impacts from agricultural production; and
- Protecting environmental values.

Zoning areas of agricultural land appropriately with adequate constraints, not only recognises the most appropriate use of the land, and provides Planning Authorities the tools to limit fettering of agricultural land. This will also reduce conflicts between land uses in the future.

Consideration must also be given to the zoning of land adjacent to agricultural land. The expanding tree change movement, represents a significant threat to our agricultural land and its use, generating increasing numbers of conflicts arising between agricultural uses, and adjoining or nearby residential or rural residential uses. Whilst there are limited solutions available to ameliorate existing situations, appropriate zoning would ensure this conflict is minimised in the future and farmers can continue to farm unfettered. A Rural Living zoning between the Rural Resource or Intensive Agriculture zoning and more intensive residential zonings, which coupled with appropriate attenuation distances would allow for systematic staggering of the uses in the area.

1.7.2 Lot Size

Ideally, minimum lot size should be tailored to the particular agricultural area and the size of a typical financially self-sustaining agricultural enterprise. As discussed in section1.8, existing patterns of lot sizes in the region's rural areas is varied and in some locations, such as the Huon Valley, as lead to significant land fragmentation.

Small lot sizes do not in themselves do not directly result in loss of agricultural potential. Many productive farming properties across the region comprise of multiple title holding and trading of land between farm holdings does occur. Smaller rural lots (generally between the 12 to 20 hectare size) can also sustain a single agricultural enterprise particularly where soils and water supply lend themselves to intensive agricultural practices.

Smaller rural lots or allowing further subdivision in rural areas indirectly fetter agricultural potential by the subsequent development expectations. Across many Council areas within the region, there is a long standing expectation of a dwelling per lot that has been supported by existing or previous planning schemes.

The result has been in some areas, particularly those that have desirable 'lifestyle' characteristics a noticeable loss of productive rural land to effectively rural residential development. The presence of rural and residential land uses in proximity to each other can also generate land use conflict, because of inherent incompatibilities. Land use conflict may arise because of such things as noise, odour, farm chemicals, light, visual amenity, dogs, stock damage and weed infestation.

These land use conflicts are exacerbated where there are small rural lots, as these lots are not large enough to incorporate appropriate buffer distances around dwellings creating insufficient physical separation to ameliorate impacts. In addition where rural and residential land uses are intermixed there is often misunderstanding of the purpose and character of the district which further contributes to land use conflict, disharmony within the community and a reduction in productive activity which contributes local and regional economies.

1.7.3 Irrigation areas

Many parts of the Southern Region have constricted water resources in comparison with the North West and parts of the Northern Region. Accordingly irrigation is of paramount importance to enable agricultural areas to thrive. Some irrigation schemes have already been established in areas such as the Coal River Valley, which have proven to be of significant benefit to those areas. As indicated above the Intensive Agriculture zone should apply to existing and planned irrigated areas.

Major irrigation schemes are currently being investigated for the main agricultural resource districts in the Southern Region. Those are the Midlands Scheme, South East Scheme, Shannon Clyde Scheme and the Swan River Scheme. These irrigation schemes, currently being developed by the Tasmanian Irrigation Development Board (TIDB), will significantly change agricultural practices in the Southern region, especially in regard to broad acre cropping and perennial horticulture.

1.7.4 Intensification and Diversification

The diverse topography, soils and microclimates of the Southern Region, have resulted in a wide range of agricultural enterprises – including perennial broad acre cropping, vine enterprises, tree and stone fruit enterprises, and in some instances intensive annual cropping.

A recent agricultural study (*Identification of Agricultural Land Potentially Suitable for Diversification and/or intensification*, Agricultural Resource Management Pty Ltd, 2011) has identified a large portion of rural land in the Southern Region for potential agricultural diversification and/ or intensification. The study revealed that approximately 82,417 Ha across the region is suitable for intensification and/ or diversification in regard to two potential rural land uses:

- Land suitable for broad acre cropping commonly irrigated by pivots and travelling irrigators; and
- Land suitable for perennial horticulture, such as vines and stone fruits.

Constraints to the diversity and viability of agricultural crops include the following:

- Soil limitations – such as slope, aspect, water logging, salinity hazard and erosion hazard;
- Climatic limitations – such as the risk of frost or drought;
- Water resource limitations – including a lack of proximity to existing or proposed irrigation infrastructure/schemes and a lack of farm dam development potential; and
- Residential or other non-resource development that has the potential to fetter adjoining agricultural land.

Agricultural diversification/ intensification is detailed further in '1.8 Towards an Agricultural Land Strategy'.

1.7.5 Growth boundaries

Whilst in the past we have seen a reduction in agricultural land through the expansion of rural residential use, the problems with this pattern of development are now well documented. This is an opportunity to rectify these issues and begin to prioritise agricultural land for its worth and value.

The Regional Planning Project will be establishing Urban Growth Boundaries as part of its settlement strategies, in conjunction with Local Councils. It is through these settlement strategies that new residential growth areas will be identified. The community and landowners in particular, need to recognise that an apparent failure of a parcel of land to accommodate a viable farm does not automatically mean it is appropriate for residential or rural-residential development.

Generally, new residential development (including rural-residential) should be located in existing settlements in order to take advantage of existing infrastructure, improve the viability of existing services and avoid further fettering of the agricultural resources.

1.7.6 Attenuation distances

Closely linked to the issue of zoning, is appropriate attenuation and buffer areas around agricultural uses. Most agricultural uses will inevitably see the use of chemicals such as pesticides and fertilisers, they will often involve heavy vehicle traffic and/or noise and are subject to periods of operation running well beyond normal hours, that in some instances, are long 24 hour periods during peak activity. Such uses introduce conflicts when located near to residential land users. Accordingly appropriate attenuation distance between the agricultural industry and the residential use should be established through the spatial arrangement of zones. For particular uses such as processing plants or cattle feedlots, an attenuation buffer arranged through a Planning Scheme overlay is appropriate, in accordance with DPIPWE standard distances.

1.7.7 Labour Needs

Throughout Australia there has been significant labour shortages in the agricultural industry. This has come about most recently through a combination of drought and alternative employment opportunities (particularly in mining). Since the severe drought event of 2002-03, the number of people working in the agriculture industry across Australia reduced from 412,000 to 308,000, in 2007 (AgriFood Skills Australia, 2010). Now that the industry begins to experience an upward trend, in response to more favourable weather conditions, it faces a significant shortage in skilled workers.

In Tasmania this shortage has been felt most significantly in the dairying, station hands, shearers and shed staff areas (2009, Tasmanian Farmers Graziers Association). This has in part contributed to a corporatisation approach where farm hands are contracted to an agricultural company to work for different properties. The sector must consider ways of attracting people back to work in the industry to ensure the viability of these rural communities is maintained.

Whilst this is not specifically a planning issue, when planning for regional communities it is important to be mindful of the pressures and constraints facing that community.

1.7.8 Processing

There are a number of sites in the Southern Region that process agricultural products within rural areas, including fish processing, fruit packaging, abattoirs, wineries and timber mills. It is important that Planning Scheme provisions accommodate downstream processing of the regions products. This encourages wealth to stay within the region, and supports local producers by minimising transport and other costs.

1.7.9 Value Adding – On-farm Tourism

There has been a move in recent years to establish on-farm tourist ventures, not only in Australia, but around the world, leveraging off the 'rural life' experience. These operations vary in scope from offering a Bed & Breakfast, to working farm holidays. The Southern Region also has the added ingredient in the guise of its many grand Georgian homesteads still at the heart of many agricultural enterprises.

These enterprises are small scale and have minimal impacts on adjoining land uses, and provide another stream of income to the farmer, which is increasingly important as farmers operate in a more competitive global economy. Providing some level of tourism venture on the farm can help the farmers remain viable and Planning Schemes should make provision for these types of activities where appropriate.

1.8 Towards an agricultural land strategy

The Southern Region can be broken down into five distinct 'agricultural sub-regions'. These 'sub-regions' are distinguished by their climatic and topographic conditions and have historically determined the type of production now endemic to the area. The data compiled and analysed above strongly reflects this. Table 6 lists these sub-regions and provides a summary of land identified as potentially suited to intensification and/or diversification. Those area identified for intensification are considered to be land that merits recognition as 'significant agricultural land' to the Southern region.

It is important to note however that land outside of these 'agricultural sub-regions' still has some relevance to agriculture in the region, albeit not at the same level of significance. For example land in

the central highlands is often used for summer grazing of livestock or parts of the Channel are utilised for more intensive forms of agriculture such as egg production.

The TIDB irrigation scheme, currently being investigated, will also help to intensify and diversify production across these 'agricultural sub-regions'.

Table 6: Summary of Agricultural Sub Regions and Potential for Intensification/Diversification) *(Agricultural Resource Management Pty Ltd 2011)*

Sub-region	Area (ha) suited to broad acre cropping	Area (ha) suited to perennial horticulture	Area (ha) potentially suited to intensification and/or diversification	Proportion (%) of total area identified across the Region.
SE Irrigation	17,263	7,824	25,087	30.4
Midlands/Highlands	28,041	0	28,041	34.0
Derwent Valley	9,171	1,406	10,577	12.8
East Coast	8,938	5,497	14,435	17.5
Southern Region	0	4,277	4,277	5.2
Total	**64,413**	**19,004**	**82,417**	**100.0**

1.8.1 The Midlands Sub-Region

A large extensive dry-land agricultural area extending across most of the Southern Midlands and parts of Central Highlands and Glamorgan-Spring Bay local government areas. This is a significant agricultural landmass, making up around 34.0% of land suitable for intensification in the Southern Region. Agricultural production in this sub-region is primarily associated with livestock for slaughter, wool, cereal and grain production (highly dependent on water availability). Some areas around Oatlands, Bothwell and Kempton have relatively good agricultural land with significant tracts of Class 4 land, although notably the fine grade wool of international standard produced in the Midlands generally occurs on the more marginal Class 5 and 6 land.

Fragmentation of land is not an issue as land holdings are generally large broad-acre farms. Some areas in the midlands have significant soil erosion and salinity issues (see Natural and Cultural Values Background report) that need to be managed through whole farm management practices to protect its long term potential.

These are also important considerations in the irrigability of the land, noting that TIDB are investigating the establishment of irrigation districts in parts of the Midlands. The availability of water through irrigation has the potential to alter the type and volume of production in the midlands.

Notwithstanding this, with or without irrigation, much of the Midlands should still be considered 'Significant'. The expanses of land not in proximity to towns or residential uses make it suitable for agricultural and non-agricultural uses that require large attenuation distances (i.e. major composting

facilities, cattle feedlot). These uses would be less appropriate in the agricultural areas such as the Coal River, Derwent Valley and Huon Valley where there are considerably more residential users scattered throughout.

The inland location and higher elevations in the midlands/highlands sub-region, has meant a very high level of frost and other weather variables; and despite higher classes of soil types, the climatic conditions greatly reduce the scope of cropping to mostly perennial broad acre cropping. However recent studies indicate that, given the TIDB interest in the area, there is still approximately 29,041 ha of land suitable to broad acre cropping (mostly around Tunbridge, Pawtella, Tunnack, Bothwell and Kempton) (Agricultural Resource Management Pty Ltd 2011)

1.8.2 The Derwent Valley Sub-Region

Defined by the Derwent River and its main tributaries (i.e. Tyenna), this district includes part of the Derwent Valley and Central Highlands local government areas. The higher quality agricultural land (Class 4 or 4/5) is generally in close proximity to the river(s) due to the presence of alluvial soils. In addition many of the larger farm holdings along the river have access to water rights which provide for irrigation on site. There is some fragmentation of land particularly in traditional hop production areas due to historical patterns in viable lot sizes for this type of production, and there are some major productive farm holdings in the district as well. Agricultural production is more varied in the Derwent Valley. The climate is moderated by the Derwent Estuary, which helps to reduce the risk of frost, and has given way to the diverse agricultural enterprises. The larger holdings are generally used for livestock, cereal production and large-scale orcharding (i.e. Reid's Fruit), while production on smaller holdings is generally for fruit and hop production.

The Derwent Valley Sub-Region makes up around 10,577 Ha of land, or 12.8% of land in the Southern Region potentially suited to intensification. Of this, 9,171 Ha is considered suitable for broad acre cropping, with the remaining land suitable for perennial horticulture. The main areas with cropping potential extend from New Norfolk to Bushy Park and also from Hamilton to north of Ouse.) (Agricultural Resource Management Pty Ltd 2011)

1.8.3 South East Irrigation Sub-Region

The Coal River Valley, makes up a large portion of this region, it is primarily an intensive agricultural district producing a variety of crops including grapes for wine production, stone fruit, lettuce, vegetable seed crops, walnuts and peas. It is located not only in the Clarence and Sorell local government area but also part of the Southern Midlands Council area, around the Campania and Colebrook and a large proportion of Brighton.

While its natural climate sees low rainfall, access to the Coal River valley irrigation schemes provides certainty and control in water to allow such a variety of production. Data in volume and value across the last 12 years indicates that the trends in production in the Coal River valley are increasingly towards lower volumes but higher values. The proposed TIDB South East irrigation scheme, is set to intensify and broaden agricultural production in this sub-region, with approximately 25,087 ha having been identified as suitable for intensification/ diversification. Though a smaller sub-region, it still makes up a significant 30.4% of the total area identified across the Southern Region.) (Agricultural Resource Management Pty Ltd 2011)

The land does show some fragmentation, although many farms are managed across multiple title holdings and with its intensive agriculture nature, the lack of broad-acre titles is not as significant as it would in other agricultural districts.

Its moderate climate (low risk of frost), its agricultural production trends and the presence of a declared irrigation district, mean the South East Irrigation Sub-Region should be identified as 'Significant' and afforded the highest level of protection.

1.8.4 Southern Sub-Region

The Huon Valley was traditionally known as one of the major producer of apples in Australia. With the changing market condition, apple production in the Huon Valley has significantly decreased over the past 30 years. Although today agricultural production in the Huon Valley is still dominated by fruit production the type of fruit commodity is more varied with pome, stone and berry fruit production. Its role in national production has also decreased. Importantly the Huon Valley economy is still strongly driven by agricultural activity (along with Forestry).

Notwithstanding changes in production, land in the Huon Valley particularly along the main river valleys is considered good agricultural land (Class 4). In addition to its southerly latitude and surrounding topography, the Huon Valley does have relatively good rainfall, which along with water extraction from the river systems provides opportunity for irrigation.

The Southern Sub-Region, due to a host of constraints has the smallest proportion of land suitable for intensification at only 4,277 Ha or 5.2% of the total Southern Region. There are some small areas of land suitable for broad acre cropping located along river flats, but given the risk of flooding, frost and cold air drainage, the Southern Sub-Region is mostly suited to the abovementioned orchards, stone fruits and some viticulture.) (Agricultural Resource Management Pty Ltd 2011)

The agricultural potential of the area is however affected by its significant extent of land fragmentation. This is largely a result of the historical development of the area. Small 10ha lots were once considered to be very viable lot sizes for apple production. Recent market trends and demands have exacerbated the problem. With the decline of the apple industry, and the lessening attraction of farming to younger generations, there has been subdivision pressure and the resultant conversion of higher value residential uses on already small land titles. Notably this market pressure is generally occurring in the high value agricultural areas in the north of the municipality. The extent of land fragmentation in the Huon Valley is not seen in any other major agricultural production area in Tasmania, and is an important issue to manage and protect the productivity of the significant agricultural areas in the Huon Valley.

1.8.5 The East Coast Sub-Region

The East Coast district includes, land in the Tasman, Sorell and Glamorgan Spring Bay local government areas. It supports diverse agricultural production including grazing, dairying, cropping, viticulture and fruit production. With the significant areas confined to specific pockets of land in the flatter valleys and coastal areas (for example the Cranbrook vicinity). This district contains some of the only prime agricultural land in the Southern Region, with small extents of Class 3 land around Marion Bay and Runnymede. It should be noted that land capability mapping is not available for most of the Tasman local government area.

Agricultural potential is constrained by water availability, and while overall this district is not as significant to agricultural production in the region as other districts, there are some key commodities produced that

will remain important into the future. These include walnuts, olives and other nuts and grapes for wine. All these products are generally high value and low volume products. The district also has significant potential for agri-tourism given its high value as a tourism destination in general.

Land potentially suitable for some or all of the above mentioned enterprises, comprises of approximately 14,435 Ha, or 17.5% of land in the Southern Region potentially suited to intensification. Farmland in the Lower Swan River has some good opportunities for diversification, coupled with the possibility that an irrigation scheme will be developed by the TIDB in the near future..) (Agricultural Resource Management Pty Ltd 2011)

Some of the key drivers associated with rural land planning in this district are not related to agricultural production such as protection of scenic qualities (which underpins its tourism industry).

2. Mineral Resources

2.1 Background

Tasmania is rich in a wide variety of mineral resources and the extraction and processing of its resources has historically been large part of its economy. The mineral extraction industry continues to be Tasmania's largest export industry. There are five substantial operating mines in Tasmania, including long-term producers Mount Lyell (copper, gold, silver), Rosebery (zinc, lead, gold, copper, silver) and Savage River (magnetite, which is converted into iron ore) and the Henty and Beaconsfield gold mines (Mineral Resources Tasmania 2009).

There are essentially three categories of extractive commodities within Tasmania: Metallic minerals; Non-metallic, Industries & Fuel Minerals; and construction materials. The major metallic mineral commodities across the State include copper, gold, iron ore, lead, scheelite, silver, tin and zinc. Iron Ore, copper and zinc are the highest extracted materials with 2 423 240 tonnes of Iron ore extracted in 2008, 95 541 tonnes of zinc and 30 483 tonnes of copper (Mineral Resources Tasmania 2009). The total value of metallic minerals extraction for the period June 30 2007 to June 30 2008 was $803 316 729 (Mineral Resources Tasmania 2009).

For Non-metallic, Industrial and Fuel Minerals, the highest extracted materials include limestone, coal, silica and clay. From the period 30 June 2007 to 30 June 2008, 1 856 125 tonnes of limestone for cement use was extracted, 132 825 tonnes of limestone for agricultural use, 725 228 tonnes of coal, 205 190 tonnes of silica and 29 323 tonnes of clay for brick work (Mineral Resources Tasmania 2009). The total value of Non-metallic, Industrial and Fuel Minerals for the period 30 June 2007 to 30 June 2008 was $55 429 254 (Mineral Resources Tasmania 2009).

In relation to construction materials, the major extraction materials are dolerite, sand, basalt, gravel and sandstone. From 30 June 2007 to 30 June 2008, 1 271 318 tonnes of dolerite were mined, 904 250 tonnes of basalt, 626 889 tonnes of sand, 36 420 tonnes of gravel and 927 tonnes of sandstone (Mineral Resources Tasmania 2009). The total value of construction materials for the period 30 June 2007 to 30 June 2008 was $71 889 846 (Mineral Resources Tasmania 2009).

Unlike the North-West region of Tasmania, Southern Tasmania does not have particularly extensive resources and consequently major extractive industries operating within the region are limited, although numerous, to small scale quarrying type operations across the region.

The major extractive businesses in the Southern Tasmania include the following:

Boral Resources (Tasmania) Limited- Blue Metal:

Boral Resources operates a hard-rock quarry at Brighton and a sand mining operation at South Arm. During 2007/2008, the Company employed a total of 25 personnel and production for the period 30 June 2007 to 30 June 2008 exceeded one million tonnes of material. One third of which was concrete aggregates, asphalt and spray seal material, 8% sand, and the remainder road based products (Mineral Resources Tasmania 2009). Boral experienced strong demand for concretes sand and aggregate, although the market within the region has remained relatively slow. All quarries have extensive reserves based on current demand levels.

Duggans Pty Ltd- Concrete:

Duggans Pty Ltd operates a quarry and a precast concrete production factory at Cradoc in the Huon Valley (as well as Launceston). Approximately sixty staff are employed across the state. Production of raw materials for the year totaled 93 500 tonnes, consisting of 64 000 tonnes of road materials, 27 000 tonnes of construction materials and 2500 tonnes of construction sand (Mineral Resources Tasmania 2009).

FR & CM Lazenby and Son- Sand:

The Lazenby extraction operation exists at South Arm and employs four full-time people and one part-time person (Mineral Resources Tasmania 2009). Production in the annual period 30 June 2007 to 30 June 2008 totaled 12 600 tonnes (Mineral Resources Tasmania, Annual Review 2007/2008). Considerable reserves are estimated within their two mining leases (Mineral Resources Tasmania 2009).

GL & DH Males Pty Ltd- Sand:

The Males Sand mining pit operates at South Arm. The company employs three full-time staff and seven casual staff (Mineral Resources Tasmania 2009). Production from the South Arm mining lease consisted of 88 000 tonnes of coarse sand, 3000 tonnes of horticultural sand, 2000 tonnes of bedding sand and 1000 tonnes of sandy loam during the period 30 June 2007 to 30 June 2008 (Mineral Resources Tasmania 2009).). Future sources of dune sand will include re-working of old areas. Because of lower demand and processing rates, the resource on site (within their lease) is projected to last for five to seven years. Rehabilitation works on site are occurring in line with the sites Environmental Management Plan.

Hanson Construction Materials Pty Ltd- Construction materials:

Hanson Construction Materials operates out of Hobart (Flagstaff Gully Road), Calder and Potato Hill. Fifteen people are employed full time and one part-time. During the period 30 June 2007 to 30 June 2008, 150 000 tonnes of aggregates, 152 000 tonnes of road materials and 73 000 tonnes of sand were produced across three operations (Mineral Resources Tasmania 2009). A Development Proposal and Environmental Management Plan has been drafted for an extension to the Hobart quarry (Mineral Resources Tasmania 2009). This project is of high priority in given the finite resources of the existing quarry.

Hobart Blue Metal Industries Pty Ltd- Blue Metal:

Hobart Blue Metal Industries Pty Ltd operates a dolerite quarry at Leslie Vale. The company has 14 permanent employees in production and a further 30 people are employed as subcontractors for material deliveries, drill and blast activities and maintenance (Mineral Resources Tasmania, Annual Review 2007/2008). Production for the period 30 June 2007 to 30 June 2008 was 740 000 tonnes, comprising 680 000 tonnes of road based material, 50 000 tonnes of concrete and asphalt aggregate and 10 000 tonnes for landscaping (Mineral Resources Tasmania, Annual Review 2007/2008). Major projects include the Cambridge Park commercial precinct development, Esperance Drive and Holyman Drive.

2.2 Legislative & Governance Context

The *Mineral Resources Development Act 1995* provides for the State to grant titles for the extraction of minerals from mines and quarries (www.mrt.tas.gov.au accessed 27 November 2009). Titles are issued for larger scale operations generally with appropriate rehabilitation bonds and conditions. Shorter terms

are preferred for small-scale remote operations to provide for regular environmental review. Mineral Resources Tasmania is responsible for the collection of mineral royalties from Crown land tenements. Royalty is not a tax but a payment to the community for the purchase of their non-renewable resources.

Exploration can be undertaken without any need for planning approvals under the RMPS. The actual extraction of mineral resources is however still subject to planning approvals. Most extractive industries are dealt with as Level 2 activities under *Environmental Management and Pollution Control Act 1994*. This means that the normal assessment processes under the *Land Use Planning and Approvals Act 1993* are altered to those specified under Section 25 of the *Environmental Management and Pollution Control Act 1994,* whereby the Environmental Protection Authority has statutory responsibility for the assessment of all environmental related matters and the local planning authority jurisdiction over non-environmental planning matters.

2.3 Planning Implications

Growth in mineral exploration and extraction is essential for the future development of the mineral sector and for the economic well-being of Tasmania. The main issues from a regional perspective are protecting those major resources which contribute to the economy from land use conflicts. Conflict between resource extraction and the pressure to preserve natural areas is commonplace within the Tasmanian community. In Southern Tasmania however, it is recognised that resources are limited and therefore providing planning frameworks (such as overlay protections) to support future extraction of regionally significant resource deposits has limited value, unlike in North-West region.

The main planning issue from a regional perspective is protection of resources and extractive operations (particularly those of regional significance) from encroachment uses, which create land use conflicts. Such encroachment can make ongoing management of operations difficult and costly in terms of managing noise, pollution and traffic and can also place limits on expansion. The Regional Land Use Strategy will therefore need to consider to the location of existing operations in development of its settlement strategies.

3. Native and Plantation Forestry

3.1 Background

Of Tasmania's total land mass (6.8 million hectares) 49% or 3.39 million hectares is forested. The forest estate can be broadly divided into two categories: native forest and plantation forest. Native forest accounts for the majority of Tasmania's forested area with 3.18 million hectares, although approximately 47% of native forests are reserved and protected through a variety of formal and informal reservations. Plantation forest accounts for a mere 7% of the total forested area or 254,000 hectares. The following table provides a summary:

Table 7: Tasmania's Forest Estate

Forest Category	Total area (ha)	% of total forest cover	% of total landmass
Publicly owned multiple use[1] forests	1.128,000	33.3	16.5
Publicly owned native forests in reserves	1,122,000	33.1	16.4
Privately owned native forest	885,000	26.1	12.9
Privately owned native forest in reserves	48,000	1.4	0.7
Plantation forests in State Forests	102,000	3.0	1.5
Plantations on other public land	1,800	0.1	0.0
Plantations on private land	150,407	4.4	2.2
TOTAL	**3,389,207**	**100**	**49.5**

Source: Private Forests Tasmania (http://www.privateforests.tas.gov.au/forestry_facts/forest_cover, accessed 16 November 2009) & Forest Practices Authority 2006.

Forestry is one of the four largest industries in Tasmania directly employing 6,300 people, of which 2,085 of these are within Southern Tasmania, 2,620 in Northern Tasmania, 1520 in the North West and a further 45 people employed in the industry and located outside of Tasmania (Schirmer 2008). Within the region the local government areas with the highest proportion of their workforce employed in the forest industry are Derwent Valley (23%), Central Highlands (13%) and Huon Valley (9%) (Schirmer 2008).

Table 13 below provides an outline on the employment and spending statistics for the forest industry across 2005 – 2006.

[1] Includes commercial wood production, conservation, tourism and recreation

Table 8: Statistics of employment and spending by the Tasmanian forest Industry in 2005-2006
(Source: Schrimer, J 2008)

Employment/spending characteristic	Findings	
Employment in the Tasmanian Forest Industry 2005-2006	People:	6300
	Full Time Equivalent	5870
Proportion of employment in different forest industry sectors	Industrial forest growers:	11.7%
	Combined growers/processors:	10.9%
	Processors:	38.7%
	Contractors, consultants and nurseries:	38.7%
Proportion employed in native forest, hardwood plantation and softwood plantation sector	Native forest	68.3%
	Hardwood plantation:	7.7%
	Softwood plantation:	24%
Proportion of forest industry employees working full-time, part-time and casual	Full Time:	74%
	Part Time:	12%
	Casual:	14%
Proportion of male and female workers:	Forest Industry workforce - male	88.4%
	Tasmanian workforce - male	53.1%
	Forest Industry workforce - female	11.6%
	Tasmanian workforce - female	46.9%
Total expenditure by the forest industry (range is given rather than a single figure to reflect uncertainty in estimates)	Growers & processors:	$940-$1020 M
	Contractors, consultants and nurseries:	$480 - $580 M
	Total:	$1420 - $1600 M
Location of expenditure (Local LGAs refer to where the business is located)	Growers & processors:	34% in local LGA 43% in non-local LGAs 23% outside Tas
	Contractors, consultants and nurseries:	73% in local LGA 22% in non-local LGAs 5% outside Tas

Tasmanian forests are highly productive in terms of wood production. In 1999 they produced 70% of Australia's decorative veneers, as well as 40% of Australian produced printing and writing paper, and 57% of newsprint production. Other products harvested from Tasmania's native forests include: firewood, raw seed, nectar, honey, cut flowers, treeferns, and sphagnum moss. Harvesting statistics for 2000-01 include: 468,500 m3 of native eucalypt sawlogs; 27,400 m3 of other native sawlogs; and 1,712 kg of raw seed. The most currently available statistics for pulpwood production were for 1999-00 when 4,735,000 tonnes of pulpwood was harvested from native forests. Between 1996-00, the volume of woodchips harvested from native forest increased by 73%.

Within the region forest harvesting operations occurs in all Local Government Areas with the exception of Hobart and Clarence (with only limited activity in Glenorchy). The Huon and Derwent Valleys are the location for the most intensive forestry activity due to the large areas of State Forest contained within their Local Government areas, followed by the Central Highlands. This correlates with the percentage of the population in those areas employed by the forest industry (as discussed above)

Within the region there are:

- 381,000 ha of State native forests, of which 360,400 hectares if available for multiple use;
- 18,500 of State forest plantations
- 20,400 ha of Private Timber Reserve plantations; and
- 432,600 ha of forest on private land (potentially available for logging, although not necessarily commercial viable or available for harvesting).

The conversion of native forests to plantations by Forestry Tasmania in State forest has ceased as part of the Australian Forestry Standards Certification requirements. In addition, as part of the Permanent Native Forest Estate Policy, there will be a reduced rate of clearing on private land for agricultural and forestry purposes in the lead up to a 2015 cut off date (Department of Infrastructure, Energy and Resources 2009c). While it has been predicted that private investment in plantations will increase over the next 5 to 10 year period, thereby driving further plantation expansion. The recent collapse of two of the largest companies involved in the Managed Investment Schemes (MISs), Great Southern and Timbercorp in the global financial crisis, may impact upon the physical expansion of private timber plantations in Tasmania.

Notwithstanding this both the Commonwealth and State Governments remain strong supporters of expanded plantation development on private land as a means of effectively implementing the Regional Forest Agreement between the State and Commonwealth (GHD Pty Ltd 2007: 84). Anecdotally there is evidence to suggest that the harvesting of native timber and/or conducting of plantations on private land has expanded. Nonetheless in comparison to the level of forestry activity generated in the Region in State Forests, the contribution of private plantations to the overall forestry activity in the region is currently low but will increase as the plantations mature.

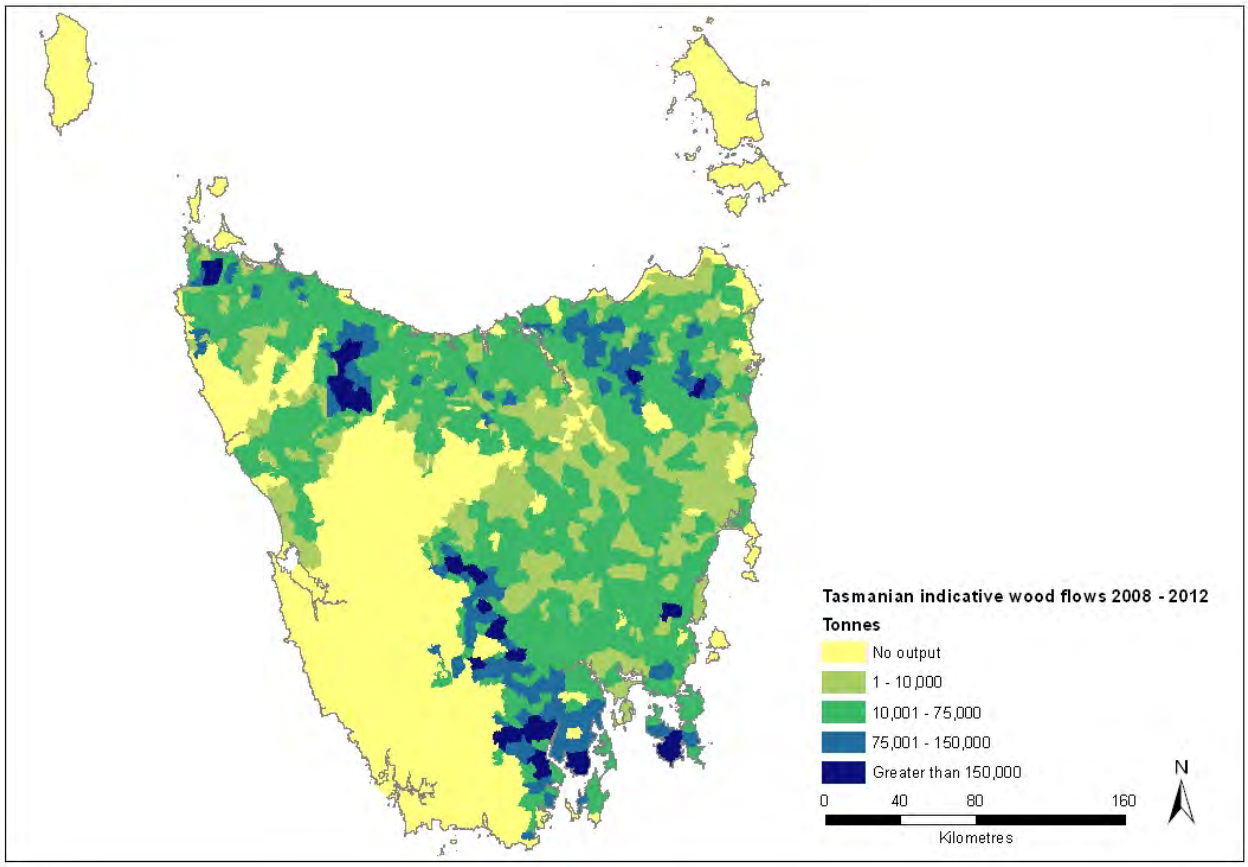


Figure 7: Tasmanian indicative wood flows 2008 – 2012 *(Source: Forestry Tasmania)*

The total area of private plantations within the region is 29,154 hectares or 1.1% of the total land area of the region. This compares to 71,821ha in the North-West and 49,974 ha in the North. In terms of percentage, Southern Tasmania only contains approximately 19.5% of all land under private plantation in Tasmania, compared to 33.2% for the North and 47.4% in the North-West (Private Forests Tasmania 2007).

Within the Region, Central Highlands has 6,963 ha or 4.6% of the total private plantation area in the State, followed by the Derwent Valley with 6,301ha or 4.2%, Huon Valley with 4,602ha or 3.1% and Southern Midlands with 4,425 or 2.9%. Glamorgan Spring Bay, Sorell & Tasman all have around 1.5% each of the total plantation activity with negligible activity in the other Local Government Areas.

In general, the minimum size for plantation forestry to be economically viable is approximately 20 hectares, although an underlying single ownership or title is not required, a relative proximity to minimise transfers between harvesting operations is optimal. For harvesting of timber from native forests on private land a minimum viable area of 30 to 40 hectares is required, although again single ownership or title is not required (GHD Pty Ltd 2007).

With harvesting from native forests, landowners may choose to have the area regenerated, converted to plantations forestry (if suitable based upon slope, rainfall and other constraints) or converted to agricultural use. In the latter options, however given that much remnant or regenerative native forest on private land demarcates the boundary of marginal land for agricultural purposes, plantation forestry often

proves to be the most productive land use from an economic viewpoint (GHD Pty Ltd 2007). Conversion to agricultural use is not possible where the long term use of the land for forestry purposes has been protected through the declaration of Private Timber Reserve status.

In terms of harvested timber volumes, wood sourced from state forests is predominantly transported to the Triabunna woodchip mill which exports around 800,000 tonnes of semi-processed wood products per year (90% of which is produced on site from logs, with the remainder coming from sawmill residue). There are however other major value-adding operations in the region, which include:

- Norske-Skog, Boyer - annual production is around 290,000 tonnes of newsprint, representing around 40% of Australia's domestic supply. The mill uses softwood feedstock. Over 75% of wood used is sourced from within a 100km radius.
- Gunns Southwood Sawmill
- Ta An veneer mill, Southwood (Huon Valley) – processes timber from both the Huon and Derwent State forests
- Gunns sawmill, Austins Ferry – producing around 15,000 m^3 per annum;
- Kellys Timbers, Dunalley – sawmill
- Musketts Sawmill, Richmond
- Torenius Timber, Forcett – sawmill
- McKays Timber Yard and processing mills at Brighton and Glenorchy

In addition to the sawmill veneer mill at Southwood, the facility is also proposed to include a wood powered power station, for which development approval has been obtained. Recent media coverage indicates that the power station is still likely to proceed. Beyond this facility, there are also approximately 20 sawmills operating in the region (including those listed above). Whilst these sawmills are important to their local economy, they are generally not of regional significance. When compared to sawmill operations in the North of the State and at Triabunna, the output and associated tasks (such as transport) are not significant. It is important to note however that the larger sawmills in the north source logs, in part, from Southern Tasmania.

3.2 Legislative & Governance Context

The majority of Forestry activities (excluding processing opportunities) exist outside planning controls, established under the *Land Use Planning and Approvals Act 1993*, with all forestry operations in State Forests and within Private Timber Reserves being exempt from planning approval.

In 1992 the Australian, State, and Territory Governments determined to enact a National Forest policy Statement (NFPS) that outlined the jointly agreed manner in which they would co-operate in ensuring the sustainability and economic viability of Australia's forests, both native forest and plantation. The NFPS was ultimately signed by the Tasmanian Government in April 1995. The NFPS indicates that "*there is a need for State and Local Governments to simplify planning procedures and to ensure that land use planning controls and land rating systems do not discriminate against plantation development."*

In Tasmania this goal could be achieved through recognition of the role of Private Timber Reserves, and the *Forest Practices Act 1985* and consistent application of the State Policy for the Protection of Agricultural Land 2009 across all Local Government areas.

Local government planning schemes play no direct role in defining where timber harvesting may occur in state forest as forest practices on state forest are excluded from the *Land Use Planning and Approvals Act 1993*. On private land, *forestry* as a permitted land use is determined by local planning schemes. Private land is subject to the *Land Use Planning and Approvals Act 1993.* Local government determines where forestry can take place on private land, according to individual councils' planning schemes. In some local government planning schemes, zones are determined where forestry is an 'as of right' permitted use and so no permit is necessary.

In addition, private land is subject to the Forest Practices Act 1985 and most forest practices will require a certified Forest Practices Plan. In November 2009, changes to the Forest Practices Regulations 2007 saw some additional exemptions which included: clearing, carried out for the purposes of constructing building(s) or associated developments, but only where they have been authorised under a permit issued under the Land Use Planning and Approvals Act. In other words clearing related to the construction of buildings or associated development is now a matter for Planning Authorities to assess.

Some immediate issues have arisen from the changes to the regulations. Some planning schemes have adequate provisions within them to assess applications involving such issues, where others have very limited provisions or none at all. Until standardized planning schemes are brought into place, most likely with a vegetation management schedule as part of that, there exists a considerable risk to Local Government and the broader community, that vegetation (including Threatened Vegetation Communities) can be cleared with limited controls. Furthermore it remains unclear how clearance related to subdivision will be assessed.

Forestry practices on land not within a Private Timber Reserve does require planning approval under the *Land Use Planning and Approvals Act 1993*, although in accordance with the State Policy on Protection of Agricultural Land 2009, nothing in a planning scheme can prohibit forestry practices within land zoned for rural purposes, except on prime agricultural land, as the definition of 'Agricultural Use' under the policy includes forestry practices.

3.3 Planning Implications

As indicated above, the majority of Forestry activities are outside Local Government planning controls, with all forestry operations in State Forests and within Private Timber Reserves being exempt from Local Government planning approval. Specific operations that are exempt include forest establishment, growing of timber, harvesting, all associated clearing, burning off, roading and quarries. Forestry on land not within a State Forest or Private Timber Reserve does require planning approval by Local Government.

However, in instance where clearing is occurring ancillary to a separate development, the recent changes to the legislation have brought Forestry back into the control of Local Government. Whilst this may be a logical change, the lack of consideration of vegetation management issues by many planning schemes means, in some circumstances, there are limited controls on vegetation management. It is hoped this will be ameliorated through the implementation of standard planning schemes with associated vegetation management Schedules and more specific zoning. However until these planning schemes are in place there is a significant gap in the legislation with regard to the control of vegetation clearance around the state.

In accordance with the State Policy on Protection of Agricultural Land 2009, new plantation forestry cannot be established on Prime Agricultural Land unless specifically allowed under a planning scheme.

As the amount of Prime Agricultural Land in the Southern region is very small, this specific provision under the Policy has negligible impact. Notwithstanding this, it is essential that the policy is implemented consistently and correctly in all planning schemes.

However, the Policy also provides that a planning scheme may require a discretionary permit for plantation forestry on any agricultural land where it is necessary to protect existing agricultural uses that are recognised as fundamental and critical components of the economy of the entire municipal area. Again, it would appear that such circumstances do not apply to any Southern Tasmanian municipal area wherein the various types of agriculture are merely partial contributors to municipal economies, not dominant components.

It can therefore be concluded that much of the forestry activity in the region is not under the jurisdiction of the planning system, being either in State Forest or Private Timber Reserves. In terms of forestry activities that can be controlled through the planning system, there are a number of key issues which require consideration;

- Forestry activity on private land, which has a pattern of occurring in short periods of high activity interspersed by many years of apparent inactivity, has the potential to conflict with the expectations of newer residents and some other forms of agriculture on adjoining land. The uncontrolled trend of rural residential development in rural areas is likely to increase conflict with the forest industry;
- Forestry activities have the potential to displace traditional agricultural activities resulting in social and economic effects on local communities where the labour and infrastructure needs of a 12 to 20 year rotational crop is entirely different from more seasonal or yearly activity. This issue, however, is not as pronounced in southern Tasmania as it appears to be elsewhere in the State. Changes to traditional farming will still impact on settlements that were established under entirely different agricultural economies. Many farm types need to grow in size in order to provide an economy of scale. Though it is also acknowledged that forestry plays an important complementary role in some farming operations;
- Forestry activities can also conflict with the landscape and aesthetic values of the community. While there is accepted industry practice in terms of assessing visual impact (through the Visual Management System: Manual for Forest Landscape Management), the appearance in the first years after harvesting particularly on upper slopes and ridgelines as well as the visual edges to plantations has the potential to alter the familiar rural or bushland landscape.
- Another major issue associated with forestry activity is the issue of transportation, particularly as it relates to the potential conflict between large trucks (carrying logs or processed timber products) and local traffic on public roads some of which are at an inadequate standard of construction. This matter is discussed in greater detail in the Infrastructure Topic Paper.

Relevant to the role of the forest industry in Southern Tasmania is the potential construction of the pulp mill in the north (at Longreach in the Tamar Valley). If constructed the pulp mill would use some timber from Forestry Tasmania and private sources in this region. The principal impact would be through redirection of transport routes as the material would have most likely have been destined for another port (such as Triabunna).

4. Fisheries

4.1 Background

Part of Tasmania's unique advantage is the waters that surround the State and our abundance of inland waters. Consequently the fishing industry is one of the major industries in the State. While the industry only employs a small percentage of the population its contribution to the economy not only regionally, but also on a national level, is significant. Tasmania accounted for the largest share of gross value production in Australia with 22% or just over $480 million of total fish production (Australian Bureau of Agricultural and Resource Economics 2009).[2]

The Salmon industry is now one of the most important fisheries for the State both in terms of employment and contribution to the economy. Accounting for 57% of the total seafood production in Tasmania in 2006-07 (Department of Primary Industries & Water 2009a). Farmed salmonoids have overtaken tuna as Australia's most valuable commercial finfish species, and in the 2006-07 financial year ranked second in the nation by volume and value accounting for 11% of the total fisheries production in Australia. Since salmon farming started in the late 1990s, salmonoid production has increased significantly with more than 95% of farmed production occurring in Tasmania, the majority of which occur in the Channel and Huon district within the southern region (Department of Primary Industries & Water 2009a). For example, salmon production in the Huon River and Esperance district accounts for 60% of total state production (GHD Pty Ltd 2007).

Second to the salmon industry is the Tasmanian Abalone Industry, which is the largest wild abalone fishery in the world (Department of Primary Industries & Water 2009), boasting 25% of the total world production (2009, Tasmanian Abalone Council). The wild abalone fishery accounts for 22% or $106m of the value of the Tasmanian seafood industry (Department of Primary Industries & Water 2009b). Within Southern Tasmania, the rocky coastline provides valuable habitat for the blacklip abalone, with the rare greenlip abalone found only along the Northern coast and Bass Strait Islands.

Other major fisheries in Tasmania of importance to the region include farmed Oysters and rock lobster (wild fishery). The Tasmanian Oyster industry is based primarily on the Pacific Oyster, which is grown at various sites around the State, including major sites in the region such as Pitt Water. The Tasmanian rock lobster production value and volume ranks third against other states, accounting for just over $58m in production value (Australian Bureau of Agricultural and Resource Economics 2009).

In total aquaculture production (farmed fisheries) in Tasmania exceeded $319 million in 2007-08 accounting for a 67% of total fish production. Together the salmonoid, abalone & oyster species accounted for 99% of this gross value of production (Australian Bureau of Agricultural and Resource Economics 2009).

4.2 Legislative & Governance Context

Activities associated with wild fisheries are undertaken without the need for any planning approvals.

The marine farming industry is regulated by the Department of Primary Industries, Parks, Water and Environment (DPIPWE) under the *Living Marine Resources Management Act 1995* and the *Marine*

[2] Discussion relating to the value of trout fishing has been discussed in context of its recreational and tourism value in Sections 4.4 as it does not constitute a commercial fishery.

Farming Planning Act 1999. Under the latter Act, marine farming development plans are prepared, designating areas in State waters where marine farming may occur. The processes under these pieces of legislation essentially establish planning approval mechanisms separate to those under the *Land Use Planning and Approvals Act 1993*, which does not apply to the establishment of marine farms.

All marine farming operations must be licensed under the *Living Marine Resources Management Act 1995.* Licenses include environmental conditions to ensure that marine farming operations are sustainable and do not have an unacceptable impact on the marine environment.

In addition, the Department of Health and Human Services manages the Tasmanian Shellfish Quality Assurance Program under the *Public Health Act 1997* and the *Food Act 1998*. This includes monitoring water quality in shellfish growing areas and the public health status of shellfish on marine farms, to ensure the safety of farmed shellfish for human consumption.

Land based facilities are however subject to the usual planning approval processes under *Land Use Planning and Approvals Act 1993 (*and in some instances the *Environmental Management and Pollution Control Act 1994,* where it is for a Level 2 activity*).*

4.3 Planning Implications

While the actual act of fishing and marine farming occurs without any relationship to the land use planning system, there are several related issues for which future planning needs to take into account. Firstly fisheries, in particular the aquaculture industry, are dependent on high water quality. Land based activities within water catchments have the potential to detrimentally affect marine habitats upon which various fisheries are based. Such activities include sewage disposal, point source discharges, land clearance and work causing sedimentation and nutrient or chemical runoff.

Fisheries are also dependent upon land based facilities to successfully operate. This not only includes ensuring berthing facilities and fishing ports are either made available or protected (for those existing) from other land uses, but ensuring that appropriate land is made available for downstream processing opportunities. While some processing activities can occur in industrial areas, as evident from the aquaculture industry in the region, land is generally required in coastal areas in proximity to marine farms (to enable live haul for example). This land needs to be appropriately serviced given the high level of physical infrastructure requirements and appropriately located to avoid conflicts with other uses and impacts upon the natural values of the coastline. Potential impacts from land based facilities include removal of coastal vegetation, reclamation of the coast, reduction in scenic quality, erosion, degradation of Aboriginal heritage and degraded plant communities and habitats (GHD Pty Ltd 2007: 88).

The planning for land based facilities associated with the aquaculture industry is a particularly important matter for the Channel, Huon & Pitt Water districts; with considerable development pressure for processing plants on or adjacent to the foreshore. A planning system that is not well equipped to deal with these development pressures can be an added burden to facilitating what is a highly important industry for the region and State not only in terms of employment (direct and indirect) but overall production value.

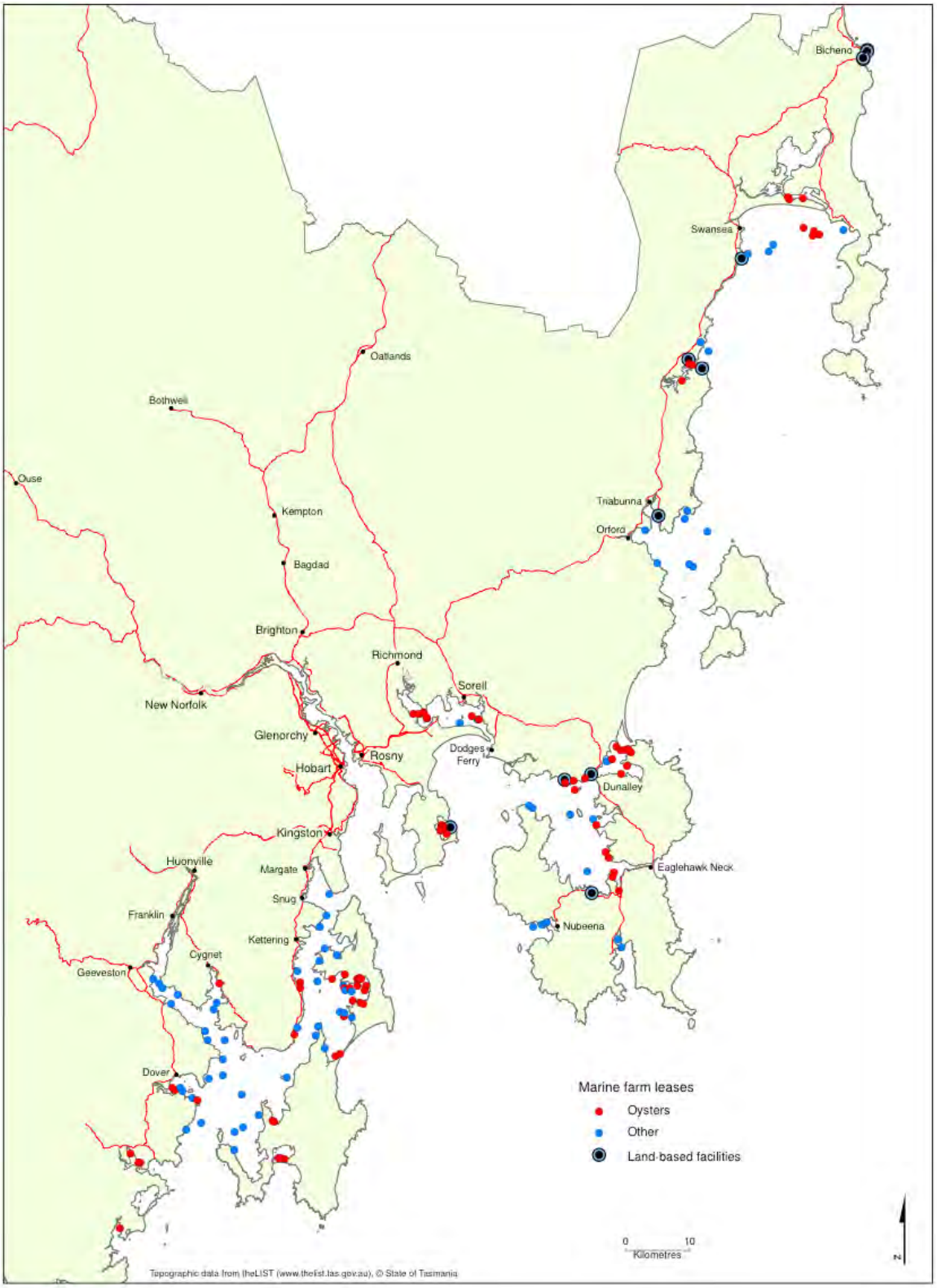


Figure 29: Marine Farm Facilities in Southern Tasmania (map available separately)

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The Southern Tasmania Regional Planning Project
is a joint initiative of the State of Tasmania, the Southern Tasmanian Councils Authority,
the 12 Southern Councils and the Sullivans Cove Waterfront Authority

FRANKLIN HERITAGE AREA ASSESSMENT May 2012

Prepared by Graeme Corney architect and heritage consultant

INTRODUCTION

Huon Valley Council is preparing a new planning scheme incorporating a heritage area for Franklin. Two draft heritage area provisions have been prepared.

This brief is to provide expert heritage advice to HVC Council Officers on the merits of the two alternatives.

Specifically to provide advice on:

(a) The pros and cons of the two approaches to assist Council officers determine which approach to proceed with
(b) Any significant issues with the two drafts that could prevent the achievement of appropriate development outcomes particularly in terms of the scope of provisions that should or should not be included, and statements of purposes and objectives
(c) Any other general suggestions or views that will assist in finalising a town wide set of planning provisions to protect key heritage and townscape values and features

This analysis has been set out as follows:

1 An overview of Franklin and its historical layers
2 A list of key characteristics and heritage values that need protection
3 An analysis of the alternative planning provisions developed by Council officers and the consultant GHD
4 Recommendations and conclusions

The indigenous values that may be present are outside the scope of this report.

1 FRANKLIN AND ITS HISTORICAL LAYERS

This report does not undertake Independant historical research, it relies on the documentation provided, in particular the *Franklin Heritage Study, August 1997* prepared by Lesley Gulson and Michael Shield and the later *Franklin Heritage Study, 2003* prepared by James Puustinen of GHD for the Huon Valley Council.

Franklin is a riverside village that clearly demonstrates various layers of occupation from its establishment up until the present time. Lady Jane Franklin's establishment of the town as 'The Settlement' in 1838, the later development of agriculture (particularly fruit) in its hinterland, the use of the Huon River as its transport system, the establishment of boat-building, the reclamation of the mudflats and subsequent use of much of this new land for community purposes, and several other progressions of development can all be seen in the built forms and in the landscape. In this respect Franklin is a unique cultural landscape. The observer can see the layers of change brought about by human occupation of this strong natural setting over time.

1.1 Overview of its historical layers

Franklin's built fabric shows predominantly a late Victorian and inter-War picturesque riverside village but retains important layers of its earlier occupation as well as important mid twentieth century layers. This section provides a very brief overview of those historic layers. It is summarises the more obvious cultural layers but does not pretend to be definitive.

Whilst most of the buildings are of moderate rather than high heritage significance, it is the overall assembly of buildings, structures, fences, lanes, plantings, boundaries, jetties, fields, orchards, wetlands and artefacts that makes Franklin village a striking cultural landscape. The property owners and the administrators of the Planning Scheme should

manage these cultural layers so that they are not heedlessly lost in incremental changes over time.

The underlying principle of the heritage area should not be to prevent development. It should carefully manage future development in a way that is predictable and retains the important cultural layers of European occupation of Franklin.

Above all the village still has a high degree of definition of its approaches and its edges. This is despite the loss of several houses for road widening in the 1940s and 1980s.

When approaching Franklin from Huonville after passing Huon Eldercare the village opens up to the traveller. When approaching Franklin from Geeveston the traveller turns past Shipwrights Point and the village opens up.

To the east the village is defined by the river which laps against public open space, sports fields and parkland.

To the west the back yards and lanes quickly become open fields of agriculture, pasture and orchards. Although there is not a straight line between urban and rural Franklin there is nevertheless an unmistakably rural backdrop of fields and orchards with occasional farm buildings. Only in one small area, the higher slopes of Walpole Lane, is the strong definition of village to rural setting tainted by uncharacteristically dense housing which is more akin to modern suburbia.

It is this high degree of definition of its approaches and edges that is a most important contributor to Franklin's picturesque cultural landscape.

1.2 The Settlement

The original 1843 subdivision encouraged by Lady Jane Franklin resulted in long narrow lots ranging from 5 to 100 acres –likely of sizes to support profitable farming practices. If the original boundaries still exist they should be retained in future land management. The 1851 town plan referred to in the GHD report may show the boundaries.
The long narrow lanes are from the settlement period and where their specific location can be determined, they should be respected in any future development along these lanes. The modern engineering requirements for wider streets and engineered street edges should be resisted in favour of continuation of the existing patterns.

1.3 Transport

Before the construction of the bridge at Huonville in 1876 Franklin relied on the river for transport. Numerous jetties serviced that river traffic. After 1876 road transport slowly took over, new houses purposefully addressed the road system.

1.4 Timber

Timber getting and milling was a core industry in Huon area from the early days of settlement, albeit the quality of the timber resource around Franklin was relatively poor. Small mills established from the 1850s onwards but by the turn of the century the main focus was on timber boxes for transporting apples.

1.5 Agriculture

From the 1850s the Huon region including Franklin developed as a major exporter of Apples. Following the development of refrigerated holds on ships the export of other fruits from the region followed in the late Victorian period. Orchards surrounded Franklin until the 1960s when for various reasons the apple industry declined quickly and many orchards were cleared. The agricultural land surrounding Franklin is now used for grazing and a few crops with some remnants of apple orchards.
As a consequence of the healthy apple and fruit industry much building development occurred between the mid Victorian through to the inter-war periods.

1.6 Sport and social activities

A water regatta (annually from the 1850s-1960s), cricket club (established 1870), football club (1930s) and bowling club (1970s?) are important elements of the social fabric of Franklin. These sporting facilities are prominent in Franklin's cultural landscape. The reclamation of the mudflats in 1923 was to make Franklin a deep water port to assist river transport. A benefit was that it allowed the development of the sports oval and the park.

2 KEY CHARACTERISTICS AND HERITAGE VALUES

The key characteristics of Franklin that need protection under the planning scheme are as follows:

3.1 Defined Main Road entry into Franklin

These approach areas also have important views to the river, town landmarks and the surrounding rural countryside.

-from the northern approach

The Heritage Area should be expanded at the northern end to include approach land crucial to preserving and enhancing the 'arrival' of Franklin township. The Heritage Area should include the houses between Church Street and the Federation house north of the Kent Street intersection. These houses are mostly mid 20th century and although they are of low heritage significance individually, they nevertheless do contribute to the cultural layers of Franklin. If they are not acknowledged as part of the Heritage Area in time the approach to Franklin could be compromised.

The wetlands should be designated as a 'no build' area.

The street edge on the 'block' of the Wooden Boat Centre should be more strongly defined by sensitive new development. This is a key 'entry' site to Franklin and should be treated as such. Any new development should also protect the vista of the Huon River when looking down Church Street.

-from the southern approach

The Heritage Area has appropriate boundaries to the south. The landscaped hillside that is on the western side of the southern approach acts as a clear contrast to the town buildings just beyond. This landscaped hillside should remain as such so that the southern approach is not watered down by new modern buildings. A designated 'no build' area immediately to both side of Main Street would be helpful to avoid future constructions in this key location.

3.2 Strong lineal form

The lineal form of the township parallel with the Huon River is an important characteristic of Franklin. The mostly likely future development pressures will be for subdivision and suburbia to creep up the hills to the west. The strong lineal form is best retained by confining new residential development to the proposed Heritage Area and by preventing future suburban allotments being created on the slopes to the west.

3.3 Vistas of the Huon River

The vistas of the Huon River, particularly when looking down the narrow lanes are important and should be protected. The vista down Temperance Lane has already been compromised by the modern Fire Station. The vistas down Church Street, Old Road, and New Road should have narrow 'no build' areas on the eastern side of Main Street. The existing 'boat-port' on the Wood Boat School site negatively impacts on the vista down Church Street and should be relocated out of this vista at first opportunity.

3.4 Rural backdrop

The rural backdrop of fields and orchards on the western slopes still demonstrates the original 'Settlement' land subdivisions. These fields also contribute greatly to the picturesque qualities of the town.

3.5 Subdivision boundaries

The 'Settlement' boundaries should be protected and incorporated into any new boundary changes.

3.6 Narrow 'rural' lanes

Any new development along the edges of the lanes should continue existing engineering standards and street setbacks. Over-engineered road works and road widening should be avoided.

3.7 Pattern of existing buildings

There is an established hierarchy of building heights and construction materials which should be continued. New houses should be single storey (attics are appropriate), of predominantly timber construction and should appear modest in size. New public buildings should be up to two storeys and of brick or stone or rendered external material. All new buildings should continue the pattern of strongly addressing the street.

3 ANALYSIS OF PROPOSED PLANNING PROVISIONS

Firstly some general comments are made about the GHD non specific approach to Heritage Area provisions.

- The starting point that all development within the Heritage Area is discretionary seems on the surface to be sensible. However it is impractical in that it requires formal DAs for a suite of minor issues that should be more easily approved.
- Experience shows that general or motherhood planning requirements are at best confusing and unhelpful to the willing applicant and at worst a Swiss cheese to the opportunistic developer.
- Importantly the general provisions provide no real contextual starting point for the applicant so inevitably time and money is wasted on early proposals that are often rejected by Council on the basis of implied but indefensible provisions in the planning scheme.

The following table comments on the merits of the alternative planning provisions proposed:

ISSUE	GHD	COUNCIL OFFICERS SAP	COMMENT
Defined main entries to town	no specific guidance	provides some controls, but needs expansion	prefer CO SAP approach but needs expansion as per recommendations
Strong lineal form	no specific guidance	controlled by zoning	controlled by zoning but could be more specific
Vistas of Huon River	no specific guidance	partly controlled in Special Area provisions	needs specific no-build areas added to Special Area Plan
Rural backdrop	no specific guidance	acknowledged but not protected	zoning should specifically prohibit further residential subdivisions on the western hills overlooking Franklin
'Settlement' boundaries	no specific guidance	provides no acknowledgement nor controls of 'Settlement' boundaries	'Settlement' boundaries –where they can be determined- should be acknowledged and retained in future boundary changes
Development along lanes	no specific guidance	acknowledged and partly protected via setbacks and addressing of new houses to street	further protection should be included to require new development to continue the historic pattern of low level road engineering
Pattern of new buildings	no specific guidance	adequately addressed	adequately controlled in CO SAP

The following important heritage/planning issues are not currently managed by either of the proposed planning provisions:

1 Inappropriate development could occur on the entry to the town between the church hall at Church Street and Kent Street;
2 Structures could inappropriately be added to the wetland northern entry to Franklin;
3 The important vistas of the Huon River from the side streets and lanes could be obliterated by future development;
4 The opportunity for new development on the Wooden Boat Centre site to strengthen the built entry to the town is not managed well enough

It is clear that the CO's SAP approach is much better equipped than the GHD provisions to manage the important heritage characteristics of Franklin. With some minor additions and improvements to the CO's SAP future development of the town can take place with more certainty for owners on how they can contribute to and not diminish the very qualities that make Franklin the jewel of the Huon region.

The following detailed comments in relation to the Council Officers SAP draft are made:

Reference	**Comment**
Recommendations for a Heritage Precinct 'Corrugated iron'	add 'or modern equivalent' after
ditto	'affect' should be 'context'
Value and characteristics	add 'the approaches to Franklin along Main Street from both the north and the south are still relatively well defined' add 'Settlement boundaries are still evident' add 'narrow under-engineered lanes lead off from Main Street and rise up the western slopes in a relatively random fashion'
Wooden Boat School	replace 'Potentially this could be achieved etc...' with 'The Wooden Boat Centre should be acknowledged as a site of high importance to the urban fabric of the town and any future structures should achieve the following: (a) a minimum 15m wide Huon Rive vista strip centred on Church Street should be preserved as a 'no-build' zone; (b) new development which is of maximum 5m height and which is respectful of traditional residential form is encouraged on or close to the Main Street edge; (c) car-parking should be screened behind this street edge construction; and (d) commercial forms of up to 9m height are permissible adjacent the Huon River edge'
X.2.1	add 'the approaches to Franklin along Main Street from both the north and the south are still relatively well defined' add 'the 1840s Settlement boundaries are still evident' add ''narrow under-engineered lanes lead off from Main Street and rise up the western slopes in a relatively random fashion'
X.4.1	comment: A means to improving the impartiality (and therefore the quality) of

		heritage impact assessments is for the Council to appoint the 'suitably qualified person' and the fee to be paid by the applicant.
X.5.2	P2	should 'a minimum' read 'less than'?
	P5(b)	could be clearer by substituting with 'existing scenic views to the Huon River from public land within the precinct and from side streets and lanes are not unreasonably reduced'
	P9	the words 'and provide relief and colour' are difficult to police and perhaps could be omitted without any real risk.
X.6	A1 (b)	Apart from the words being a bit clumsy, it is dangerous to include all building additions –some building additions can be very early and have some heritage value, so it may be better to omit (b) altogether
X.4.2	A1	I think there is a case for acknowledging the importance of the Wooden Boat Centre site as a town entry and treating it differently by including the following provisions any future structures should achieve the following: (a) a minimum 15m wide Huon River vista strip centred on Church Street should be preserved as a 'no-build' zone; (b) new development which is of maximum 5m height and which is respectful of traditional residential form is encouraged on or close to the Main Street edge; (c) car-parking should be screened behind this street edge construction; and (d) commercial forms of up to 9m height are permissible adjacent the Huon River edge'

4 RECOMMENDATIONS AND CONCLUSIONS

All heritage towns have characteristics that are particular to that place. Each town has important views and vistas, settings and cultural items that need acknowledgement and protection. This cannot be successfully achieved to any useful degree by adopting a generic heritage overlay. In this respect the GHD approach is crucially deficient. The Council SAP is strongly preferred as the appropriate tool to manage heritage values.

It has been my experience that the protection of specific views and vistas and town approaches and edges is best done specifically within a new Heritage Area. The early discussion with land-owners are not compromised by the economic and emotional commitments that become part of development applications.

The following recommendations are made:

1. Subject to some additions listed below, Council should adopt the SAP presented by its officers;
2. The proposed Heritage Area should be extended at the northern end to include the group of houses addressing Main Street between Church Street and the Federation house immediately north of Kent Street (refer to the attached plan);

3 At the southern entry to the town a ‘no-build’ area should be designated on the landscaped hillside for the 20m adjacent the road verge (refer to the attached plan);

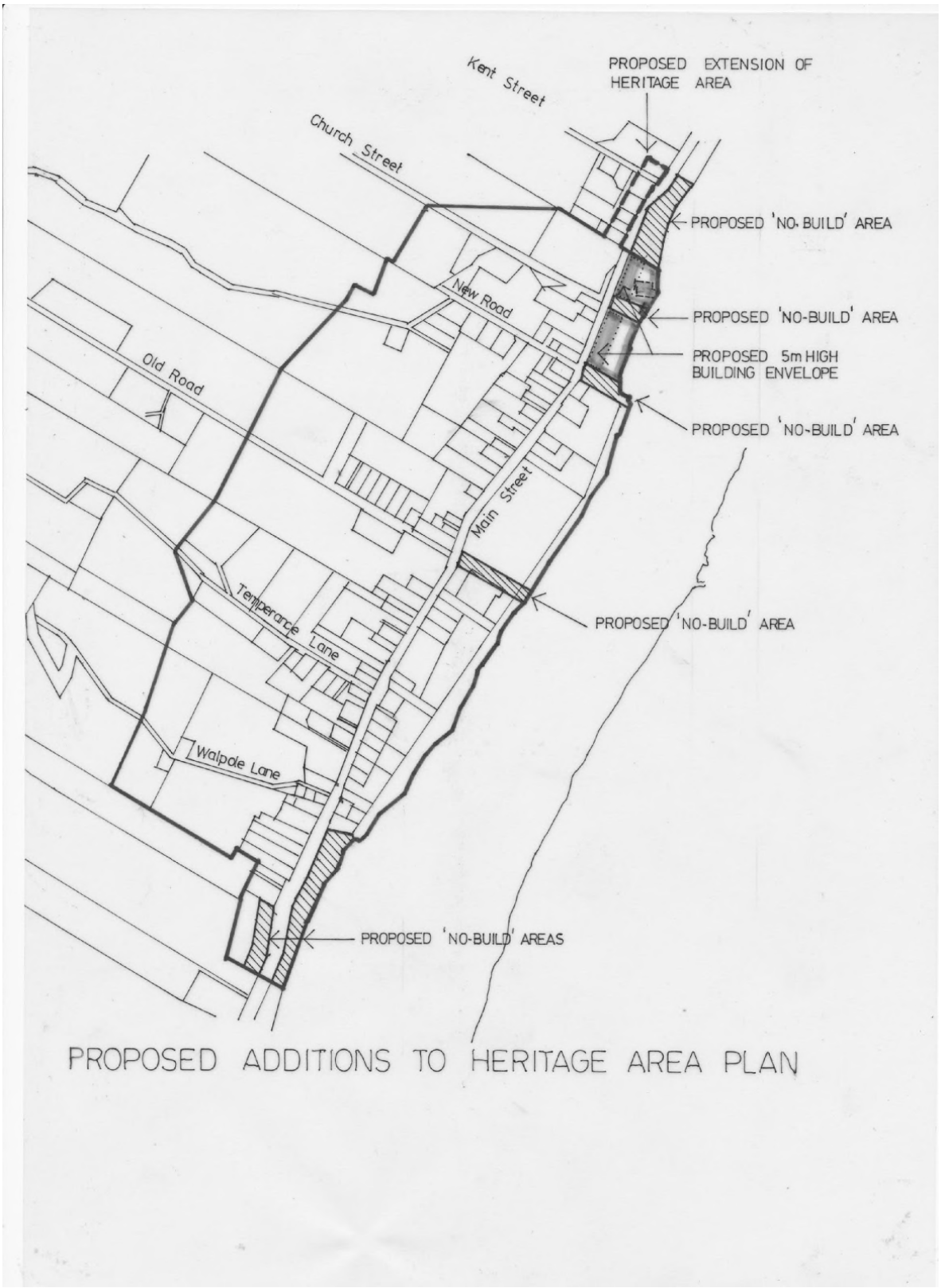
4 The wetlands between Church Street and the Huon Eldercare be designated as a no-build zone (refer to the attached plan);

5 The Wooden Boat Centre should be acknowledged as a site of high importance to the urban fabric of the town and any future structures should achieve the following: (a) a minimum 15m wide Huon River vista strip centred on Church Street should be preserved as a ‘no-build’ zone; (b) new development which is of maximum 5m height and which is respectful of traditional residential form is encouraged on or close to the Main Street edge; (c) car-parking should be screened behind this street edge construction; and (d) commercial forms of up to 9m height are permissible adjacent the Huon River edge (refer to the attached plan);

6 No further housing subdivisions should be approved in the western hills overlooking Franklin;

7 ‘Settlement’ boundaries –where their specific location can be determined -should be acknowledged and retained in future boundary changes; and

8 ‘No-build’ areas of 15m wide should be centred on the continuations of Church Street, Old Road, and New Road on the eastern side of Main Street to protect vistas of the Huon River (refer to the attached plan).



PROPOSED ADDITIONS TO HERITAGE AREA PLAN



Figure 1 vista of Huon River down New Road should be protected



Figure 2 Vista of River down Church Street is compromised by boat-port

Huon Heritage Review Stage 1 - Review of Existing Items not included on SHR

The project brief identified 15 Items that are currently in the three combined planning schemes for the council area but are not included on the Tasmanian Heritage Council register of places of State significance.

The first stage of the project is to physically identify and locate the sites to determine if the items are extant, altered or removed. Fieldwork has been undertaken that has resulted in four categories of places:

A Extant and has probable heritage significance

B Extant but not of sufficient heritage significance to include in the schedule at this time

C Extant but not able to be assessed without access to the site and owners consent, this is required to determine what is there and its status.

D Not Extant

The final part of this stage is to make assessments of significance, based on the fieldwork, to determine if each property should be included in the heritage schedule of the proposed Planning Scheme.

The table below provides a short comment or description of each place, sets out a brief statement of significance, based on available information and not any new or original research, provides some photos of the place taken during the fieldwork and then makes a recommendation on the listing and status of the place, based on the above four categories.

In summary the study recommends:

Status	Applicable Sites
A Sites that are recommended to be included in the proposed Huon Valley Planning Scheme Heritage Schedule	2 - Roman Catholic Cemetery, Franklin 4 - Settlement, Brooks Bay 5 - Shop and Residence, 6895 Huon Highway, Dover 8 - Hope Island 10 - Honeywood, 68 O'Halloran's Road, Geeveston 11 - Former Savings Bank of Tasmania, 13 Church Street, Geeveston 12 - House and Cottage, Four foot Road, Geeveston 13 - Former Roman Catholic Church, 5 Bronwell Street, Geeveston 15 - Apple Sheds, 5528 Huon Highway, Waterloo
B Sites that are recommended NOT to be included in the proposed Huon Valley Planning Scheme Heritage Schedule	9 - House c1890, 5093 Huon Highway, Riley Creek
C Sites that are recommended to be included in the proposed Huon Valley Planning Scheme Heritage Schedule, noting that the sites have not been visited but clearly contain items of heritage significance	1 - Glen House, Glen Road, Ranelagh 3 - Valleyfield House, 772 Glen Huon Road, Glen Huon
D Sites that are no longer remaining and which are recommended NOT to be included included in the proposed Huon Valley Planning Scheme Heritage Schedule	6 - c1840 House, Roaring Beach Road, Roaring Beach 7 - House c1890, Huon Highway, near Glendevie 14 - House Huon Highway Strathblane - ID 169, opposite no 7743.

Tasmanian State Heritage Criteria

The following criteria are those used by the Tasmanian Heritage Office to assess places for inclusion on the state heritage register. They can apply equally to local and state heritage places, noting that the values can be either local or of State significance. Generally the places within the Huon Valley area are locally significant with some notable exceptions. Apart from possibly some of the apple sheds being of State heritage significance (and this requires further comparative assessment), early convict sites, possibly the hop buildings at Ranelagh, the buildings proposed for listing are of local heritage significance.

Criterion a *It is important is demonstrating the evolution or pattern of Tasmania's history*

Criterion b *It demonstrates rare, uncommon or endangered aspects of Tasmania's heritage*

Criterion c *It has potential to yield information that will contribute to the understanding of Tasmania's history*

Criterion d *It is important as a representative in demonstrating the characteristics of a broader class of cultural places*

Criterion e *It is important in demonstrating a high class of technical or creative achievement.*

Criterion f *it has strong or special meaning for any group or community because of social, cultural or spiritual associations;*

Criterion g *it has a special association with the life or work of a person, a group or an organisation that was important in Tasmania's history.*

The following table, using the item numbers in the brief sets out the status of each property:

Item no	Description	Status	Comment	Significance Assessment	Photos	Photos
1	Glen House, Glen Road, Ranelagh	C	The house is located in a mature garden setting with substantial trees that only allows peripheral views. A stone barn, the garden and various outbuildings can be seen from the road. The site needs to be visited but it appears that the early house remains.	A - B - C - D - E - F - G -		
2	Roman Catholic Cemetery Franklin	A	The cemetery is located on a rise above a bend in the main road where there are excellent views from the cemetery particularly to the north along the river. It appears the site has been recently cleared of quite heavy vegetation, as there is now some regrowth. The east and south verges are still wooded and provide no views through the undergrowth, but they probably	A Cemeteries demonstrate the pattern of settlement and development as they map the lives and deaths of each community. This cemetery appears to date back to quite early settlement of the area B Not applicable. C Gravestones provide information about members of the community that contribute to a broader knowledge of the region.		

			once existed. It can be imagined that the knoll was cleared and was visible in the early years of use and that more recently it has become overgrown. The cemetery is still active and the earliest observe graves were 1860, however the gravestones are very deteriorated and many are missing. There has been extensive vandalism and neglect. The cemetery cannot be seen from the public roadways. It is a significant part of the area, even though outside the edge of the village and should be heritage listed.	D Cemeteries are a well-recognised class of places that as a group have high heritage significance. This is a small but good example of the class of place. E Funereal art demonstrates high levels of artistic achievement and even thought eh cemetery is overall modest, there are some fine examples of headstones. F Cemeteries have strong meaning to the community as they are reminders of those who have died, of the history of the locality and of human frailty. G Cemeteries have many special associations to those who are interred. These will vary from cemetery to cemetery, it is not known of particularly significant burials in this location, however, the meaning for the local community satisfies this criterion.		
3	Valleyfield House 772 Glen Huon Road Glen Huon	C	This is a large property of which the house is a relatively small element. It is set back from the road behind vegetation and is difficult to see. It appears as a modest house that may have undergone some alteration, its age could not be determined due to distance. The site contains other elements of significance. There is a very fine old driveway flanked by mature oak trees, the drive is no longer used, a barn, and excellent and large 3 storey oast house flanked by other large sheds, at least one pickers accommodation building and a range of other elements that could not easily be seen. It appears the broader site has heritage significance and a more detailed assessment with site access would be required to make a determination.	A - B - C - D - E - F - G -		

4	Settlement Brooks Bay	A	The listing for this is vague as it does not nominate which buildings in the small valley are meant to be included in the listing. There is a fine apple shed located on the waters edge, partially on filled and reclaimed land. It has a new roof, is in good condition and has had new drainage and tanks recently added. A house c1890-1900 (no 330) is directly behind it of heritage value. It is fine example of the c1900 period farm house in a prominent setting with fine detailing that indicates a house of some value in contrast to many more modest dwellings in the region. Directly behind this is another fine house of the same vintage (no 336) that also has heritage value. It is also a well detailed house c1890-1900 Opposite and to the south of the shed is a mid twentieth century house that is not of individual heritage value, it would have been added to the area probably after the cessation of river transport. There are several other houses around the valley set further back from the road, one is of modest heritage value. The 1983 photos show other sheds that no longer remain on the opposite side of the road. As a group the whole valley reads as a landscape unit with the various buildings. If precinct listing is undertaken this valley should be listed as a landscape element, if this occurs the shed should be individually listed and the remaining elements identified in the precinct. If this does not occur, separately the shed and two adjoining houses should be individually heritage listed. Interestingly on several visits to the location there were a number of people stopped photographing the shed and bay suggesting it has a level of esteem in the broader community.	Apple Shed A Apple and fruit sheds are a core historic element of the Huon Valley that demonstrate patterns of development, farming and the key industry of the region for over 150 years of settlement. B Although once prolific in number and while a number remain, mostly in ruined form, this building type is endangered and maintained examples are rare. This is an excellent and rare example of a shed that is located directly on the water. This form of shed is found at larger centres but rarely in remote locations. C The shed has some ability to reveal information about its construction but this is limited. D The shed is an excellent example of the broader class of places of apple and fruit sheds within the Huon Valley. E The building construction demonstrates modest achievement in technical matters. F Fruit and apple sheds are identified by the community as part of their farming heritage and have some community esteem. The buildings have high tourist value as important historic element within the landscape, this is seen in the number of people who stop and photograph these structures. G There are no known particular associations with this structure. Houses A The houses are good examples of their type and form, that is rural well built farm housing from the core period of development of the region. They demonstrate different design and stylistic approaches in a tight knit grouping. B The houses are not rare or threatened, however the grouping with the waterfront shed is rare. C The houses have limited ability to reveal information that is not already known. D The houses are good examples of settlement in a remote and largely intact setting that is closely related to fruit growing and transport of crops by sea and road. This is a reasonably rare grouping of	   	   

				elements. E The buildings construction demonstrates modest achievement in technical matters. F The shed is held in some community esteem as it is often photographed and visited for its rather iconic value and superb setting. G There are no known particular associations with these structures however research may reveal associations.	   	
5	Shop and residence 6895 Huon Highway Dover	A	The shop has been built in a few stages and may have been a residence with a shop addition or may have always had a shop that has been altered over time. The roof form suggests additions, as the planning is irregular. The cladding also changes around the shop area, the house being clad in chamfered edge boarding probably around 1900 and the shop having rounded boarding more likely to be 1930 onwards. The building is in a key location as it is in the centre of the view on the northern approach to the town. Despite some changes to detailing including steel verandah posts, shutters being recently added and a changed shopfront, the building still contains much of its early form and has local heritage value. The building has also undergone change over its life, some of which is difficult to determine from external inspection. It appears originally to have been a house with the shop added to the corner, however, the shopfront form may have been part of the early building. There are differences in wall cladding and detailing around the building reflecting at least later changes and the awkward roof form to the corner and retail area, in contrast to he regular roof form over the dwelling, suggests later construction.	A The building is a very good example of the small shop/residence form in a small township that retains much of its early detail. It is a good representative example of this type of late nineteenth century to early twentieth century development. B The building is not rare, however the desire of occupiers to upgrade the retail areas in particular places small commercial buildings such as this at reasonable risk. C The building has limited ability to reveal information that is not already known. D It is a good representative example of a commercial building in a small settlement attached to an early dwelling. E The buildings construction demonstrates modest achievement in technical matters. F As a part of the small shopping precinct of Dover, the building clearly has some community esteem for its contribution to the town. G There are no known particular associations with these structures however research may reveal associations.	     	

			Some of the minor changes would be easily reversed in future works.			
6	c1840 House Roaring Beach Road Roaring Beach	D	There are no early residences that can be seen from any of the roads in this area, Roaring Beach Road is open and contains only housing from the late twentieth and later housing. Recommend this item be deleted from the schedule.	Not applicable.		
7	House c1890 Huon Highway near Glendevie	D	A photo of the house exists in the 1985 study, but there is no building near the location indicated on the attached mapping. There is evidence of the site of at least one house in this location (levelled platform with garden trees) that could have been the subject house site. There is however a similar house opposite the identified location on the top of s steep rise with two more recent houses built near the street. The owner (in his 80's) of one of the newer houses advised that he grew up in this house and that his grandfather bought it. The house is of considerable interest, even though now in partial ruin, It is of early date, probably 1850s with fine joinery, attic rooms in one end in a commanding location with very mature trees and the remains of a cobble driveway extending up the hill. The building is not recoverable but appears to be one of the earlier houses in the area. It is possible that the 1985 study was in error and that this is the house identified, with a wrong photo, but it is not clear. Recommend the nominated item be deleted from the schedule and the located item be considered for heritage listing.	Not applicable.		

8	Hope Island	A	Hope Island was cleared and developed as part of the Dover Probation Station. The Dover site itself is not known, however it started around 1844 but was closed around 1848 and the island was put up for lease. The island was used for growing crops for the station as it was quite fertile, there was good rainfall and it was not subject to frost. Convicts and later the owner, cleared rocks from the fields and used them to build walls. A site survey from 1851, presumably as part of the sale, shows 6 buildings, 2 yards ad a garden area. An 1853 watercolour by Alport shows three cottages, fences and cultivation noting the house as belonging to John Boothman who farmed the island after the probation use ceased. A 1954 photo shows an overseers cottage still standing and dates it to 1844-7. The photo caption notes it was used initially be Boothman and his family but they built another residence nearby. Irrespective of the extant remains, of which there will be some, the site is of high interest for its convict probation station development. It can be assumed that the later owners retained the buildings for use in relation to their occupation and agricultural use of the island. The house was a simple hipped roof two room cottage of stone with central door and flanking windows.	A The former convict probation station use of the site is of high significance for the ability to demonstrate a pattern of Tasmanian life related to early convict sites and their role in agriculture and building settlements. B Convict sites are by their nature rare, and despite the remnant state of the elements remaining o the island they are a now rare feature of the landscape. There are relatively few convict sites identified in the Huon area due to its relatively late settlement. This is an early and significant convict site. C The site has potential to reveal information about both the early convict use of the island and the later agricultural use. D This site is part of a broader collection of convict probation sites found around Tasmania, all of which contribute to an understanding of the convict system of settlement in the colony. E It may be able to demonstrate technical achievement, but this is most likely through research or archaeology. F The island is locally iconic as the largest of the three islands in the cove, Faith Hope and Charity Islands. G The site has associations with the convict probation station and is the only tangible remains of that station, it is also associated with John Boothman and important early local identity in Dover.		
9	House c1890 5093 Huon Highway Riley Creek	B	The house exists with some alteration and numerous additions around it. The building is typical of many farm houses in the region that are not heritage listed. In the overall pattern of farm buildings it is a reasonably well represented type and there are more interesting and significant buildings that are not listed. Some of the changes to the building and setting detract from its	A All buildings demonstrate this criterion to some extent, this building along with all farm buildings demonstrates a pattern of settlement, however, this element is not distinctive or a particularly fine example of its type. B The building is not endangered or part of an endangered group of places. C The building does not contribute particular or new knowledge about Tasmania or a		

			significance. On balance it is not recommended for heritage listing unless there is some historical reason for listing.	class of places. D The building is not an important representative example of a class of places. E The building does not demonstrate particular technical or other values beyond a wide range of similar buildings. F The building does not have particular community esteem even though t is an attractive building. G There are no known associations that set the place apart.		
10	Honeywood 68 O'Halloran's Rd Geeveston	C	The site was first developed in the 1840s by JB Walter who used convict labour to dig a channel from upstream to power a mill that appears to have first been a flour mill. The channel remains in remnant elements (outside the property) and was largely removed through bushcare works some 40 years ago. Richard Hill purchased the mill in 1849 with 100 acres and converted it to a sawmill, it appears to be the first sawmill in the Huon area. It is probable that Hill built the first house which was a hipped roof building with attic rooms and dormer windows. It is reported 12 people lived there. The two storey addition to one side also appears quite early and is in early photos. These photos show the hipped roof form with a separate two level addition. The Hills maintained the property until the middle of the 20th century and at some point the government acquired it using it for staff accommodation, it sold around 2000 with the current owners acquiring it in 2011. Substantial changes were made after 2000 with the site being excavated and levelled. The house (other buildings apart form one shed are not of interest or significance) has had major changes to much of tis fabric over time: hipped roof removed and new gabled roof added with lower pitch; attic rooms removed (possible through fire); internal walls removed; nearly all external windows and joinery replaced c 1930-40; external linings removed and reinstalled in different locations; verandahs added, side addition linking to early twentieth century shed added; external boarding replaced; new internal fitout. The two storey addition retains a reasonable level of fabric internally.	A The site is very important in demonstrating the commencement of the timber industry in the Huon with a few remnant elements from that period. The documentary evidence available is compelling and the site remains evocative of this use. The house demonstrates early settlement, despite its changes and allows an understanding of the pattern of development I the early phase of settlement of the Huon. B The house is not endangered and has been repaired. The shed is not endangered as it is in use. The remnant convict water channels are endangered but are not on the subject property but on adjacent land. C The site makes some contrihution to an understanding of a class of places in the development of the timber industry in the Huon. D The building is a modest example of its type as a result of the level of change that has occurred to the structure. E The building continues to demonstrate dome, albeit limited now, technical values in the use of local materials. F It appears the building has a level of community esteem and is well recognised for the former mill use. G The place has strong associations with the local Hill family who were prominent in business, orchards, milling, commerce, and community activities. The site has important associations with the development of the timber industry and convict construction.	 	 

			Despite changes the house retains some significance and has a recognisable form when compared to early photos. The mill site has been completely removed, however an adjacent shed shows limited evidence of an early use and was probably the mill office building that is apparent I the photos. It is in very deteriorated condition. While the place is significant, it is far from intact and is not recoverable to an earlier form, even with research.			
11	Former Savings Bank of Tasmania 13 Church Street Geeveston	A	No longer a bank but now a restaurant and real estate agency, it retains its form and detail, partially painted which is unfortunate. The building dates from the 1950's and is built in a restrained manner with a parapeted form. It is well-designed to express solidity and the conservative nature of the bank function. The main façade features a central doorway with pilasters to each side and a restrained porch. The parapeted form is dominant set above a painted string course. The facades are symmetrical. An eating deck is now located to one side on the street corner however this does not detract from the form of the building. It is importantly located on a central corner of the town centre opposite the former town hall and is key visual element within the main street. The change of use has not diminished its form or importance in the township. An important element in the town centre streetscape amidst other heritage buildings. The building even without further research should be heritage listed.	A The building demonstrates the importance of townships within the largely rural setting of the Huon Valley and the quality of the building, even though built in the 1950's shows the importance of banks and institutions to small communities. The building is an excellent example of its type. B The building is not endangered or part of an endangered group of places. C The building does not contribute particular or new knowledge about Tasmania or a class of places. D The building is a good, if reasonably modest example of a class of places, being rural bank and institutional buildings. Along with the former town hall it is important within the setting of Geeveston. E The building does not demonstrate particular technical or other values beyond a wide range of similar buildings. F The building will have some community esteem as part of the heritage centre of Geeveston and for it contribution to the overall quality of the townscape. G There are no known associations that set the place apart.		 

12	House and Cottage Four Foot Road Geeveston	A	Two dwellings on the same title. The main house from c 1880 has attic rooms, steep pitched roof and is reasonably intact. As visible from the street it is a four-room structure on the ground floor with a rear skillion. It is a typical house from the late Victorian period of more interest due to its relationship to the cottage adjacent and its ability to demonstrate phases of development in the area. The cottage, which is much earlier in date, possibly 1850s, is occupied with interesting recent additions. Sufficient of the early building remains for it to be considered for heritage listing as one of the early buildings of the area. It would seem that the cottage is the first building on the site and that as fortunes improved, a larger and more commodious house was built adjacent. This was a reasonably common action that can be seen elsewhere in the Huon area. The building retains early windows and cladding and the original form of the simple probably single room structure.	House A The house demonstrates the change from early simple cottages to more substantial housing that, even though there are stylistic differences became the quintessential house form in the Huon from this time through to the second world war. It is a good example of the early form of the timber farmhouse in the region and is importantly linked to its antecedent structure. B The building is not endangered or part of an endangered group of places. C The building does not contribute particular or new knowledge about Tasmania or a class of places but does illustrate this period of construction well. D The building is a good, if reasonably modest example of a class of residential farm houses that typify the Huon Valley area. E The building does not demonstrate particular technical or other values beyond a wide range of similar buildings. F The building does not have particular community esteem even though t is an attractive building. G There are no known associations that set the place apart, however further research may reveal associations that are important to the district. Cottage A The house demonstrates the change from early simple cottages to more substantial housing. It is an excellent is slightly altered example of this class of early settlement housing. B The building type is endangered and very few remain in use. C The cottage has the ability to reveal early construction detail and information that is rapidly disappearing within the Huon Valley area. D The building is a very good example of the first stage of settlement of the region.	    

				E The building demonstrates early construction methods and use of materials. F The building does not have particular community esteem. G There are no known associations that set the place apart, however further research may reveal associations that are important to the district.		
13	Former Roman Catholic Church 5 Bronwell St Geeveston	A	The building is extant but has been converted to residential use. The form of the building can still be seen however the description of Victorian Gothic Revival is not accurate. It is a simple rustic timber church building with minimal decoration and adornment (externally) that is typical of modest church construction across the state. It is located in a residential streetscape set back from the Huon Highway and has similar scale to the residential buildings. The building although changed in use has some ability to demonstrate its historic use and makes a contribution to the townscape.	A The building does have some ability, despite its change of use, to demonstrate a pattern of development where church buildings of various scales were built in rural areas. This is perhaps the most modest church in the township reflected in its siting on a single residential lot and out of the main town centre. B It does not demonstrate rare or endangered aspects of Tasmania's history, as even though there is a large change in the ownership of church buildings taking place across the State, the building can still be understood as a former church within the townscape. C The building has limited ability to reveal new information or contribute to an enhanced understanding of Tasmania's history. D The building does represent a broader class of places, that is modest church buildings, even though it is no longer in use. E The building does not demonstrate a particular technical achievement. F The building does not have special meaning to the community as it has ceased church use and was sold. G There are no known associations of importance and it is likely that these ceased, if they existed when the building was sold.	 	

14	House ID 169, opposite no 7743 Huon Highway Strathblane	D	There is no evidence of the house remaining apart from a possible levelled building site amidst some orchard plantings. The building should be removed from the schedule.	Not applicable		
15	Apple Sheds 5528 Huon Highway Waterloo	A	Built close to the edge of the road, as was customary, there are two sheds constructed on timber (mostly) round stumps and one pickers hut building. The hut has vertical timber boarding and a corrugated iron chimney. The apple sheds are horizontally boarded and in generally good condition. They have their backs to the road and are accessed from the ends and side away from the road. Vehicles delivering and collecting apples are able to drive off the road, load or unload and pass the sheds moving back onto the main road. They are a modest scaled set of sheds. They are an excellent example of a quintessential building form in the Huon area and should be heritage listed.	A Apple and fruit sheds are a core historic element of the Huon Valley that demonstrate patterns of development, farming and the key industry of the region for over 150 years of settlement. These sheds are in a prominent location in a valley setting that demonstrates the importance of not only fruit growing but the handling of produce within the transport systems of the valley. B Although once prolific in number and while a number remain, mostly in ruined form, this building type is endangered and maintained and fair condition examples are rare. This is an excellent and rare example of a shed that is located close to the road. C The shed has some ability to reveal information about its construction but this is limited. D The shed is an excellent example of the broader class of places - apple and fruit sheds - within the Huon Valley. E The building construction demonstrates modest achievement in technical matters. F Fruit and apple sheds are identified by the community as part of their farming heritage and have some community esteem. The buildings have high tourist value as important historic element within the landscape, this is seen in the number of people who stop and photograph these structures. G There are no known particular associations with this structure.	  	  

Southern Tasmania Industrial Land Strategy

Stage 2 Final Report

Southern Tasmanian Councils Authority
Department of Economic Development, Tourism and Arts
July 2013

SGS Economics & Planning

Independent insight.





SUPPORTED BY



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1 INTRODUCTION

Industrial land is of great importance for the functioning of the economy. Not only should there be sufficient industrial land, it should also meet the requirements of the market. Industrial land is used by firms from a wide variety of industries, ranging in size from firms without employees to large companies with hundreds of employees working from one site.

To support a sustainable pathway for urban growth, planning for industrial land should also ensure that:

- Supply of industrial land does not outpace demand (which may result in inefficient land use)
- Conservation and heritage values of land are properly considered
- Sensitive uses, such as residential, are not significantly adversely impacted on
- Industrial land is used efficiently and effectively
- Usage of existing infrastructure is optimised before expanding the capacity of roads, power, water, sewage and internet infrastructure

1.1 Aim of the Strategy

The aim of this strategy is to plan for sufficient industrial land in Southern Tasmania to accommodate future economic growth and to allow for sustainable urban growth patterns, for the next 15 to 30 years.

This strategy describes a strategic land use growth path for industrial land in Southern Tasmania, with a focus on Greater Hobart. It recommends on:

- Sites for future industrial use/zoning for the next 5, 15 and 30 years;
- Measures and planning provisions to ensure future land supply meets the needs of industries; and
- A monitoring plan to periodically review the sequencing of land rezoning.

It also considers possible ways to ensure existing industrial land is better used and how this may influence on the timing and sequencing of the rezoning of future industrial sites.

1.2 Scope of the Strategy

This strategy builds on the Stage 1 report for this project that assessed projected demand for industrial land over the next 5, 15 and 30 years against existing supply of industrial land. As part of that exercise, the suitability of existing vacant industrial land was reviewed. The analysis showed that of the 199 hectares of vacant industrial land identified initially, about 141 hectares is regarded as suitable for industrial use.

As part of the Stage 1 report it was noted that there appear to be industrial sites that are currently underused. This suggests there may be opportunities to make better use of existing industrial land, especially in Glenorchy. While the scope of the study does not encompass specific analysis and strategies to make better use of existing land, it is an area that requires further exploration. Once effective measures *have* been identified, this should be incorporated in a future iteration of the industrial land strategy. If implemented effectively, strategies to make better use of existing land may reduce the need for additional Greenfield industrial land in the future and contribute to more sustainable spatial development of the built environment. This strategy discusses some measures in broad terms. It also recommends on actions and work to explore better land use options.

This industrial land strategy includes a section on monitoring and review. Economic growth, technological innovation and socio-demographic may drive demand for industrial land in a different way than we see today. Also, if measures

to make better use of existing land will be implemented in the future, the rate of demand for net additional land may drop. The section on monitoring and review makes recommendations about the information that needs to be collated and how this information may influence decision making for industrial land use planning.

1.3 Remainder of this Strategy

Section 2 summarises the task for the Industrial Land Strategy based primarily on the findings of the Stage 1 report. It also gives an overview of the assessment method that was used to assess potential future industrial sites on their suitability for industrial use in general and more specific for local service industries, transport and warehousing, export oriented industries or a mix of uses. The section also summarises the relevant strategic planning objectives that were used as part of the suitability assessment.

Section 3 reports on the results of the site assessments. It lists the long lists of sites that were initially considered and it concludes with the short lists of suitable sites, including the industry categories that should be accommodated at these sites. It also identifies whether sites are of local significance, predominantly servicing local demand for land, or of regional significance, where sites are intended to service demand for land at a regional scale.

Section 4 is the actual Industrial Land Use Strategy. It includes:

- The objective of the strategy,
- Its strategic scope,
- Possible measures to manage land availability,
- Considerations in regards to the timing and sequencing of future industrial sites
- Maps of the recommended future sites
- Planning conditions to manage Regionally Significant Sites
- Monitoring and Review

2 THE TASK FOR INDUSTRIAL LAND

This section provides an overview of the key findings of the Stage 1 report and summarises the task for this strategy in terms of identifying sites for future industrial use. It also provides a summary of the methodology that was used to for identifying and assessing potential future sites.

2.1 Task for this Strategy

Greater Hobart is home to about 92% of economic activity in Southern Tasmania. It will continue to be the centre of economic activity of the Southern Tasmanian region. Future industrial land should therefore primarily be accommodated for within Greater Hobart. In Southern Tasmania, demand for vacant industrial land over the last five years has been strongest in Brighton (Bridgewater) and Clarence (Cambridge). This reflects to some extent location preferences by industries, but also the availability of land geographically.

In Southern Tasmania there is currently an industrial land supply of approximately 141 hectares of vacant and suitable industrial land. Over 80 hectares of vacant land is available in Clarence.

The current supply is sufficient to meet demand over the next five years. However, there is a projected shortfall of industrial land to meet demand for the next 15 years. The projected shortfall for export oriented industries and transport and warehousing is between 34 to 88 hectares in Greater Hobart (over the next 15 years).

Further, shortfalls at the local level to meet future demand for local service industries (over the next 15 years) are projected in:

- Glenorchy – 7 to 9 hectares
- Kingborough – 1 to 2.5 hectares
- Sorell – 1 to 1.5 hectares
- Hobart – 12 to 15 hectares
- Tasman – up to about 2,000 sqm
- Potential shortfall in Brighton with few small lot sizes and competing demand for transport & warehousing and export oriented industries. The Brighton area continues to attract significant industries, especially in the areas of transport and warehousing of regional significance. More small lots are required to ensure local service industries are catered for.
- While there is no overall shortage of industrial land in Clarence, there are few lots with an area of less than 2,000 sqm which is most suitable for local service industries. With some possible 'flow-over' land demand from local service industries from Glenorchy and Hobart, it is important to provide more small lots in the short to medium term.

The long term (30 year horizon) shortfall of demand for industrial land for Southern Tasmania is between 188 and 326 hectares, or 153 to 238 hectares for the period from 2026 to 2041.

The task for this strategy is to identify:

- Regionally significant sites in Greater Hobart to cater for 34 to 88 hectares of transport & warehousing and export oriented industries over the next 15 years;
- Locally significant sites to accommodate demand for local service industries; and
- Sites to meet the medium to long term demand of 153 to 238 hectares of industrial land in total (2026 to 2041).

2.2 Overview Site Assessment Method

The identification and assessment of potential future sites for industrial use has followed a two-step approach. In relation to the **identification** of potential sites a broad list of potential future industrial sites was considered. The long list was based on consultation with local and State government representatives and industry stakeholders. Stakeholders were allowed to nominate any site they would consider potentially suitable, without any form of upfront selection or assessment.

The **first** step of the assessment involved:

- Compiling site information
- Excluding any sites that are obviously not suitable for potential future industrial use

Key considerations in step one were:

- Would the potential future use of the site for industrial activities be clearly out of line with Tasmania's Resource Management & Planning System and the Southern Tasmania Regional Land Use Strategy? The next section considers these objectives in more detail (Section 2.3).
- Are there any obvious constraints that would inhibit potential future use of the site for industrial activities, or make it prohibitively costly to develop the site (physical, legislative, statutory and/or conservation constraints)?
- Are there any obvious and significant adverse impacts the potential future use of the site for industrial activities would impose on nearby uses?
- Is the current zoning and/or use of the site of such a nature it would prohibit potential future rezoning to industrial?

The **second** step of the assessment process considered the specific land use and location requirements of businesses that occupy industrial land. These requirements vary between transport & warehousing, export oriented and local service businesses. The second assessment step focussed on the site and location preferences of specific industry categories.

The second step involved:

- Assessment of the options in regards to their suitability for:
    - local service industries (locally significant sites)
    - transport and warehousing and/or (regionally significant sites)
    - export oriented industries (regionally significant sites)
- The optimal sequencing of potential future sites to meet 5, 15 and 30 year land demand targets.

Location criteria for industrial businesses (with employees[1]) vary by category. The table below demonstrates the common location criteria for industrial businesses in transport & warehousing, export oriented services (traditional, state of the art high value adding and specialised) and for local service industries.

TABLE 1 COMMON LOCATION CRITERIA FOR INDUSTRY BUSINESSES BY CATEGORY

Industry category	Location criteria
Transport & warehousing	Access to heavy transport routes and/or rail
	Strategically located in relation to source of produce/goods, transport corridor and/or ports and the market
	Water, sewage, electricity and ICT
	Often prefer large precincts
	Medium to large lots: as a guide, plan for lots of 4,000 sqm to 1.5 ha, 1.5 to 4 ha and 4 to 8 ha. Occasional demand of up to 16 ha (40%, 20%, 30% and 15%)
	Relatively flat land
	Opportunities to operate 24/7 and according to JiT processes; potential benefits for co-location
	Regionally or locally significant sites
Export oriented industries	
'- traditional	Medium to large sites (2 ha and up)
	Water, sewage, electricity and gas
	Large buffers to nearby uses
	Access to heavy transport routes and/or rail
	Regional significant sites
'- state of the art	Close to key inputs: resources, labour and/or knowledge/research institutions
	Small to medium lots (mostly 4,000 sqm to 1 ha and up to 2 ha)
	Opportunities for co-location (which may go as far as providing shared services such as business and IP services)
	Water, sewage, electricity and ICT
	Small to medium buffers to nearby uses
	Regionally significant sites
'- specialised	Varies greatly, depends on the specific type of industry
Local service industries	Small lots (up to 2,000 sqm) and some medium sized lots (to say 4,000 sqm)
	Small buffers to nearby uses
	Close to market / population centres
	Possibly visible location
	Industrial or commercial zoning
	Locally-significant sites

The future industrial options were assessed against these criteria. The assessment determined whether an option is mostly suitable for transport & warehousing, export oriented industries and/or local service industries (or none).

2.3 Strategic Planning Objectives in Southern Tasmania

This sub section provides an overview of the relevant strategic planning objectives that are applicable to Southern Tasmania. They have been used as input into the first step of the options assessment process.

The objectives of the Resource Management and Planning System (RMPS) of Tasmania are to:

a) Promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity;
b) Provide for the fair, orderly and sustainable use and development of air, land and water;
c) Encourage public involvement in resource management and planning;
d) Facilitate economic development in accordance with the objectives set out in the above paragraphs; and

[1] Businesses with no employees are often run from home or have no physical address (such as transport and construction)

e) Promote the sharing of responsibility for resource management between the different spheres of government, the community and industry in the State.

These objectives are included in the Acts that form part of the integrated RMPS.

The *Land Use Planning and Approvals Act 1993* (LUPAA) is part of the RMPS. The objectives of LUPAA in addition to the RMPS objectives are to (Part 2, Schedule 1):

a) Require sound strategic planning and co-ordinated action by State and local government;
b) Establish a system of planning instruments to be the principal way of setting objectives, policies and controls for the use, development and protection of land;
c) Ensure that the effects on the environment are considered and provide for explicit consideration of social and economic effects when decisions are made about the use and development of land;
d) Require land use and development planning and policy to be easily integrated with environmental, social, economic, conservation and resource management policies at State, regional and municipal levels;
e) Provide for the consolidation of approvals for land use or development and related matters, and to co-ordinate planning approvals with related approvals;
f) Secure a pleasant, efficient and safe working, living and recreational environment for all Tasmanians and visitors to Tasmania;
g) Conserve those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value;
h) Protect public infrastructure and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community; and
i) Provide a planning framework which fully considers land capability.

The *State Policies and Projects Act 1993* (SPP) is part of the RMPS. It provides for Tasmanian Sustainable Development Policies, ('State Policies') the integrated assessment of projects of State significance, for State of the Environment Reporting and for related purposes. There are only three State Policies in Tasmania:

- **The State Policy on the Protection of Agricultural Land 2009,** which seeks to conserve and protect agricultural land so that it remains available for the sustainable development of agriculture, recognises the particular importance of prime agricultural land. Southern Tasmania has an insignificant amount of Prime Agricultural Land, however the Policy requires other land that is nonetheless significant from a local or regional point of view to be recognised and protected, particularly where within an existing or proposed irrigation district. It is noted that the Policy does not rule out the conversion of significant, or even prime, agricultural land to other uses, but there needs to be demonstrable benefits to the region. In the context of this industrial land study, there may well be justification for conversion of some significant agricultural land to industrial land, especially if the alternative would be a shortage of viable and practical industrial land across the region.

- **The State Policy on Water Quality Management 1997**, which seeks to achieve the sustainable management of Tasmania's surface water and groundwater resources by protecting or enhancing their qualities while allowing for sustainable development.

- **The State Coastal Policy 1996,** which attempts to implement the sustainable development objectives of the RMPS in coastal areas.

The recently declared (October 2011) Southern Tasmania **Regional Land Use Strategy's** vision is *'a vibrant, growing, liveable and attractive region, providing a sustainable lifestyle and development opportunities that build upon our unique natural and heritage assets and our advantages as Australia's most southern region.'*

The Strategy has been developed in the context of the RMPS and supports its objectives. The strategy has a set of strategic directions that determine how the strategy's vision should be achieved. These strategic directions are:

Adopting a more integrated approach to planning and infrastructure (SD1). Among other things the strategy says in relation to this that the direction should ensure that "new development makes use of excess capacity in existing infrastructure..". New infrastructure should be developed when existing capacities are no longer able to meet demand within the foreseeable future. In that regard it is important to note that planning of infrastructure should not be too strict/limited so that it adversely affects market dynamics for property/land. If infrastructure is only provided when current infrastructure is at or close to capacity, demand may drive up prices of scarce properties/land with infrastructure provisions[2]. This is true for all land use, industrial or other.

Holistically managing residential growth (SD2). The aim is to provide a strategic planning environment to support less dispersed settlement with a greater diversity of housing types and densities and which considers affordability. There is no reason to approach growth for employment and industrial development in a different way as it supports and interacts with residential growth patterns.

Creating a network of vibrant and attractive activity centres (SD3). This direction is not directly relevant in relation to industrial land. Industrial estates are generally not recognised as activity centres which provide a mix of uses including residential, recreational and commercial activities. Industrial uses are mostly separated from other more sensitive uses. The only type of use of industrial land that may relate to this is bulky goods retailing that is recognised as a 'specialist centre' (Cambridge Park).

Improving our economic infrastructure (SD4). Good and reliable access to interstate transport infrastructure (through intrastate linkages) for industrial operators is important to support the region's economic sustainability. More specific, access to the three ports in the State's north and the Hobart airport is a priority in relation to industrial development.

Supporting our productive resources (SD5). Aquaculture, forestry and niche agricultural production are forms of primary production that involve some industrial activities. These activities are primarily undertaken on resource, rural or other types of land zoning. For future industrial development it is important to understand that not all industrial activities take place on industrial land. The renewed industrial land demand study (DEDTA, 2011) has excluded primary production sectors from demand projections for industrial *zoned* land. The current task for the industrial land strategy is aimed at industrial activities using industrial land.

I**ncreasing responsiveness to our natural environment (SD6).** Settlement planning should consider the presence and conservation of natural values and the management of natural hazards. Future industrial development should also take these aspects into account.

Improving management of our water resources (SD7). Access to sufficient and clean water is important for the health and wellbeing of the public and for the prosperity of productive resources and industries. Efficient use of and minimal impacts on the water supply are considerations for future industrial development.

Supporting strong and healthy communities (SD8). The direction aims to promote equity in access to services for all residents. Availability and access to jobs is an important factor. The future provision of industrial land should therefore take jobs accessibility into account. Economic growth and creation of jobs benefit from the availability of sufficient industrial and other land.

Making the region nationally and internationally competitive (SD 9). Southern Tasmania should (continue to) benefit from its comparative advantages and ensure these advantages are not adversely impacted upon by development. In relation to industrial land planning, the important notion would be that there should be sufficient land of proper quality and servicing to support the economic competitiveness of Southern Tasmania.

Creating liveable communities (SD10). Liveability refers to quality of life, health and wellbeing of places where people live, work and recreate. Liveable places are generally referred to as attractive, safe, accessible and having a high amenity. Availability of services and activities as well as urban design aspects play an important role. In relation

[2] In some states among which New South Wales a 'user pays' approach has been introduced to ensure that expansion of infrastructure provision keeps pace with demand (development contributions).

to this direction it would be fair to expect that future industrial sites do not adversely affect liveability in a negative way.

The Strategy also has a number of specific regional policies that are relevant to the identification of new industrial land. The most directly relevant are the *Industrial Activity* strategies:

17 – Industrial Activity

IA 1 *Identify, protect and manage the supply of well-sited industrial land that will meet regional need across the 5, 15 and 30 year horizons.*

- *IA 1.1* *Ensure industrial land is relatively flat and enables easy access to major transport routes, other physical infrastructure such as water, wastewater, electricity and telecommunications*
- *IA 1.2* *Locate new industrial areas away from sensitive land uses such as residentially zoned land.*
- *IA 1.3* *Through the Southern Tasmania Industrial Land Study identify land sufficient to provide a 30-year supply of industrial land and protect from use and development, which would preclude its future conversion to industrial land use.*
- *IA 1.4* *Through the Southern Tasmania Industrial Land Study identify land sufficient to provide a 15-year supply of industrial land and ensure its zoning for industrial purposes within the new planning schemes.*
- *IA 1.5* *Aim to ensure a minimum 5-year supply of subdivided and fully serviced industrial land.*
- *IA 1.6* *Take into account the impact on regional industrial land supply, using best available data, prior to rezoning existing industrial land to non-industrial purposes.*

IA 2 *Protect and manage existing strategically located export orientated industries.*

- *IA 2.1* *Identify significant industrial sites through zoning and ensure that other industrial uses not related to its existing function do not diminish is strategic importance.*

IA 3 *Ensure industrial development occurs in a manner that minimises regional environmental impacts and protects environmental values.*

- *IA 3.1* *Take into account environmental values and the potential environmental impacts of future industrial use and the ability to manage these in the identification of future industrial land.*

The other policies within the Regional Strategy all interact to varying degrees and many will have bearing on the subject of identifying future industrial land, most notably:

- 12 - Physical Infrastructure
- 13 - Land Use and Transport Integration
- 15 - Strategic Economic Activities
- 16 – Productive Resources
- 18 – Activity Centres
- 19 – Settlement & Residential Development

Summary of Strategic Planning Objectives

The strategic planning objectives for the State and Southern Tasmania would require potential future sites to contribute to and/or not significantly adversely impact on:

a) Sustainable economic and spatial development with consideration for
   - natural values, water supply and catchment and natural hazards
   - significant agricultural land , and
   - liveability and a pleasant, efficient and safe working, living and recreational environment

b) Efficient use of existing infrastructure capacities where possible

c) A less dispersed settlement pattern

d) Equitable access to jobs

3 FUTURE OPTIONS ASSESSMENT

This section reports the results of the future options assessment process. It concludes with a short list of potential sites that indicates the significance of the options (locally or regionally significant) and the industry categories the options should best serve.

3.1 Potential Future Sites for Industrial Use

The long list of potential future options is as follows is provided below. The appendix (Appendix 1) provides a detailed overview of each option.

TABLE 2 LONG LIST OF POTENTIAL FUTURE INDUSTRIAL OPTIONS

Site description	Considered developable land area (in ha.)
Brighton, Bridgewater Cove Hill, 12 vacant lots in Hurst St, Cove Hill Rd and Cowle Rd	7
Brighton, Brighton-Bridgewater, seven lots adjacent to Brighton Industrial Estate	15
Brighton, Pontville, 367, 447 and 503 Tea Tree Road	150
Brighton, Transport Hub west, south-west (Cobbs Hill Rd)	82
Brighton Transport Hub Infill Opportunities	5
Clarence, Cambridge, 51 Cranston Parade	70
Clarence, Cambridge, Cranston Parade (excluding 51 Cranston Prde)	25
Clarence, Cambridge, 1 Kennedy Drive	14
Clarence, Hobart International Airport, Precinct 3 and 9	6
Clarence, Hobart International Airport, land for potential future aeronautical purposes	36
Clarence, Mornington, 128 Mornington Rd	3
Derwent Valley, New Norfolk, cr Glebe Rd and the Avenue.	4
Glamorgan-Spring Bay, Triabunna, Part of Mount Murray, 336 Okehampton Rd	270
Huon Valley, Cradoc, Duggans Pty ltd quarry, Channel Hwy	3
Huon Valley, Geeveston, next to oval and adjacent to existing industrial land	2
Huon Valley, Huonville, 199 Glen Road (approved)	14
Kingborough, Leslie Vale: HBMI Pty Ltd Quarry	37
Kingborough, Huntingfield – Maddocks Rd, 27 Springfarm Rd	16
TOTAL	**759**

3.2 Overview of sites

The assessment against the four following criteria determines if the sites are in broad terms suitable for potential future industrial zoning. The four key criteria to discern broad **potential suitability** are:

- Is the potential future industrial use of the site clearly in contrast with the strategic land use objectives of Tasmania's Resource Management & Planning System and the Southern Tasmania Regional Land Use Strategy (STRLUS)?
- Is the site obviously constrained in such a way that future industrial use is inhibited or prohibitively costly? (physical, legislative, statutory and/or conservation constraints)

- Is the potential future use of the site obviously imposing significant adverse impacts on nearby sensitive uses?
- Is the current zoning or use of the site of such a nature it inhibits potential future industrial zoning and use of the site?

Of the eighteen long listed options there are three options that are deemed not suitable after being assessed against the four criteria and are not further considered as part of this strategy for future industrial use. One of the four options does not meet the criteria except for one lot within that option. All but one option have been excluded on the basis they clearly contrast with the strategic land use objectives in Southern Tasmania.

The sites that are deemed unsuitable after being assessed against the four key criteria are:

- **Brighton, Brighton-Bridgewater**, six of the seven lots adjacent to existing Brighton Industrial Estate: one lot (4.3 ha) is deemed potentially suitable. Conservation values and long term conservation commitments by DIER are the core reasons.
- **Glamorgan-Spring Bay, Triabunna, Okehampton Rd**. The land is away from existing development, is not serviced and would impact on the character of the surrounding environment. Further, there appears to be an oversupply of industrial land in the area with sufficient industrial land remaining vacant.
- **Huon Valley, Cradoc, quarry Channel Hwy**. The land is away from existing settlement and is not (yet) serviced. The land is within an agricultural area and a change of use could significantly impact on the character of the area.

In addition, there are two sites that do not meet the criteria either, at least for the short to medium term. These sites do not support a sustainable and consolidated urban growth pattern. However, in the longer term the urban fabric of Greater Hobart is likely to change and expand. If by then no better alternatives are available, these sites may be reconsidered:

- **Brighton, Pontville, Tea Tree Road**. The land is away from existing settlement, would impact on the liveability and current character and is not serviced. This option may be reconsidered in the long term when the urban footprint may have altered and when there are insufficient alternatives to meet demand for land. ***Therefore, this area is recommended to be earmarked for potential long term future development***. Site studies will be required to determine the development capabilities of the land. The site abuts and potentially overlaps with an area of land that is under investigation by the Brighton and Southern Midlands Councils as a possible joint heritage landscape precinct within their new planning schemes.
- **Kingborough, Leslie Vale, quarry Leslie Vale Rd**. The land is away from existing settlement, is not serviced and would require significant effort to make it serviceable. The option may be reviewed if no other options remain available. ***This area is recommended to be earmarked for potential long term future development***. Site studies are required to determine the development capabilities of the land.

Both sites are recommended to be reserved and included in the next iteration of the Regional Land Use Strategy.

Finally, **Hobart International Airport Pty Ltd (HIAPL)** has identified a **site for potential future aeronautical purposes**. This land does not fall under the Clarence Planning Scheme, like other land areas of the airport which are on Commonwealth land. Currently the identified land is not in use, however, HIAPL has identified that opportunities exists to use the land for aeronautical purposes in the future. These uses include:

a. Antarctic services;
b. Aircraft maintenance and hangars;
c. General Aviation; and
d. Freight and logistics.

The land was brought forward as a potential future industrial site by Clarence City Council. Considering the intended uses of the land, especially points b. and c., the land is recommended to be zoned for specialty industrial use to allow for use and development of airport related functions. Aviation related uses require specific safety and quality standards and this would best be provided if it is recognised and managed as a zone for that particular purpose. The site is therefore excluded from the general industrial supply analysis.

The intended uses, once realised, are expected to have positive flow-on effects for related industrial uses nearby. The Cranston Parade site would be well suited to accommodate such potential future flow-on effects.

The following table provides an overview of how the long list options scored against the criteria to determine their broad suitability for future industrial use (Table 3).

TABLE 3 FIRST STEP ASSESSMENT SUMMARY OVERVIEW

	Considered developable land area (in ha.)	Contrasting strategic planning objectives	Constraints that inhibit industrial use?	Causing significant adverse impacts?	Current use inhibits industrial use?	Excluded for consideration in this strategy?	Possibly suitable area (ha)
Brighton, Bridgewater Cove Hill	7	no	no	no	no	no	7
Brighton, Brighton-Bridgewater	15	no	yes, except 1 site	no	no	yes, except 1 site	4.3
Brighton, Pontville, Tea Tree Road	150	yes	no, but issues	no	no	yes, long term review	
Brighton, Transport Hub west, south-west	82	no	no	no	n/a	no	82
Brighton Transport Hub Infill Opportunities	4.6	no	no	no	n/a	no	4.6
Clarence, Cambridge, 51 Cranston Parade	70	no	no	no	no	no	70
Clarence, Cambridge, Cranston Parade	25	no	no	no	no	no	25
Clarence, Cambridge, 1 Kennedy Drive	14	no	uncertain	no, but issues	no	no	6
Clarence, HIAPL 3 and 9	4	no	no	no	n/a	no	4
Clarence, HIAPL aeronautical purposes	36	no	yes	no	no	Identified for specialty industrial use[3]	
Clarence, 128 Mornington Rd	3	no	no	no	no	no	3
Derwent Valley, New Norfolk	4	no	no	no	no	no	4
Glamorgan-Spring Bay, Triabunna	270	yes	no	no	no	yes	
Huon Valley, Cradoc	3	yes	no	no	no	yes	
Huon Valley, Geeveston	2	no	no	no	no	no	2
Huon Valley, Huonville (approved)	13	no	no	no	n/a	no	13
Kingborough, Leslie Vale	37	yes	no	no	no	yes, long term review	
Kingborough, Huntingfield – Maddocks Rd	16	no	no	no	no	no	16
TOTAL	**755.6**						**240.9**

[3] Excluded from general assessment of potential future industrial sites.

3.3 Short profiles of suitable sites

The table below (Table 4) shows the sites that are considered as potential future industrial sites of strategic importance after step one of the assessment.

TABLE 4 LIST OF OPTIONS AFTER FIRST STEP ASSESSMENT

Site description	Considered developable land area (in ha.)	In %
Brighton, Bridgewater Cove Hill, 10 vacant lots in Hurst St, Cove Hill Rd and Cowle Rd	7	3%
Brighton, Brighton-Bridgewater, 1 lot adjacent to Brighton Industrial Estate	4.3	2%
Brighton, Transport Hub west, south-west (Cobbs Hill Rd)	82	34%
Brighton Transport Hub Infill Opportunities	4.6	2%
Clarence, Cambridge, 51 Cranston Parade	70	29%
Clarence, Cambridge, Cranston Parade (excluding 51 Cranston Prde)	25	10%
Clarence, Cambridge, 1 Kennedy Drive	6	2%
Clarence, Hobart International Airport, Precinct 3 and 9	4	2%
Clarence, Mornington, 128 Mornington Rd	3	1%
Derwent Valley, New Norfolk, cr Glebe Rd and the Avenue.	4	2%
Huon Valley, Geeveston, next to oval and adjacent to existing industrial land	2	1%
Huon Valley, Huonville, 199 Glen Road (approved)	13	5%
Kingborough, Huntingfield – Maddocks Rd, 27 Springfarm Rd	16	7%
TOTAL	**240.9**	100%

Below follows a short summary of each site that meets the step 1 assessment criteria. Detailed site descriptions are provided in the fact sheets (Appendix 1). For each site it is also recommended whether it should be developed as a site that is locally significant or regional significant, and whether the site should be aimed at accommodating local service industries, export oriented industries, transport and warehousing or a mix of uses.

Brighton- Bridgewater, Cove Hill

This option consists of ten vacant lots that are currently zoned commercial. Council intends to rezone the area to industrial to better reflect the character of existing uses in the commercial precinct. One large parcel is close to an existing residential area in Bridgewater, and would require adequate buffering and planning provisions not permitting uses with significant impacts such as noise, air quality and smell. The total developable area would be approximately 7 hectares.

The area would be most suitable for **local service industries**. The area provides a number of small parcels (<2,000 sqm) and a large site that could potentially be subdivided. Three parcels are in the area of 600 sqm, 4 parcels just under 3,000 sqm and 2 parcels just over 4,000 sqm and 1 parcel of 5.8 hectares of which about 4.8 hectares would be developable.

The area is well accessible from the Midland Hwy and close to local and regional population centres (market). All sites are serviced. The land is flat and there are no known constraints to converting it to for industrial use. There may be a negative perception attached to the location which is close to a social housing estate. However, many businesses have already established in the area. If need be, a local business association could possibly address any issues in regards to image and security.

The lots are readily available and would be suitable to meet short to medium term demand (over next 15 years). The larger site would preferably be subdivided in order to meet demand for land by local service industries.

Brighton-Bridgewater, north adjacent to Hub

The site (rural parcel 159938/4) is owned by DIER and is zoned rural and has an area of 4.3 ha. It is strategically located adjacent to Midlands Highway. There are no known constraints to the site, which has been intensely surveyed as part of the Brighton bypass and transport hub projects. Services are all close by. The land is relatively flat. DIER considers the site for disposal so it can be developed for industrial use.

Industrial zoning would be in line with the strategic direction and use of the wider area of the Brighton transport hub. The site would be part of the Brighton Transport Hub industrial precinct, which is of regional significance with a string orientation towards transport and warehousing.

The rural zoned land does not have the capacity under current conditions to sustain a viable rural enterprise and the surrounding land is largely zoned industrial.

The site would have good visibility. The overall direction of the transport hub and industrial estate is towards transport and warehousing, and the intended use of the site would be compatible to that. The site would therefore be most suitable to accommodate transport & warehousing and related export industries. The site is part of a **regionally significant precinct**.

Brighton, Transport Hub west, south-west

This area of industrial land that is not yet occupied by industrial uses covers an area of approximately 82 hectares over six titles. The current land use is agriculture (in line with historic zoning) and some land is owned by DIER and is likely to become available for disposal and development. The land is strategically located and future industrial use of the land would make optimal use of the transport provisions at the hub. Since the land is already zoned industrial, there are no constraints to its future use as industrial.

Due to its proximity to the transport hub and the midland highway, the land is ideally located for transport and warehousing and related export oriented industries. It is therefore recommended that the minimum lot size would be between 2,000 and 3,500 sqm.

The site is part of a **regionally significant precinct**.

Brighton Transport Hub Infill Opportunities

There are four vacant parcels that lie within the Transport Hub precinct. The land is partially zoned rural and is owned by DIER. The land will likely be disposed of to become available for development. This option represents an infill development and therefore supports the regional planning objectives. The land is currently zoned industrial and owned by DIER, who aims to dispose of the sites so they are available for future industrial use. Infrastructure and services are available nearby. The parcels vary in size between 0.5 ha and 2.6 ha (Rogerville Siding). All four sites are strategically positioned close the transport hub and adjacent to the Midland Hwy.

The location and parcel sizes would make the areas suitable for transport and warehousing and related export oriented industries.

The site is part of a **regionally significant precinct**.

Clarence, Cambridge, 51 Cranston Parade

The site is strategically located adjacent to Hobart International Airport and is subject to the Airport Buffer Overlay and the Inundation Overlay (Clarence Planning Scheme). The land is currently zoned rural. The area would represent development of land that is not suitable for residential use and there should be sufficient buffer from residential uses since it is within the Airport Buffer Overlay. The site is well accessible and close to other employment lands.

Part of the site may be proposed for rezoning (for Scheme amendment S33(2)(a)) and encompasses approximately 70 ha, subject to further design work. The remainder is to be conserved for natural values and to be developed as water drainage area (water retention basin) to manage inundation risks. Although there are significant constraints in regards to drainage and servicing, the technical assessments undertaken so far suggest these constraints can be overcome by the developer.

Access to the Airport and the Tasman Highway is possible via Cranston Parade or Holyman Dr (the latter would be supported by DIER). The land is currently zoned rural. The technical assessments undertaken so far have not yet been reviewed and contested. Possibly the southwest corner of the proposed rezoning leaves insufficient buffer to residential uses, and this may be addressed by resizing the area earmarked for industrial zoning.

The site is strategically located close to the airport, and future industrial use should be aimed at accommodating export oriented industries and transport and related transport and warehousing. The Southern Economic Development Strategy (DEDTA) recognises the Antarctic Gateway as an important opportunity for Hobart and Southern Tasmania. HIA does have an established (non-passenger) air connection with Antarctica. HIA may not be strongly positioned to substantially grow air bridge services based on the international connectedness of the airport compared to other competing international gateways. The Cranston Prde site would be well positioned to accommodate industries and services related to the Antarctic operations.

Due to its strategic positioning the site should be developed for **regionally significant** industries, export oriented industries and transport and warehousing that is preferably related to the export gateway. Local service industries should in principle be discouraged from this site to leverage from its strategic location for export oriented industries and possible future Antarctic Gateway related flow-on effects by setting a minimum lot size.

The technical assessments undertaken so far need to be reviewed independently or to be otherwise appropriately tested.

Clarence, Cambridge, Cranston Parade (excluding 51 Cranston Prde)

The land is located close to the HIA and Cambridge industrial area, and is subject to the Airport Buffer Overlay and partially to the Inundation Overlay. The total land area is approximately 25 ha. The land is zoned rural.

The site would likely have similar constraints to 51 Cranston Parade, with the difference that no known site assessments have been undertaken. The distance between the closest dwelling and the nearest border of the site would be approximately 250 metres.

Access to the Airport and Tasman Highway could be provided either via Cranston Parade (not favoured by DIER) or through 51 Cranston Parade onto Holyman Drive. In the latter case, development at 51 Cranston Parade would have to allow for access.

It would be logical from an urban consolidation and infrastructure development point of view to sequence land zoning and first allow 51 Cranston Parade to be developed and then the subject adjacent site.

The future intended use would be to accommodate **regionally significant** export oriented industries and related transport and warehousing. It is therefore recommended to apply a minimum lot size of between 2,000 and 3,500 sqm.

Clarence, Cambridge, 1 Kennedy Drive

The Kennedy Drive site is adjacent to existing industrial uses in Cambridge and has a total area of approximately 17 hectares. The land is zoned intensive agriculture, but arguably of limited agricultural productive quality. The land is serviced and adjacent to existing industrial uses, agricultural uses and residential uses. It has good access onto the Tasman Highway and is adjacent to existing industrial uses.

A proposed rezoning and subdivision of the land to residential was refused by the Tasmanian Planning Commission (May 2012) due to site constraints (nearby uses, existing dwelling on land, current zoning). Any future development proposal would need to consider the integration and connectivity to the surrounding area as part of a local area or structure plan[4].

To minimise potential land use conflict, it would be plausible that only part of the site is considered for rezoning to industrial. This could involve a strip of land along Kennedy Drive. The western part of the site could possibly allow for a greater depth in line with adjacent industrial uses, while the eastern site would allow for less depth to minimise land use conflict. Overall, sufficient buffer from sensitive uses will be required. On this basis, and as a broad assumption, it is likely that approximately 6 hectares of industrial land could be created. A larger area may be feasible if constraints are addressed appropriately.

The land is flat and close to other industrial uses. Due to its close proximity to the Cambridge bulky goods retail area and accessibility from residential centres the site would be well positioned to accommodate **local service industries**.

[4] this was also part of the Tasmanian Planning Commissions considerations of the site as part of a recent development proposal

Clarence, Hobart International Airport, Precinct 3 and 9

HIA falls under the Federal planning authority and is not subject to local and regional planning objectives, although the local planning context was considered when proposing and assessing development on the land. The airport is strategically significant and provides access to export markets. Industrial development that aims to use and capitalize on this infrastructure is in principle in line with planning objectives.

The precincts are already partially in use, and about 4 hectares likely remains vacant. The master plan aims to attract industrial activities that require direct access to export markets. The site is part of a **regionally significant** precinct.

Clarence, 128 Mornington Rd

The site is currently used for industrial purposes. The land is zoned rural and has been degraded and impacted on by human interaction. The road has been purchased by Council and has been upgraded towards government standard. This has improved the accessibility to the site. The location of the site would remain somewhat invisible and 'tucked away'.

The site is fairly close to rural residential uses. However, these uses are at the other side of the hill, and sufficient buffer could be created within the site to minimise adverse impacts, according to Council planner. The potential for residential intensification of the rural residential area is limited. A significant proportion of the site is steeper than desirable for industrial uses, limiting the development potential of the site. The site is expected to be limitedly suitable for subdivision to small lots and related intense use by local service industries. Due to the topography of the site Council indicates that only about 3 hectares of vacant land would be available for industrial use. Council indicates that benching work has been undertaken and more is planned for the future to provide level sites for industrial use. Rezoning to industrial would be in line with its existing use and would allow for some localised expansion of activities.

Derwent Valley, New Norfolk, cr Glebe Rd and the Avenue

Future use for industrial would be in line with the existing use of surrounding parcels. Part of the land would consist of redevelopment of land formerly used for health care facilities. It would make use of existing infrastructure capabilities and not represent an expansion of the urban footprint. There may be some issues with nearby sensitive uses, but these can expectedly be dealt with through proper urban design. There is a risk of residential encroachment which may need to be addressed in the Planning Scheme.

The total developable area is approximately 4 hectares and contains seven parcels, of which five of less than 5,000 sqm. Two larger sites include derelict buildings and would need to be redeveloped. Redevelopment will likely be as a result of market dynamics – when there is sufficient demand. The land would be suitable for local service industries and export and transport and warehousing activities that are related to local resources and industries. In order to allow for a **mix of uses of local significance**, the land should allow for a mix of lot sizes.

Huon Valley, Geeveston, next to oval and adjacent to existing industrial land

The site is adjacent to existing industrial land. The gravel road would require an upgrade in case of rezoning and services are not on site. The rezoning would have limited impact on the liveability of the area. The site is close to the residential settlement of Geeveston.

There is no apparent need for more industrial land in the Huon Valley. Since the land is in broad terms in line with strategic planning objectives, the land could be reserved for future industrial use, and as a holding zone it could be considered for rezoning to rural resource zone.

The developable land area is approximately 2 ha.

Huon Valley, Huonville-Ranelagh, 199 Glen Rd (rezoning approved)

The land was rezoned from intensive agricultural to light industrial. In September 2011, the TPC approved the draft amendment to rezone 199 Glen Road from intensive agriculture to light industrial and to allow subdivision (under a

specified departure clause). The quarry is largely exhausted, which makes it available for alternative use. The site is close to existing developed areas and close to Huonville CBD and supports a less dispersed development pattern. Due to its proximity to town, it would provide fairly easy access for most. The rezoning of the site is supported by local strategic planning directions and by the Huonville/Ranelagh Structure Plan.

Council estimates about 13 ha of 20 ha is suitable for development. The minimum lot size is 1,000 sqm, and the use classes largely comprise local service industries but also allow for general industries and rural industries. Access onto the Huon Highway is via Glen Rd, which is sealed and wide to allow for trucks. Other industrial uses from that road include a local saw mill and timber yard and a Tassal processing plant. The wider area is also recognised in the Huonville / Ranelagh Structure Plan as having potential for downstream processing of agricultural and horticultural products.

The site is suitable to be developed as a **locally significant site** for a **mix** local service industries and resource related export oriented and transport and warehousing industries.

Kingborough, Huntingfield – Maddocks Road

The site is within the urban growth boundary for Greenfield development. Industrial zoning would compete with demand for land for residential and commercial purposes, but the total land area would likely allow for mixed uses. It is currently zoned primary industries. The optimal mix and intensity of uses will be subject to future site investigations. It has good access to the Channel Hwy, possibly onto bypass roundabout near Antarctic Division.

The land is zoned Primary Industries and Council aims to zone it Particular Purpose Urban Growth Zone under the new planning scheme, which in principle allows for residential, commercial and/or industrial use. It would be a 'holding zone' for future growth. Up to 16 hectares of the total land area of 54 ha would possibly be available for industrial use.

The land is being reserved by Council for future urban growth, and could therefore become available for development in the medium to long term (15 to 30 years). The site would be **regionally significant** (servicing the southern part of Greater Hobart) and would ideally accommodate a **mix** of local service industries, export oriented industries and transport and warehousing.

The area would require a structure plan or area development plan to plan for its future use and to determine any appropriate industrial zoning for part of the site, and how this could be feasible without adverse impacts on sensitive uses.

3.4 Overview

There are two key sites that could accommodate a significant share of the projected shortfall of industrial land for the next 15 to 30 years:

1. The Brighton Transport Hub south, south-west site which covers approximately 82 ha of land which is already zoned industrial but still used for agricultural purposes or owned by DIER and likely to be disposed of so it can be developed for industrial use; and
2. 51 Cranston Parade in Cambridge (Clarence) which covers approximately 70 ha of developable land and for which a development application is being prepared by the owner. The site is within the Airport Buffer Overlay which is regarded as unsuitable for residential development due to airport noise impacts.

Adjacent to 51 Cranston Parade is more land that was suggested by Council for consideration. This site covers approximately 25 ha of developable land within the Airport Buffer Overlay.

Another significant site for consideration (Huntingfield - Maddocks Rd) is located in Kingston and is close to the Kingston bypass roundabout near the Antarctic Division. Council is holding this land for future urban development and may involve (a mixture of) residential, commercial and industrial development.

Early 2012 the Tasmanian Planning Commission approved the industrial rezoning of land on Glen Rd (Huonville-Ranelagh) of which about 13 ha is developable for industrial purposes.

Both Clarence and Brighton are expected to play crucial roles in providing additional industrial land in the medium to long term (Table 5). These potential future sites will potentially provide up to 241 hectares of additional industrial

land. The net additional demand for industrial land is projected to be between 34 and 88 hectares. The identified sites are in principle sufficient to meet demand over the next 15 years.

TABLE 5 POTENTIAL FUTURE SUPPLY OF INDUSTRIAL LAND, BY COUNCIL

Council area where options are located	Total area of potential future sites	Area as share of total potential future supply in Southern Tasmania
Brighton	98	41%
Clarence	108	44%
Derwent Valley	4	2%
Huon Valley	15	6%
Kingborough	16	7%
TOTAL	**241**	**100%**

The net additional demand for industrial land in the medium term (2026 to 2041) is between 153 and 238 hectares. Depending on how strong the economy develops and the population grows, the identified sites as mentioned above may not be sufficient to meet the long term demand. This means in the long term the potential future sites along Tea Tree Rd (Pontville, Brighton) or Leslie Vale (Kingborough) may need to be reconsidered, if no better alternatives are found in the meantime. Of the two sites, the Tea Tree Rd site is better positioned to a main transport corridor, close to a population centre and more easily serviced and would therefore be preferred over the Leslie Vale site. Also, potential future urban redevelopment opportunities may further impact on demand for Greenfield land.

TABLE 6 POTENTIAL FUTURE SITES, BY SIGNIFICANCE AND INDUSTRY FOCUS

Significance	Site name	Industry focus	Land area (ha)
Regionally significant	Brighton, Transport Hub west, south-west	T&W, related EOI	82
	Brighton-Bridgewater, north to Hub	T&W, related EOI	4.3
	Brighton Transport Hub Infill Opportunities	T&W, related EOI	4.6
	Clarence, Cambridge, 51 Cranston Parade	EOI, related T&W, Antarctic industries	70
	Clarence, Cambridge, Cranston Parade (ex 51)	EOI, related T&W	25
	Clarence, HIA, Precinct 3 and 9	EOI, related T&W	4
	Kingborough, Huntingfield – Maddocks Rd	Mixed uses	16
	SUBTOTAL		**206**
Locally significant	Brighton, Bridgewater Cove Hill	LSI	7
	Clarence, Cambridge, 1 Kennedy Drive	LSI	6
	Clarence, 128 Mornington Rd	LSI	3
	Derwent Valley, New Norfolk	Mixed uses	4
	Huon Valley, Huonville, Glen Road	Mixed uses	13
	SUBTOTAL		**30**
Long term holding	Brighton, Pontville, Tea Tree Rd	n/a	150?
	Kingborough, Leslie Vale	n/a	40?
	SUBTOTAL		**193**

4 INDUSTRIAL LAND USE STRATEGY

This section presents the industrial land strategy for Southern Tasmania over the next 15 to 30 years.

4.1 Objective

The overall objective of the industrial land use strategy is:

- ***To plan for sufficient industrial land in Southern Tasmania to accommodate future economic growth and to allow for sustainable urban growth patterns, for the next 15 to 30 years.***

The task is to identify 34 to 88 hectares of additional (to existing vacant, suitable land) land for industrial use for the medium term (0-15 years), or to 2026. The strategy will plan for the high demand scenario (88 hectares) initially. The task is further to identify sites for long term future development (15 to 30 years from now). In the medium to long term, 2026 to 2041, the projected need for net additional land is between 153 and 238 hectares.

The overall objective implies there should not be too little supply of land, which would drive land prices up and adversely impact on economic growth. It also implies there should not be too much supply of land as this can lead to unsustainable land use patterns: underuse of land, urban sprawl and establishment of uneconomic industries.

In general, regional land use strategies aiming to provide for sufficient industrial land aim[5] to have about 15 years of supply zoned industrial, and to have up to about 25 years of land designated for future development. This strategy has adopted a 30 year timeframe.

Periodic monitoring of the take-up and availability of industrial land will be required to review this strategy. As a result of the actual future take-up of land, this target may need to be adjusted. In case of even higher demand, sites identified for development in the 15 to 30 year horizon may need to be considered for the 0 to 15 year horizon. In case of lower demand, the development of sites identified for the 15 to 30 year horizon may need to be postponed.

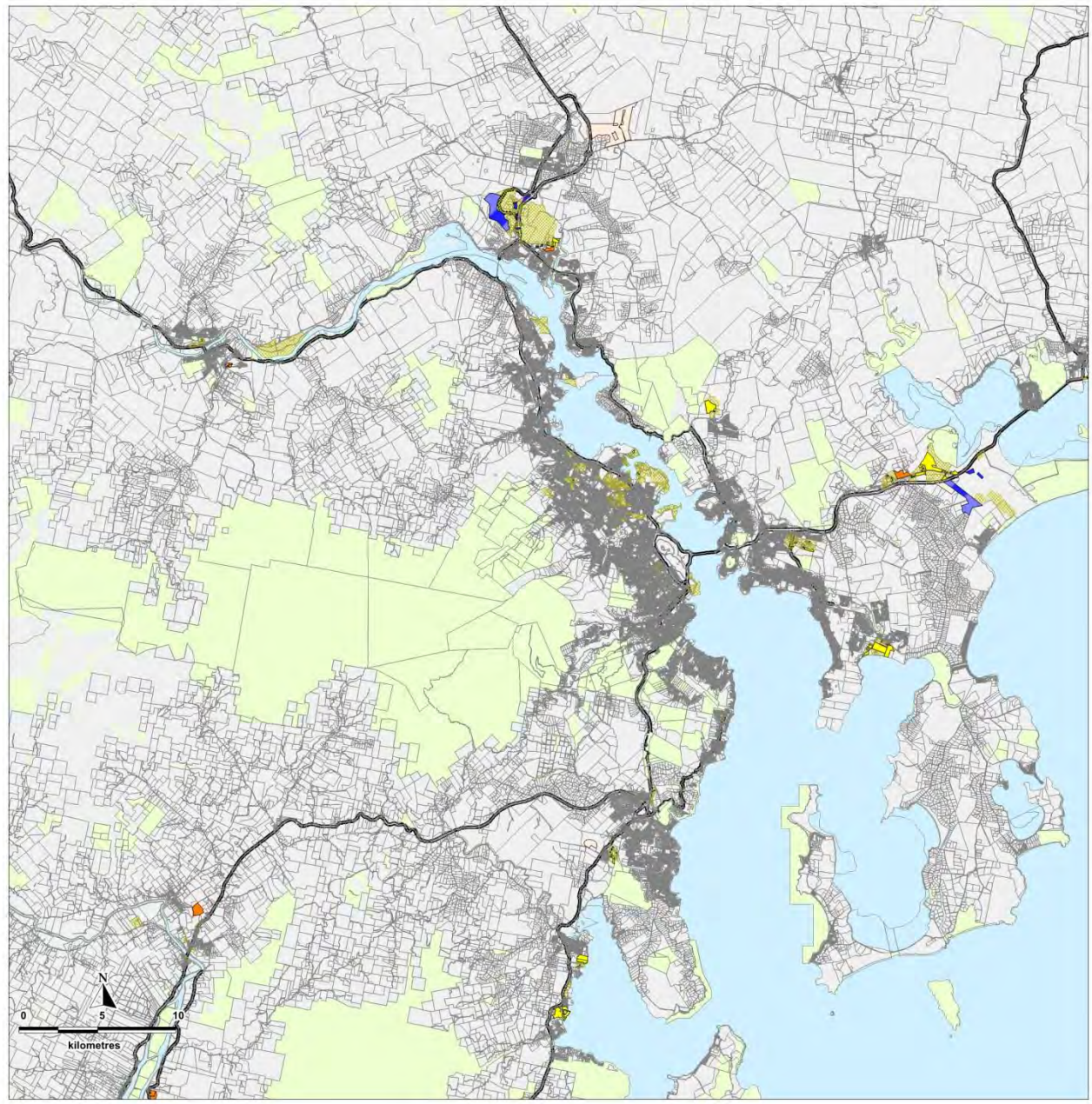
The future demand for Greenfield industrial land may be impacted by better use and redevelopment of existing industrial land, redevelopment of industrial land to alternative uses and/or by closure of significant industrial complexes. The periodic monitoring and review that is proposed as part of this strategy will ensure these aspects will be considered, and that the industrial land strategy will be amended accordingly.

4.2 Overview of Future Industrial Sites

The map on the following page shows the future industrial sites for Southern Tasmania. More detailed maps with supporting descriptions are provided in Section4.6.

[5] Productivity Commission (2011), Performance Benchmarking of Australian Business Regulation: Planning, Zoning and Development Assessments

FIGURE 1 OVERVIEW MAP OF FUTURE INDUSTRIAL SITES IN SOUTHERN TASMANIA





Industrial Land

Potential Significant Industrial Land

- Locally Significant: 0-15 years
- Regionally Significant: 0-15 years
- Regionally Significant: 15-30
- Regionally Significant: 0-30 years
- Current Vacant Industrial Land
- Industrial Land
- Open Space Reserves

SGS Economics & Planning

4.3 Strategy Scope

To plan for the supply of sufficient suitable vacant industrial land, the following measures are available:

- Zoning of land, codes and specific area plans
- Setting conditions to manage the intended use or development of the land in line with strategic considerations (such as minimal lot size, urban design criteria, access requirements)
- Actively managing regional land use and development, for instance by a land development agency

The first two points can be achieved by an industrial land use strategy for the region that is endorsed and adopted by participating councils and local planning schemes.

The third dot point relates to a more active and regionally concerted approach to land use planning where a separate government body such as a land development agency would play a central role in purchasing land, developing it and releasing it to the market according to a sequenced approach.

The objective of this strategy is to provide for industrial land over the next 15 to 30 years. The scope of the strategy does not include the identification of possible redevelopment sites and any measures to achieve better use of existing land. However, the two are interrelated. Redevelopment of land may impact on land availability and therefore impact on demand for net additional land.

In fact, a theoretical data exercise undertaken in the first stage of this study suggests underutilisation of industrial land may be a key issue in Southern Tasmania, especially in long established industrial areas such as in Glenorchy. There is a need to properly investigate the apparent underutilisation of industrial land in established urban areas, and to form a strategic approach to improve land use in these areas for Greater Hobart.

Non-conforming uses, fragmented land ownership and historical urban growth patterns are causes of inefficient land use. If better use of existing land can be achieved, there may be less demand for Greenfield land. Vice versa, an oversupply of Greenfield sites discourages redevelopment of derelict and underused sites. Measures for better use of existing industrial land include:

- Prevention of non-conforming uses through planning schemes
- Management of regional supply of land (in case of an oversupply of Greenfield land, potential redevelopment sites are less attractive)
- Active management of redevelopment of existing derelict and/or underused sites (amalgamating fragmented land, purchasing, redeveloping and selling land), by a government-owned land organisation (GLO)

While the first point can be addressed through succinct planning schemes[6], the two latter points require a more active and regionally concerted approach. Redevelopment of areas generally requires the support of a land development agency, or government-owned land organisation, to purchase and amalgamate land, to redevelop the areas and to then release (sell) the land according to a strategic and sequenced approach.

If in the future a strategy to improve land use efficiency is adopted, such a strategy would achieve results in the medium to long term (say 5 to 15 years from now) at best. The results may impact on the net additional demand for industrial land over time. So, by that time there may be a need to review this Industrial Land Strategy in light of realistic targets to make better use of existing industrial land.

Tasmania is the only state in Australia that does not have a government-owned land organisation (GLO) that acts as a developer. A GLO can guide Greenfield land release and to redevelop existing urban areas. Although GLOs have the capacity to complete developments on their own, they often partner with private sector developers to complete projects (PC, 2011). ***In the absence of that, the available measures for land use planning of industrial land is mainly confined to rezoning of land and setting planning conditions***.

Appendix 2 provides a quick overview of the operations of government-owned land organisations in Australia.

From a property development perspective, any barriers or constraints to invest and develop may defer the release of serviced and newly developed industrial land. Also, any incentives to support property development may speed up the release of serviced and newly developed land. The level of red and green tape sometimes generates significant

[6] This has mostly been achieved already; most current non-conforming uses are a result of more historic planning decisions and planning conditions.

additional costs to developers to meet conditions and for local government authorities in terms of costs of regulation. The costs of additional regulation should in general be outweighed by the benefits.

Barriers and incentives to property development have not been considered to any level of detail as part of this study. As a rule of thumb, the costs of implementing and applying regulation, subsidies, development charges and other constraints and incentives should be outweighed by the wider benefits. Benefits would not only relate to monetary values, but also social, environmental and other less tangible values.

A broader study into development constraints and incentives that considers all land zonings and uses may provide a solid background of relevance for future industrial development.

4.4 Measures to Manage Industrial Land Availability

Within the existing planning framework, planning authorities have a number of measures available to influence and manage land supply and the way land supply meets demand characteristics.

This strategy makes recommendations using some of these measures including minimum and maximum lot sizes and the need to implement structure plans at some of the key sites of strategic importance. In addition to the recommendations in this strategy, local planning authorities may want to consider the application of additional conditions to permits derived from their local planning scheme zone objectives.

Below follows an overview of the generic measures that are available in Tasmania at present.

Special provisions

Special provisions for certain types of use or development are not specific to any zone, area plan, or an area to which a code applies. Currently the Special provisions in the Template relate to changes to existing non-conforming uses, adjustments of boundaries and demolition. Additional special provisions could be made that apply to all use or development.

Land Zoning

Under the new planning scheme format the following zones are designated for industrial land use:

- **Light Industrial Zone** which provides for manufacturing, processing, repair, storage and distribution of goods and materials where off-site impacts are minimal or can be managed to minimize conflict or impact on the amenity of any other uses.
- **General Industrial Zone** which provides for manufacturing, processing, repair, storage and distribution of goods and materials where there may be impacts on neighbouring uses.

Other zones that may accommodate some industrial uses are:

- **Rural Resource Zone** which provides for:
    - the sustainable use or development of resources for agriculture, aquaculture, forestry, mining and other primary industries, including opportunities for resource processing; or
    - other use or development that does not constrain or conflict with resource development uses.
- **Port and Marine Zone** which provides for port and marine activity related to shipping and other associated transport facilities and supply and storage..
- **Particular Purpose Zone** which provides for use with a particular purpose defined by the relevant planning authority.

Codes (Subclause 7.1 of the Planning Directive)

Codes set out standards for use or development for matters that are not confined to one zone and apply over and above zone provisions. Where there is a conflict, codes provisions override zone provisions but specific area plan provisions override code and zone provisions. A code should not alter the intent of the zone and should assist in delivering appropriate planning outcomes.

Specific area plans (Subclause 7.2 of the Planning Directive)

Specific area plans can comprise of local area plans, structure plans or development plans. They are used to implement more detailed planning controls and apply in addition to the underlying zone or overlying code. Where there is a conflict, the provisions of specific area plans override zone and code provisions.

Use and development standards

Standards are requirements that must be addressed by the particular use of development of land and are provide as a section of a zone, code or specific area plan.

Use standards relate to the on-going operation or performance of a use and include requirements in regards to:

- Hours of operation
- Size and type of machinery
- Noise, air and light emissions
- Outdoor storage and public display

The conditions may be attached to a permit.

Development standards relate to built structures and the subdivision or consolidation of land, and include:

- Lot dimensions
- Height and setbacks
- Density and site coverage
- Public and private open space

4.5 Sequencing and Timing Considerations

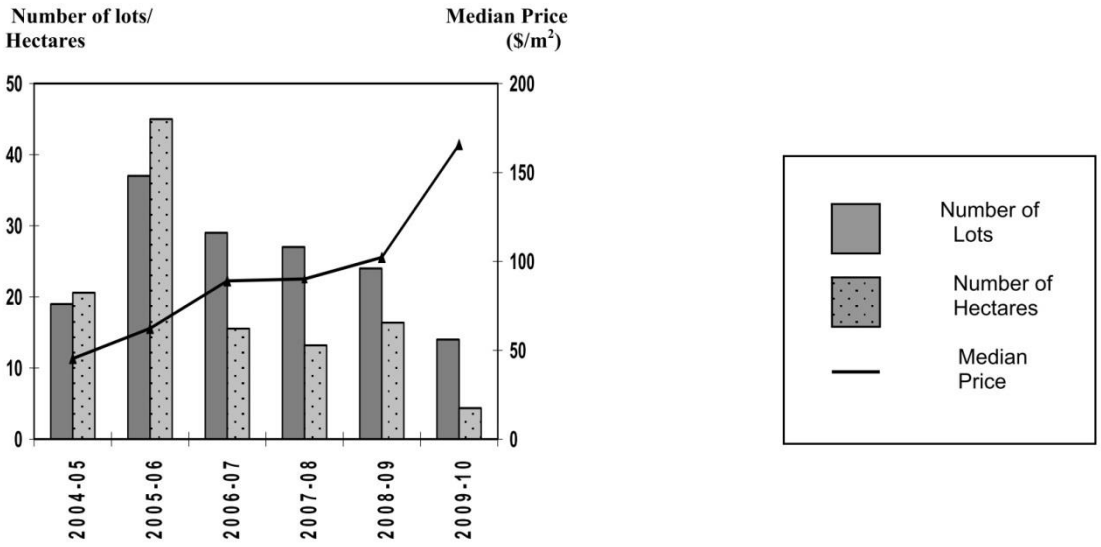
Meeting the projected shortfall over the next 15 years

There are two significant sites that could meet most of or the entire target of 34 to 88 hectares industrial land in Greater Hobart for transport and warehousing and export oriented industries over the next 15 years. These sites are the already industrial zoned land to the west south-west of the Brighton transport hub (approximately 82 hectares of vacant land) and the proposed site at 51 Cranston Parade (approximately 70 hectares of land).

The strategic focus of the two areas differs somewhat. The site south, south-west of the transport hub would logically be transport and warehousing oriented, with a focus on rail and road transport and both inbound and outbound transport activities with related export oriented industries. The site adjacent to the airport would be more export oriented, supported by warehousing, with a short delivery line to the airport.

Anecdotal evidence suggests a few land owners hold the majority of vacant land in ownership. The Productivity Commission recently published data that show that industrial land prices in Greater Hobart have increased quite sharply in recent times. The figure below (Figure 2) shows a significant drop in land sales (and also a shift towards smaller lots) and a simultaneous significant increase in land prices. This effect may occur due to either an undersupply of land or an 'artificial' undersupply of land, where existing supply is not made available to the market. Land data analysis has shown there is no acute shortage or undersupply of industrial land in the short term. Also, the land prices continued to increase in an economically weakening period.

FIGURE 2 GREATER HOBART SALES & PRICES OF INDUSTRIAL LAND, 2005-06 TO 2009-10



Source: Productivity Commission (2011)

To adequately support economic growth in Southern Tasmania, it is important there is sufficient industrial land providing for a range of types, sizes and locations. It is therefore recommended to allow for industrial development at the two locations of strategic regional significance in Brighton (south, south-west to the transport hub) and in Clarence (51 Cranston Parade) and to stage or sequence the development of these sites according to forecast demand. By allowing both sites to be partially developed over the next 15 years, the risk of undersupply of land (artificial or not) is reduced.

For the **regionally significant sites** it is recommended:

- To identify both the site south, south-west to the Brighton transport hub and the 51 Cranston Parade site as regionally significant industrial sites with relevance to the short to medium term supply (0-15 years) and medium to long term supply (15 to 30 years) of regionally significant industrial land.
- To identify the site south, south-west to the Brighton transport hub as a site oriented towards transport and warehousing, requiring proper truck access to sites and medium to large lots.
- To identify the 51 Cranston Parade as a site oriented towards export industries and supporting warehousing with strong linkages to the airport, and requiring a mix of medium and large lots. In case an activity on the air bridge between HIA and the Antarctic grows substantially, the site should also be identified as a site to accommodate industries related to the Antarctic. Note: the technical assessments of 51 Cranston Parade need to be reviewed to confirm the suitability and feasibility of the site.
- To release these sites according to a staged approach, by allowing approximately half of the area of the sites being subdivided within the next 15 years. The remainder is to be held in large lot sizes;
- To reserve the remainder by allowing subdivision of the remaining land in the longer term only (15 to 30 years from now) or on the basis of a review of the industrial land use strategy or a demonstrated need for more industrial land. This land is to be included in the next iteration of the Regional Land Use Strategy and reserved as potential long term industrial land.
- To develop a structure plan (or local area plan) for both the Brighton transport hub and the 51 Cranston Parade sites. These plans need to prescribe that at least half of the developable land area of these sites is

to be reserved for large lot sizes until 15 years from now or if it can be demonstrated there is an unmet need for smaller lot sizes that cannot be accommodated at other nearby industrial sites.

- To allow the development of the infill sites and the site north and adjacent to the Hub in Brighton for industrial use. Lot sizes should be adequate to accommodate transport and warehousing and export oriented industries.
- The Antarctic Gateway principle is an important economic development principle for Southern Tasmania. An established passenger air bridge between HIA and the Antarctic (not currently present) would be a key element of this development opportunity. The Cranston Prde site would be strategically well located to accommodate services and industries related to Antarctic operations. The type of associated uses and their typical footprints and other use and operational aspects may require specific allowances in the structure plan for this precinct. The structure plan should clearly demonstrate the likelihood of an established passenger air bridge with the Antarctic and the requirements for Antarctic related industries and how this translates to lot sizes, use and operational standards. Also, the structure plan should provide for measures, use and operational requirements that prevent local service industries from occupying this regionally significant precinct.

In addition to industrial land of regional significance, there should also be sufficient land to accommodate demand from **local service industries**. In regards to local service industries, it is at the discretion of individual to plan for industrial zoned land. ***This strategy provides considerations for Councils in relation to their strategic industrial land use planning.***

In Clarence, there is sufficient industrial land in general, but a lack of small sites of below 2,000 sqm. A variation to a recent approval for subdivision aims to create just over 70 lots, with about 56 lots for general industrial uses with lot sizes ranging from 1,800 sqm to 7,000 sqm in the Cambridge area. More small lots are likely required within the 15 year timeframe. Part of the site at 1 Kennedy Drive would be well suited to accommodate demand for local service industries, including potential 'over flow' demand from Hobart and Glenorchy[7]. If to be developed within the next 15 years, this site should be required to provide small lots primarily (maximum lot size of about 3,500 sqm).

In Brighton, to provide for local service industries and some possible 'over flow' demand from Glenorchy, the Cove Hill area should be made available to accommodate local service industries specifically. The area has already attracted a significant number of small scale industries, in quite a similar way as the area in Southern Brighton that is proposed to be zoned industrial to reflect and accommodate existing uses. A possible socio-economic benefit would be the local job creation in an area where unemployment rates are significant.

In Kingborough, no potential new sites for industrial zoning within the short to medium term were identified. The Huntingfield – Maddocks Rd property is unlikely to be developed within five to ten years. Council has earmarked this site for future urban growth. A temporary shortage of industrial land for mixed industrial uses may occur in Kingborough. Better use of existing land may help bridge this temporary gap, until land at Huntingfield – Maddocks Rd is being developed.

Outside Greater Hobart, additional potentially suitable sites of local significance have been identified in New Norfolk, Huonville and Geeveston[8]. The New Norfolk site represents an opportunity for redevelopment of derelict land. The site in Huonville has been approved in 2011 and provides land for local service industries and possibly some export oriented industries and transport and warehousing. The site would provide sufficient land to meet demand for the next 30 years. The site at Geeveston could be considered in the long term, and may in the meantime be rezoned to rural resource zone as a holding zone.

In the short to medium term the following locally significant sites should be considered to be rezoned to industry:

- Brighton, Cove Hill – the area that is currently zoned commercial, to accommodate local service industries (7 ha.)
- Clarence, part of 1 Kennedy Drive, to accommodate local service industries (approximately 6 ha.)
- Clarence, 128 Mornington Rd, to enhance conformity of use and allow for some expansion of industrial uses (approximately 3 ha.)
- Derwent Valley, New Norfolk, corner of Glebe St and the Avenue, to accommodate a mix of local service industries, export oriented industries and transport and warehousing (4 ha.)
- Huon Valley, Huonville, Glen Road (rezoning already approved), to accommodate a mix of local service industries, export oriented industries and transport and warehousing (13 ha.)

[7] The option at 128 Mornington Rd is little suitable for industrial use, and especially for local service industries.
[8] No other shortfalls were identified in Southern Tasmania

In total these locally significant sites for local service industries add up to approximately 30 hectares of developable land.

Meeting future demand for industrial land, 2026 to 2041

In the longer term, 15 to 30 years from now, the remainder of the sites south, south-west of the Hub and 51 Cranston Parade are recommended to be rezoned (if applicable) and subdivided. Over this longer term period, the following sites may also be rezoned and developed for industrial use, depending on specific site assessments:

- Cranston Parade site adjacent to 51 Cranston Parade in Clarence (~25 hectares)
- Huntingfield – Maddocks Rd property in Kingston (up to 16 hectares)

Depending on the growth rate of the economy and of the population in Southern Tasmania, additional future sites may need to be considered. By that time, and if no suitable alternatives are found, it would be recommended to consider the land identified off Tea Tree Rd in Pontville (Brighton) for future industrial use. The site would need to be assessed in more detail. Potential constraints include its current agricultural zoning, nearby residential uses, heritage and natural conservation values. Since the site is that large, there would presumably be sufficient opportunities to create buffers and to reserve areas for conservation offsets.

It is recommended to identify the Tea Tree Rd site in the future iteration of the Regional Land Use Strategy mapping as a potential long term future site for industrial growth (15 to 30 years from now).The current rural resource zone could remain in the meantime.

The Leslie Vale site is less suitable as a regionally significant site than the Tea Tree Rd site. It is less strategically located towards the south of Hobart, and there are no infrastructure and services provided or nearby. However, if the site assessments at Tea Tree Rd identify constraints that inhibit future industrial use, this site may still be considered. The Leslie Vale site could be reserved for long term future use (30+ years). The current zoning (Primary industries) would be appropriate to reserve the land for potential future industrial use.

These sites should be included in the next iteration of the Regional land Use Strategy and reserved as potential long term industrial land.

4.6 Overview and Maps

The table below indicates how the unmet demand for industrial land over the medium term (to 2026) and long term (to 2041) would be met by future industrial sites.

TABLE 7 INDUSTRIAL LAND TO 2026 AND 2041

	Future sites Site names	Land area	To meet projected shortfalls for
Regionally significant sites, for the short to medium term, **to 2026**	- 50% south-west Hub, Brighton	41 ha	
	- Infill Brighton, Brighton	9 ha	
	- 50% 51 Cranston Pd, Clarence	35 ha	
	- Hobart Airport (HIA), Clarence	4 ha	
	Sub-Total	**89 ha**	**34-88 ha**
Regionally significant sites, for the medium to long term, **2026 to 2041**	- 50% south-west Hub, Brighton	41 ha	
	- 50% 51 Cranston Pd, Clarence	35 ha	
	- Cranston Pd, Clarence	25 ha	
	- Huntingfield–Maddocks Rd, Kingb.	16 ha	
	For consideration: Tea Tree Rd, Pontville	*150 ha*	
	Sub-total	**267 ha**	**153-238 ha**
Locally significant sites, to meet local shortfalls for the short to long term (**to 2041**)	**Cove Hill, Brighton**	7 ha	
	1 Kennedy Dr, Clarence	6 ha	
	128 Mornington Rd	3 ha	
	Glebe Rd/Avenue, New Norfolk	4 ha	
	190 Glen Rd, Huonville	13 ha	
	Sub-total	**33 ha**	**Local shortfalls**
Total		**389 ha**	**187 – 326 ha**

Source: SGS (2012)

The following maps (Figure 3 to Figure 9) show the potential future sites and indicate the significance (locally or regionally significant) and the timing of the envisaged release of the land.

The first map focuses (Figure 3) on the Bridgewater area and Brighton Transport hub. There are three identified options that would be part of the Brighton Transport Hub which is an industrial estate of regional significance and still well in development. The three options are:

- Brighton-Bridgewater, north adjacent to Hub
- Brighton Transport Hub west, south-west
- Brighton Transport Hub infill opportunities

The Railyards are in the process of being relocated from Hobart to reserved land[9] at the transport hub over the next couple of years. This is expected to generate additional demand for development in the area. Macquarie Point in Hobart may become a mixed use site without industrial uses.

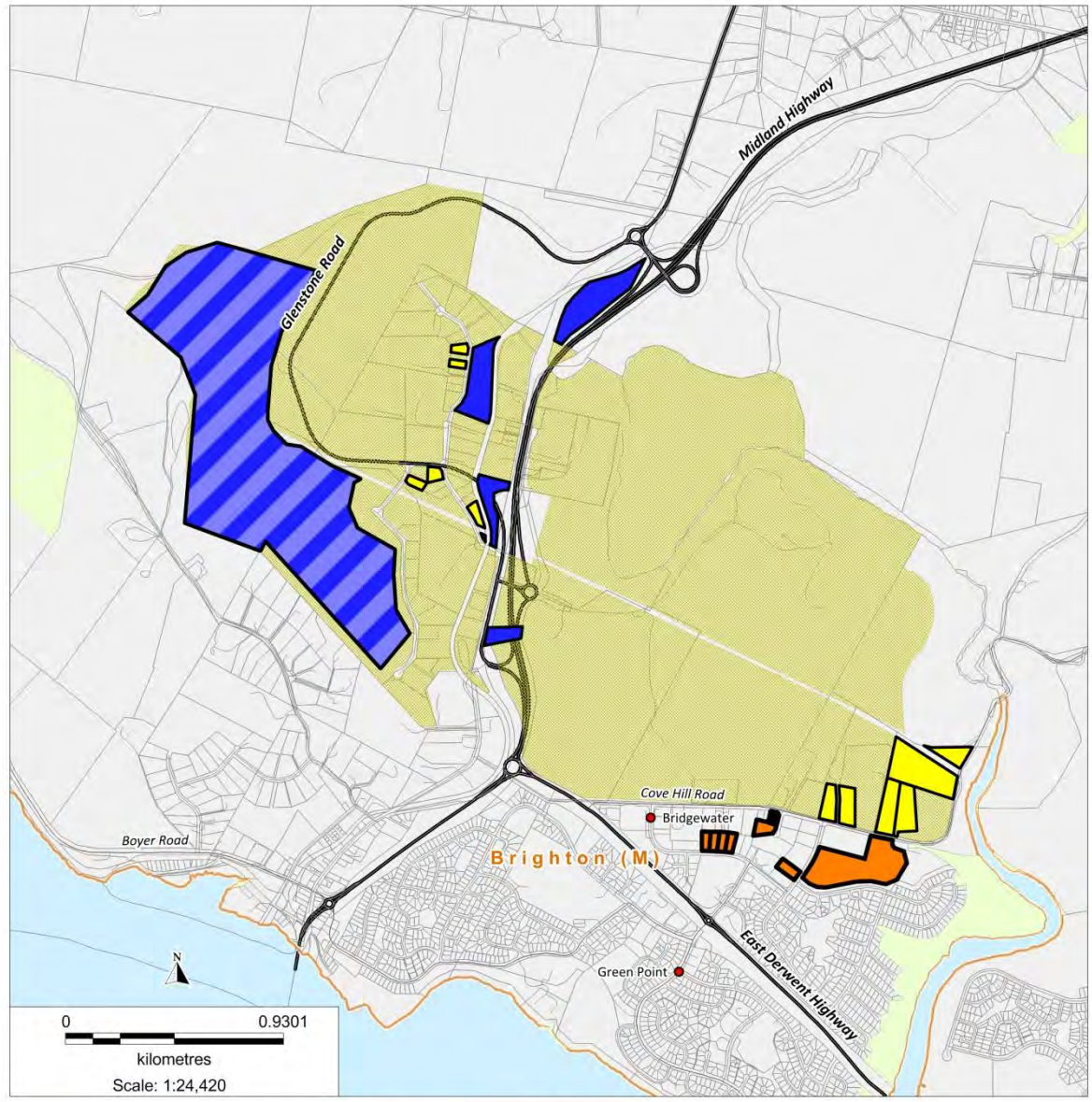
The infill sites around the hub are recommended to be released and developed within the short to medium term. The large site south-west of the hub is recommended to be gradually released and developed, about half of it over the next 15 years and the remainder in the longer term. These sites will be developed in a way that they attract transport and warehousing and related export oriented industries. Lots need to be medium to large (~3,000 sqm and above), have good access to the Midland Highway and be accessible by large trucks. The land is flat to undulating, which is suitable for transport and warehousing activities.

In the Cove Hill Rd area in Bridgewater, future industrial sites are recommended to cater for local service industries. The land is recommended to cater for small lot sizes. The area has already attracted a range of local service industries and this will enable agglomeration effects attracting increasing traffic.

[9] This land has not been identified as vacant in Stage 1 of the project, as it is reserved for intended uses.

The next following map (Figure 4) provides a more distant overview of the Brighton area and also identifies the potential future site for industrial use at Tea Tree Rd. Depending on the rate of economic and population growth, and the availability of suitable alternatives, this site may need to be considered in the long to very long term. Until that time, this land is identified as a potential future site for urban growth.

FIGURE 3 BRIGHTON-BRIDGEWATER TRANSPORT HUB AND COVE HILL AREA





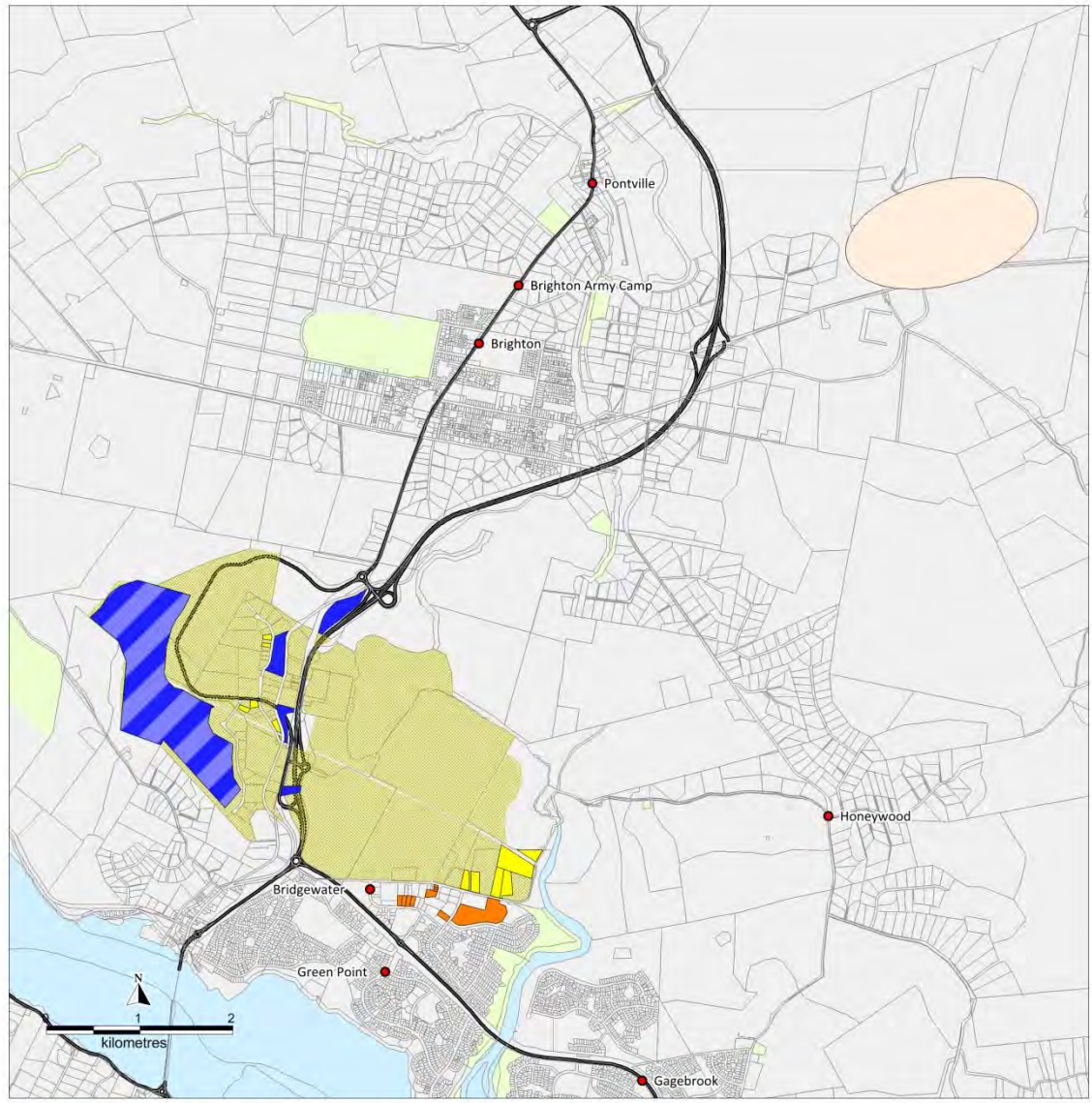
Industrial Land

Potential Significant Industrial Land Supply

- Locally Significant: 0-15 years
- Regionally Significant: 0-15 years
- Regionally Significant: 15-30
- Regionally Significant: 0-30 years
- Current Vacant Industrial Land
- Industrial Land
- Open Space Reserves

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FIGURE 4 BRIGHTON BRIDGEWATER, INCLUDING TEA TREE ROAD





Industrial Land

Potential Significant Industrial Land

- Locally Significant: 0-15 years
- Regionally Significant: 0-15 years
- Regionally Significant: 15-30
- Regionally Significant: 0-30 years
- Current Vacant Industrial Land
- Industrial Land
- Open Space Reserves

In Clarence (Figure 5), most of the future industrial land is located in and around the Cambridge area and the Hobart International Airport (HIA). In the short to medium term, regionally significant sites at HIA and part of 51 Cranston Parade are recommended to be released and developed. From about 2026 to 2041, the remainder of 51 Cranston Parade would be developed, and depending on the rate of demand, the adjacent site also at Cranston Parade should be considered for industrial use.

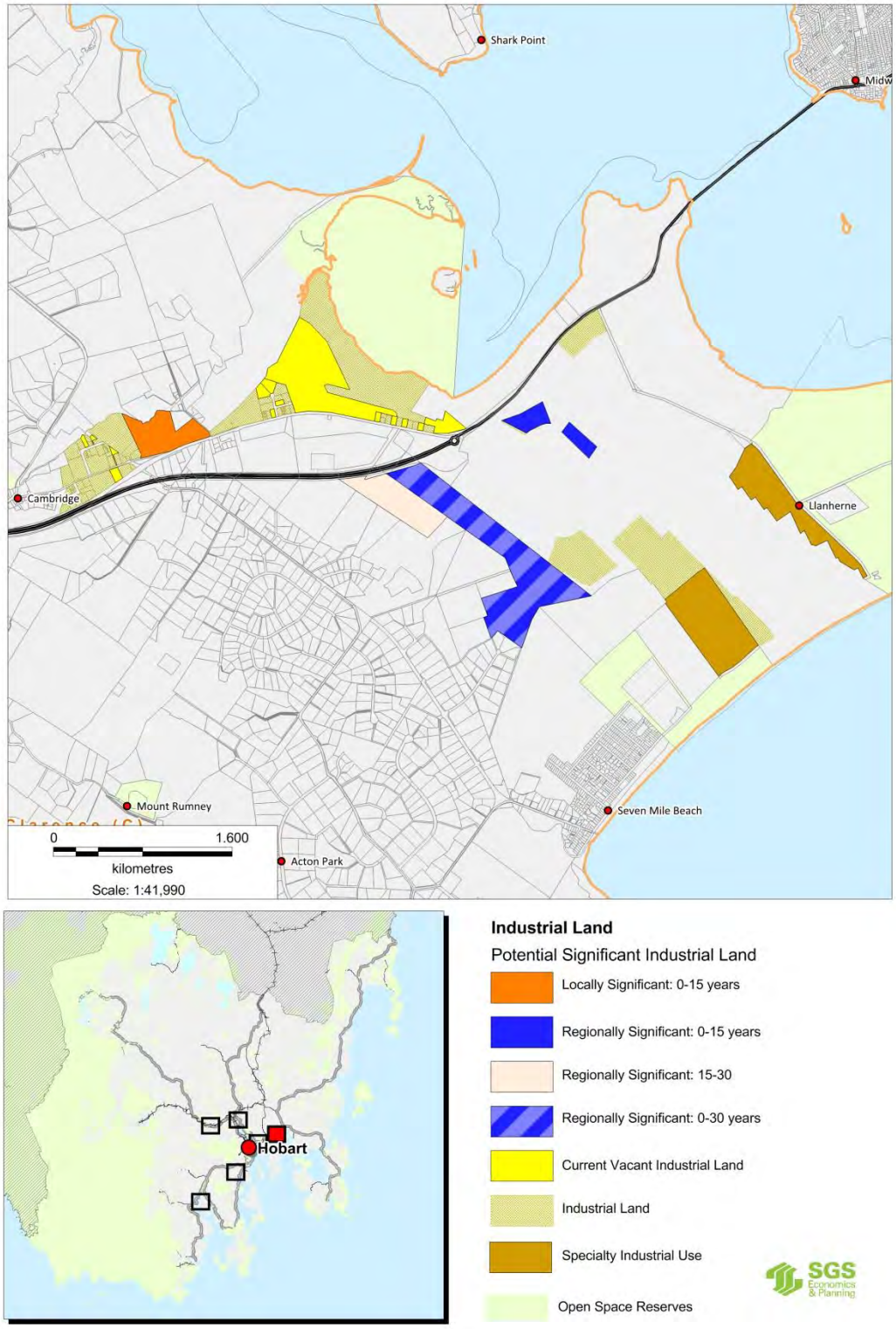
While there is a significant supply of vacant industrial land in Clarence, there is a shortfall of small lots to cater for local service industries to 2026. There may therefore be an opportunity, to zone part of the site at 1 Kennedy Drive and subdivide this land into small lots (up to about 3,000 sqm).

The land between Tasman Highway and Kennedy Drive, referred to as Cambridge Park, has been included as a non-industrial site. The current use and development of this area is not predominantly industrial, despite the zoning in the planning scheme, and includes many commercial uses. The removal of industrial zoning from this land would not have a material impact on the future supply of vacant industrial land. It is not for this Strategy to recommend on land zonings other than industrial.

In Kingborough, there is a shortfall of industrial land to cater for a mix of industrial uses. For the short to medium term, there may not be opportunities to address this shortfall. In the medium to long term however, a significant site near the Kingston bypass roundabout near the Antarctic Division may be available for future urban growth (Figure 7). Kingborough Council intends to reserve this land (referred to as the Huntingfield- Maddocks Road property) as a special particular purpose zone for future urban development. It is recommended that part of this site, up to 16 hectares, is considered for industrial use, catering for a mix of potential uses (local service industries, transport and warehousing and export oriented industries).

The Kingborough map provides an indicative size, shape and location of the future industrial land within the property. The exact size and location will be determined as part of future urban planning exercises and site assessments.

FIGURE 5 CLARENCE



* Specialty industrial use: Commonwealth land, which is beyond the jurisdiction of State and local planning controls.

FIGURE 6 CLARENCE, MORNINGTON

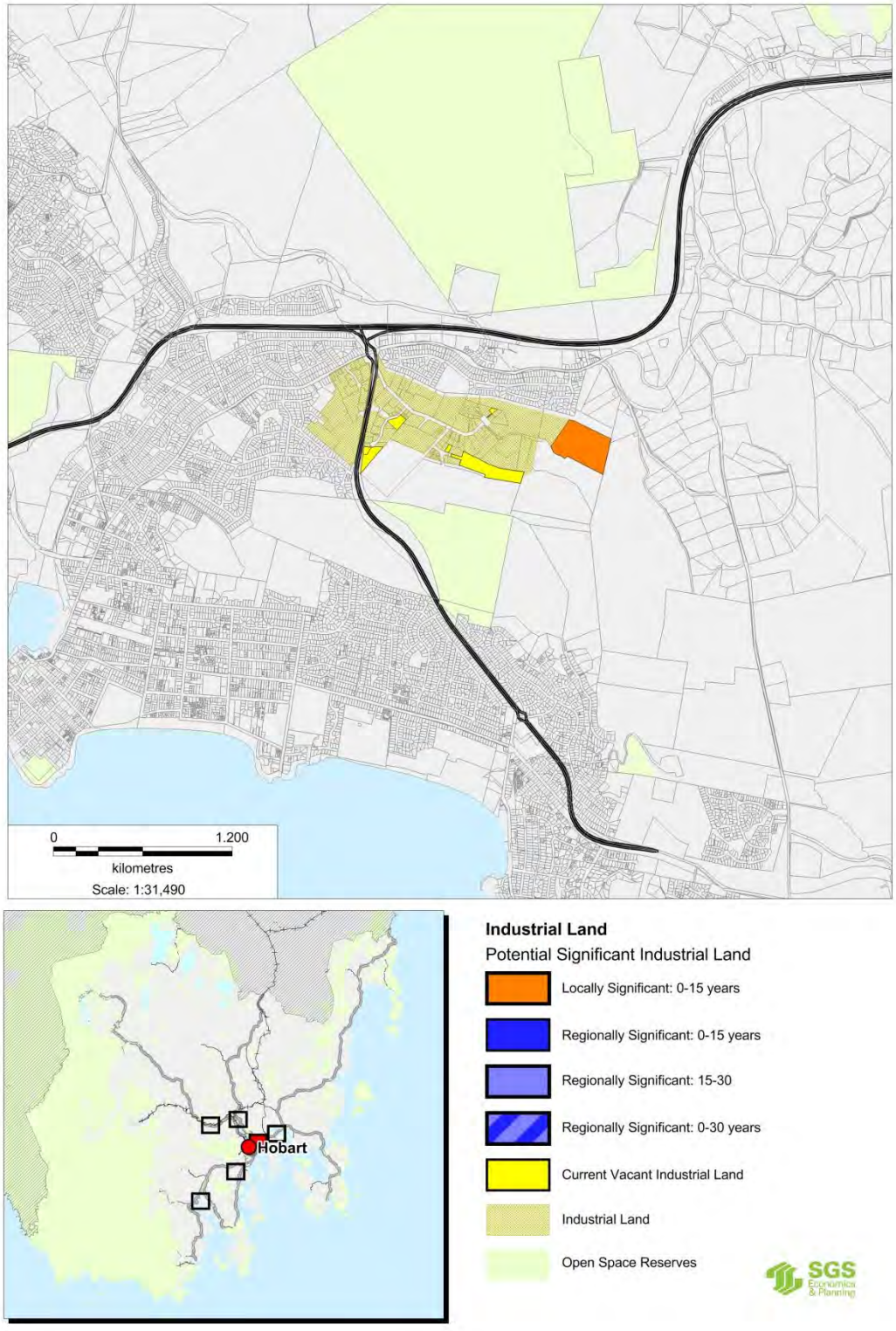
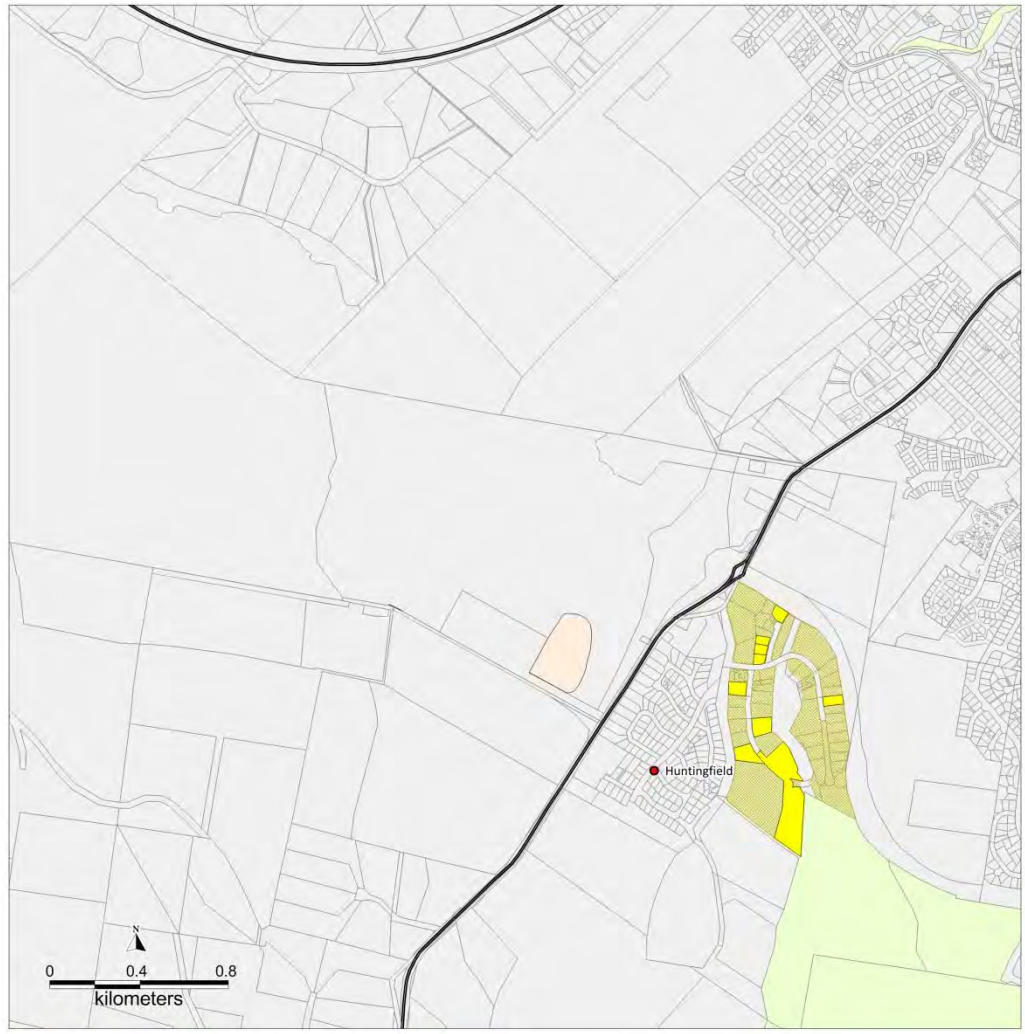


FIGURE 7 KINGBOROUGH





Industrial Land

Potential Significant Industrial Land

- Locally Significant: 0-15 years
- Regionally Significant: 0-15 years
- Regionally Significant: 15-30
- Regionally Significant: 0-30 years
- Current Vacant Industrial Land
- Industrial Land
- Open Space Reserves

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In the regional areas of the Huon Valley and the Derwent Valley, the economic centres of Huonville and New Norfolk are recommended to cater for industrial land for a mix of industries; local service industries and transport and warehousing and export oriented industries that are predominantly related to local resources and agricultural production.

In Huonville, a proposed rezoning has been approved for an industrial site between Huonville and Ranelagh (Figure 8). The site is close to an existing aquaculture processing plant. The area around the plant has been earmarked for downstream processing of regional produce and resources.

In New Norfolk, Council aims to rezone land adjacent to the centre of New Norfolk to industrial (Figure 9). These two sites are expected to accommodate demand for land over the short to long term. The site is part of the previous health precinct which has been abandoned and is in a derelict state. Rezoning and redeveloping the site is a strategic planning opportunity. There is a risk of sensitive uses encroaching the area thereby increasing the risk of land use conflict. It is recommended for Council to address this appropriately and maintain sufficient buffer.

FIGURE 8 HUONVILLE

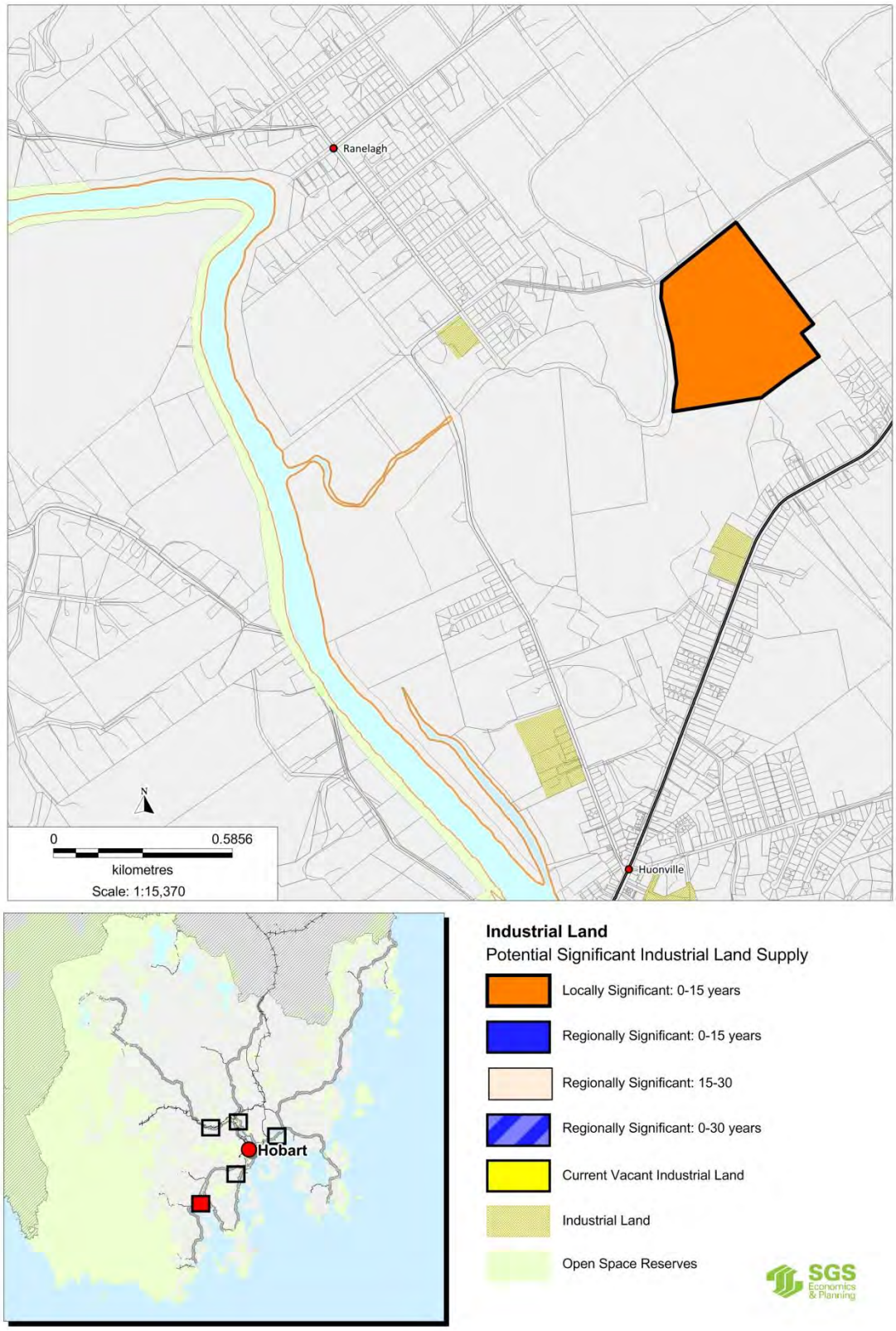
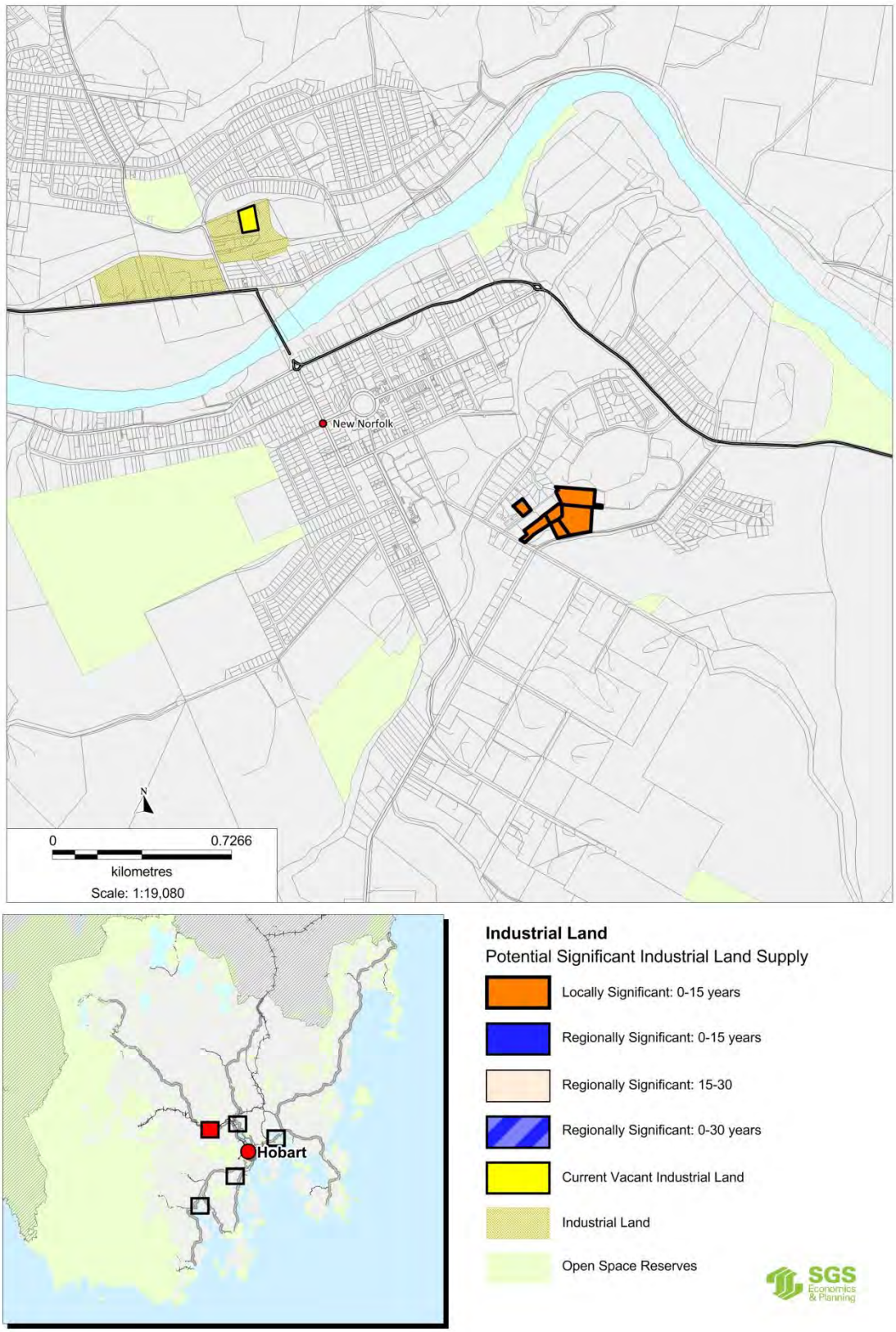


FIGURE 9 NEW NORFOLK



4.7 Conditions for Regionally Significant Sites

While it is important to determine the strategic direction of regionally significant sites, being too prescriptive may inhibit the development of the land and economic growth in general. As was recently noted by the Productivity Commission, industrial land uses across cities are far more varied than residential and commercial uses. Hence, there is far greater variation required. This strategy does therefore not aim to provide precise requirements in regards to for instance road frontage, lot depth, use restrictions etcetera.

This strategy does aim to provide sufficient guidance to ensure sufficient industrial land is planned for, and that the land is broadly suitable for the intended use categories: local service industries, export oriented industries, transport and warehousing or a mix of these. Local planning authorities may add conditions to ensure local planning issues are being considered.

Minimum and maximum lot sizes

A key denominator between local service industries and export and transport & warehousing, is the common lot size. Local service industries tend to use lots with a size up to 2,000 sqm mostly, with some uses requiring lots of between 3,000 and 4,000 sqm. Transport and warehousing and export oriented industries tend to occupy land of 3,000 sqm and up. In order to guide the intended use of sites, it is recommended for Councils to:

- Apply a maximum lot size of about 3,500 sqm for local service industries, and
- Apply a minimum lot size of about 2,500 sqm for regionally significant sites, that accommodate export oriented industries and transport and warehousing.
- Occasionally, there is demand for very large industrial sites of more than 10 or 20 hectares.

The intended use of regionally significant sites

The two strategic sites south-west to the Hub in Brighton and 51 Cranston Parade in Clarence will accommodate a significant amount of industries over the next 15 to 30 years. To ensure the two sites fulfil their significant roles in providing for regionally significant land, there should be due consideration of how these sites relate and connect to their surrounding areas. It is recommended to develop **local area or structure plans for both areas**. While structure plans are generally drawn up for residential and mixed use areas, the regionally strategic significance of the two sites requires that they are developed sensibly and with regard to their surroundings. The structure plan for the south-west to the Hub site would consider most of the Brighton transport hub and surrounding industrial uses. The structure plan for Cranston Parade would include both 51 Cranston Parade and the adjacent site and the connectivity to HIA and the Tasman Highway.

The structure plans will at least need to address:

- Transport connectivity; traffic flow, road width and design and logistics are key considerations for the southwest hub site, and the connection to the HIA and Midlands Hwy is a key issue for the Cranston Parade sites
- Operating hours; 24/7 operating hours is a key requirement for transport and warehousing activities and therefore the southwest hub site in Brighton. For the Cranston Parade site operating hours may be considered in relation to the Airport Buffer Overlay[10] and possible nuisance for nearby residential uses
- An appropriate mix of lot sizes. Export oriented industries mostly operate from medium sized lots of between 3,000 sqm and 2 hectares. Transport & warehousing activities operate from a mix of lot sizes. Based on the existing mix of transport & warehousing uses in Greater Hobart, the precinct area would provide a mix of sites of
    - ~2,500 sqm to 1.5 ha – covering roughly 35% of the total area;
    - 1.5 to 4 ha – covering roughly 20% of the total area;
    - 4 to 8 ha – covering roughly 30% of the total area, and
    - Larger sites – covering roughly 15% of the sites.

Other issues may be addressed in the local area or structure plans at the discretion of the responsible municipality, such as urban design and sustainability principles.

[10] Flights and noise from the airport is mostly restricted to between 6am and 12pm

Staging of Land Development

Land at potential future sites may be allowed to be rezoned in line with the intended development horizon of the sites demonstrated in the maps.

However, there are no planning instruments available to control the timing of land release and development of land if it is already zoned industrial, or if sites are intended to be developed according to a staged approach.

The local area or structure plans for the southwest hub site and the 51 Cranston Parade site will need to describe the intended rate of development of the land. In order to provide some guidance both the south-west hub site and the 51 Cranston Parade are required to reserve a significant share of land for potentially very large uses (requiring 10, 20 hectares or more) for the next 15 years or until it can be demonstrated that there is an unmet demand for industrial land for smaller lot sizes, and that this unmet demand cannot be met by alternative suitable locations.

The Cranston Prde precinct will be well positioned to accommodate Antarctic related industries. The local area or structure plan should allow for appropriate lot sizes and other guidelines to accommodate Antarctic industries based on demonstrated evidence of the particular needs of these industries. The local area or structure plan should also include requirements to ensure the land is occupied by a range of intended uses complimentary to the functions of the airport (i.e. export oriented, Antarctic industries and transport and warehousing).

For the southwest hub site, approximately 40 hectares would need to be reserved for potential demand for large industrial sites of 10 hectares or more. For the 51 Cranston Parade site, approximately 35 hectares (or 50% of developable area) would need to be reserved for demand for large industrial sites of 10 hectares or more.
It is further intended that the site adjacent to 51 Cranston is developed after that site has been largely taken up. Therefore this strategy determines that the rezoning and development of the site adjacent to 51 Cranston Parade, which would expectedly occur in the medium to long term (between 2026 and 2041), would be allowed if it can be demonstrated there is an unmet demand for industrial land which cannot be met at alternative suitable locations (most importantly 51 Cranston Parade).

4.8 Monitoring and Review

Monitoring is required to understand the actual take-up of vacant industrial land and the rezoning of land to or from industrial. This data could be collected on a bi-annual basis, or at least once every five years. The analysis of the monitoring data will demonstrate:

- How much land is taken up
- Where land is taken up
- What lot sizes are taken up and developed
- How much land is being rezoned
- Any changes in the land price of industrial land

On the basis of this analysis, the industrial land strategy may need to be reviewed. A lower or higher than expected take-up rate of land may require a reconsideration of the timeframes for future industrial sites. Also, it may be possible that in the future measures will be implemented by planning authorities to support land redevelopment into alternative uses, infill development and better or more efficient use of industrial land. The possible future closure of a significant industrial complex could provide land for other industries to locate there. As part of that, it may be required to adjust the timeframes for Greenfield land release either by:

- Minimising new land release as an incentive to make better use of existing industrial land (note that this measure should only be adopted if effective measures to enable better use of land are available);
- Adjusting the timing of future industrial sites to reflect the expected drop in demand for Greenfield sites as a result of better use of existing land (allowing more industrial uses being accommodated on existing industrial land)

The data requirements for monitoring encompass the following:

- Uptake of vacant land by location (Council, Precinct/Suburb):
    - Number of parcels
    - Land area
    - Date of development application
    - Type of use
- Supply of vacant and suitable industrial land by location:
    - Number of parcels
    - Land area
- Rezoning of land to industrial and vice versa by location:
    - Number of parcels
    - Land area
    - Date of approval
- Trends in industrial land price data:
    - Number of lots and area sold per annum
    - Mean and median land price per annum ($/sqm or $/ha)
- Redevelopment projects involving industrial land (to make better use of existing land) or land that may be rezoned to industrial land.
    - Number of parcels
    - Land area
    - Expected improvement of the use of the land

Further, there is a need to properly investigate the apparent underutilisation of industrial land in established urban areas, and to form a strategic approach to improve land use in these areas for Greater Hobart.

APPENDIX 1 FIRST STEP OPTION ASSESSMENT – FACT SHEETS

The long list of future options is as follows:

- **Brighton, Bridgewater Cove Hill**, 10 vacant lots on current commercial precinct, considered to be rezoned to light industrial, Hurst St, Cove Hill Rd and Cowle Rd, developable area 10 ha.
- **Brighton, Brighton-Bridgewater**, seven lots adjacent to existing Brighton Industrial Estate, adjacent and close to Midland Hwy[11].
- **Brighton, Pontville,** 367, 447 and 503 Tea Tree Road, approximately 150 ha.
- **Brighton, Transport Hub west, south-west, Industrial land with current agricultural**, Cobbs Hill Rd.
- **Brighton Transport Hub Infill Opportunities,** Industrial parcels 85916/1, 9559/3, 50018/4 and 163537/1.
- **Clarence, Cambridge, 51 Cranston Parade**, developable area approx. 70 ha.
- **Clarence, Cambridge, Cranston Parade (excluding 51 Cranston Prde),** developable area approximately 25 ha, subject to site assessments
- **Clarence, Cambridge, 1 Kennedy Drive,** land zoned intensive agriculture.
- **Clarence, Hobart International Airport**, Precinct 3 and 9, land is partly in use, remaining vacant area is well below than 15.5 ha. (Which is total area).
- **Clarence, HIAPL land identified for potential future aeronautical services,** land is vacant and adjacent to airport, area is approximately 35.6 ha
- **Clarence, Mornington,** three lots comprising existing Mornington Waste Transfer Station and adjacent, developable area less than 23.5 (total area).
- **Derwent Valley, New Norfolk**, cr Glebe Rd and the Avenue. Developable, vacant land area is approx. 5.6 ha, proposed rezoning as part of PS review.
- **Glamorgan-Spring Bay, Triabunna**, Part of Mount Murray, 336 Okehampton Rd, developable area yet unknown, could be very large.
- **Huon Valley, Cradoc**, Duggans Pty ltd quarry, Channel Hwy, developable area yet unknown.
- **Huon Valley, Geeveston**, next to oval and adjacent to existing industrial land, Council owned, 2 to 3 hectares.
- **Huon Valley, Huonville**, 199 Glen Road: approved rezoning to industrial. Developable area approx. 13ha.
- **Kingborough, Leslie Vale**: HBMI Pty Ltd Quarry opposite Leslie Vale turn-off from Huon Hwy. Developable area approx. 50 ha.
- **Kingborough, Kingston Huntingfield – Maddocks Rd**: 27 Springfarm Rd, developable area up to ~16 ha.

For each of the identified future industrial options, the first stage was used to collate the following information to gain a better understanding of the likely suitability of the option in broad terms:

1. Alignment with State and regional planning objectives
2. Developable land area
3. Current zoning and use
4. Land status: ownership, parcels, lot sizes, planning and management authorities
5. Availability and proximity of infrastructure and services (transport, water, sewage and power)
6. Physical site characteristics (slope, soil issues, hazards, contamination)
7. Environmental, heritage and other conservation values
8. Other planning, legislative or statutory constraints
9. Nearby uses

[11] Land titles are: 2 titles unknown, 156586/10, 156586/3, 159938/4, 156586/1, 156856/11

Site: Brighton, Bridgewater Cove Hill	Address: Hurst St, Cove Hill Rd and Cowle Rd
Suburb: Bridgewater	**Date: 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The vacant lots are in a wider commercial zone, which is proposed to be rezoned to industrial to better reflect the actual use of the area. One significant parcel particularly is close to an existing residential area in Bridgewater, and would require adequate buffering and planning provisions not permitting uses with significant impacts such as noise, air quality and smell.

The adjacent Bridgewater residential area is a social housing area with a high level unemployment. More industrial land would potentially create additional jobs for this community, however, a rezoning from commercial to industrial does not necessarily provide better job opportunities.

The sites are within the existing developed area and development could most likely be serviced by existing infrastructure provisions.

2. DEVELOPABLE LAND AREA

Ten lots were vacant at the time of site visit (28 March 2012). Total area comprises approximately 8 hectares, with one site comprising 5.8 ha. This lot is adjacent to residential area requiring maybe 1 ha buffer. This brings the developable area to 7 hectares.

3. CURRENT ZONING AND USE

The vacant parcels are currently zoned commercial and are currently not in use.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The parcels are in private ownership. Three parcels in the area of 600 sqm, 4 parcels just under 3,000 sqm and 2 parcels just over 4,000 sqm and 1 parcel of 5.8 hectares of which about 4.8 hectares would be developable. See below parcels marked with red cross.

All land falls under the Brighton Planning Scheme.



5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

All sites have road access. All sites would also have access to water, sewage, power and telephone/broadband. Cove Hill Rd provides easy access, also for heavier vehicles, to the Midland Hwy.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is relatively flat and as far as known there are no soil issues and/or hazards.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

There are no known conservation values applicable to the land.

8. OTHER CONSTRAINTS

The land is close to a social housing estate. This may impact adversely on the perception of businesses located there. There may also be a (perceived) risk to security in being located there.

9. NEARBY USES

One parcel is close to a residential area of Bridgewater. Sufficient buffer would be required when developing this land. This would be true both under its current zoning and its potential future zoning as industrial. Other nearby uses are commercial/industrial.

10. OTHER OBSERVATIONS

-

Site: Brighton, Brighton-Bridgewater	**Address: seven lots adjacent to existing Brighton Industrial Estate, adjacent and close to Midland Hwy[12]**
Suburb: Brighton	**Date: 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

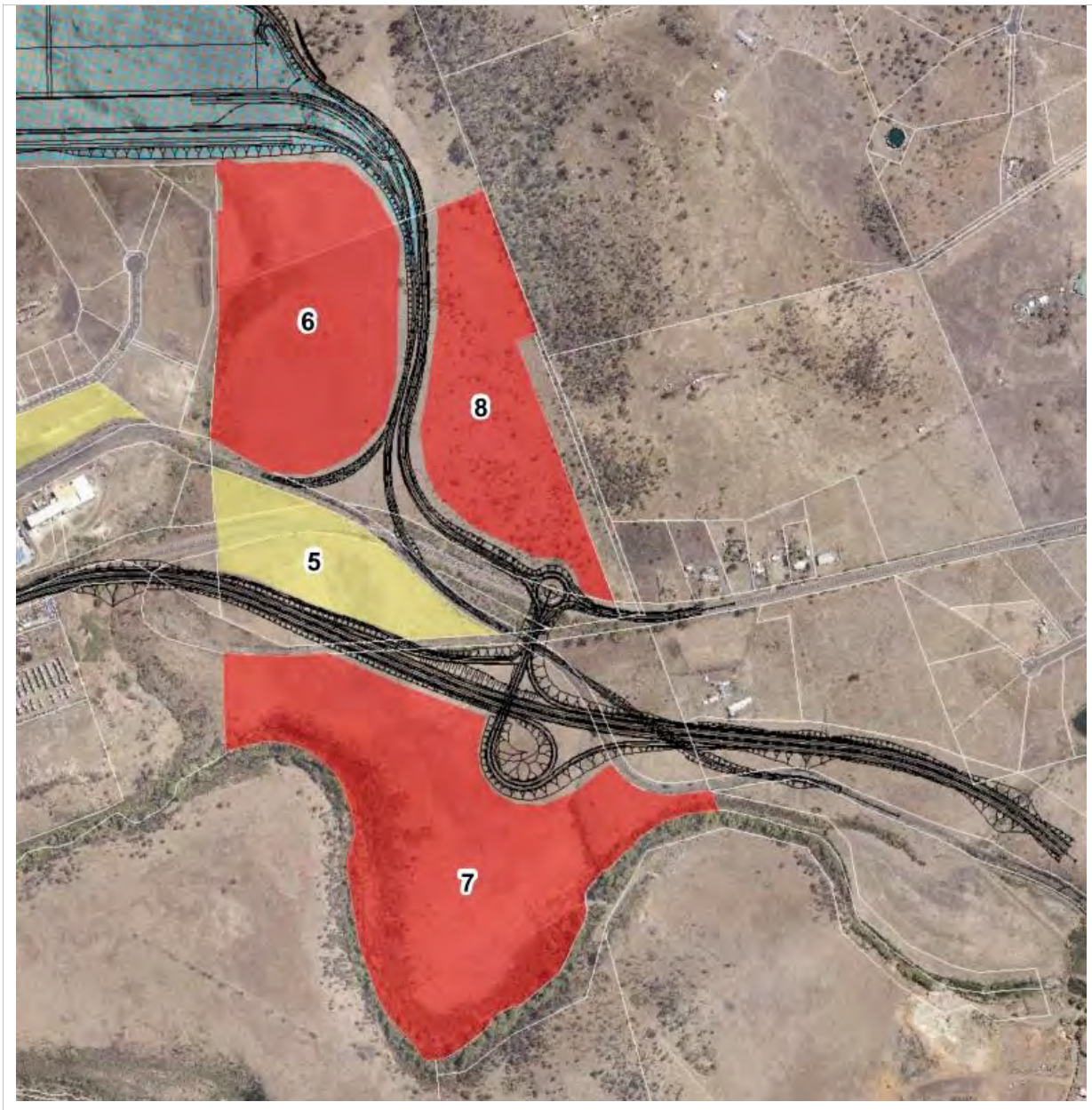
The sites are all close the Brighton Transport Hub and close to the Brighton bypass. It would use land directly adjacent to a key transport corridor. The sites could in principle make use of existing infrastructure (partly still in development). There are however some significant constraints in terms of conservation values and physical aspects (see remainder).

Only one site does not contain significant natural and/or cultural heritage values (159938/4), the other sites are not available/suitable for industrial use.

2. DEVELOPABLE LAND AREA

The total area of the parcels is approximately 11 ha (see map below). The red parcels are heavily constrained. The yellow site is unconstrained.

[12] Land titles are: 2 titles unknown, 156586/10, 156586/3, 159938/4, 156586/1, 156856/11



After excluding the parcels with significant constraints, one parcel remains and has an area of 4.3 ha – see map below. The remaining six parcels have an area of about 11ha.



3. CURRENT ZONING AND USE

Current zoning Rural. Except for one parcel (159938/4), the remaining parcels are Future Crown Reserves and future zoning would likely be Environmental Management Zone.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The parcels are owned by DIER. With the exception of the one parcel, the land has significant natural and cultural values. DIER has long term obligations to protect the values. The sites often contain offset areas to compensate for natural values that were within the Brighton bypass route. Parcel (159938/4) is also owned by DIER is considered (by DIER) for disposal to it can be used for industrial activity.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The parcel without conservation values and long term protection obligations (parcel 159938/4), has good road access and is located between rail and road infrastructure (adjacent to the Brighton Bypass). Water, sewer and electricity would be easily available.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

Parcel (159938/4) is relatively flat and is not subject to any known hazards.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

All parcels (except parcel 159938/4) have significant heritage and natural conservation values. Also, DIER has long term obligations to protect the values. These sites are all owned by DIER and earmarked as future Crown Reserve and expected to be rezoned to Environmental Management Zone.

8. OTHER CONSTRAINTS

One parcel has no road access (156586/10).

9. NEARBY USES

Parcel 156586/10 is adjacent to the Boral site. DIER expresses to ensure the site will be retained as a buffer between the Boral site and other uses.

10. OTHER OBSERVATIONS

-

Site nr: Brighton, Pontville	**Address: 367, 447 and 503 Tea Tree Road**
Suburb: Brighton	**Date: 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The sites, if rezoned to industrial, would significantly expand the urban footprint of Brighton and Greater Hobart. It would significantly alter the rural and rural-residential character of the area. Via Tea Tree Rd the sites would have quick access to the Midland Hwy. It is likely that the existing infrastructure capacity would need to be upgraded to service the industrial use of the land.

2. DEVELOPABLE LAND AREA

Approximately 189 ha, but natural values would likely significantly reduce that area, to about say 150 ha.

3. CURRENT ZONING AND USE

The land is currently zoned rural.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

Land is in private ownership and falls under the Brighton Planning Scheme.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

Via Tea Tree Rd the sites would have quick access to the Midland Hwy. It is likely that the existing infrastructure capacity would need to be upgraded to service the industrial use of the land.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is relatively flat. There are no known soil issues or hazards.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

As part of earlier work undertaken by Southern Water, it was established there are threatened species on the land (parcel 158420/21). Parts of this land have also been used by DIER for natural values offsets via conservation covenants.

Without detailed surveying, the extent of natural conservation values on the land are not known.

8. OTHER CONSTRAINTS

-

9. NEARBY USES

Rural and rural-residential.

10. OTHER OBSERVATIONS

-

Site: Brighton, Transport Hub (west south-west), Industrial land with current agricultural use or DIER land potentially available for development/disposal	**Address:** **Industrial zoned sections of 155 Cobbs Hill Rd, 32 Cobbs Hill Rd, Cobbs Hill Rd (156750/2) and Cobbs Hill Rd (156750/1)**
Suburb: Bridgewater	**Date: 28 March 2012**

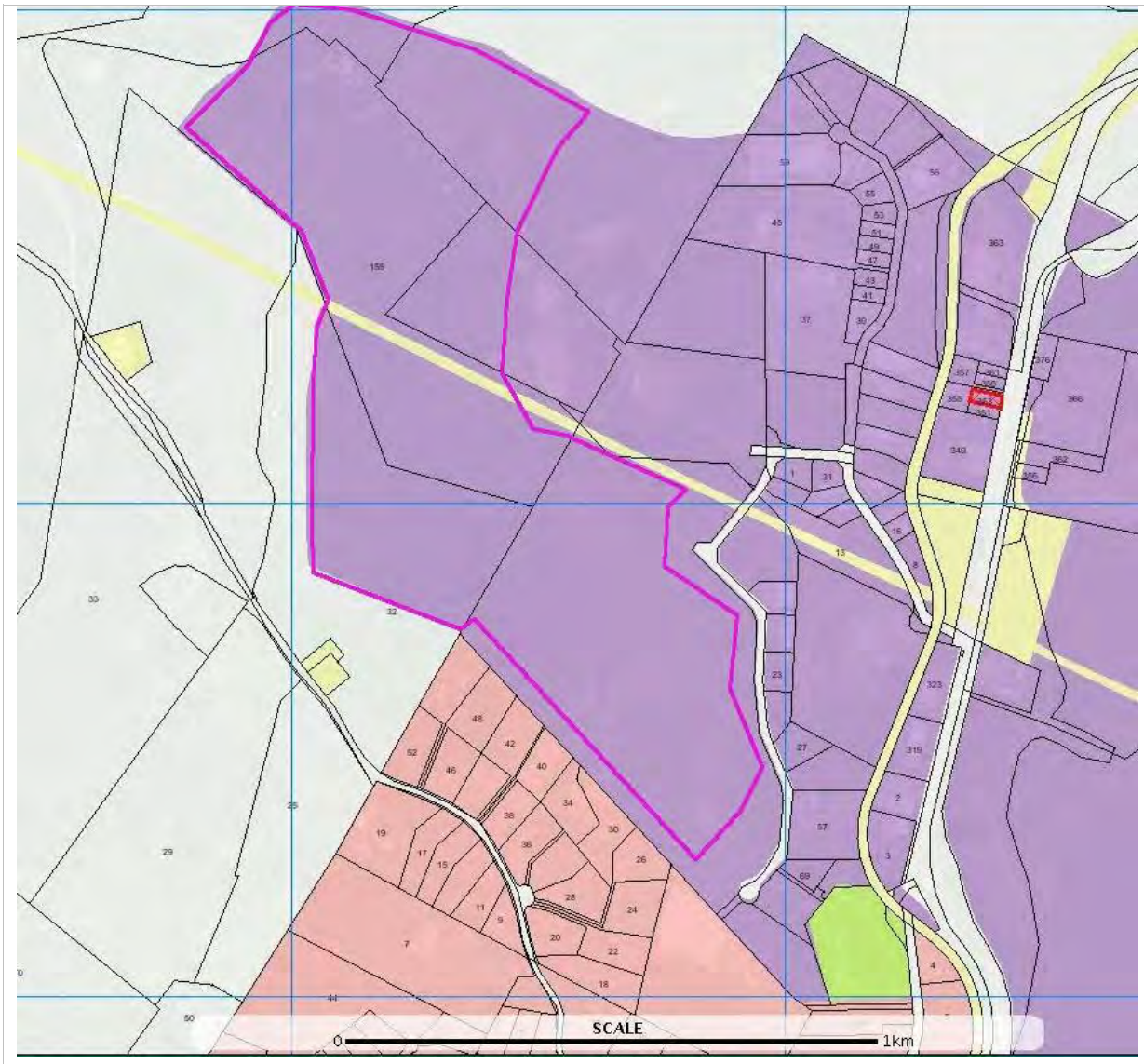
1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The land is already zoned industrial, and directly adjacent to the Brighton Industrial hub. Industrial use of the land would make optimal use of the transport provisions at the hub.

2. DEVELOPABLE LAND AREA

- 155 Cobbs Hill Rd (158008/1): ~28 hectares of industrial zoned land, privately owned
- 32 Cobbs Hill Rd (127216/1): ~ 12-13 hectares of industrial zoned land, privately owned
- Cobbs Hill Rd 156750/1: ~5.8 hectares of industrial zoned land, minus ~1.5ha water basins, DIER
- Cobbs Hill Rd 156750/2:~ 6 hectares of industrial zoned land, DIER
- Cobbs Hill Rd 156752/1: ~ 3 hectares of industrial zoned land, privately owned
- Greenbanks Rd 156757/1: ~29 developable vacant industrial zoned land, privately owned

- **SUM: ~82 hectares (see pink marked area below)**



3. CURRENT ZONING AND USE

Zoned industrial, use is rural in line with historic zoning. While the land is currently technically not vacant, the future intended use would be industrial instead of rural.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

155 and32 Cobbs Hill Rd, Cobbs Hill Rd 156752/1 and Greenbanks Rd 156757/1 are privately owned, and the two remaining lots are DIER owned. The land has not been subdivided, except for Greenbanks Rd of which the subdivided lots are currently on the market. DIER land lots will likely be disposed of for future industrial use.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

DIER parcels have road access and other services would be nearby. The private owned parcels (32 and 155 Cobbs Hill Rd and Cobbs Hill Rd 156752/1) are not yet serviced, but services would be nearby especially after the two DIER parcels would have been developed. It would be recommended to not provide road access, especially for freight, via Cobbs Hill Rd, but solely via the transport hub.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

Land is mostly flat to undulating. Some parts of the parcels may have areas with a slope of greater than 10%, towards the outer edges of the land. But this appears to be minimal. Since the land is already zoned industrial, no significant hazards or soil issues are likely present.

Cobbs Hill Rd 156750/1 includes approximately 1.5ha of water basins, which may serve a drainage purpose and would likely need to be retained.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

The land is already zoned industrial, so it is very unlikely that there are conservation values present that have not already been dealt with (for instance via offsets elsewhere).

8. OTHER CONSTRAINTS

-

9. NEARBY USES

There is a buffer area between the rural residential uses on Cobbs Hill Rd and the industry zone. No other obvious constraints are present.

10. OTHER OBSERVATIONS

The land is strategically positioned in relation to the transport hub and is already zoned industrial.

Site: Brighton Transport Hub Infill Opportunities,	**Address: Industrial parcels part of 85916/1, 156374/1, part of 9559/3, part of 50018/4 and 163537/1 (Rogerville Siding)**
Suburb: Bridgewater	**Date: 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

All four parcels lie within the Transport Hub precinct and would represent infill development. The land is currently zoned industrial and owned by DIER, who aims to dispose of the sites so they are available for future industrial use. Infrastructure and services are available nearby.

2. DEVELOPABLE LAND AREA

- part of 85916/1, 156374/1: 0.6 ha (nr.1)
- part of 9559/3: 0.9 ha (nr.2)
- part of 9559/3 and part of 50018/4: 0.5 ha (nr.3)
- 163537/1 (Rogerville Siding): 2.6 ha (nr.4)

- **SUM: 4.6 ha.**





3. CURRENT ZONING AND USE

- part of 85916/1, 156374/1: industrial & rural zone, possibility to rezone (according to DIER)
- part of 9559/3: industrial zone
- part of 9559/3 and part of 50018/4: industrial zone
- 163537/1 (Rogerville Siding) recently subdivided, balance available for industrial development, remainder was used for transport infrastructure development

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

All four sites are owned by DIER and may be disposed of and become available for industrial use. The parcels are smaller than 1 ha. Except Rogerville Siding.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

All four sites are strategically positioned close the transport hub and adjacent to the Midland Hwy. All services would be available.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

Most of the land is zoned industrial. There are no known soil issues or hazards.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

The land is already zoned industrial, so it is very unlikely that there are conservation values present that have not already been dealt with (for instance via offsets elsewhere).

8. OTHER CONSTRAINTS

-

9. NEARBY USES

Nearby uses are industrial and transport.

10. OTHER OBSERVATIONS

Strategically located. And as infill development it would support regional planning objectives.

Site: Clarence, Cambridge,	**Address: 51 Cranston Parade**
Suburb: Cambridge	**Date: 19 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The site is strategically located adjacent to Hobart International Airport and is subject to the Airport Buffer Overlay and the Inundation Overlay (Clarence Planning Scheme). The land is currently zoned rural. The area would represent development of land that is not suitable for residential use (Airport Buffer Overlay). The site is well accessible and close to other employment lands.

2. DEVELOPABLE LAND AREA

Part of the site may be proposed for rezoning (for Scheme amendment S33(2)(a)) and encompasses approximately 70 ha, subject to further design work. Remainder to be conserved for natural values and to be developed as water drainage area (water retention basin) to manage inundation risks.



3. CURRENT ZONING AND USE

The site is zoned Rural and the northern part (approx. 21 hectares) is used as a motocross track with significant fill and earth barriers. The southern part of the site has until recently been used for grazing. Part of the site is swampy/wetlands.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The parcels are owned by one single private party. The land is subject to the Clarence Planning Scheme.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The site is strategically located adjacent to the Airport, close to the Tasman Hwy, with possible access via Cranston Parade or Holyman Dr (the latter would be supported by DIER). Stormwater could be managed on site and the site would connect to the HIA drainage system. Sewer would require new rising main with new main pump station (200-300 mm) to be provided for by developer. It is located close to Cambridge Waste Water Treatment Plant. Water supply provisions to meet water demand have not been assessed yet, and no feedback has been received yet from Southern Water.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

Part of the site is subject to inundation. The site is mostly within the 20NEF Noise Forecast Contour which would make it unsuitable for residential use. The land is flat. There are natural conservation values that are outside the proposed industry zone.

To manage inundation risks the site plan includes a water retention basin of approximately ~20 ha.

A geotechnical assessment by p+s (2010) concludes the site is suitable for industrial development, provided sympathetic design to near-surface

clays and water logging.

A Stormwater Drainage Assessment (p+s, 2010) shows a detention basin would be required on the remainder of the site. Water supply provisions have not yet been assessed.

In short; although there are significant constraints, the technical assessments undertaken so far suggest these constraints can be overcome by the developer.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

Aboriginal cultural heritage assessment indicates no Aboriginal sites or object (Nov, 2010).

Desktop historic heritage assessment (p+s, Oct 2011) indicates no features of heritage significance.

Flora and fauna assessment (February 2009 and Spring 2010) identify 6 threatened species under the TSP Act 1995 and 2 species under EPBC Act 1999.

8. OTHER CONSTRAINTS

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9. NEARBY USES

- Hobart International Airport
- Tasman Hwy
- Cambridge Park Industrial Precinct
- To south west: rural residential. The industrial zoned is contained within the Airport Buffer Overlay: an area already subject to noise.
- To south east: recreation zone: Llahere Golf Course.

10. OTHER OBSERVATIONS

The technical assessments undertaken so far have not yet been reviewed and contested. Possibly the southwest corner of the proposed rezoning leaves insufficient buffer to residential uses, which may be addressed by resizing the area earmarked for industrial zoning.

Site: Clarence, Cambridge, Cranston Parade (excluding 51 Cranston Prde)	**Address: Cranston Parade. Parcels: part of 107856/2 or HRB28, part of 156582/1 or HRB36 and part of 161103/1 or HRP11**
Suburb: Cambridge	**Date: 19 & 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The land is located close to the HIA and Cambridge industrial area, and is subject to the Airport Buffer Overlay and partially to the Inundation Overlay.

2. DEVELOPABLE LAND AREA

- part of 107856/2 or HRB28: ~11.3 ha
- part of 156582/1 or HRB36 ~3 ha
- part of 163617/1: ~7.5 ha

part of 146586/6: 3.5 ha.

SUM ~25 ha. Minus area required to manage inundation risks / drainage.



3. CURRENT ZONING AND USE

Rural zone with grazing.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The land is privately owned and falls under the Clarence Planning Scheme.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The land would have access to Cranston Parade and Cranston Parade has access to the Tasman Hwy via the airport roundabout. The roundabout requires a future upgrading to adequately manage traffic streams on the Hwy and from the airport. DIER has expressed it would not be in favor of increasing the traffic volume from Cranston Parade onto the roundabout due to design and road safety issues. Alternatively, access could be created through 51 Cranston Parade onto Holyman Dr.

Sewer infrastructure would likely require an upgrade in line with what is defined for 51 Cranston Parade. Whether this upgrade could support both 51 Cranston Parade and this site is uncertain.

A drainage system would be a required infrastructure investment to manage inundation risks.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is flat and there are no known soil issues. The site is subject to inundation hazards and these should be addressed as part of the site's development.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

As far as known, no site assessments have taken place. Based on the assessments on the adjacent land, it would be possible there are some threatened species present. In case the site is developed this would have to be addressed adequately.

8. OTHER CONSTRAINTS

-

9. NEARBY USES

Nearby uses are rural residential to the southwest, the Tasman Hwy, HIA and the Cambridge industrial area. There is a buffer of approximately 700 meters from the nearest rural-residential use (dwelling).

10. OTHER OBSERVATIONS

This site would be closer to rural-residential uses than the 51 Cranston Parade site. It would be logical from an urban consolidation point of view to first develop (if at all deemed suitable) 51 Cranston Parade and then the subject site.

Site nr: Clarence, Cambridge, 1 Kennedy Drive	**Address: 1 Kennedy Drive**
Suburb: Cambridge	**Date: 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

Developing the entire site for industrial use may not be in line with strategic planning objectives. The site is zoned intensive agriculture and is outside the urban growth boundary. But, the site is fully serviced (supporting the aim to make efficient use of existing infrastructure capabilities).

A proposed rezoning and subdivision of the land to residential was refused by the Tasmanian Planning Commission (May 2012). The agricultural value of (some) of the land and nearby residential uses would conflict with an industrial zoning. Possibly, part of the site with road frontage may be suitable for industrial use, say 6 hectares of total area.

The current zoning allows for agriculture related industrial uses, such as a horticulture and garden centre.

2. DEVELOPABLE LAND AREA

The site is 17 hectares minus reserved area for possible future bypass and buffers from sensitive uses, say 14 ha. Minus preservation for some agricultural use and buffer from sensitive uses, the developable area may be around 6 ha..



3. CURRENT ZONING AND USE

The land is zoned Intensive Agriculture and is used for grazing. Evidence submitted to the TPC hearing suggests the land is mostly suitable for grazing and somewhat suitable for intensive cropping. It was however also argued that intensive cropping at the site given constraints such as available water volume from irrigation schemes would be uneconomically.

Discretionary uses under the current zone include plant nursery / garden centre and rural industry.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The land is privately owned, is within Clarence City Council authority and consists of two parcels of ~17ha and 2ha.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

According to a report for the development proposal, the land is fully serviced with access to mains water, sewer, power and communications

infrastructure. The land has good access to the Tasman Hwy.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is relatively flat and a creek runs along the border of the parcels. There are no known soil issues or hazards, apart from the argument that the land may be less suitable for intensive agriculture. Land category is Class 4 which according to Grose (1999) makes it mostly suitable for grazing and potentially suitable for occasional cropping.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

The value of the land for agricultural uses (on an economical basis) appears to be constrained. There are no known significant conservation values.

8. OTHER CONSTRAINTS

-

9. NEARBY USES

The land is adjacent to rural-residential uses to the north-east, adjacent to intensive agriculture to the north and adjacent to industrial uses to the south and west. The site is close to the Tasman Hwy to HIA.

10. OTHER OBSERVATIONS

A proposed residential redevelopment of the site was not approved by the Tasmanian Planning Commission.

Site: Clarence, Hobart International Airport, Precinct 3 and 9	**Address: Hobart International Airport**
Suburb: HIA	**Date: 19 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

HIA falls under the Federal planning authority and is not subject to local and regional planning objectives, although the local planning context was considered when proposing and assessing development on the land.

The airport is strategically significant and provides access to export markets. Industrial development that aims to use and capitalize on this infrastructure is in principle in line with planning objectives.

2. DEVELOPABLE LAND AREA

Precinct 3 and 9, as identified as part of the HIA Master Plan (2009, approved July 2010) are earmarked for industrial use. The precincts are already partially in use and the developable area is less than 15.5 ha (total precinct areas) and likely in the area of ~4ha. (response requested from HIA – no response after 3 actions).

3. CURRENT ZONING AND USE

The land is zoned industrial.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

Federal land, owned by Hobart International Airport.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

Land is fully serviced.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is flat and part of the airport land, and constraints to some uses that may impose a risk to aviation traffic are likely applicable.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

There are no known conservation values that have not already been dealt with as part of the HIA Master Plan.

8. OTHER CONSTRAINTS

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9. NEARBY USES

Hobart International Airport, Tasman Hwy and industrial uses and agricultural land adjacent to HIA.

10. OTHER OBSERVATIONS

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Site: Clarence, Hobart International Airport, potential future aeronautical purposes	**Address: Hobart International Airport**
Suburb: HIA	**Date: 28 March 2013**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The subject land falls under the Clarence Planning Scheme and is currently not part of the HIAPL master plan. The land has been identified for potential future use by specific aeronautical uses. The intended uses are aviation related. Any use of land related to aviation is subject to particular safety and quality standards. A particular purpose zone should be considered for this site. Industrial zoning is not appropriate.

2. DEVELOPABLE LAND AREA

The land is located to the southwest of the current airport. The land area is approximately 36 ha.



3. CURRENT ZONING AND USE

The land is zoned recreation.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

Commonwealth land, owned by Hobart International Airport.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

Land is not serviced. The land has no direct access onto major transport routes.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is flat and part of the airport land, and constraints to some uses that may impose a risk to aviation traffic are likely applicable.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

There are no known conservation values.

8. OTHER CONSTRAINTS
-
9. NEARBY USES
Hobart International Airport, rural and recreation uses.
10. OTHER OBSERVATIONS
The intended uses of the land by the airport are for aeronautical purposes: Antarctic services; Aircraft maintenance and hangars; General Aviation; and Freight and logistics.

Site: Clarence, Mornington Rd, Waste Transfer Station and adjacent parcel	**Address: 126 and 128 Mornington Road** **- 128 Mornington Rd, 140025/1, HRQ56** **- 126 Mornington Rd, Waste Transfer St, 135388/1 & 135388/2**
Suburb: Mornington	**Date: 19 March**
1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES	
Both 126 and 128 are currently used as industrial land and most land has been degraded by human interaction. The sites would not expand the existing urban footprint and could plausibly make use of existing infrastructure provisions. Since much of the area is already used for industrial purposes, a rezoning would represent a limited expansion of available *vacant* supply by about 6 hectares for 128 Mornington Road. At 126 Mornington Rd the rezoning would allow for an expansion of operations by the waste transfer station and would not create additional land for other industrial uses. The road towards the site is currently privately owned, but is likely to be purchased by Council and upgraded towards government standard in late 2012 early 2013. This is expected to improve the accessibility to the site. The location of the site would remain somewhat invisible and 'tucked away'.	
2. DEVELOPABLE LAND AREA	
126 Mornington Rd: The waste transfer station uses the site and is intended to continue to do so. The site may be used more intensely in the future. The developable area of the site (which is mostly already in use) is about 18 ha. Since the use is already industrial the rezoning would not generate available new supply. 128 Mornington Rd: Part of the site listed as a potential future industrial site covers approximately 6 hectares.	



3. CURRENT ZONING AND USE

126 Mornington Rd, The Mornington Waste Transfer Station is currently zoned industry.

128 Mornington Rd: the part listed as potential future industrial is zoned Landscape and skyline conservation zone, and is an undeveloped area and mostly degraded by human interaction. Part of the remainder of the site is currently zoned industrial and used as such.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

126 &128 Mornington Rd: fall under the Clarence planning scheme.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

Both 126 and 128 Mornington Road have road access and have power, water and sewage on site.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

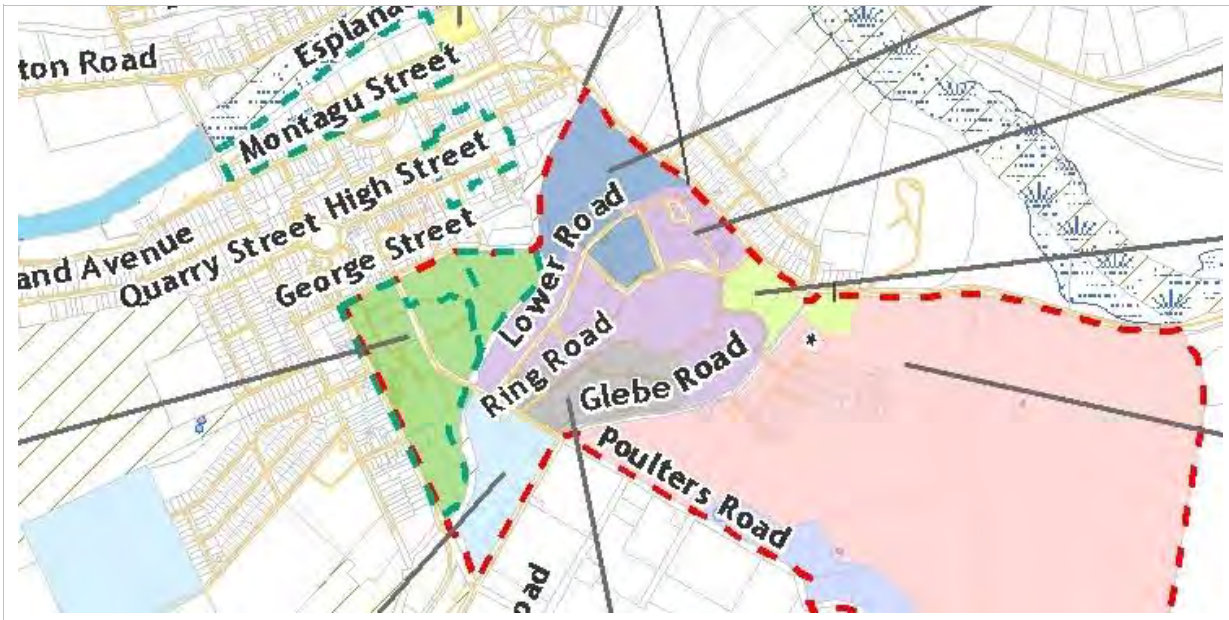
126 Mornington Rd: the area is steep at places, and many terraces have been made.

128 Mornington Rd: the area is fairly steep, and would likely be limitedly suitable for intense use. Expansion of existing uses would likely be possible.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)
There are a number of threatened flora species (Risdon Peppermint) at the southern border of 126 Mornington Rd and some buffer may be required. There are no known other conservation values. 128 Mornington Rd is a landscape and skyline conservation area, but the selected area within the site does not include known natural values and is not the most elevated part.
8. OTHER CONSTRAINTS
-
9. NEARBY USES
Nearby uses are mostly residential (north and west) and some rural residential uses nearby (north). To south and east the land is surrounded by natural and skyline conservation zone and rural-residential uses. There is a steep natural ridge to the south of 126 Mornington Rd, which provides a natural border. The potential for residential intensification of the rural residential area is limited.
10. OTHER OBSERVATIONS
The waste transfer station site is proposed for rezoning to better reflect its current use and to allow for expansion of existing activities. 128 Mornington Rd would allow for expansion of existing use and to some extent for locating additional industrial uses, although the slope may be a limiting factor. The site is however tucked away behind existing industrial uses, and would unlikely be attractive for intensive use by local service industries. In all, the site offers limited development potential.

Site: Derwent Valley, New Norfolk	**Address: cr Glebe Rd and the Avenue**
Suburb: New Norfolk, Derwent Valley	**Date: 28 March 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES
Future use for industrial would be in line with the existing use of surrounding parcels. Part of the land would consist of redevelopment of land formerly used for health care facilities. It would make use of existing infrastructure capabilities and not represent an expansion of the urban footprint. There may be some issues with nearby sensitive uses, but these can expectedly be dealt with through proper urban design. There is a risk of residential encroachment which may need to be addressed in the Planning Scheme.
2. DEVELOPABLE LAND AREA
Developable, vacant land area is approx. 4 ha. Vacant sites: • 139660/5, HVS16 – 4,500 sqm • 139660/8, HVS12 – 3,000 sqm • 139660/7, HVS40 – 3,000 sqm • Abandoned, 139660/6, HVS45 – 1.2 ha • Abandoned, part of 159779/38 – 1.2 ha • Council land 139660/22 – 2,500 sqm • Plus underused parcels with subdivision potential ~0.5ha



3. CURRENT ZONING AND USE

Council considers rezoning as part of PS review: the current zone is Special Development and that will cease to exist under new scheme. Planner will recommend rezoning it to Light Industrial to Council. Surrounding uses are industrial and commercial. It is supported by the Joint Land Use Planning Initiative (Derwent Valley, Southern Midlands, Brighton and Central Highlands Councils) which was completed in 2009, endorsed by Council but it has not been declared a regional land use strategy by the Minister (Section 30C(3) of LUPAA 1993.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

According to Council's planner there are no nearby sensitive uses, land is flat and owners are happy to rezone. Land is all subject to Derwent Valley planning scheme.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The land is accessible by road and should be fully serviced. Some of the on-site infrastructure may be out of date (some parcels were historically health care facilities).

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is flat. Two larger parcels have abandoned (derelict) building on them.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

There are no known heritage or other values.

8. OTHER CONSTRAINTS

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9. NEARBY USES

Nearby uses include commercial/industrial uses. Nearby residential uses are towards the southeast, west and north. Both in southeast and north residential lost are being released. The residential uses mostly separated by a road, other industrial uses and open space.

10. E

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Site: Glamorgan-Spring Bay, Triabunna, Part of Mount Murray, 336 Okehampton Rd	**Address: 336 Okehampton Rd**
Suburb: Glamorgan-Spring Bay, Triabunna	**Date: n/a**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The land is away from other industrial land in Triabunna and would also expand the urban footprint. The land is only limitedly serviced (one dwelling) and accessible by access road.

2. DEVELOPABLE LAND AREA

Developable area yet unknown, could be very large. The entire parcel is ~270 hectares.

3. CURRENT ZONING AND USE

The land appears to be used for grazing and includes one dwelling. The land is zoned Rural and a small part of it is zoned Native Habitat.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The land consists of one large parcel and is subject to the Glamorgan-Spring Bay planning authority.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The land is only limitedly serviced (one dwelling) and accessible by access road.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is flat to fairly steep. There are no known hazards or issues.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

There was one flora conservation site identified on the land. There are no known other conservation values.

8. OTHER CONSTRAINTS

There is a lack of demand for industrial land.

9. NEARBY USES

Rural and natural areas.

10. OTHER OBSERVATIONS

There is no obvious reason to rezone an enormous parcel of land to industrial in light of the facts there is vacant supply and a lack of demand. It would also not make use of existing (road) infrastructure capabilities. There would likely be more suitable locations in case there was a need for additional industrial land.

Site: Huon Valley, Cradoc, Duggans Pty ltd quarry	Address: Duggans Pty ltd quarry, Channel Hwy, Cradoc (PID 3138515)
Suburb: Cradoc	**Date: 23 April 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The site is used for quarry and industrial activities. A future industrial zoning of the site would arguably better reflect current activities and allow for expansion of manufacturing (construction industry) related activities. The site is well away from urban settlement. The site will soon be connected to reticulated water and has state highway access.

The future industrial zoning of this site would not support a less dispersed settlement pattern. However, the site is already in use – so it would also not adversely affect the settlement pattern that already exists.

The future industrial zoning of the site would contribute to a more efficient use of existing infrastructure to the site.

The rezoning would involve rezoning from rural land (rural A) which aims to protect the rural environment and rural related activities.

2. DEVELOPABLE LAND AREA

Area to be developed (excluding existing uses): ~2 ha..

3. CURRENT ZONING AND USE

The land is a Buffer Area. "The purpose of Buffer Areas is to indicate areas which may be detrimentally affected in terms of health, safety or amenity due to the influence of a particular use on surrounding land." (Port Cygnet Planning Scheme)

The zoning is Rural A, the intent of which is to "to protect the rural environment and to aid the continuance of farming and other rural related activities"

The land is currently used as a quarry and also for manufacturing of pre-cast concrete walls.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The land is under the Port Cygnet Planning Scheme, and under the future Huon Valley Planning Scheme.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The site is accessible from the Channel Hwy and is soon to be connected to reticulated water as part of the Huon Valley Regional Water Scheme.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The site is fairly steep, less so towards the west. Terraces have been made in the past as part of quarry activities. There are no known other site issues.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

There are no known conservation values. There are no known threatened species on the land. However, some threatened species (fauna) are listed on the exact boundary of the site (eastern barred bandicoot).

8. OTHER CONSTRAINTS

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9. NEARBY USES

Rural and rural-residential.

10. OTHER OBSERVATIONS

There are some current industrial activities (pre-cast concrete wall manufacturing) that have spinned off the quarry activities. Quarry activities are

however discretionary under the Rural A zoning.

Site: Huon Valley, Geeveston, next to oval and adjacent to existing industrial land	**Address: Incorporated in Kermandie Foorball Club site, 4525 Huon Hwy, owned by Council**
Suburb: Geeveston	**Date: 14 May 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

The site is adjacent to existing industrial land. The gravel road would require an upgrade in case of rezoning and services are not on site. The rezoning would have limited impact on the liveability of the area. The site is close to the residential settlement of Geeveston. There is no apparent need for more industrial land. The land could be reserved for future industrial use, and as a holding zone it could be considered for rezoning to rural resource zone.

2. DEVELOPABLE LAND AREA

The developable land area is approximately 2 ha.



3. CURRENT ZONING AND USE

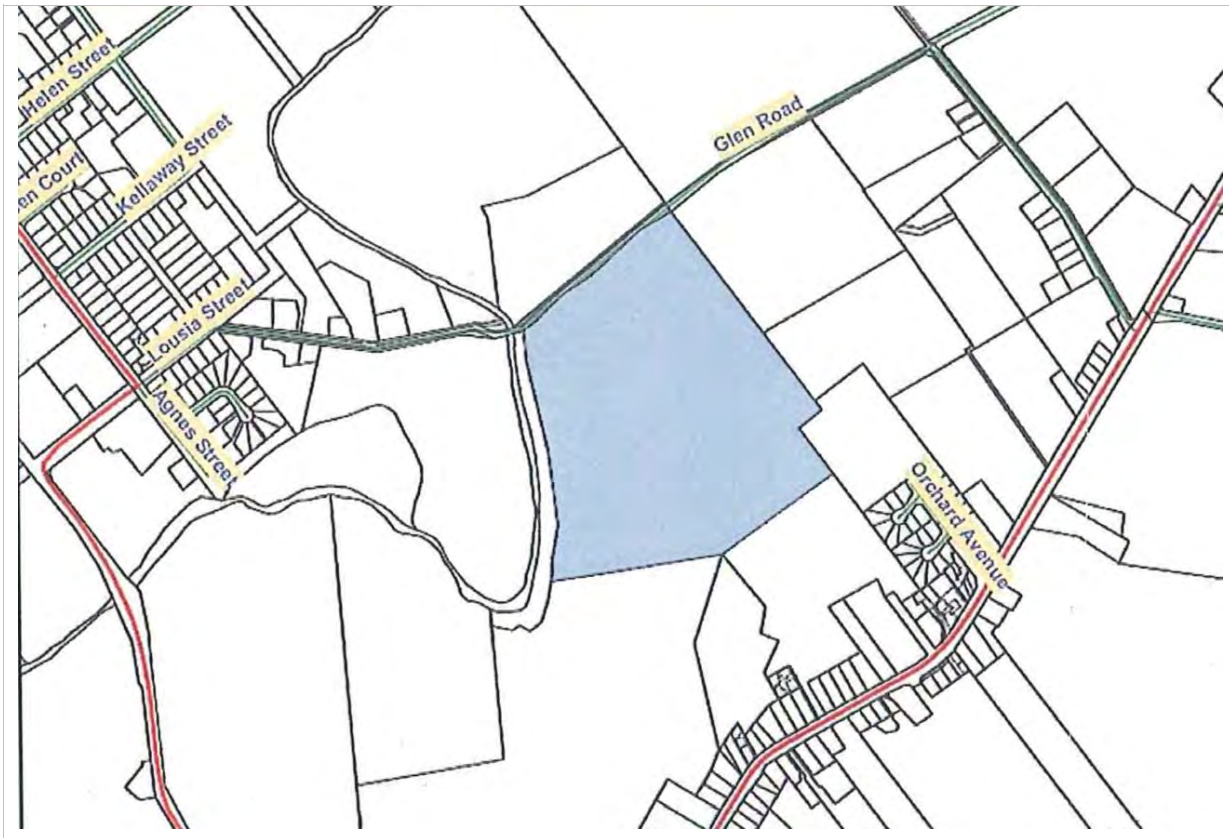
The land is zoned Open Space under the Esperance Planning Scheme. Council purchased the land from the Crown as part of the Crown Land Classification Project and incorporated it in the recreation ground.

The land is currently not used and does not include the existing sports ground.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)
Council owns the site.
5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)
No servicing for water. Sewage could be made available from highway. There is an existing gravel road access (Thiessen's Rd) which would require upgrading.
6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)
The land is relatively flat and there are no known physical issues.
7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)
There are no known conservation values on the site.
8. OTHER CONSTRAINTS
-
9. NEARBY USES
Adjacent uses are recreation (football), rural and industrial and some residential uses at some distance with light industry in between.
10. OTHER OBSERVATIONS
-

Site: Huon Valley, Huonville-Ranelagh, former quarry, approved rezoning to industrial	**Address: 199 Glen Rd**
Suburb: Huonville	**Date: 24 January 2011**

11. ALIGNMENT STRATEGIC PLANNING OBJECTIVES
• The land was rezoned from intensive agricultural to light industrial. The land had been in use as a quarry (mining sand, pebbles and clay) for an extended period, and as such was preferred to be rezoned over other rural zonings with actual agricultural use. Stormwater management is appropriately dealt with in the amendment. • The quarry is largely exhausted, which makes it available for alternative use. • The site is close to existing developed areas and close to Huonville CBD and supports a less dispersed development pattern • Due to its proximity to town, it would provide fairly easy access for most. • The rezoning of the site is supported by local strategic planning directions and by the Huonville/Ranelagh Structure Plan
12. DEVELOPABLE LAND AREA
Council estimates about 13 ha of 20 ha is suitable for development. This excludes land with conservation values, flood prone land and large dam).



13. CURRENT ZONING AND USE

Light Industrial, limited use as quarry, otherwise ready for redevelopment.

14. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The land has been rezoned to Light industrial after approval by TPC. The land is in single ownerships (Hazell Brothers Group Pty Ltd). Huon Valley Council is the responsible planning authority.

Minimum lot sizes 1,000 sqm

Use classes largely comprise local service industries and also allows for general industries and rural industries.

15. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

Direct access to a local road which is sealed and wide to allow for trucks. Other industrial uses from that road include a local saw mill and timber yard and a Tassal processing plant.

Council has advised the site is capable of being serviced.

16. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

Mixed features, including excavation features, hardstand areas, small dams, pockets of pasture and remnant eucalypt woodland.

Provision has been allowed for a walkway beside Mountain River in the proposed departure.

17. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

Approximately 1 ha is below 1/100 ARI flood mapping conducted in 1993. A clause for development in this area is provided in the planning scheme amendment.

Ares with natural values protected from development (through clauses)are:

- Dry blue gum forest and woodland (threatened native vegetation community), important habitat for threatened fauna species.

- Riparian vegetation is classified as vulnerable land: clearance and conversion is not permitted unless exceptional circumstances

A Weed Management Strategy and Hygiene Plan are required prior to development.

A rehabilitation plan is required and to be approved before the current mining lease can be surrendered.

18. OTHER CONSTRAINTS

-

19. NEARBY USES

Agricultural and residential, close to Tassal factory and area that is recognized in Huonville / Ranelagh Structure Plan as having potential for downstream processing of agricultural and horticultural products. Council aims to allow for downstream processing in the rural resource zone under the new planning scheme.

20. OTHER OBSERVATIONS

-

Site: HBMI Pty Ltd Quarry opposite Leslie Vale turn-off from Huon Hwy	**Address: The cleared part of three titles:** • **441 Leslie Vale Rd (198868/1)** • **Huon Hwy (199923/1)** • **Huon Hwy (101664/7)**
Suburb: Leslie Vale (Kingborough)	**Date: 14 May 2012**

1. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

- The site does not support a condensed settlement pattern, as it is away from existing settlement.
- It would require water and sewage to be provided on site or the infrastructure to be supplied to the site. It would also require an upgrade of the highway turn-off.
- It does not result in obvious land use conflicts. The existing quarry likely creates some noise and dust issues.
- The cleared land on the site has been degraded in the past, and is currently zoned Primary Industries (and rural resource zone under the planning scheme – which Council recognizes a 'holding zone' for potential future industrial use).

2. DEVELOPABLE LAND AREA

The cleared area over the three parcels is approximately 54 hectares. The potentially developable area (minus the steep land area of ~17ha) is approximately 37 ha.

3. CURRENT ZONING AND USE

The land is currently used for extractive industries and functions as a quarry. Part of the site is used for the sale of extracted products. The cleared land is not all currently in use, but has been degraded in the past.

The land is currently zoned Primary Industries, and will be zoned rural resource under the planning scheme. It is used by Council as a holding zone for potential future industrial use of the site depending on findings from future investigations into the feasibility of the site. In the meantime it can be continued to be used for extractive and related industries.

4. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)

The land is privately owned and exists of three lots, all owned by a single owner.

5. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)

The land is well accessible via the Huon Highway and there is an existing turn-off (Leslie Vale Rd) which could be used, but would require upgrading to allow more intense use.

Water and sewer are not available. Electricity can easily be made available.

6. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)

The land is mostly flat to undulating and there is a more steep area that would likely be unsuitable for industrial use.

There are no known issues.

The land is mostly surrounded by very steep bushland which creates a natural buffer to any nearby uses.

7. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)

The cleared land encompasses few known conservation values (beaked needlebush and common brushtail possum) and no known threatened or rare species. The timbered areas around the cleared land (not considered for potential industrial) does inhibit some conservation values.

The cleared land has been significantly degraded in the past.

8. OTHER CONSTRAINTS

-

9. NEARBY USES

Most nearby uses are rural. Across the Huon Hwy there are rural-residential uses. Part of the site is used as a quarry, and there is a sales yard for quarry products.

10. OTHER OBSERVATIONS

-

Site: Kingborough, Kingston Huntingfield – Maddocks Rd, 27 Springfarm Rd	**Address: 27 Springfarm Rd, 158092/1**
Suburb: Kingston (Kingborough)	**Date: 14 May 2012**

11. ALIGNMENT STRATEGIC PLANNING OBJECTIVES

- Within the urban growth boundary (Kingborough Council) for Greenfield development
- Would compete with demand for land for residential and commercial purposes; possible mixed use area
- Currently zoned primary industries
- Not currently serviced for water and sewage
- Good access to Channel Hwy, possibly onto bypass roundabout near Antarctic Division.

12. DEVELOPABLE LAND AREA
Developable area (minus steep land 17ha. and minus Environmental Management zone 3.5ha) is approximately 54 ha. Assuming mixed use development, between 14 and 18 ha. May be available for future industrial zoning.
13. CURRENT ZONING AND USE
Current use is mainly paddocks / grazing. The land is zoned Primary Industries and Council aims to zone it Particular Purpose Urban Growth Zone under the new planning scheme, which in principle allows for residential, commercial and/or industrial use. It would be a 'holding zone' for future growth.
14. LAND STATUS (OWNERSHIP, PARCELS, LOT SIZES, PLANNING AND MANAGEMENT AUTHORITIES)
Single ownership, under the Kingborough Planning Scheme.
15. INFRASTRUCTURE AND SERVICES (TRANSPORT, WATER, SEWAGE, POWER, ICT)
Road access would be either via Maddocks Rd onto the Channel Hwy or directly onto roundabout of Kingston by-pass near Antarctic Division. It is adjacent to a Transend power station. The land is currently not serviced, but would be once Greenfield development is initiated.
16. PHYSICAL SITE CHARACTERISTICS (SLOPE, SOIL ISSUES, HAZARDS, CONTAMINATION)
There is a steep area nearly dividing the land in two separate areas (natural buffer between different uses) of about 17 ha, which would be unsuitable for development. There is a creek running through the land, and the creek and the area around it is zoned Environmental Management (approx. 4 ha. outside the steep area), which would not be proposed to be developed. There are no other known issues.
17. ENVIRONMENTAL, HERITAGE AND OTHER CONSERVATION VALUES (INCLUDING SIGNIFICANT AGRICULTURAL LAND)
There are likely some natural values in the Environmental Management Zone. There is threatened flora (gentle rush). There may be Aboriginal Heritage values, possibly along the Creek.
18. OTHER CONSTRAINTS
-
19. NEARBY USES
Primary industries / agriculture, utilities, State highway and at some distance residential and commercial uses.
20. OTHER OBSERVATIONS
-

APPENDIX 2 OVERVIEW OF GOVERNMENT-OWNED LAND ORGANISATIONS IN AUSTRALIA

	GLO	*Legislation*	*Statutory powers*	*Area of operation*
NSW	Landcom	*The Landcom Corporation Act 2001*	• General power to do business	Sydney and regional
Vic	VicUrban	*Victorian Urban Development Authority Act 2003*	• General power to do business • Additional powers relating to declared projects include compulsory land acquisition and the power to impose charges (general and infrastructure recovery) on property owners in declared areas	Declared areas in Melbourne and regional Victoria
Qld	Urban Land Development Authority (ULDA)	*Urban Land Development Authority Act 2007*	• Planning and DA within declared areas • Impose conditions on development • Impose penalties for breach of conditions or planning scheme • Override local council by-laws • Coordinate, provide or pay for infrastructure • Issue directions to a state or local government entity to provide or maintain infrastructure • Impose charges and/or other terms for infrastructure, services and works	Designated areas in Brisbane and regional Queensland
WA	LandCorp Department of Housing[a]	*Western Australian Land Authority Act 1992*	• General power to do business	Across Western Australia
SA	Land Management Corporation (LMC)	*Public Corporations (Land Management Corporation) Regulations 1997*	• General power to do business	Adelaide
Tas	No agency in operation			
ACT	Land Development Agency (LDA)	*Planning and Development Act 2007*	• No special powers under the Act	ACT
NT	Land Development Corporation (LDC)	*Land Development Corporation Act 2009*	• General power to do business • Make by-laws and impose minor penalties for breaches of those by-laws • Make regulations	Darwin and Palmerston

[a] Following a government review in 1998, Landcorp transferred its 10,000 to 12,000 lot land bank to the Department of Housing which is estimated to provide in excess of 10 per cent of the greenfields lot releases in Perth.

Sources: *The Landcom Corporation Act 2001* (NSW); *Victorian Urban Development Authority Act 2003* (Vic); *Urban Land Development Authority Act 2007* (Qld); *Public Corporations (Land Management Corporation) Regulations 1997* (SA); *Western Australian Land Authority Act 1992* (WA); *Land Development Corporation Act 2009* (NT); *Planning and Development Act 2007*(ACT).State and territory legislation; LDA (2010a); LDC (2010a); LMC (2010a); Landcom (2010a); LandCorp (2010a); ULDA (2010a); VicUrban (2010a).

Australian Capital Territory

The Land Development Agency (LDA) is a territory authority established by Section 31 of the Planning and Development Act 2007. The LDA sells and develops land on behalf of the ACT Government. The LDA is the act government's agency with responsibility for the development and release of government owned land for residential, commercial, and industrial and community purposes. In this role it operates at the boundary of commercial and

public sector activities. It seeks to balance potentially competing priorities, and provide opportunities for private sector development to optimise the community benefits from the act's land assets. In the discharge of its responsibilities, the LDA is:

- A key deliverer of government land release outcomes;
- A major supplier of raw land for development and individual serviced sites for building activities for private sector developers, builders, households and businesses; and
- A tool for the delivery of the act community's aspirations for high quality, sustainable living environments.

Each year the ACT Government prepares Indicative Land Release Programs setting out the Government's intended Program of residential, commercial, industrial and community and non-urban land releases. The Programs are indicative and are subject to change as market conditions alter or as Government priorities are adjusted. The Economic Development Directorate (EDD) is responsible for preparing the Programs in conjunction with key Territory agencies such as Treasury Directorate, Chief Minister and Cabinet Directorate (CMCD), and ACT Planning and Land Authority (ACTPLA). EDD also closely consults with the Land Development Agency (LDA). The Economic Development Directorate is the portfolio agency for the LDA. From there, the LDA sells residential land in three ways: over-the-counter, auction and ballot.

In the 2010- 2011 financial year, LDA released residential land totalled sites for 5,048 dwellings (target 5,000). Commercial land releases comprised a total area of 168,233 square metres with industrial land releases totalling 173,466 square metres. As of 30 June 2011, the LDA held exchanged contracts with a total value of $476 million. During 2010-11, total land sales revenues and profits were $218.3 million in. (Land Development Agency, 2011)

New South Wales

Landcom is a state-owned corporation, operating under the Landcom Corporation Act 2001. As the New South Wales Government's property developer, Landcom is charged with delivering the state's plans for urban growth and change. Landcom plan and deliver strategic developments across the greater metropolitan region including residential neighbourhoods; mixed use centres of commerce, employment and services; and regional recreational facilities.

Landcom's principal functions are to:

- Undertake and participate in residential, commercial, industrial and mixed development projects; and
- Provide advice and services related to urban development, on a commercial basis, to government agencies and others.

Landcom's developments must deliver on the urban growth and management objectives set by the New South Wales Government. For the 2010/ 2011 period, Landcom achieved $403.9 million in total revenue. Dwelling equivalents delivered to the market for this period totalled 1,758 (Landcom, 2011).

New South Wales has a number of site specific redevelopment authorities within metropolitan Sydney. The Sydney Metropolitan Development Authority (SMDA) was established in December 2010 to pursue the NSW Government's commitment to urban renewal in the Sydney Metropolitan area and to ensure delivery of the objectives of the State Environmental Planning Policy (Urban Renewal) 2010 (SEPP). The SMDA assumes many of the functions of the now defunct Redfern-Waterloo Authority, and focuses on the areas of Redfern-Waterloo and Granville. The Sydney Metropolitan Development Authority is constituted under the *Growth Centres (Development Corporations) Act* 1974 and reports to the Minister for Planning and Infrastructure through the SMDA Board. (SMDA, 2012) The Sydney Harbour Foreshore Authority was formed in 1999 under the Sydney Harbour Foreshore Authority Act 1998 to consolidate the work and functions of City West Development Corporation, Darling Harbour Authority and Sydney Cove Authority (Sydney Harbour Foreshore Authority, 2012).

+Regions outside metropolitan Sydney also have designated land development authorities. The Hunter Development Corporation is active in the Lower Hunter region of New South Wales, facilitating the development of industrial, residential and recreational facilities. In July 2007 the NSW Government announced the formation of the Hunter Development Corporation through the merger of the Honeysuckle Development Corporation and the Regional Land Management Corporation. As a NSW State Government organisation, corporate governance is the province of a board of directors which reports to the Minister for Planning and Infrastructure (Hunter Development Corporation, 2012). The Central Coast Regional Development Corporation (CCRDC) was established to be the State Government's lead agency in creating development projects and opportunities over key government land holdings across Central Coast of NSW. It was created under the Growth Centres (Development Corporations) Act and it has replaced expanded the role of the former Festival Development Corporation (CCRDC, 2012).

Queensland

The Urban Land Development Authority (ULDA) is a statutory authority which operates under the Urban Land Development Authority Act 2007 and whose main purpose is to facilitate the following areas:

- The availability of land for urban purposes;
- The provision of a range of housing options to address diverse community needs;
- The provision of infrastructure for urban purposes;
- Planning principles that give effect to ecological sustainability and best practice urban design; and
- The provision of an ongoing availability of affordable housing options for low to moderate income households.

The ULDA's role is to plan, carry out and co-ordinate the development of land in selected urban areas. As well as planning and development assessment, the ULDA also develops key sites and priority infrastructure within selected urban areas. The Authority is controlled by the State of Queensland which is the ultimate parent.
For the 2010/ 2011 period, the ULDA achieved a total revenue of $54.79 million. Income from the sale of land was $40.27 million (ULDA, 2011).

Queensland also has a further land development authority which is responsible for one particular area in Metropolitan Brisbane. The South Bank Corporation has been the development authority responsible for South Bank since its inception in 1989. Under the South Bank Corporation Act 1989, the Corporation's responsibilities are as follows:

- To promote, facilitate, carry out and control the development, disposal and management of land and other property within the corporation area; and
- To achieve an appropriate balance between the corporation's commercial and non-commercial functions; and
- To ensure the corporation area complements, rather than duplicates, other public use sites in the inner city Brisbane area; and
- To provide for a diverse range of recreational, cultural and educational pursuits for local, regional and international visitors; and
- To accommodate public events and entertainment that benefit the general community; and
- To achieve excellence and innovation in the management of open space and park areas. (South Bank Corporation, 2012)

Northern Territory

The Land Development Corporation (LDC) is a commercially driven statutory authority established in 2003 to develop and manage the Northern Territory Government owned land identified for strategic industrial development. In 2009 the Corporation's scope was increased to include innovative residential developments. The LDC operates under the Land Development Corporation Act and through an advisory board, and reports to the minister for Lands and Planning. The LDC is the Northern Territory Government's leading land developer. They provide companies that are about to start up, or plan to expand their operations, with easy access to a range of strategically located industrial and commercial land ready for development. It offers a choice of lot sizes, locations and onsite facilities to suit the needs of a wide variety of industry and business sectors. The Corporation assists key industry sectors to take advantage of major industrial project in the region and facilitates strategic industrial land development to further stimulate economic growth. In addition to this, the LDC has a mandate to facilitate other activities associated with the development or management of project land by industrial businesses or the use of project land for residential developments; including:

- Commercial activities;
- Recreational activities; and
- Activities relating to heritage and environmental conservation.

For the 2010/ 2011 financial year, the LDC achieved a total gross industrial sales revenue of $10,727,475, and a total income of $8,684,000 (Land Development Corporation, 2011).

The Northern Territory has an additional land development authority which is responsible for a defined area of Metropolitan Darwin. The Darwin Waterfront Corporation is a statutory authority which was established to develop, manage and service the Waterfront precinct for the benefit of the community and on behalf of Government. The Darwin Waterfront Corporation operates under the Darwin Waterfront Corporation Act (Darwin Waterfront Corporation, 2012).

Western Australia

Landcorp is the trading name for the Western Australian Land Authority. Landcorp is a government trading enterprise, and is governed by the Western Australian Land Authority Act 1992 and the Statutory Corporations (Liability of Directors) Act 1996. The Act sets out a clear role for Landcorp to ensure the State's future land needs are met in a commercially responsible manner and establishes lines of accountability with the State Government. The West Australian Minister for Regional Development and Lands has portfolio responsibility for Landcorp. Landcorp provides residential, commercial and industrial land for the growth of Western Australia. This includes major urban projects that come about through a need for land rejuvenation, urban renewal or population growth. Industrial estates are developed by Landcorp to ensure an adequate supply of strategic commercial land is available right throughout WA. Redevelopment of government property where the original use has changed is also a major focus for Landcorp. In the 2009/10 financial year, Landcorp achieved a total revenue for land sales of $272,646,000. Landcorp's total comprehensive income for the same period was $68,151,000(Landcorp, 2011).

Further to Landcorp, Western Australia has another land development authority which is designated to facilitate growth in defined areas of metropolitan Perth. The Metropolitan Redevelopment Authority (MRA) was established as a result of the Metropolitan Redevelopment Authority Act 2011 to undertake redevelopment projects in suitable areas within the Perth metropolitan area. It combines the responsibilities and projects formerly undertaken by the East Perth, Subiaco, Midland and Armadale redevelopment authorities and the Perth Waterfront project. The MRA continues the work of the former redevelopment authorities revitalising large areas in and around Central and East Perth, Subiaco, Midland and Armadale. The MRA's functions are to control these developments and to prepare and keep under review the Redevelopment Schemes for those areas. Under the Act, the MRA has the power to resume land, undertake environmental rehabilitation and plan, implement, promote and coordinate urban regeneration projects. Each redevelopment area has a Land Redevelopment Committee enabling community and local government involvement in the development and delivery of redevelopment projects (MRA, 2012).

South Australia

The Urban Renewal Authority (URA) has recently been established in South Australia to present a fully integrated approach to urban development. The key objectives of the URA will be to create opportunities and attract private sector investment and involvement to help progress development and accommodate population growth. The URA will plan, prepare and negotiate to ready development sites for market release. It will also seek to increase private sector's involvement in the areas of master planning, urban design, project delivery, infrastructure development and social housing. When establishing the URA, the state government acknowledges the private sector's role in the development sector, claiming "the private sector's expertise, financial resources and entrepreneurship will be critical in helping State Government deliver national leading urban renewal, greenfield and social housing initiatives". The URA does not yet operate under an Act.

Victoria

VicUrban was established through the Victorian Urban Development Authority Act 2003 which sets out the following functions:

- Carry out urban development alone or in partnership;
- Develop the Docklands area in accordance with the Docklands Act 1991;
- Undertake declared projects; and
- Assist in the implementation of government urban development policies and strategies

The Act requires VicUrban to carry out its functions on a commercial basis. From 8 August 2007, VicUrban has reported to the Minister for Planning. In June 2011 the government introduced legislation into Parliament abolishing VicUrban and establishing the Urban Renewal Authority. All VicUrban's assets, liabilities, projects and staff will transfer to the new Authority.

In June 2011 the government introduced to Parliament the Victorian Urban Development Authority Amendment (Urban Renewal Authority Victoria) Bill 2011. Places Victoria was established in 2011 by this Act of Parliament. Places Victoria facilitates large-scale urban renewal – for residential and mixed-use purposes – within established areas of Melbourne and strategic locations in regional Victoria. Places Victoria is the Victorian Government's land development agency, helping government to meet the challenges of population growth and increased demand for housing by facilitating the delivery of diverse and affordable living options. Places Victoria drives major long-term urban renewal projects and is self-funding. Places Victoria creates opportunities for the realisation of Victorian Government policy and private sector investment by making urban renewal sites development ready, including:

- Master planning;
- Land preparation and site acquisition;
- Developing land; and
- Partnering with land owners, developers and builders.

As Places Victoria was only established in July 2011, financial results are not available. In the 2011/11 financial year however, VicUrban's total revenue was $280 million (VicUrban, 2011).

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HUON VALLEY COUNCIL

INFOSHEET FOR PLANNING APPLICATIONS
DEVELOPMENT ON LAND PRONE TO TUNNEL EROSION

Development on land that consists of dispersive soils can result in tunnel erosion and consequential damage to private property, public infrastructure, and environmental harm. Tunnel erosion results in the formation of underground cavities that can collapse causing subsurface erosion. Tunnel erosion is difficult to repair and therefore it is important to avoid initiating tunnel erosion through appropriate design and construction techniques.

This infosheet is intended to present a brief overview of this issue and is a summary of a comprehensive reference source "Dispersive soils and their management: Technical Reference Manual" available at www.dpipwe.tas.gov.au.

Dispersive soils are also known as sodic soils and sodosols and are often derived from Triassic sandstone or Permian Mudstone geology. In contact with water, excessive sodium in soils can attach to clay forcing clay particles apart. In the process, dispersed clay particles can clog up the small pores in the soil degrading soil structure and affecting water movement and root growth.

Dispersive soils can be identified by dribble patterns and pitting (Fig. 1) and early stages of tunnel erosion can be identified by 'spew holes' and fans of dispersed material ejected from tunnels (Fig. 2 & 3). Dispersion is often evident in muddy or milky water in dams.



FIG 1 – EXAMPLE OF DRIBBLE PATTER '



FIGURE 2 – EXAMPLE OF 'SPEW HOLE'



FIGURE 3 – EXAMPLE OF SEDIMENT FAN

SOURCE: DISPERSIVE SOILS AND THEIR MANAGEMENT – GUIDELINES FOR LANDHOLDERS, PLANNERS AND ENGIEERS WWW.DPIPWE.TAS.GOV.AU

Simple test to identify if dispersive soils are present
A simple test to identify the presence of dispersive soils is detailed in "Dispersive soils and their management: Technical Reference Manual" available at www.dpipwe.tas.gov.au and consists of collecting and drying the soil and then observing how the soil changes once placed in distilled / rain water.

Activities that increase risk of tunnel erosion
Tunnel erosion is generally caused by site disturbance allowing rainwater to come into direct contact with dispersive subsoils. The risk of exposing dispersive subsoils to direct contact with rainfall include;

- removal of topsoil,
- subsoil excavations (cut and fill) or for trenches for services such as telecommunications,
- construction of roads, culverts and driveways,
- sewage and grey water disposal systemss, and
- changes to surface water flows, concentrating runoff from hardstand areas, construction of culverts or dam construction.

Reducing risk associated with dispersive soils

The risk of initiating tunnel erosion during construction or development of land containing dispersive soils can be minimised by;

- identifying and avoiding disturbance to areas with dispersive subsoils,
- minimising excavation of dispersive soils through appropriate construction techniques such as pier footings rather than cut and fill to achieve concrete slab footings,
- minimising or avoiding the use of trenches and where this is not possible ensure that repacked soil is compacted, treated with gypsum, covered with topsoil and re-vegetated,
- not allowing water to pond on the soil surface, or exposed subsoils and directing runoff to areas with no dispersive soils,
- keeping dispersive soils buried under topsoil,
- using above ground on-site wastewater disposal systems rather than septic systems,
- maintaining vegetation cover, and
- applying gypsum or hydrated lime at appropriate rates which modifies the chemical composition of the soil and may limit the extent of dispersion.

Rehabilitation of tunnel erosion

Land subject to tunnel erosion can be repaired with appropriate techniques detailed in Dispersive soils and their management: Technical Reference Manual" available at www.dpipwe.tas.gov.au

Mapping of tunnel erosion hazard

The following map shows areas that may be prone to tunnel erosion. It is an indicative map only and cannot be relied upon for detailed site planning.

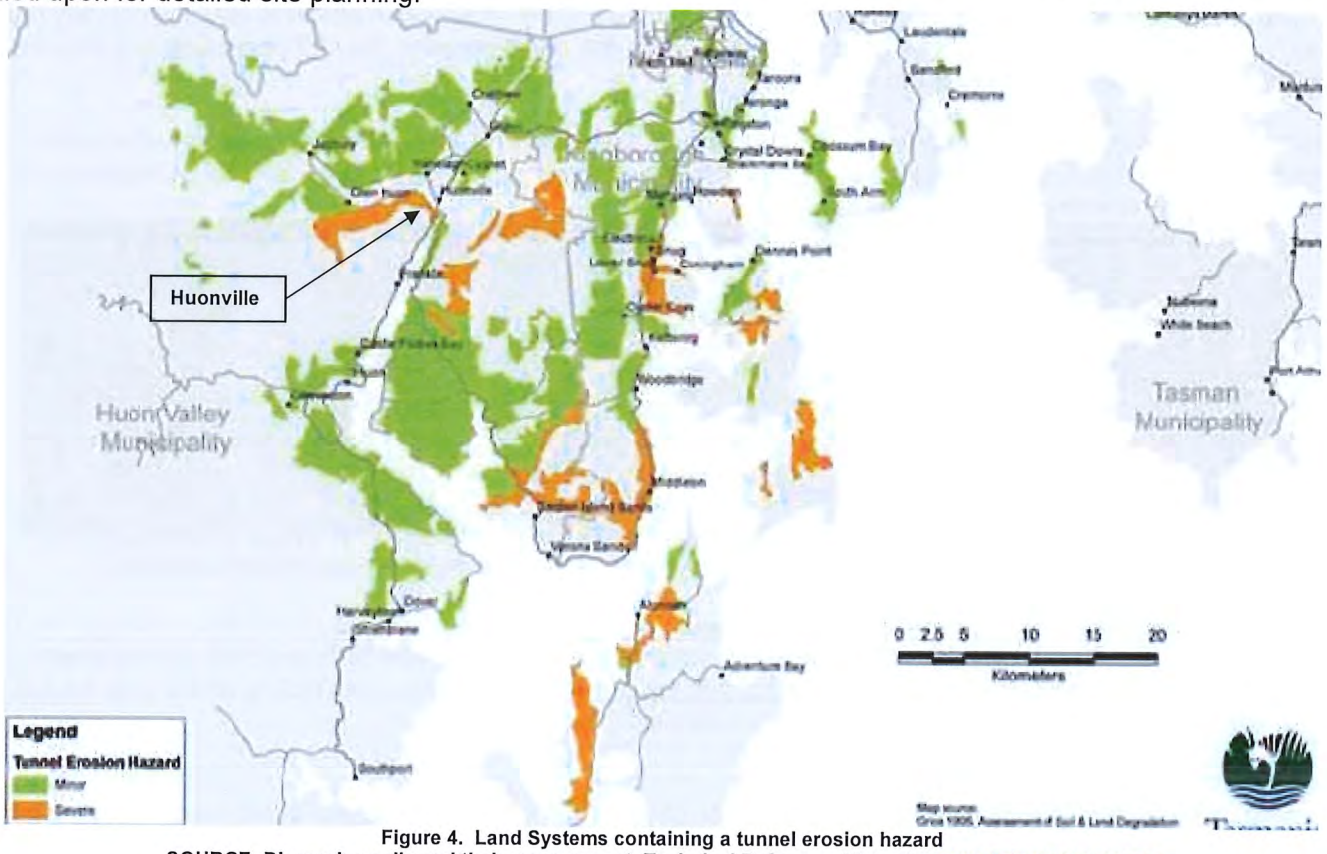


Figure 4. Land Systems containing a tunnel erosion hazard
SOURCE: Dispersive soils and their management: Technical Reference Manual – www.dpipwe.tas.gov.au

Please Note: The information provided in this guide is only intended to be a summary. All applications are considered on their individual merits and therefore situations may vary. It is recommended that you seek independent professional advice and / or contact Council's Planning Unit on (03) 6264 0345.

HUON VALLEY COUNCIL



HUON VALLEY COUNCIL STRATEGIC PLAN

2015 TO 2025



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NAVIGATE TO PAGE



INTRODUCTION

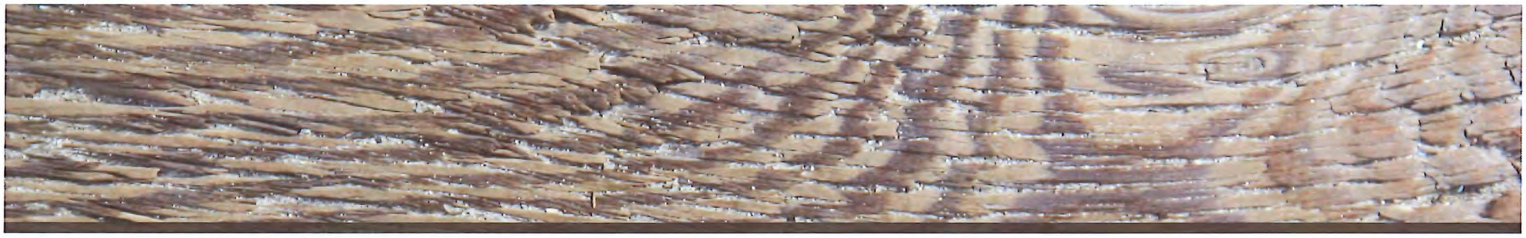
The Huon Valley Council Strategic Plan 2015-2025 outlines the Council's strategic direction for the next 10 years. The Strategic Plan is an important document; it describes how Council works with and within the community to deliver the governance and services that will achieve community objectives and priorities.

This Strategic Plan:

- Places the governance principles and community values that frame Council's focus, roles, decision making and relationship with the Huon Valley community and other stakeholders in public view;
- Establishes a decision making framework based on achieving outcomes that reflect common values identified by the community and from this, provides the basis for community conversations around key issues and challenges;
- Provides clear indicators against which progress can be evaluated and as necessary lead to changes in approaches and strategies;
- Provides the basis for structured relationships and engagement with other levels of government and proposal proponents; and critically
- Provides the basis for annual plans that are clearly focused on achieving the outcomes identified within the strategy.

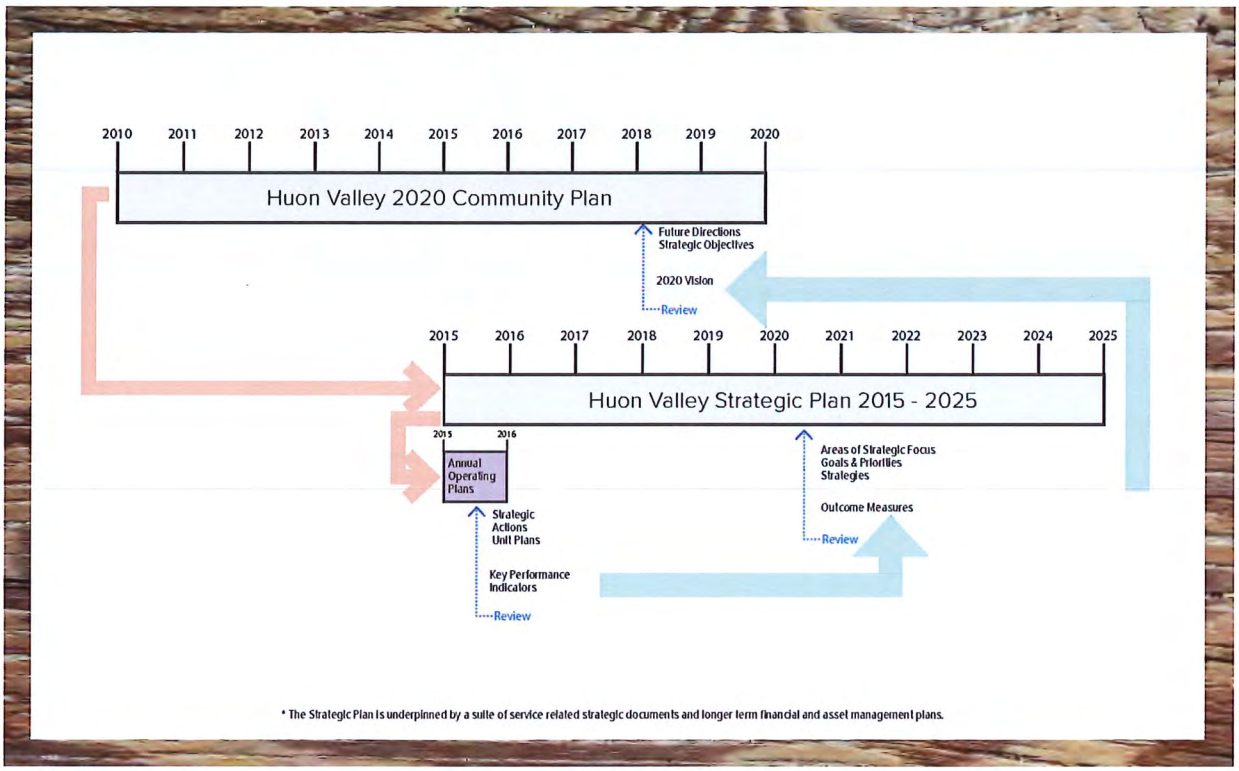
The environment within which we as a community operate changes rapidly, events that occur internationally, changes in government and a wide range of other influences flow through to our community with a mix of influences. Within our community other internal changes also influence how our community works. The Huon Valley Council believes that it must manage in a manner that considers these dynamic influences and ensures that the contribution Council makes is proportional and beneficial to the community. For this reason it has adopted the following approach to its 2015-2025 Strategic Plan.

Strategic influences such as climate change are considered as an overlay to the framework – impacting on each element, but in different ways. Similarly strategies such as consultation and engagement is an overlay, the framework providing a means of designing meaningful and constructive input and collaboration.



THE STRATEGIC PLAN IN CONTEXT

To recognise the value of the Strategic Plan it is necessary to understand its relationship with key Council documents.



The foundations of the Strategic Plan were laid in 2007 when members of the Huon Valley community came together to develop the Huon Valley 2020 Community Plan. The following eight future directions were identified in the Community Plan:-

- Care for our environment
- Build health and well being
- Enhance recreational opportunities
- Improve transport and communications
- Create diverse education opportunities for all
- Develop prosperity
- Expanded community engagement and involvement
- Celebrating our arts, heritage and culture

The Community Plan has been an important reference point for the Huon Valley Council's Strategic Plan. The development of this plan is underpinned by the comprehensive engagement informing the Community Plan's development, and engagement which was undertaken in 2010 to update the community input.

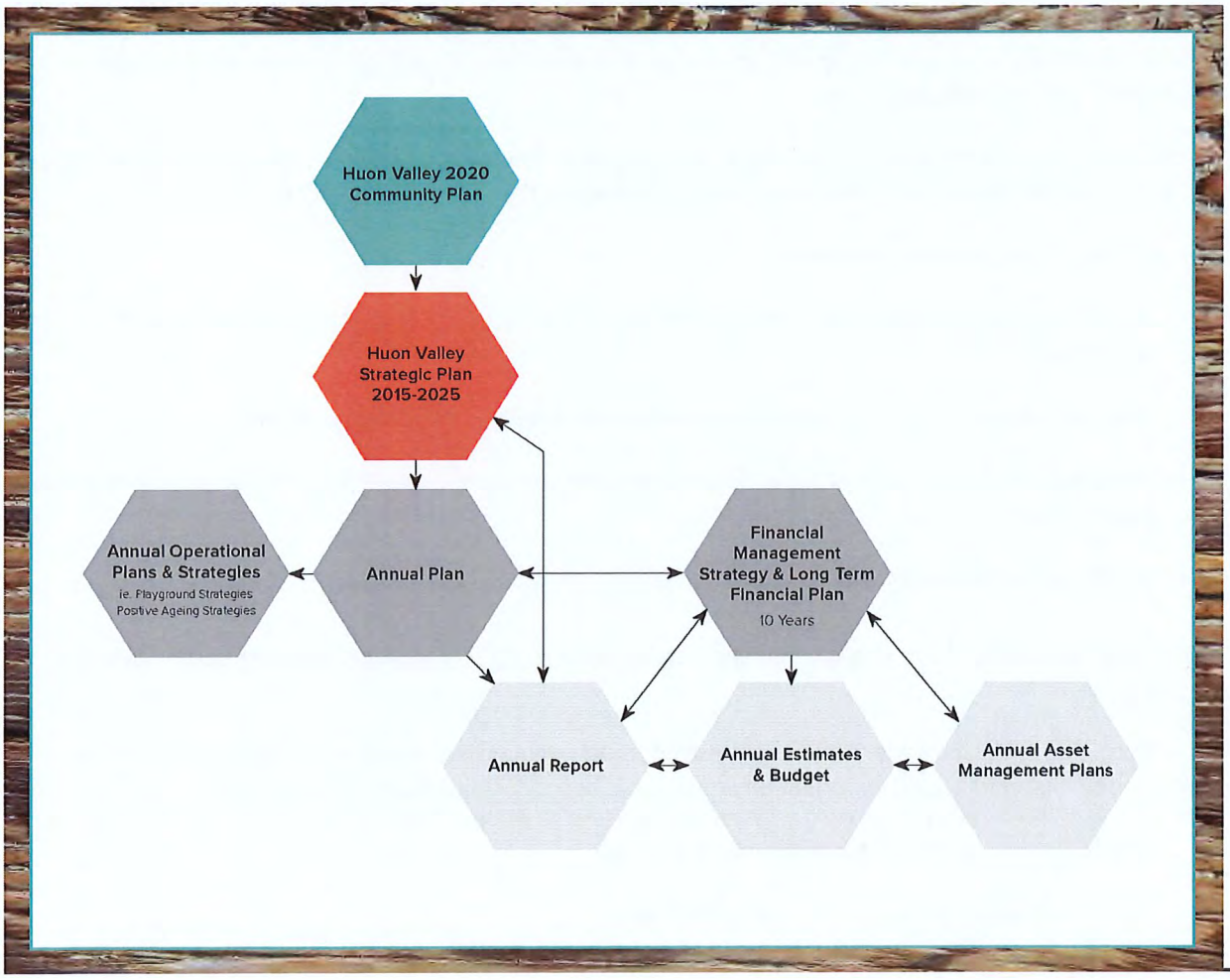
To build on the above, a range of further engagement has contributed to the preparation of this Strategic Plan, including:

- Council briefings and workshops
- A community workshop with some 40 representatives reflecting community sectors; and
- A comprehensive series of workshops with Council's management team and business unit management teams.

This process has ensured a mix of input ranging from the identification of goals and priorities, through to clarifying problems faced on the ground by the community. This mix of input helps match aspiration and practicality and also helps to ensure that the people responsible for implementing the Plan are committed to using it as a tool to assist them to achieve their performance and productivity goals.

The Strategic Plan also builds on current Council planning and strategic documents. The Strategic Plan is the guiding document for the ongoing review of that strategic work, including critical plans such as the *Huon Valley Land Use and Development Strategy,* structure plans, *Asset Management Strategy, Financial Management Strategy & Long Term Financial Plan* and the annual plans.

The following diagram represents these key interrelationships and processes.





COUNCIL'S STRATEGIC GOVERNANCE AND MANAGEMENT FRAMEWORK

The Strategic Plan is built on Council's need to simultaneously manage a wide range of activities, services and issues in what is a dynamic environment. In summary, Council aims to positively impact on a community system to achieve defined, beneficial characteristics and outcomes.

To do this well, Council has worked to better understand how the elements and characteristics that make up a successful community fit together and how we can organise and manage through our strategies to achieve the key strategic objectives.

Our strategic management framework, depicted in the figure below, is a tool to enable us to ensure that all of the actions undertaken in Council work towards achieving the strategic outcomes.

This approach is designed to ensure that:

- Our on ground decisions and actions contribute to the community's strategic objectives and outcomes;
- Council's departmental units and people are aware of what is expected of them;
- If the result achieved is different to requirement, the activity is evaluated and as necessary changes made; and
- Progress can be measured in a consistent way by both Council and the community.

The approach is designed to engage stakeholders in conversations about how the community works and changes, by:-

- Providing a logical, systems management approach within which the current state of the community can be mapped across important environmental, economic and social dimensions;
- The influences on these and their impact clarified;
- Community objectives/priorities addressed; and
- Changes measured.



The strategic management framework provides the structure and logic to this plan by defining the strategic context and as a result, helping to organise and adapt our thinking and strategies, and to manage the complexity of the task at hand.

The Vision and Strategic Objectives, provide the Plan's strategic focus by identifying the characteristics sought and valued by the community and the manner in which Council will work with the community to achieve them. The achievement of these objectives is evaluated by using the characteristics and trend measures drawn from a wide range of sources and are generally considered on a medium term basis or in relation to a specific challenge/opportunity being addressed. The strategic objectives provide a reference point for making decisions around issues and proposals that may arise to ensure their fit to community values and priorities.

The characteristics enable Council, the community and other stakeholders to consider how sectors work together to support each other as a "community system" and contribute to the longer term strategic outcomes.

In the event that some sectors may be limiting the performance of others, or that the strategic objectives are not being realised, Council has adopted a mix of strategies to use to either reduce the risk or realise opportunities.

The tool is designed to be used as both a formal and informal framework to get the thinking and logic of a decision in order. For example:

- If the result in a specific (or number) of strategic objectives is not what is required, the focus moves to the bottom line to identify what specific sector(s) are not making the contribution sought and then the strategy mix that is likely to redress the shortfall.
- Similarly, if there is a proposal to invest in a major development in one sector the tool helps to develop insight into how that development may affect other sectors and contribute to the strategic outcomes.

The tool is designed as a prompt to assist Council to recognise the inter-relationships between the various sectors of the community and what impact its operations may have. It assists identification of priorities, evaluation of results and it provides logic and focus to community issues.

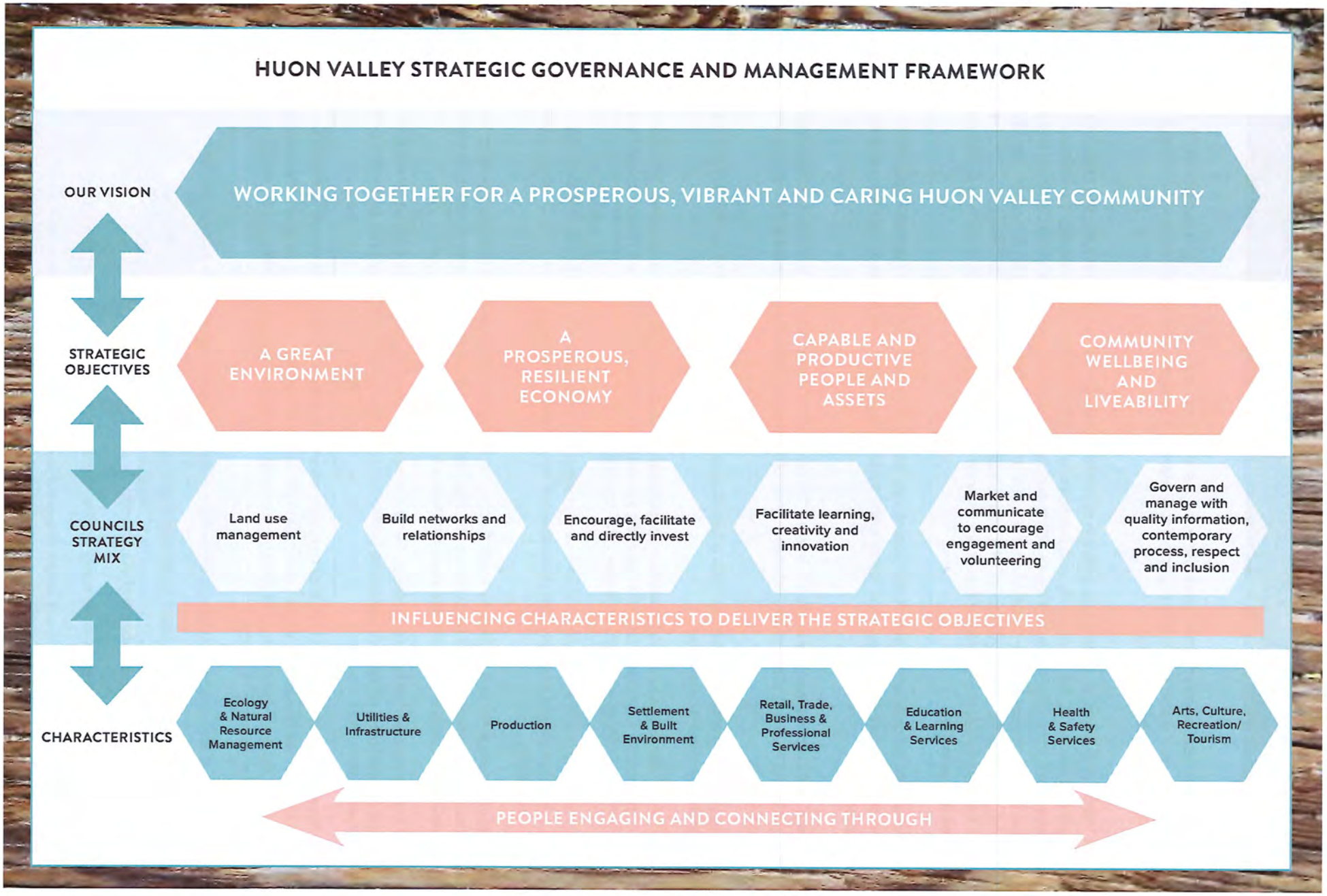
Over the 10 year period for this strategy, trend changes or "shocks" will dictate that, while each of the strategic objectives, or sectors within the profile are important, the balance of focus and effort between them will shift.

This approach to strategy ensures that Council's effort is focused on contemporary, important factors, and is not locked into issues that, while important in 2015, are not so (for example), in 2018. This approach reinforces Council's commitment to engagement and partnership with the community as a means of jointly achieving the strategic objectives.

To ensure that the long term strategic objectives are met, Council will develop annual plans.

To action this strategy as the basis for focused and productive annual plans, Council has:

- Defined its strategic focus and objectives;
- Clarified the necessary community profile characteristics necessary to achieve those objectives;
- Defined the strategies it will adopt to work towards the key characteristics; and
- Mapped how those strategies will be generally applied to the community profile.


HUON VALLEY STRATEGIC GOVERNANCE AND MANAGEMENT FRAMEWORK
OUR VISION
WORKING TOGETHER FOR A PROSPEROUS, VIBRANT AND CARING HUON VALLEY COMMUNITY
STRATEGIC OBJECTIVES
A GREAT ENVIRONMENT
A PROSPEROUS, RESILIENT ECONOMY
CAPABLE AND PRODUCTIVE PEOPLE AND ASSETS
COMMUNITY WELLBEING AND LIVEABILITY
COUNCILS STRATEGY MIX
Land use management
Build networks and relationships
Encourage, facilitate and directly invest
Facilitate learning, creativity and innovation
Market and communicate to encourage engagement and volunteering
Govern and manage with quality information, contemporary process, respect and inclusion
INFLUENCING CHARACTERISTICS TO DELIVER THE STRATEGIC OBJECTIVES
CHARACTERISTICS
Ecology & Natural Resource Management
Utilities & Infrastructure
Production
Settlement & Built Environment
Retail, Trade, Business & Professional Services
Education & Learning Services
Health & Safety Services
Arts, Culture, Recreation/ Tourism
PEOPLE ENGAGING AND CONNECTING THROUGH

COUNCIL'S STRATEGIC FOCUS

VISION

The vision takes a long term, broad view that combines, in simple, aspirational terms the "what and how".

Council's vision is:

"Working together for a prosperous, vibrant and caring Huon Valley community"

The vision is realised by working together to achieve the balance of characteristics we want as a community, and expressed as our Strategic Objectives.

STRATEGIC OBJECTIVES

The strategic objectives are medium term outcomes that we must achieve if our vision is to be realised - in simple terms "what are we trying to achieve by doing this or that". These are more specific in definition and are designed to reflect commonly held aspirations and values – a shared, practical community focus.

In order to achieve the strategic objectives, we need a community characterised by:

- *A Great Environment*
- *A Prosperous, Resilient Economy*
- *Capable and Productive People and Assets*
- *Community Wellbeing and Liveability*

The strategic objectives reflect environmental, economic and social perspectives, and recognise their interdependency and necessary balance.

The strategic framework is designed to remain in place for longer than this 10 year Strategic Plan period. Over time the relative weighting and measures may change depending on the social and economic environment, as will the strategy mix used to achieve and protect them.

Council's strategy is designed to aim towards the strategic objectives through a strong understanding of how the Huon Valley works as a community and how we can support it to achieve its aspirations.

These strategic elements are critical pieces of the plan; they provide the context within which to focus effort and resources, test the success of Council and the community and to also test new ideas and proposals. They become the practical basis on which Council delivers, facilitates and lobbies in the community interest.



OUR STRATEGIC OBJECTIVES – WHAT WE WANT TO ACHIEVE AS A COMMUNITY

Council is focused on ensuring our decisions and processes deliver the following strategic objectives.



A GREAT ENVIRONMENT

Historically, the natural environment, climate and what was able to be produced was the basis for settlement in the Huon Valley. The environment provided the attributes for people to achieve their life goals. Today it remains a key advantage and motivates people to live, invest in business and visit the Huon Valley. Protection of this environment and appropriate use and development is a key strategic focus from both natural values and human perspectives. We seek:

- An environment that is acknowledged, appreciated and generates pride and a strong sense of place; and
- A natural and developed environment that is managed for sustainability and beneficial use.

Strategic and Trend Indicators include:

- Care Group participation;
- Collected visitor feedback;
- Grant income generation;
- Threatened species, weed species and vegetation communities profile;
- Development assessed for environmental impacts;



A PROSPEROUS, RESILIENT ECONOMY

A level of economic and financial prosperity is central to the success of a place. The generation of individual and community wide income and wealth supports the ability for a community to provide opportunity and to deliver the range of services necessary to create a sustainable community. To achieve this we will pursue:

- A contemporary, market oriented and diverse economy characterised by creativity, strong revenue and investment; and
- Creation of the opportunity to participate in and pursue rewarding employment and careers.

Strategic and Trend Indicators include:

- Workforce participation rate;
- Income profile & diversity of sources;
- Community wealth; and
- Positive changes in economic profile.



CAPABLE AND PRODUCTIVE PEOPLE AND ASSETS

A community is about people, their values, capabilities and the way they interact, develop and utilise available assets to achieve their goals. This mix of human, social and investment capital is central to young people aspiring to and achieving careers, families and businesses successfully establishing and older people being able to continue to actively engage in the community. Our goals are:

- Knowledgeable, skilled people actively and constructively engaged in pursuing their goals and preferred pathways to the future;
- Private assets that deliver sustainable returns on investment; and
- Public infrastructure and services that deliver optimal benefit for the cost to the community.

Strategic and Trend Indicators include:

- Education participation;
- Workforce participation;
- Census community profile;
- Volunteer profile;

- Business continuity;
- New development investment; and
- Infrastructure condition and investment.



COMMUNITY WELLBEING AND LIVEABILITY

The characteristics of a place, as a means for attracting and retaining people, is based on a mix of what is here – the natural environment, its developed attributes and the "way the place works" in terms of individual, familial and social networks and support systems. There are many aspects of a place which attract and retain people in a community. The natural environment, the economic environment and the social environment are all factors. Our goal is to ensure:

- People experience a sense of purpose, inclusion, recognition, value and wellbeing;
- Support and services are relevant and accessible when needed;
- People feel safe;
- Diversity of values and ideas is encouraged, respected and used to achieve creative solutions;
- People feel empowered and are encouraged to formally and informally provide leadership and effort to contribute to the community; and
- People work together, share knowledge and experience to achieve common outcomes.

Strategic and Trend Indicators include:

- Community satisfaction (LGAT survey criteria);
- Community based activity profile;
- Aged living at home;
- Community health profile;
- Australian Early Childhood Development Index;
- Socio economic community profile;
- Community profile data;
- Key health indicators;
- Population retention and attraction; and
- Engagement in key community conversations.

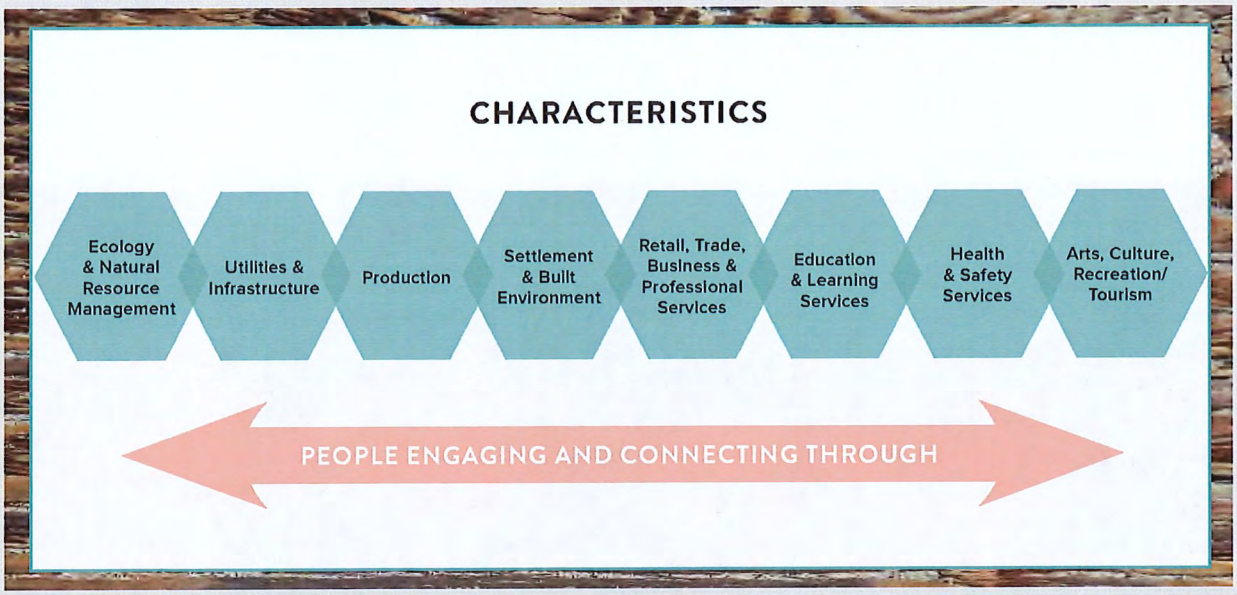
A community characterised by these strategic objectives provides a sustainable basis on which to attract people to live, invest in and visit the Huon Valley.



CHARACTERISTICS

The characteristics of the Huon Valley community drives its day to day attractiveness as a place in which to live, invest and work. The structure below summarises the key perspectives that Council will focus on to ensure that each sector can support each other and that individually and collectively they provide opportunity for the community to achieve its aspirations.

It is important that we describe characteristics that we have set for each of the sectors of the community. Population characteristics and Council's governance characteristics have also been included in our analysis of their impact on our preferred future.



The description below includes Council's approach and stance to each of the characteristics and how we will measure success. The discussion above reinforces that if we are to meet our strategic objectives, the goals are interdependent.

CHARACTERISTIC 1

POPULATION

A DIVERSE AND CAPABLE POPULATION OF AROUND 20,000 PEOPLE.

The Huon Valley has an estimated population of 16,020 (ABS 2012), and is projected to grow at a rate of 1.2%. Population is a key determinant of a community's capacity to provide a range of activities and services that sustain it socially and economically.

In addition to overall numbers, the make-up of the population is important. A balance of different age groups, levels of education and the skill profile are all important factors in enabling a community to achieve income levels to support a good quality of life, to enable it to achieve economic opportunities and provide the range and level of services that are required to make it an attractive place to live, work and invest.

The nature of settlement within the Huon Valley ensures that people seeking specific locational characteristics, whether from a country or seaside lifestyle, proximity to Hobart or to other local work, living in a small settlement enables the Huon Valley to increase population without diminishing the valued character.

Council's strategic stance is to support population growth and diversity in its demographic to ensure our strategic outcomes are achieved.

Characteristic and Trend Measures include:

- Rate of increase of the population; and
- Demographic profile diversity.





CHARACTERISTIC 2

ECOLOGY AND NATURAL RESOURCE MANAGEMENT

OUR NATURAL RESOURCES ARE ACTIVELY PROTECTED AND SUSTAINABLY UTILISED TO PROVIDE COMMUNITY BENEFIT.

The Huon Valley is rich in natural resources. Its geography and the climate combine to support primary production, forestry, agriculture and fishing. These natural characteristics are now also supporting industries including agriculture and aquaculture, and are a key attractor for visitors to Tasmania.

The natural environment provides a major reason why people live in and visit the Huon Valley.

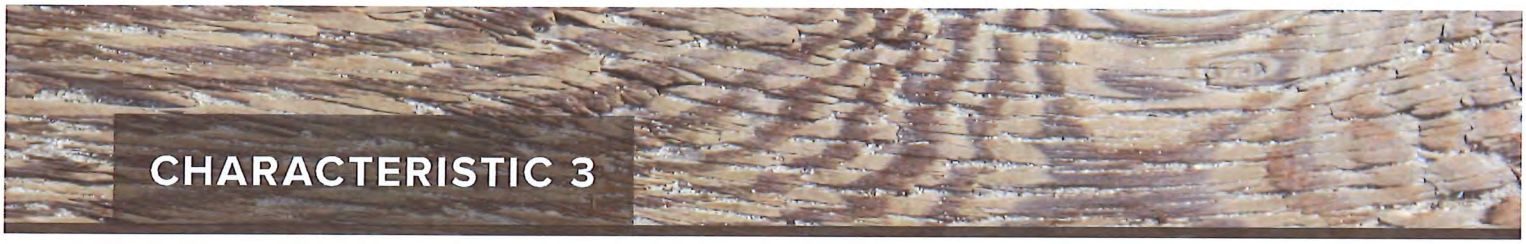
Council's strategic stance is to actively, and through regulation, protect and manage the natural environment for sustainable passive and active beneficial use by the community and visitors.

Characteristic and Trend Measures include:

- Natural diversity;
- Water quality;
- Invasive species controlled;
- Productive land capability; and
- Direct and indirect business activity and employment.







CHARACTERISTIC 3

UTILITIES AND INFRASTRUCTURE

UTILITIES AND INFRASTRUCTURE THAT FACILITATE PEOPLE TO LIVE, VISIT AND INVEST IN THE HUON VALLEY.

Our ability to access each other, property, services, market and recreation is dependent upon infrastructure. While this access has historically been based on physical infrastructure forms, digital access now is a key component. This infrastructure underpins our ability to live and work day to day and participate in our recreational activities.

This arena also includes social infrastructure. As we become more service oriented, the provision of places where services are placed, where people can gather and children can play and develop are increasingly important. Changing values means that while road transport is critical, other transport and communication alternatives for social, service and business connections are critical to the infrastructure profile. The mix of infrastructure is important to ensure the Huon Valley is competitive and attractive.

Changes have meant we re-think how we approach the provision and balance of infrastructure to ensure upgrading or new investment is made to reflect the strategic risks, opportunities, community's contemporary values, needs and behaviours and how we can meet both the technical standards and these requirements. Principles such as "zero waste" introduce new ways of thinking and investing to achieve our strategic objectives.

An example of this is how we consider rainwater run-off. If we consider all water a valuable asset, our approach to how we design infrastructure alters significantly and the way we frame our benefit/cost considerations around the investment also alters.

Council's strategic stance is to manage existing assets using best practice technical and investment approaches. It is to work to ensure that our utilities and infrastructure enables the community to be safe, ensures access, reduces potential risk and damage and enables opportunities to be realised.

Characteristic and Trend Measures include:

- Infrastructure serviceability reflects community needs;
- Compliance with contemporary standards;
- Meet or exceed contemporary accepted asset management measures;
- Number of innovation projects;
- Digital coverage;
- Recognition of social infrastructure; and
- The number and value of externally funded projects – full, part, public, private.

CHARACTERISTIC 4

PRODUCTION

INCREASE THE DIVERSITY AND VALUE OF PRODUCTION WITHIN THE HUON VALLEY.

The Huon Valley has a long history of primary production but limited value adding from downstream processing, this has often resulted in high quality production being viewed as a commodity and subject to global competition. Production is important, it draws external income to the Huon Valley and redistributes it through wages and demand for products and services. As value add processing occurs, the employment and income multipliers increase dramatically.

The emergence of the requirement for safe, sustainably produced and high quality food and beverage has created the opportunity for "provenance" as the basis to increase both marketability and price for places such as the Huon Valley. The ability to achieve viable margins is a key to further investment in production within the Huon Valley.

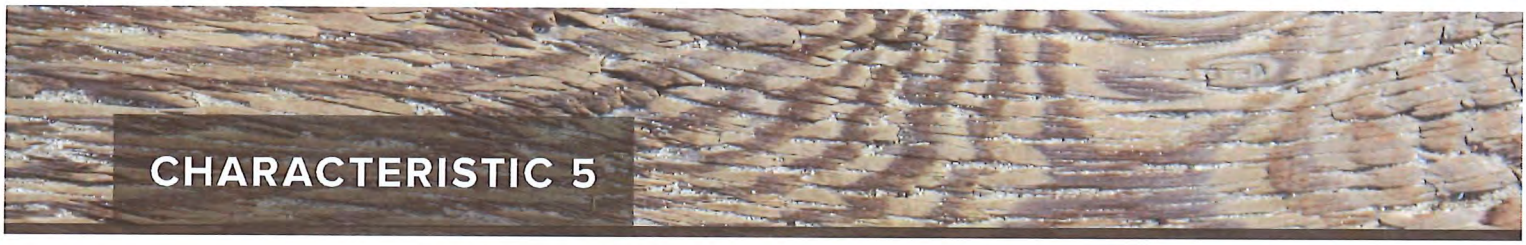
Council's strategic stance is to ensure that the productive capability of the land and waterways is maintained and enhanced to increase diversified production.

Characteristic and Trend Measures include:

- Huon Valley value of production;
- New or expanded production and value adding;
- Direct employment and income; and
- Contribution to Huon Valley brand and positioning.







CHARACTERISTIC 5

SETTLEMENT AND BUILT ENVIRONMENT

PROVIDE A MIX OF ATTRACTIVE RESIDENTIAL AND BUSINESS OPTIONS TO THE MARKET, WHILE PROTECTING EXISTING VALUES AND FUTURE POTENTIAL.

The Huon Valley is characterised by larger towns and dispersed communities that emerged from early transport links and economic activity. These smaller towns now provide for both long term resident families and people attracted by the amenity and differing characteristics of these locations.

Investment in all settlements over recent years has resulted in a series of projects designed to improve amenity and the usability of key sites. These have achieved significant use and provide a great source of community pride. To move beyond a single project focus Council will consider these towns from understanding their character and appropriate design to ensure they both continue to provide a contemporary place to live and can also build on this character to stimulate visitation and appropriate growth.

While the Huon Valley reflects highly attractive settlement characteristics, there is also a range of challenges that will need to be met. .

Agriculture tends to be based on relatively small sized properties, this leads to potential tensions between neighbours where the land use differs. The early land settlement patterns create a limit to efficient agricultural production, in particular if value adding is low, this necessitates consolidation to achieve single enterprise scale economies or collaboration through the value chain. Protecting the potential for viable primary production across the landscape is a key challenge and focus.

The tensions between land uses also exist to some degree in the relationship between industrial/production spaces and residential spaces on land, water and coastlines. These challenges require the input of a wide range of government agencies.

There is undeveloped land within existing town boundaries that can enable population growth. Some of this requires infrastructure to enable its transformation.

Council's strategic stance is to encourage the development of underutilised residential land, to manage tensions between land uses and to ensure that the town environments provide a reflection of the Huon Valley brand whilst honouring their unique town characteristics.

Characteristic and Trend Measures include:

- Planning and building approvals;
- Utilisation of zoned land by classification;
- Awareness of diverse characteristics of the Huon Valley; and
- Brand recognition.

CHARACTERISTIC 6

RETAIL, TRADE, BUSINESS AND PROFESSIONAL SERVICES

INCREASE THE SCOPE AND CAPABILITY OF SERVICES TO ACHIEVE A CONTEMPORARY MIX THAT INCREASES LOCAL SPEND.

Businesses are recognised as important for many reasons, including:

- Providing products and services to homeowners and other businesses;
- Providing essential and discretionary retail goods;
- Introducing an operational, managerial and professional occupational mix into the community, providing training and career options;
- Providing an economic multiplier effect by circulating income throughout the community; and
- Increasing the liveability of the Huon Valley.

This sector has grown in terms of enterprise numbers, scope of offer and professionalism and is considered important to support future growth and prosperity.

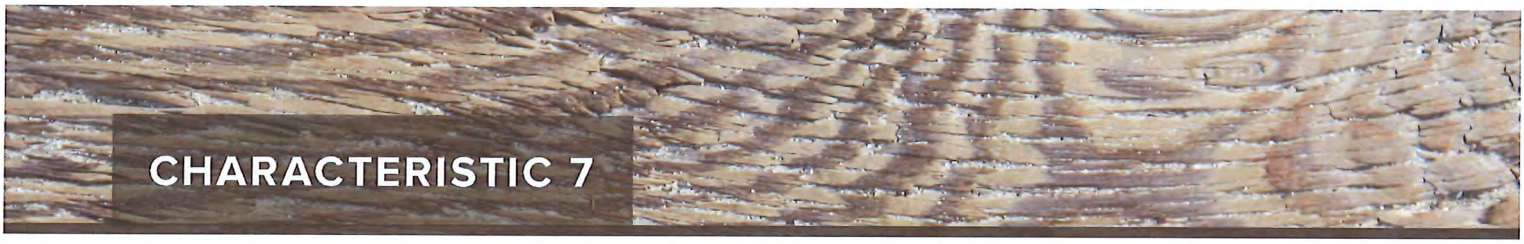
Council's strategic stance is to support growth, ensuring appropriate land and infrastructure is available, training opportunities are identified and facilitated and local businesses are preferred suppliers where possible.

Characteristic and Trend Measures include:

- Business profile – current and trend; and
- Employment profile – current and trend.







CHARACTERISTIC 7

EDUCATION AND LEARNING SERVICES

TO ACHIEVE A LIFELONG LEARNING CULTURE WITHIN THE HUON VALLEY.

Council recognises and promotes a mix of formal and informal approaches to education and learning across the Huon Valley.

The protection of the scope and level of locally available education is a significant challenge and one where Council collaborates with other community stakeholders to ensure success.

Council has provided the catalyst for early learning and care. This has ensured young children get access to early education, preparing them for school and developing social skills. Critically, it allows parents to participate in the economy and social networks.

Post school learning, formal and informal, is identified as a key aspect in ensuring that community members remain connected and productive contributors to their communities. Lifelong learning enables people to transition into jobs and careers as well as an opportunity to transition to retirement. For current and prospective business owners, access to training and development is identified as important for business success.

Council's strategic stance is to support the continuity and improvement of formal education within the Huon Valley and to work with key community stakeholders and education/training providers to develop strategies to support lifelong learning to the point where learning becomes part of the Huon Valley culture.

Characteristic and Trend Measures include:

- Education and learning participation and achievement profile;
- Population qualification profile;
- Trainee/apprentice profile;
- Literacy levels; and
- Australian Early Childhood Development Index.

CHARACTERISTIC 8

HEALTH AND SAFETY SERVICES

THE PROVISION OF SERVICES THAT ENSURES PEOPLE'S INTERESTS, HEALTH AND SAFETY ARE ENHANCED AND PROTECTED.

Council is a key part of this sector. Along with the Huon LINC and Huon Community Health Centre there are accessible connections to local, state and federal government services.

Primary health services are provided through larger towns, they include doctors, allied health and visiting specialists however known challenges such as access and cost of transport can be a barrier to accessing centralised services. Local access to this network is viewed as a priority.

The retention of emergency services and disaster response capabilities are considered important in the protection, health and safety of the community.

While the Huon Valley enjoys high quality aged care facilities, the community care mix is identified as critical to retaining older residents and ensuring they are able to exercise choice in their lifestyle.

The mix of health services, doctors, allied health, emergency response and aged care facilities is critical to attracting and retaining people and businesses across the Huon Valley.

Council's strategic stance is to intervene and as necessary facilitate services on a break-even cost basis. There is the opportunity to work with networks to develop creative and cost effective responses to health and safety conditions and risks that also include preventive elements.

Characteristic and Trend Measures include:

- Accessibility;
- Scope and quality of service; and
- Compliance to response standards.







CHARACTERISTIC 9

ARTS, CULTURE, RECREATION / TOURISM

ARTS, CULTURAL, RECREATION AND TOURISM CHARACTERISTICS OF THE HUON VALLEY MAKE A MAJOR CONTRIBUTION TO COMMUNITY WELLBEING AND VISITOR ATTRACTION.

Arts, cultural and recreational pursuits and opportunities within the Huon Valley are many and varied. These range from traditional sports, arts, bushwalking, fishing and water sports, horse riding, food, wine and cafes, mountain biking and off road driving. These play a strong role in why people live in the Huon Valley and because of the ability to connect to others of similar interests and values. Many of the groups that support these activities deliver significant value to the community.

The challenge is in providing the mix of infrastructure and facilities that ensures they are suitable for purpose and productively used. Multiple use and outcomes is a key principle when considering upgrade or new investment.

For residents and visitors, the Huon Valley provides much in close proximity. Increasingly, these possibilities are recognised by the visitor market. This provides both an opportunity and risk. There is the opportunity to attract visitors to turn a marginal business into a thriving business, or to establish a new business opportunity or community events. The risk is in not providing it to the expectations of the market.

Increased visitation can play an important direct role in the Huon Valley economy. Indirectly it also ensures that higher quality recreational and cultural infrastructure and more numerous facilities are available to the community. Plans in this arena will include local and visitor perspectives as part of their development.

Council's strategic stance is to encourage local arts, cultural and recreational pursuits, by facilitating or providing appropriate infrastructure and support for these local activities and events. The newly developed "Huon Valley Brand" provides an overlay brand to tourism and recreation events, sectors and businesses, in effect providing a joint marketing approach. With use of the brand comes the responsibility to achieve standards reflective of the target market expectations.

Characteristic and Trend Measures include:

- Arts, cultural and recreational activity profile;
- Participation levels, including organisational;
- Profile of accommodation and attractions;
- Visitor numbers; and
- Length of stay and yield.

The mix of strategies identified as available to Council and the community to achieve and manage these challenges and opportunities is outlined below. Again, depending on the specific context, the mix will differ to reflect the situation.



CHARACTERISTIC 10

COUNCIL'S SUSTAINABILITY, CAPACITY AND GOVERNANCE

THE HUON VALLEY COUNCIL EFFECTIVELY PARTICIPATES IN THE DEVELOPMENT OF LOCAL GOVERNMENT IN TASMANIA AND IS WIDELY REGARDED FOR ITS LEADERSHIP, PROFESSIONALISM, INNOVATION AND QUALITY OF SERVICE DELIVERY.

The practice of good governance in local government can make a significant contribution to improving community life. When local governments practice good governance, their communities are more connected and engaged, better services are provided and more efficient use is made of resources. In meeting the highest standards of accountability and transparency, good governance produces better outcomes.

Council must take into account the diverse needs of the local community in its decision making, set and monitor strategic objectives and ensure resources are managed in a responsible manner. The broad functions of Council are:

- to provide for the health, safety and welfare of the community;
- to represent and promote the interests of the community; and
- to provide for the peace, order and good government of the municipal area.

In performing these roles and functions Council is required to consult, involve and be accountable to the community.

Council's strategic stance is to demonstrate integrity through consistent, cohesive and equitable processes and decision making, to foster and promote long term organisational sustainability and the strategic positioning of the Council, and to deliver high performance products and services based on leadership, professionalism, skill and commitment of elected Councillors and employees

Characteristic and Trend Measures include:

- Legal and statutory compliance;
- Financial compliance and stability;
- Increased external funding; and
- Development of partnerships.



STRATEGIES COUNCIL USES TO ACHIEVE OUR CHARACTERISTICS

Councils, like all governments, have limited resources to apply over a wide range of responsibilities. This means that a range of strategies must be used to achieve an optimal mix of direct investment, facilitation and support to achieve the defined outcomes.

The mix of strategies below is a "tool set" utilised by Council, most often in combination, to achieve the best outcome possible for the resources available.

A) LAND USE MANAGEMENT

This is a core regulatory responsibility of Council within its delegation as a planning authority. The availability and use of land for "best purpose and future opportunity" based on location, proximity, existing and potential servicing and risks, is a key tool in ensuring the strategic objectives can be realised in a balanced manner. The outcomes become the test of the focus and value of our planning instruments and of "good land use".

Development Trends

- Development trends;
- Level of re-zoning of land;
- Number of DAs over time / zones;
- Number of BAs over time / zones;
- Development type;
- Processing times;
- Number of applications converted to development;
- Number of food businesses;

- Assets generated from developments; and
- Increase in property value generated from new development.

B) BUILD NETWORKS AND RELATIONSHIPS

The development of networks within the community and with other stakeholders, such as government and industry, is important in terms of ensuring their decisions and actions "add" to the achievement of beneficial community outcomes. The goal is to ensure that when they make decisions that are focused on and supportive of our community objectives. Success in this strategy adds significantly to the Huon Valley resource base that is focused on this achievement.

Strategy Success Measures

- Number of engagement activities we undertake – structured meetings / Committees;
- Networks are in place;
- Achievement of the networks' goals; and
- Contribution to strategic objectives.

C) ENCOURAGE, FACILITATE AND DIRECTLY INVEST

With a limited rate base, it is important that a mix of private and government investment is sourced. This investment relates not solely to physical assets but also in terms of community services. The potential investment of "sweat" by individuals and groups within the community, as a key input, is included within this strategy as a key community resource. The Huon Valley has achieved very strong financial sustainability benchmarks (one of the top Councils within Tasmania). This provides a solid foundation on which to achieve the community's goals.

Strategy Success Measures

- Council's financial sustainability indicators;
- Quality and scope of assets and services;



- Level and continuity of investment by government and community;
- Private investment by community profile sector;
- Benefit/cost relationship of investment; and
- Economic flow-on value from Council investment.

D) FACILITATE LEARNING, CREATIVITY AND INNOVATION

The world is highly dynamic and interconnected. The ability for a community to be sustainable in the long term is highly related to its ability to recognise and adjust to those dynamics – to be creative. This strategy is applied to the internal operations of Council, the manner in which Council engages with stakeholders and the way those stakeholders resolve the problem or capture the opportunity. While we often and appropriately focus on technology, it is also about how we engage with one another and approach challenges and opportunities.

Strategy Success Measures

- Recognition and development of potential value;
- Achievement and application of learning and qualifications; and
- Number and benefit of innovative projects.

E) MARKET AND COMMUNICATE TO ENCOURAGE ENGAGEMENT AND VOLUNTEERING

Huon Valley Council has recently invested in a Huon Valley branding strategy as a means of external and internal marketing. This branding can provide the "positioning" of the Huon Valley in the market, an "umbrella" under which different sectors of the economy can undertake their specific interest promotion in a structured and productive way.

This strategy also provides the basis for telling the Huon Valley story or that of specific issues within the community as a means of encouraging engagement. The application of the brand to internal community



conversations related to each sector of the community profile, specific issues and opportunities within them and importantly, the interdependence of the sectors is considered a key component of the strategy to improve engagement and engagement across the community with key activities and initiatives.

Strategy Success Measures

- Utilisation rates of Council infrastructure and facilities;
- Awareness, recognition and use of the Huon Valley brand;
- Volunteering culture and level of volunteering; and
- Formal engagement activities undertaken.

F) GOVERN AND MANAGE WITH QUALITY INFORMATION, CONTEMPORARY PROCESS, RESPECT AND INCLUSION

Governance is not just a political and technical exercise. The Community Plan has a consistent and recurring message around increased engagement. During the development of the Strategic Plan this has evolved into an increasingly collaborative form of governance – working together, where Council is one of a number of "leadership groups", albeit with a specific legislative mandate, that works towards jointly achieving the community outcomes sought.

The governance framework is based on using the strategic objectives as both the goal and reference point for decisions and effort. Taking a reflexive approach and establishing constructive conversations around contentious and major issues, Council's direct role then becomes situational, sometimes the direct provider, advocate or facilitator.

The focus on outcomes is designed to develop creative solutions that both achieve them and are productive.

Strategy Success Measures

- Compliance with statutory and internal policy requirements;
- Successful stewardship of community assets;
- Decisions and actions are supported by best available information;
- Source of best available, integrated information; and
- Strong capacity to cope with "shocks" and to generate/accommodate ideas.



HOW WE WILL APPLY THE STRATEGIES

The following tables bring together the way in which strategies will be implemented to achieve community outcomes and associated success measures.

The table summarises the approach that will be taken to applying the strategies to achieve our specific goals and their measures of success. The purpose of these tables is to create the bridge between the Strategic and Annual Plans and provide a practical demonstration of how Council will apply and measure the success of the strategies as it addresses its responsibilities.

The approach is designed to ensure that Council has consistency in how matters are approached, when we are pursuing a strategy for a specific goal, we consider how it may leverage value across other arenas. It is further designed to ensure the organisation works together in a cohesive manner and is focused on results, rather than just tasks. Understanding how a business unit "fits" within the development pathways and works with others to achieve it is critical to achieving the strategic objectives.

While this is important within Council, it is equally important across the community.

Our goal is to design and implement a strategy that facilitates "working together" to achieve common goals – this is the essence of our implementation approach.

LINKING STRATEGY, CHARACTERISTICS AND STRATEGIC OBJECTIVES

The tables demonstrate how Council links its strategy to Characteristics to progress towards our strategic objectives. This table is the base document on which the Annual Plan is developed.

The development pathways for each community sector (along the rows) shows the general strategy mix Council will apply to the sector. This is designed to ensure the right level of effort and investment in each strategy to achieve the outcomes sought.

To further contribute to improved outcomes and productivity, the strategies (down the columns) are analysed to consider how applying the strategy can simultaneously contribute to a number of sectors. This is important in both achieving an improved return and in developing collaboration between the sectors within the community.

		STRATEGIES						CHARACTERISTIC & TREND MEASURE
		A- Land use management	B - Build networks and relationships	C - Encourage, facilitate and directly invest	D - Facilitate learning, creativity and innovation	E - Market and communicate to encourage engagement and volunteering	F - Govern and manage with quality information, contemporary process, respect and inclusion	
CHARACTERISTICS	1. POPULATION	• Providing zones and places for people to work, live and invest	• Community cohesion • Identify networks people can connect to	• Ensuring investment maintains value	• Advocate and encourage options to facilitate education and learning	• Foster a volunteering culture • Promoting the Huon Valley as a place to work, live and invest	• Promote the Huon Valley brand • To ensure effective communication during emergency events	• Rate of increase of the population; and • Demographic profile diversity
	2. ECOLOGY AND NATURAL RESOURCE MANAGEMENT	• Consideration of ecology and natural resource management in using land eg. risks, limitations and opportunities	• Actively maintain relationships with key stakeholders • Develop opportunities for joint planning and whole of area plans	• Encourage development opportunities enabled by the natural environment	• Facilitate landholder education • Encourage innovative methods of natural resource management • Encourage resilience and adaptability	• Foster a volunteering culture • Promote sustainable access to and beneficial use of the natural environment • Promotion of Huon Valley brand • Promotion of the natural environment as a key attractor to the Huon Valley	• Encourage and promote the value proposition of natural resource management	• Natural diversity; • Water quality; • Invasive species controlled; • Productive land capability; and • Direct and indirect business activity and employment.
	3. UTILITIES AND INFRASTRUCTURE	• All land use planning must include consideration of infrastructure eg. risks, limitations and opportunities	• Actively maintain relationships with key stakeholders • Develop opportunities for joint planning and whole of area plans	• Maintain current asset base • Identify strategic growth projects • Lobby for maintenance and growth of non-Council owned public infrastructure	• Consideration of reutilisation of wastes as resources • Structured continuous improvement	• Active promotion of Council's infrastructure (halls/parks) • Continual assessment of future infrastructure growth, re-use and rationalisation	• Manage assets in accordance with accepted standards	• Infrastructure serviceability reflects community needs; • Compliance with contemporary standards; • Meet or exceed contemporary accepted asset management measures; • Number of innovation projects; • Digital coverage; • Recognition of social infrastructure; and • The number and value of externally funded projects – full, part, public and private

		STRATEGIES						CHARACTERISTIC & TREND MEASURE
		A- Land use management	B - Build networks and relationships	C - Encourage, facilitate and directly invest	D - Facilitate learning, creativity and innovation	E - Market and communicate to encourage engagement and volunteering	F - Govern and manage with quality information, contemporary process, respect and inclusion	
CHARACTERISTICS	4. PRODUCTION	• Encourage production through the creation of special zoning and incubation clusters • Advocate for and utilise regulatory and process efficiencies	• Actively maintain relationships with key stakeholders • Advocate for research, support and development into new and existing industries	• Actively work with developers from inception to delivery • Advocate for appropriate incentives and frameworks to encourage production	• Advocate for local skill development • Decrease barriers to innovative production development	• Create awareness of new development and opportunities • Maintain formal relationship between Council and industry	• Streamline Council regulation and processes • Actively support economic development	• Huon Valley value of production; • New or expanded production and value adding; • Direct employment and income; and • Contribution to Huon Valley brand and positioning.
	5. SETTLEMENT AND BUILT ENVIRONMENT	• Land use planning that incorporates a diversity of offer • Optimises infrastructure utilisation • Protection of iconic Huon Valley attributes • Advocate for and utilise regulatory and process efficiencies	• Actively maintain relationships with key stakeholders	• Actively work with developers from inception to delivery • Encourage a range of public and private investment • Optimise the community infrastructure contributions • Enhance distinctive settlements	• Encourage places and processes to support creativity • Evolve pathways to consider new ideas and developments	• Actively encourage conversion of visitors to investors • Promote the unique Huon Valley offer • Enable multiple use of spaces	• Actively support development • Actively promoting the Huon Valley brand • Ensure that all plans incorporate consideration of a diversity of users	• Planning and building approvals; • Utilisation of zoned land by classification; • Awareness of diverse characteristics of the Huon Valley; and • Brand recognition.
	6. RETAIL, TRADE, BUSINESS AND PROFESSIONAL SERVICES	• Ensuring zones and spaces are available • Ensuring accessible services with supporting infrastructure • Facilitate mix of retail, trade, business and professional services available	• Encourage relationships between business and service sector • Promote and encourage value added processing and other employment opportunities	• Encourage increase in private investment	• Advocate for local skill development • Decrease barriers to innovation	• Promote the unique Huon Valley offer and the benefits of Buy Local • Create awareness of new development and opportunities • Maintain formal relationship between Council and industry	• Streamline Council regulation and processes • Actively support economic development	• Business profile – current and trend; and • Employment profile – current and trend

		STRATEGIES						CHARACTERISTIC & TREND MEASURE
		A- Land use management	B - Build networks and relationships	C - Encourage, facilitate and directly invest	D - Facilitate learning, creativity and innovation	E - Market and communicate to encourage engagement and volunteering	F - Govern and manage with quality information, contemporary process, respect and inclusion	
CHARACTERISTICS	7. EDUCATION & LEARNING SERVICES	• Optimise educational facilities use within and across settlements	• Encourage educational institution / industry / business partnerships	• Encourage lifelong learning • Facilitate the provision of early learning centres • Facilitate the servicing of critical gaps	• Advocate for local skill development • Encourage technological partnerships • Encourage and demonstrate a learning culture	• Promote innovation and learning outcomes • Foster a volunteering culture	• Advocacy, championing and facilitating education services • Deliver to standards and benchmarks	• Education and learning participation and achievement profile; • Population qualification profile; • Trainee/apprentice profile; • Literacy levels; and • Australian Early Development Census
	8. PUBLIC ADMINISTRATION	• Ensure location of services and facilities in areas of convenience and need • Facilitate multiple use and service mixes • Encouraging land use management taking into account risk and emergency service considerations	• Actively maintain relationships with key stakeholders • Develop opportunities for joint planning and whole of area plans	• Facilitate the servicing of critical gaps • Facilitate the achievement of lifelong health and wellbeing • Encourage investment in risk management	• Advocate for local skill development	• Promote lifelong health • Encourage home based risk management plans • Foster a volunteering culture • Facilitate information provision from primary service providers	• Deliver to standards and benchmarks • Actively educate, enforce and support people to achieve compliance • Maintain formal relationship between Council and primary service providers • Support business and community continuity	• Accessibility; • Scope and quality of service; and • Compliance to response standards
	9. ARTS, CULTURE, RECREATION / TOURISM	• Ensuring zones and spaces are available • Ensuring accessible services with supporting infrastructure	• Actively maintain relationships with key stakeholders • Facilitate the building of networks and collaboration	• Promote existing spaces to enable activities • Encourage community and private investment • Actively support a diversity of community events • Continued provision of visitor information services	• Advocate for local skill development and sustainability	• Foster a volunteering culture • Promote lifelong participation • Promote cultural characteristics of each of the settlements • Visitor marketing and the provision of visitor information • Promote the Huon Valley brand	• Use Huon Valley brand • Streamline Council regulation and processes • Actively support economic and social development	• Arts, cultural and recreational activity profile; • Participation levels, including organisational; • Profile of accommodation and attractions; • Visitor numbers; and • Length of stay and yield.

		STRATEGIES						CHARACTERISTIC & TREND MEASURE
		A- Land use management	B - Build networks and relationships	C - Encourage, facilitate and directly invest	D - Facilitate learning, creativity and innovation	E - Market and communicate to encourage engagement and volunteering	F - Govern and manage with quality information, contemporary process, respect and inclusion	
CHARACTERISTICS	10. COUNCIL SUSTAINABILITY, CAPACITY AND GOVERNANCE	• Ensuring appropriate land is available for Council development	• Maintain strong intergovernmental relationships • Participate in resource sharing opportunities	• Ensure opportunities are identified for funding of projects in the Huon Valley • Maintain strong intergovernmental relationships • Participate in key local government authorities	• Encourage and facilitate a learning culture • Promote innovation and learning outcomes	• Foster a volunteering culture • Promote the Huon Valley brand • Provide high quality services	• Demonstrate consistent and equitable processes and decision making • To minimise risk • To ensure legal and statutory compliance	• Legal and statutory compliance • Financial compliance and stability • Increased external funding • Development of partnerships

	STRATEGIES					
	A- Land use management	B - Build networks and relationships focus and support	C - Encourage, facilitate and directly invest	D - Facilitate learning, creativity and innovation	E - Market and communicate to encourage and facilitate engagement and volunteering	F - Govern and manage based on information, process, respect and inclusion
SUCCESS MEASURES	• Development trends • Ensure land is used for its best use • Level of re-zoning of land • Number of DAs over time / zones • Number of BAs over time / zones • Development type • Processing times • Number of applications converted to development • Assets generated from developments • Increase in property value generated from new development	• Number of engagement activities we undertake – structured meetings / Committees • Networks are in place • Achievement of the networks' goals • Contribution to strategic objectives	• Council's recurrent and discretionary investment • Quality and scope of assets and services; • Level and continuity investment by government and community; • Private investment by community profile sector; • Benefit/cost relationship of investment; and • Economic flow-on value from Council investment.	• Recognition and development of potential value • Achievement and application of learning and qualifications • Number and benefit of innovation projects	• Utilisation rates of Council infrastructure and facilities; • Awareness, recognition and use of the Huon Valley brand; • Volunteering culture and level of volunteering; and • Formal engagement activities undertaken.	• Compliance with statutory and internal policy requirements • Successful stewardship of community assets • Decisions and actions are supported by best available information • Source of best available, integrated information • Strong capacity to cope with "shocks" and to generate/ accommodate ideas

Huon Valley Economic Development Strategy 2015-2020

Huon Valley Economic Development Strategy 2015-2020

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EXECUTIVE SUMMARY

Background

The Huon Valley Council's Economic Development Strategy 2015-2020 outlines the Council's strategic direction for the next five years with respect to delivering economic development related outcomes for the community. It describes how Council works with and within the community and other service providers, to deliver economic programs and activities that will achieve objectives and priorities for local businesses and the community overall.

The Council's role in economic development is to facilitate business investment, implement policy and create an environment conducive to appropriate industry as outlined in this strategy. The aim of the Economic Development Strategy is to identify practical actions for the enhancement of the Huon Valley economy; responding to the opportunities and constraints to economic and business growth and the values of the community.

The material in the Economic Development Strategy is derived from industry research, consultation with the *Huon Valley Economic Development Advisory Committee* (a special Committee of Council), and comments provided by the Huon Valley community in response to the *Huon Valley Economic Development Strategy Discussion Paper 2015*, prepared in June 2015.

The previous *Huon Valley Economic Development Strategy 2009* set a solid base for delivering economic development outcomes for the Huon Valley. A number of the initiatives identified in the 2015-2020 reiteration, are currently being progressed by the Huon Valley Council; hence this document provides a framework for both existing and new economic development initiatives.

Economic Context

The Huon Valley is a vibrant, semi-rural community commencing just 30 minutes south of the Tasmanian capital city, Hobart. It is Australia's southernmost municipal area with a population of more than 15,000 people.

The Valley's 5,497 square kilometres is dominated by meandering waterways and forested hills. The region's fertile landscape produces an array of quality foods that has helped Tasmania earn its reputation as a food lovers' paradise.

The Huon Valley is also a haven for yachting and boating enthusiasts with easy access to the Huon River and D'Entrecasteaux Channel. These waters offer world class fishing, sailing, diving and rowing experiences.

The Huon Valley's key industry sectors in terms of jobs and value include aquaculture and fishing (approximate value approaching $350 million), agriculture (approximate value $45 million), forestry (approximate value $25 million) and tourism (Sources: *Tasmanian Salmonid Growers Association Ltd*, *Australian Bureau of Statistics – Value of Agricultural Commodities Produced 2010-11*, *Forestry Tasmania 2010/11 Annual Report*).

The following trends highlight some key characteristics of the Huon Valley for consideration of the Economic Development Strategy:

- The Huon Valley has a diverse industry base with employment access through a variety of sectors including aquaculture, agriculture, health care and social assistance, and retail/tourism sectors. (Source: *Australian Bureau of Statistics, Census 2011*);
- The Huon Valley's population has progressively increased each year for the last ten years, with a total population of 16,273 people residing in the municipal area by end financial year 2013/14 (an increase of 0.7% on the previous year). (Source: *Australian Bureau of Statistics, Regional Population Growth, Australia 2014*);
- The Huon Valley population is ageing, with the majority of residents being aged between 45 and 65 years. The median age of the Huon Valley population is 43 years, which is slightly above the state average. (Source: *Australian Bureau of Statistics, Huon Valley LGA 2013*); and
- School retention rates and completion of tertiary education continue to be a challenge for the Huon Valley. The number of males completing year ten or equivalent is greater than those who complete year twelve or more (2051 males completed year 10 compared with 1920 having completed year 12). Further, more females are likely to complete year twelve than males, with 2294 females having completed year 12 compared to 1920 males. (Source: *Australian Bureau of Statistics, Census 2011*).

Economic Development Objectives

The following objectives were identified and agreed by the Council, through its *Economic Development Advisory Committee* during the development of the Economic Development Strategy:

- Enhance and develop the Huon Valley as a destination for high quality tourism experiences and services;

- Revitalise the Huon Valley economy through developing a dynamic place for business and investment;
- Enhance the Huon Valley's reputation as being an attractive and desirable place for business and investment, where the balance between lifestyle and work can be achieved;
- Effectively leverage off the Huon Valley's strategic location for the purposes of attracting residential and business investment and growth, and improve the destination appeal for visitors;
- Plan for the future growth and prosperity of the region;
- Support the Huon Valley's primary production sector to transition into innovative primary industries and non traditional practices; and
- Enhance the Huon Valley's regard nationally as a creative region.

These objectives are compatible with Council's recently endorsed Strategic Plan, whereby the aims of the Economic Development Strategy assist to fulfil the following core characteristics:

- A great environment;
- A prosperous, resilient economy;
- Capable and productive people and assets; and
- Community wellbeing and liveability.

PART A – BACKGROUND

INTRODUCTION

About the Economic Development Strategy

The Huon Valley Council's Economic Development Strategy 2015-2020 outlines the Council's strategic direction for the next five years with respect to delivering economic development related outcomes for the community. It describes how Council works with and within the community and other service providers, to deliver economic programs and activities that will achieve objectives and priorities for local businesses and the community overall.

The Council's role in economic development is to facilitate business investment, implement policy and create an environment conducive to appropriate industry as outlined in this strategy. The aim of the Economic Development Strategy is to identify practical actions for the enhancement of the Huon Valley economy; responding to the opportunities and constraints to economic and business growth and the values of the community.

The material in the Economic Development Strategy is derived from industry research, consultation with the *Huon Valley Economic Development Advisory Committee* (a special Committee of Council), and comments provided by the Huon Valley community in response to the *Huon Valley Economic Development Strategy Discussion Paper 2015*, prepared in June 2015.

FIGURE 1 – Economic Development Strategy Process



Methodology

The methodology shown in Figure 1 provides a broad overview of the Economic Development Strategy process.

The process responds to the requirements of the project plan that was endorsed by Council management and the Huon Valley Economic Development Advisory Committee.

How to Influence Economic Development

While it is acknowledged that the private sector (business and industry) remains the primary contributor to economic development driven by a desire to develop business, build the economy and accumulate wealth, Council have recognised through its Strategic Plan 2015-2025 a process by which the Council and the community can jointly influence and contribute towards the outcomes it desires. The new strategic focus relies heavily upon the characteristics that enable the Council, the community and other stakeholders to consider how sectors work together to support each other as a "community system" and contribute to the longer term strategic outcomes. Mixes of strategies are available and can be used in whichever relevant situation. In the event that some sectors may be limiting the performance of others, or that the strategic objectives are not being realised, the Council has acquired a mix of strategies to use to either minimise the risk or realise opportunities.

The Council's Strategic Plan serves to provide an approach that ensures Council's effort is focused on contemporary, important factors, and is not locked into issues that, while important in 2015, are not so (for example), in 2018. This approach reinforces Council's commitment to engagement and partnership with the community as a means of jointly achieving the strategic objectives.

The Council and the community can influence the investment and business development through:

- Supporting and facilitating business networks;
- Enhancing existing industry clusters and encouraging the development of new clusters;
- Supporting appropriate tourism development that balances the benefits of visitation as well as against amenity and environmental impacts;
- Nurturing entrepreneurialism through support for new and potential industries and businesses; and
- Encouraging and facilitating innovation.

The Council can equally facilitate a conducive business environment through:

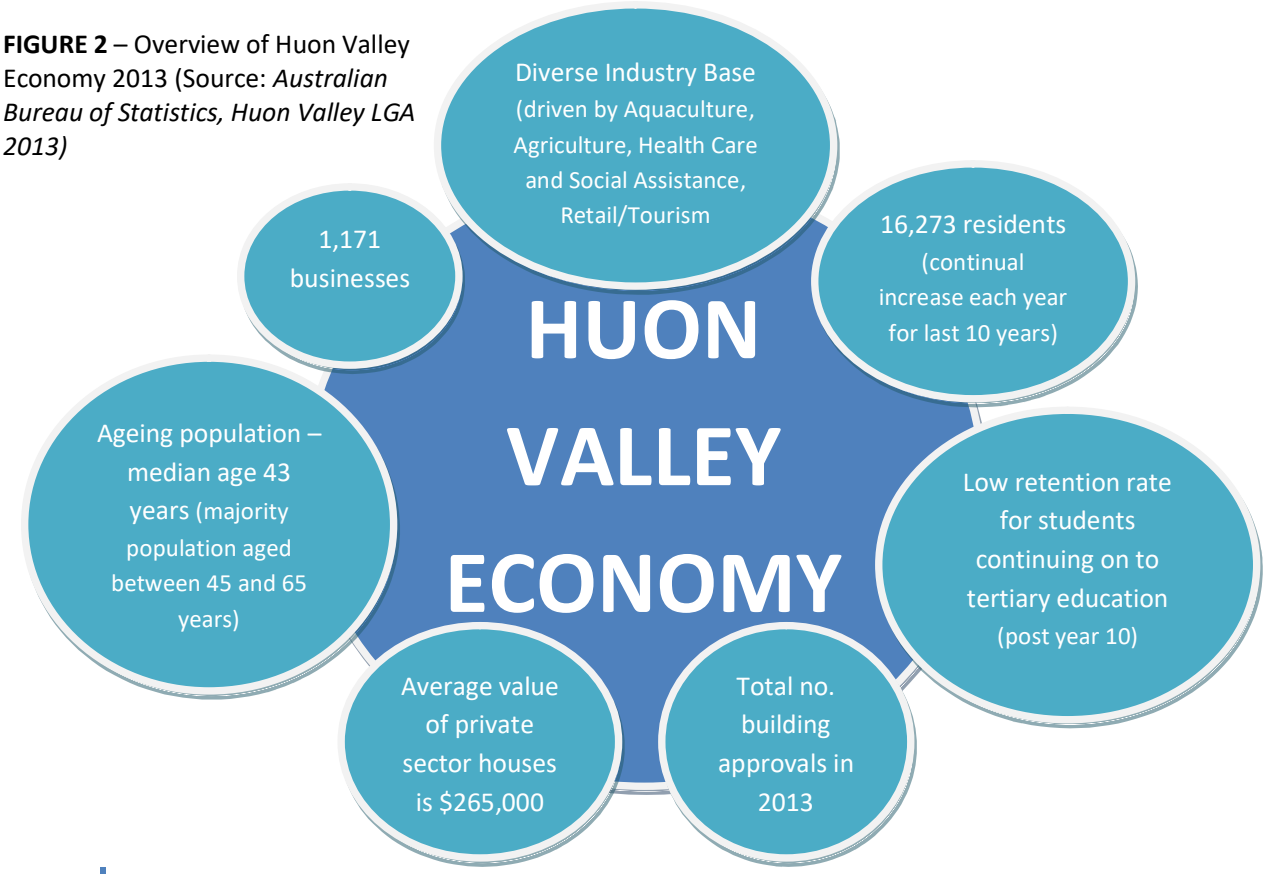
- Reviewing land use and development plans to ensure they are more closely aligned with economic strategy outcomes;

- Provide dedicated Council resources to economic development, and ensure their involvement is embedded in Council procedures to more effectively facilitate linkages to businesses;
- Encourage the use of environmentally, economically and socially sustainable business practices;
- Undertake specific infrastructure and/or development projects to enable investment;
- Facilitate training and capacity building initiatives;
- Foster social inclusion; and
- Provide business information and advisory services.

ECONOMIC CONTEXT

The Huon Valley's key industry sectors in terms of jobs and value include aquaculture and fishing (approximate value approaching $350 million), agriculture (approximate value $45 million), forestry (approximate value $25 million) and tourism (Sources: *Tasmanian Salmonid Growers Association Ltd*, *Australian Bureau of Statistics – Value of Agricultural Commodities Produced 2010-11*, *Forestry Tasmania 2010/11 Annual Report*).

FIGURE 2 – Overview of Huon Valley Economy 2013 (Source: *Australian Bureau of Statistics, Huon Valley LGA 2013)*



KEY ECONOMIC TRENDS

Spatial Economic Context	The Huon Valley is influenced significantly by its relatively close proximity to Tasmania's capital city Hobart. The urban spread from Hobart and into neighbouring municipal area, Kingborough, provides both competition for local businesses and services, as well as a catchment market for Huon Valley businesses and experiences to leverage. The close proximity to these two denser populated areas, coupled with lower average house prices, means that to first home owners and other low-medium income earners, the Huon Valley offers considerable appeal.
Growing Population	The Huon Valley has experienced steady population growth over the past 10 years at around 0.7% per annum – among one of the highest population percentage increases of other similar regional areas. The population is forecast to grow, with the Huon Valley becoming increasingly popular with a range of demographics, particularly the age group ranging from 35 years to 64 years. Population growth within this age group presents a range of opportunities and demand for service industries including retail, health, aged care provisions, recreational, education, property and construction.
Ageing Population and Growing Family Demographic	The Huon Valley is becoming increasingly appealing for those seeking a retirement destination, as indicated by the age profile of the region's population. In addition with retirees, the Valley is also equally appealing towards those who are first home buyers and young families, attracted to the region for its lifestyle attributes and close proximity to more urban centres such as Hobart and Kingston. Capturing growth in younger family demographics is essential for community sustainability and should therefore be a continued focus for the region.
Diversity of Industry Base	A key strength of the Huon Valley lies in its depth of industry sectors, with particular emphasis on growing and emerging industries including aquaculture, agriculture, health care and social assistance, and retail/tourism. The region is well placed to capitalise on opportunities such as the emergence of aquaculture as a key economic contributor, increasing its current production levels considerably (currently 75% of state's total production) in the Huon Valley. Agriculture as a traditional industry upon which the Valley has grown and developed, continues to play a key role in providing opportunities for the community. As new niche experiences and products are explored, so too are the range of opportunities available to value add and retain current farms and orchards financially sustainable. Furthermore, with an increased

	ageing population the scope for health care and social assistance presents considerable opportunities for a region which generationally helps to strengthen the community's linkages to the place, and create a desire to continue living in the region during the latter stages of life.
Educational Aspirations	The difficulty of retaining students in education beyond year 10, has long hindered the capacity and opportunities available to the Huon Valley community. In recent times, accessibility to quality, meaningful education opportunities have been enhanced through such facilities as the *Huon Valley Trade Training Centre* and the inclusion of year 11 and 12 subjects in some of the district's high schools. Further lobbying and advocacy is required to sustain this momentum, and provide meaningful training opportunities for the Valley's growing population – particularly for those young families basing themselves in the region.

ECONOMIC DEVELOPMENT OBJECTIVES

The following objectives were identified and agreed by the Council, through its *Economic Development Advisory Committee* during the development of the Economic Development Strategy. They constitute the key issues for business and investment in the Huon Valley and the underlying community values of Huon Valley residents.

These objectives underlie the development of the strategies for economic development in the Huon Valley.

- Enhance and develop the Huon Valley as a destination for high quality tourism experiences and services;
- Revitalise the Huon Valley economy through developing a dynamic place for business and investment;
- Enhance the Huon Valley's reputation as being an attractive and desirable place for business and investment, where the balance between lifestyle and work can be achieved;
- Effectively leverage off the Huon Valley's strategic location for the purposes of attracting residential and business investment and growth, and improve the destination appeal for visitors;
- Plan for the future growth and prosperity of the region;

- Support the Huon Valley's primary production sector to transition into innovative primary industries and non traditional practices; and
- Enhance the Huon Valley's regard nationally as a creative region.

PART B – HUON VALLEY ECONOMIC DEVELOPMENT PILLARS

PILLAR ONE: HUON VALLEY DESTINATION DEVELOPMENT

Vision

The Huon Valley is recognised for high quality tourism experiences and services

Profile

The Huon Valley's environment and setting is one of its greatest tourism assets. The geography and natural attractions provide an unparalleled backdrop for the tourism industry to leverage.

The Huon Valley already has a diverse and attractive tourism offer, including its pristine and accessible waterways and wilderness, rich heritage and historical presence, and world renowned food, wine and beverage experiences. Its most unique attribute stems from being the southern-most point in Australia.

There is great opportunity to continue to develop the Huon Valley as a unique destination that sets it apart from other regional areas in Tasmania. The Huon Valley has the potential to become a globally recognised destination with further investment in product and infrastructure, as well through effective, collaborative marketing and promotional mechanisms.

Key Focus Areas

1.1 Actively encourage investment in the Huon valley in areas that have been strategically identified to improve the overall visitor amenity and service provisions/experiences throughout the region.

Direction 1A: Strategically review the Council's *Huon Valley Accommodation Prospectus* and the *Huon Valley Attractions and Experiences Prospectus* to ensure relevance and consistency with key development policies and strategies and investment opportunities.

Direction 1B: Maintain a range of communication tools for promoting investment and development opportunities with respect to accommodation and attractions/experiences in the Huon Valley.

Direction 1C: Undertake any necessary actions to ensure that Council owned sites identified as being suitable for tourism development are investment ready.

Direction 1D: Liaise with, and support, private land owners to develop their sites to ensure they are investment ready.

Direction 1E: Align activities where possible with State Government agencies such as *Invest Tasmania* and other support agencies to promote

the investment and development opportunities available in the Huon Valley.

Direction 1F: Support and facilitate any investment and/or development interest with the Council's regulatory and development processes to encourage development to proceed.

Direction 1G: Strategically review the provision of Council owned/operated RV accommodation sites in accordance with the State Government's Economic Regulator requirements and in harmony with private operators.

1.2 Establish and maintain an appropriate level of visitor information services 'on the ground' throughout the Huon Valley.

Direction 1H: Support the sustainable operation of the *Huon Valley Visitor Centre*.

1.3 Maintain effective marketing and promotion of the region for the purposes of tourism through the Huon Trail and Huon Valley Brand.

Direction 1I: Develop marketing plans for the Huon Trail and the Huon Valley Brand which are differentiated in their aims and objectives to ensure effective promotion of the Huon Valley is maintained.

Direction 1J: Implement the endorsed marketing plans for the Huon Trail and the Huon Valley Brand ensuring effective promotion of the Huon Valley occurs.

Direction 1K: Ensure all marketing and promotional activities undertaken by either the Huon Trail or the Huon Valley Brand occurs in accordance with their respective Brand and Style Guides.

PILLAR TWO: HUON VALLEY ECONOMIC REVITALISATION

Vision

The Huon Valley will be developed as a dynamic place for business and investment, led by growth in the agriculture, aquaculture and tourism industries.

Profile

Contribution to the Huon Valley's economy is led by the following key industry sectors: aquaculture and fishing (approximate value approaching $350 million), agriculture (approximate value $45 million), forestry (approximate value $25 million) and tourism (Sources: *Tasmanian Salmonid Growers Association Ltd*, *Australian Bureau of Statistics – Value of Agricultural Commodities Produced 2010-11*, *Forestry Tasmania 2010/11 Annual Report*).

Forestry while in decline, still plays a role in providing employment for a number of local residents.

The requirement for continual investment in key services and facilities to support these critical industries cannot be understated.

Key Focus Areas

2.1 Ensure the commercial centres of the Huon Valley are competitive and economically viable.

Direction 2A: Continue to invest in township development and presentation through streetscape and infrastructure initiatives.

Direction 2B: Seek to attract investment and development for the purposes of an expanded commercial area in Huonville – with emphasis on the establishment of a second major supermarket chain, multi-generational facility and transit centre.

Direction 2C: Support the development of a multi-service facility in Dover to improve the availability of medical, multi-generational and community wellbeing services to enhance the attractiveness of the area for employment and liveability.

2.2 Progress the development of an industrial park in Huonville.

Direction 2D: Continue to support the development of a light industrial park in Huonville.

Direction 2E: Participate in any review of the availability and suitability of light industrial land in the Huon Valley.

Direction 2F: Consider opportunities in other towns where industrial zoned uses may apply, including Cygnet, Geeveston and/or Dover.

2.3 Review the *Huon Valley Interim Planning Scheme* in the context of economic development needs and demands.

Direction 2G: Review and consider potential implications imposed by the new Codes underpinning the Council's Planning Scheme to ensure consistency (where possible) with overall economic development strategy aims and objectives.

2.4 Work with key industry partners to identify untreated fresh water needs to meet fish bathing, irrigation and industrial water needs.

Direction 2H: Investigate opportunities for smaller scale irrigation opportunities and requirements for the benefit of local agricultural, viticulture and aquaculture developments.

2.5 Consider the opportunity for development of commercial marinas at key locations such as Franklin, Cygnet, Dover and/or Port Huon.

Direction 2I: Undertake investigations into the demand and supply for supporting the development of further commercial marinas in the Huon Estuary.

Direction 2J: Investigate opportunities and potential for floating pier model similar to that applied at Brooke St Pier, Hobart.

2.6 Retain commitment to the development and maintenance of smaller scale waterway infrastructure.

Direction 2K: Continue to support and invest in Council owned marine infrastructure.

2.7 Strive for improvements to road network throughout the Huon Valley.

Direction 2L: Lobby and advocate State and Commonwealth Governments to prioritise upgrading and maintenance of existing arterial road network to meet national standards, with specific attention to primary transport routes including:

- Realignment of Channel Highway, Huonville
- Huon Highway corridor between Geeveston and Dover
- Lune River Road, Lune River (Hastings to Cockle Creek)
- Hastings Caves Road, Hastings
- Arve Road, Geeveston

PILLAR THREE: HUON VALLEY: OPEN FOR BUSINESS

Vision

The Huon Valley is regarded as an attractive and desirable place for business and investment, where the balance between lifestyle and work is achieved.

Profile

It is important that the Huon Valley provide an environment conducive to investment and business growth. The mainstay of the local economy is built upon a high number of small, entrepreneurial businesses – of which require adequate support and assistance to encourage their growth and diversity.

Through the community engagement process, the community and business stakeholders have highlighted that Government regulation and training/support programs are the largest barriers to business growth; therefore the Council's role needs to consider how it can best provide an environment that supports business.

Key Focus Areas

3.1 Encourage the growth of existing businesses in the Huon Valley to optimise employment opportunities and economic expansion.

Direction 3A: Continue to identify and communicate training and funding opportunities that may be of interest and relevance to local businesses.

Direction 3B: Consider the development of an annual *Huon Valley Business Confidence Survey* to monitor trends and issues, and identify opportunities for new business development support services for local businesses.

Direction 3C: Explore opportunity for the development of a commercial skills assistance program for Huon Valley businesses consisting of key components including:

- A regular mystery shopping program;
- Short course training programs (with guest speakers); and
- Locally based mentoring program consisting of local business ambassadors.

Direction 3D: Continue to liaise with and support initiatives progressed by the *Huon Valley Business Enterprise Centre*.

Direction 3E: Retain commitment to Council initiatives and other programs such as the *Buy Local* campaign, and *Build your Business Brochure* to support local businesses and the community.

3.2 Ensure Council support for and involvement in economic development programs and initiatives is sustained.

Direction 3F: Ensure economic development involvement is embedded in Council's regulatory and development services processes with particular emphasis on commercial related development opportunities.

Direction 3G: Undertake a promotional campaign to inform and educate new developers and existing businesses of Council's development facilitation support available through economic development.

Direction 3H: Be pro-active in the identification of grant funding opportunities which will advance positive economic development outcomes.

3.3 Liaise with NBN Co and other information technology agencies to prepare the Huon Valley for being able to take advantage of high speed internet.

Direction 3I: Undertake discussions with *TasmaNet* to consider the expansion of the current *Memorandum of Understanding (MOU)* for the provision of free wireless internet outlets in high traffic areas in the Huon Valley.

Direction 3J: Continue to disseminate information to local businesses and residents about the availability and progress of the installation of the National Broadband Network in the Huon Valley.

3.4 Encourage improved networking and communication between established businesses within the Huon Valley.

Direction 3K: Continue to work with and support initiatives progressed by the *Huon Valley Business Enterprise Centre*.

Direction 3L: Continue to maintain the *Huon Valley Business Database* and subsequent *Huon Valley Directory* (hard copy and online – www.huonvalleydirectory.com.au).

Direction 3M: Encourage the establishment of a Huon Valley wide Chamber of Commerce organisation with the view of empowering the local business community and promote collaboration between businesses.

3.5 Enable a community which highly values professional development, training opportunities and engages with local service providers.

Direction 3N: Encourage local businesses and industries to continue their engagement with and support for training programs and opportunities made available through the *Huon Valley Trade Training Centre*.

Direction 3O: Encourage employers within the Huon Valley to implement skill development programs within their workforces by offering:

- Apprenticeships
- Traineeships
- And other training opportunities

Direction 3P: Organise in conjunction with *Huon LINC*, the *Huon Valley Trade Training Centre* and local businesses, a training information day.

PILLAR FOUR: LEVERAGING FROM THE HUON VALLEY'S GEOGRAPHICAL LOCATION

Vision

Huon Valley effectively leverages off its strategic location in proximity to Hobart through attraction and investment growth in targeted sectors.

Profile

The Huon Valley is well placed to leverage off the urban growth being experienced by its neighbours – Hobart and Kingborough. The proximity to Tasmania's capital city, provides considerable benefits and opportunities, whilst providing a quality, balanced lifestyle experience that is highly sought after by many demographics.

Property and rate costs are just some of the factors that help to present a uniquely appealing destination for many a developer and investor. Such sectors as tourism, agriculture, aquaculture and other retail/service industries all stand to directly benefit.

Key Focus Areas

4.1 Promote investment and development opportunities in the Huon Valley in targeted sectors including: tourism, agricultural and retail/services industries.

Direction 4A: Produce relevant promotional materials for the purposes of attracting investment and development in key identified areas including:

- Visitor accommodation
- Visitor attractions and experiences
- Downstream processing opportunities

Direction 4B: Seek to attract investment and development for the commercial expansion of Huonville.

Direction 4C: Continue to support and liaise with developers in respect of Council's regulatory and development functions.

4.2 Continue the development of a regional marketing identity that promotes the Huon Valley's unique attributes and quality products, producers and experiences.

Direction 4D: Progress implementation of the *Huon Valley Brand* (in accordance with the approved Implementation Plan), to achieve the following key outcomes:

- Establish clear quality control criteria for retaining quality assurance with those products, producers and services who engage with and leverage from the *Huon Valley Brand*.
- Implement regular monitoring processes for ensuring quality assurance measures are adhered when used under the *Huon Valley Brand*.
- Develop a marketing strategy aimed at promoting the *Huon Valley Brand* in an effort to entice investment and development, visitation and migration to the Huon Valley.
- Establish a suitable governance model for overseeing the future progress of the *Huon Valley Brand*.
- Consider the development of a regional prospectus that introduces and promotes the Huon Valley's strengths, advantages and opportunities for attracting new business development, tourism and residential migration.

PILLAR FIVE: PLAN FOR AN ECONOMY OF THE FUTURE

Vision

Council will plan for the future growth and prosperity of the region, with consideration to residential and employee attraction, climate change, workforce participation, and improved 50+ services

Profile

In response to the economic trends facing the Huon Valley, a number of key areas have been recognised for ensuring the Huon Valley's economic growth and prosperity continues. Focus areas include the increasing population (over 16,000 people) and the opportunity for development and investment, the ageing demographic and ensuring their needs are adequately met, training opportunities, and the educational aspirations and the community's ability to effectively participate in the local workforce. These determining factors will have an impact on the Huon Valley's ability to appropriately address the community's needs, and continue to offer an appealing quality, balanced lifestyle.

The Council's commitment to being an active participant and provider of health and wellbeing related services remains a critical component to ensuring the Huon Valley community can access the necessary services it needs. As per Council's Strategic Plan, the ability to ensure a prosperous and resilient economy is sustained, and ensures the community's wellbeing and liveability is reliant on the outcomes achieved through this Pillar.

Key Focus Areas

5.1 Progress the development of a Population Growth and Development Strategy for the Huon Valley.

Direction 5A: Undertake a study of the region's key residential growth areas in order to determine residential and commercial expansion opportunities.

Direction 5B: Support any review and progress made with regards to stormwater needs and demands in the Huon Valley – with a particular aim of ensuring economic expansion and residential growth opportunities are maximised.

Direction 5C: Develop a 'promotional kit' designed to encourage families to relocate to the Huon Valley:

- Establish regular communication links with the local real estate community as a means of promoting the 'kit' and acquiring community sentiment to identify relevant barriers to investment and development (commercial and residential);

- Consider the development of a regional prospectus that introduces and promotes the Huon Valley's strengths, advantages and opportunities for attracting new business development, tourism and residential migration.

5.2 Ensure a highly skilled and competitive workforce which is provided with optimum opportunity to fulfil individual potential and further the economic prosperity of the Huon Valley.

Direction 5D: Continue to lobby and advocate the State and Commonwealth Governments for improvements and commitment to ensuring suitably practical educational opportunities are available in the Huon Valley.

Direction 5E: Investigate opportunities for establishing a Huon Valley focused training strategy in conjunction with key stakeholders such as local businesses, *Huon LINC*, *Huon Valley Trade Training Centre*, *Tas TAFE*, *University of Tasmania* and local district high schools.

Direction 5F: Continue to encourage a range of adult literacy programs to be provided to the community.

Direction 5G: Retain regular communication and dissemination of training opportunities between local training providers and industry.

Direction 5H: Encourage employees to utilise and support the opportunities offered through local training institutions such as the *Huon Valley Trade Training Centre*.

5.3 Continue the delivery of health and wellbeing related programs and services that are relevant for enhancing the Huon Valley community's overall wellbeing and liveability.

Direction 5I: Support the aims of the *Huon Valley Rural Health Strategy* in enhancing the region's overall health and wellbeing for the benefit of improved economic related outcomes.

5.4 Capitalise on the opportunity presented by the Huon Valley's increasing ageing population to improve access to the range of 50+ services as per the Council's *Positive Ageing Strategy*.

Direction 5J: Encourage the establishment of alternative, quality, affordable aged care housing options within easy reach of community and health services.

5.5 Continue to advocate on behalf of the community and lobby for State Government to ensure the continued provision of State Government services in the Huon Valley.

Direction 5K: Undertake an audit of existing service providers and identify gaps.

Direction 5L: Assist with the promotion of opportunities to further develop availability of additional locally based professional services.

5.6 Identify and pursue opportunities that arise due to climate change.

Direction 5M: Monitor, analyse and report on publications released from the State Government and nationally that relate to economic development in terms of how the outcomes might relate to the Huon Valley.

Direction 5N: Continue to support natural resource management initiatives and programs.

5.7 Enhance the ongoing contribution to the local economy by volunteers.

Direction 5O: Encourage the Council to continue its support and recognise local volunteer effort.

PILLAR SIX: RESILIENT AND INNOVATIVE PRIMARY INDUSTRIES

Vision

The Huon Valley's primary production sector will continue to transition with innovative primary production and non-traditional production practices supported by growth in downstream processing opportunities.

Profile

The Huon Valley has long been the home for many agricultural enterprises. The nature of traditional agricultural land uses has changed over the region's history. Changing market conditions, competition from imported low cost products, increasing land fragmentation and growth in business costs have created difficult business conditions for many agricultural enterprises.

Enabling farmers and orchardists to be resilient into the future is a key objective for economic development.

The food and downstream processing sector is also a prominent industry in the Huon Valley and is critical to providing value adding to the regional economy.

Key opportunities for agriculture and agri-product processing sector includes:

- Protecting against further fragmentation and management of land use conflicts;
- Transitioning into non-traditional agricultural products; and
- Engaging with other industry sectors such as tourism to leverage off new markets and development opportunities.

Key Focus Areas

6.1 Encourage increased downstream processing of natural produce and resources.

Direction 6A: Encourage networking between primary producers to identify opportunities for increased downstream processing.

Direction 6B: Identify opportunities for collaboration between processing businesses.

Direction 6C: Liaise with relevant advocacy groups such as *Fruit Growers Tasmania* and the *Tasmanian Salmonid Growers Association* to identify opportunities as they relate to Huon Valley producers across sectors.

Direction 6D: Undertake a review of all agricultural zoned land within the Council's Planning Scheme, with a view to maximise re-use opportunities as they apply to contemporary agricultural related uses.

6.2 Maximise visitor access to the region's fresh, local produce

Direction 6E: Encourage food and wine/cider producers in the Huon Valley to provide an interactive experience for visitor's onsite, wherever possible.

Direction 6F: Encourage food and wine/cider producers in the Huon Valley to consider the provision of "farm gate" experiences or direct from the source selling opportunities.

Direction 6G: Encourage cross promotion between producers and suppliers (eg. Local cafes and restaurants) to showcase food and wine/cider that is sourced from the region.

PILLAR SEVEN: THE CREATIVE CAULDRON

Vision

The Huon Valley will become a place recognised nationally as a creative region, allowing existing creative practitioners to prosper and continue to attract new creative businesses to the region.

Profile

The Huon Valley is well known for its diverse landscapes and pristine environment. This setting drives the community's connection with the place, and provides inspiration for many creative practitioners who are drawn to the Huon Valley's meandering valleys and coastal areas to establish their businesses and experiences.

Throughout the Huon Valley, the region's artistic and creative presence continues to evolve, with townships such as Cygnet and Geeveston both having a particularly strong artistic flair unlike any other. It is this uniqueness that helps to diversify and set the region apart from others, and is therefore important that the economic development strategy acknowledge this.

Growth in recreational opportunities that can benefit both community and visitor amenity also has the capacity to improve the Huon Valley's liveability and assist in increasing the overall appeal and cultural offer for new migrants and other key demographics such as families.

Key Focus Areas

7.1 Work towards achieving an innovative community that supports, values and enjoys a vibrant and sustainable arts industry, and recognises and protects heritage.

Direction 7A: Progress the implementation of the *Huon Valley Arts and Heritage Strategy 2012-2017*.

Direction 7B: Expand the existing focus on the arts and other creative elements in and around Cygnet, and link with other similar experiences across the region.

Direction 7C: Use the profile and visitation of the *Cygnet Folk Festival* and other events to promote authentic local experiences.

7.2 Encourage the development of appropriate recreational and cultural opportunities throughout the Huon Valley.

Direction 7D: Continue to support the maintenance of parks and reserves infrastructure throughout the Huon Valley.

Direction 7E: Promote the public infrastructure currently available for the purposes of sporting, recreational and cultural use throughout the Huon Valley to the broader community.

Direction 7F: Continue to investigate funding opportunities to pursue a partnership with *Sports Marketing Australia* aimed at attracting local and national sporting programs and events to the Huon Valley.

Direction 7G: Support the aims of the *Huon Valley Walking Track Strategy* in enhancing the region's walking and recreational tracks and infrastructure.

Direction 7H: Support and liaise on projects and activities that have broad economic benefits for the community and local businesses.

Direction 7I: Work collaboratively to implement initiatives identified through the *Huon Valley Art Cooperative Initiative*.

PART C – ACTION PLAN

IMPLEMENTATION AND PERFORMANCE MEASURES

Macroeconomic Measurements

A series of macroeconomic measurements will be referred to, to monitor the success of the Huon Valley Economic Development Strategy 2015-2020. These are presented in the following table.

The measures identified provide the closest indication of the desired outcomes of the strategy in terms of results for the Huon Valley economy. It is important to consider the broad macroeconomic factors influencing each of these key indicators when evaluating the success of strategy initiatives. Additionally, it is important to note that the stakeholders have limited control and influence over these factors and while these goals represent the overall desired achievement of the Economic Development Strategy, the attainment of these goals need to be viewed in conjunction with the achievement of the KPIs set out in individual work and project specific plans.

Further to this, the list of directions that have been identified under each Pillar will equally assist in the delivery of the objectives of the Economic Development Strategy. Each relates to an objective with some objectives having multiple tasks identified for them. The list of directions supports comprehensive implementation of the Economic Development Strategy more broadly throughout the Huon Valley.

A schedule has been developed (Appendix 1) to identify each of the directions contained within this document, and indicate when each is to be achieved or implemented. The schedule will inform the Council's Annual Plan and budget processes for ensuring the strategy is achieved within the life of the document. It also provides indicators for ensuring the Economic Development Strategy meets the objectives identified within the Council's Strategic Plan.

Outcome	Measure	Target	Current Benchmark	Source Agency	Indicator	New Data Released	Web Link
More jobs, higher income	Average wage		2011 average weekly household income $868.00	ABS (Census)	Median household income	5 yearly	ABS Census of Population and Housing, 2011
	Employment count		8,338 employed persons March Quarter 2015	DEEWR (Small Area Labour Markets)	Number of employed persons	Quarterly	Dept. of Employment - Small Area Labour Markets publication
Greater economic diversity	Employment by occupation concentration index		• Labourers – 16.8% • Technicians and Trades Workers – 15.9% • Professionals – 15.6% • Managers – 13.7% • Clerical and Admin Workers – 12.2%	ABS (Census)	Employment by Occupation	5 yearly	ABS Census of Population and Housing, 2011
	Industry sector monitoring		• Aquaculture and Fishing - $350 million (2012) • Agriculture - $45 million (2010-11) • Forestry - $25 million (2010/11) • Tourism	• Tas Salmonid Growers Assoc. • DPIPWE • ABS • Forestry Tasmania • Tourism Tasmania	Value by Key Industry Sector	Annually	Source as required
Stronger population growth	Population growth		0.7% growth over 2013/14	ABS (Regional Population Growth, Aus 2013-14) Cat. No. 3218.0	Annual Population % Growth	Annually	ABS Regional Population Growth Australia - Cat. No. 3218.0

Greater regional competitiveness	Building approval levels (residential and non residential)		Value of total residential building = $27 million; Value of total non-residential building = $17 million	ABS (Region Profile Huon Valley LGA 2012/13)	Annual residential and non residential building approval value and growth	Annually	ABS Region Profile - Huon Valley LGA
	Visitor nights		Places stayed overnight • Huonville – 26,279 nights • Dover – 7,982 nights • Cygnet – 13,233 nights • Cockle Creek – 5,179 nights Total holiday visitors who spent one or more nights on a touring route • Huon Trail – 48,432 nights TVS Year Ending: April 2014-March 2015	Tourism Tasmania: Tasmanian Visitor Survey	Annual visitor night growth	Quarterly	Tourism Tasmania - Tasmanian Visitor Survey

Evaluation of the Huon Valley Economic Development Strategy 2015-2020

The Huon Valley Economic Development Strategy 2015-2020 shall be report on the implementation of the Strategy twice a year in conjunction with the Council's Economic Development Advisory Committee.

It is envisaged that the progress of the Huon Valley Economic Development Strategy 2015-2020 will be monitored annually against the indicators described in this document, or as new data becomes available.

The success of individual initiatives and day-to-day economic development activities will also be reported as part of the Council's Annual Plan process, and updated at a minimum 12 monthly period. Further, reporting on the Strategy implementation will also occur as part of the standard quarterly unit reporting schedule to Council. This will ensure activities are current and remain in the best interest of the Huon Valley community and economy as economic, demographic, and industry circumstances change.

PART D – APPENDIX 1

Pillar One	Goal	Direction	Stakeholder	Timeframe
Huon Valley Destination Development	To actively encourage investment in the Huon Valley in areas that have been strategically identified to improve the overall visitor amenity and service provisions/experiences throughout the region.	A. Strategically review the Council's *Huon Valley Accommodation Prospectus* and the *Huon Valley Attractions and Experiences Prospectus* to ensure relevance and consistency with key development policies and strategies.	Huon Valley Council	2015/16
		B. Maintain an effective range of communication tools for promoting investment and development opportunities with respect to accommodation and attractions/experiences in the Huon Valley.	Huon Valley Council	Annually
		C. Undertake any necessary actions to ensure that Council owned sites identified as being suitable for tourism development are investment ready.	Huon Valley Council	2016/17
		D. Liaise with and support private land owners to develop their sites to ensure they are investment ready.	Huon Valley Council / Property Owners	Annually
		E. Align activities where possible with State Government agencies such as *Invest Tasmania* and other support agencies to promote the investment and development opportunities available in the Huon Valley.	Huon Valley Council / State Government	Annually
		F. Support and facilitate any investment and/or development interest with the Council's regulatory and development processes to encourage development to proceed.	Huon Valley Council	Annually

		G. Ensure the provision of any Council owned/operated RV accommodation provisions function in accordance with the State Government's Economic Regulator and in harmony with private operators.	Huon Valley Council	Annually
	Establish and maintain an appropriate level of visitor information services 'on the ground' throughout the Huon Valley.	H. Support the sustainable operation of the *Huon Valley Visitor Centre*.	Huon Valley Council	Annually
	Maintain effective marketing and promotion of the region for the purposes of tourism through the Huon Trail and Huon Valley Brand.	I. Develop marketing plans for the Huon Trail and the Huon Valley Brand which are differentiated in their aims and objectives to ensure effective promotion of the Huon Valley is maintained.	Huon Valley Council	Annually
		J. Implement the endorsed marketing plans for the Huon Trail and the Huon Valley Brand ensuring effective promotion of the Huon Valley occurs.	Huon Valley Council	Annually
		K. Ensure all marketing and promotional activities undertaken by either the Huon Trail or the Huon Valley Brand occurs in accordance with their respective Brand and Style Guides.	Huon Valley Council	Annually

Pillar Two	Goal	Direction	Stakeholder	Timeframe
Huon Valley Economic Revitalisation	Ensure the commercial centres of the Huon Valley remain competitive and economically viable.	A. Continue to invest in township development and presentation through streetscape and infrastructure initiatives.	Huon Valley Council / Property owners	Annually
		B. Seek to attract investment and development for the purposes of an expanded commercial area in Huonville – with emphasis on the establishment of a second major supermarket chain, multi-generational facility and transit centre.	Huon Valley Council	2015/16
		C. Support the development of a multi-service facility in Dover to improve the availability of medical, multi-generational and community wellbeing services to enhance the attractiveness of the area for employment and liveability.	Huon Valley Council	Annually
	Progress the development of an industrial park in Huonville.	D. Continue to support the development of a light industrial park in Huonville.	Huon Valley Council / Private developer	2015/16
		E. Participate in any review of the availability and suitability of light industrial land in the Huon Valley.	Huon Valley Council	2016/17
		F. Consider opportunities in other towns where industrial zoned uses may apply, including Cygnet, Geeveston and/or Dover.	Huon Valley Council	2016/17

	Review the *Huon Valley Interim Planning Scheme* in the context of economic development needs and demands	G. Review and consider potential implications imposed by the new Codes underpinning the Council's Planning Scheme to ensure consistency (where possible) with overall economic development strategy aims and objectives.	Huon Valley Council	2017/18
	Work with key industry partners to identify untreated fresh water needs to meet fish bathing, irrigation and industrial water needs.	H. Investigate opportunities for smaller scale irrigation opportunities and requirements for the benefit of local agricultural, viticulture and aquaculture developments.	Huon Valley Council	2017/18
	Consider the opportunity for development of commercial marinas at key locations such as Franklin, Cygnet, Dover and/or Port Huon.	I. Undertake investigations into the demand and supply for supporting the development of further commercial marinas in the Huon Estuary. J. Investigate opportunities and potential for floating pier model similar to that applied at Brooke St Pier, Hobart.	Huon Valley Council / Private developer Huon Valley Council / Private developer	2018/19 2018/19
	Retain commitment to the development and maintenance of smaller scale waterway infrastructure.	K. Continue to support and invest in Council owned marine infrastructure.	Huon Valley Council	Annually
	Strive for improvements to road network throughout the Huon Valley.	- Lobby and advocate State and Commonwealth Governments to prioritise upgrading and maintenance of existing arterial road network to meet national standards, with specific attention to primary transport routes including: - Realignment of Channel Highway, Huonville - Huon Highway corridor between Geeveston and	Huon Valley Council / State Government / Commonwealth Government	Annually

		Dover - Lune River Road, Lune River (Hastings to Cockle Creek) - Hastings Caves Road, Hastings - Arve Road, Geeveston		

Pillar Three	Goal	Direction	Stakeholder	Timeframe
Huon Valley: Open for Business	Encourage the growth of existing businesses in the Huon Valley to optimise employment opportunities and economic expansion	A. Continue to identify and communicate training and funding opportunities that may be of interest and relevance to local business.	Huon Valley Council	Annually
		B. Consider the development of an annual *Huon Valley Business Confidence Survey* to monitor trends and issues, and identify opportunities for new business development support services for local businesses.	Huon Valley Council	2015/16
		C. Explore opportunity for the development of a commercial skills assistance program for Huon Valley businesses consisting of key components including: - A regular mystery shopping program; - Short course training programs (with guest speakers); and - Locally based mentoring program consisting of local business ambassadors	Huon Valley Council	2017/18
		D. Continue to liaise with and support initiatives progressed by the *Huon Valley Business Enterprise Centre*.	Huon Valley Council / Business Enterprise Centre	Annually
		E. Retain commitment to Council initiatives and other programs such as the *Buy Local* campaign, and *Build your Business Brochure* to support local businesses and the community.	Huon Valley Council	Annually

	Ensure Council support for and involvement in economic development programs and initiatives is sustained.	F. Ensure economic development involvement is embedded in Council's regulatory and development services processes with particular emphasis on commercial related development opportunities.	Huon Valley Council	Annually
		G. Undertake a promotional campaign to inform and educate new developers and existing businesses of Council's development facilitation support available through economic development.	Huon Valley Council / Business Enterprise Centre / Real Estate agencies	2015/16
		H. Be pro-active in the identification of grant funding opportunities which will advance positive economic development outcomes.	Huon Valley Council	Annually
	Liaise with NBN Co and other information technology agencies to prepare the Huon Valley for being able to take advantage of high speed internet.	I. Undertake discussions with *TasmaNet* to consider the expansion of the current *Memorandum of Understanding (MOU)* for the provision of free wireless internet outlets in high traffic areas in the Huon Valley.	Huon Valley Council / *TasmaNet*	2016/17
		J. Continue to disseminate information to local businesses and residents about the availability and progress of the installation of the National Broadband Network in the Huon Valley.	Huon Valley Council / National Broadband Network	Annually

	Encourage improved networking and communication between established businesses within the Huon Valley.	K. Continue to work with and support initiatives progressed by the *Huon Valley Business Enterprise Centre*. L. Continue to maintain the *Huon Valley Business Database* and subsequent *Huon Valley Directory* (hard copy and online – www.huonvalleydirectory.com.au) M. Encourage the establishment of a Huon Valley wide Chamber of Commerce organisation with the view of empowering the local business community, and promote collaboration between businesses.	Huon Valley Council / Business Enterprise Centre Huon Valley Council Huon Valley Council / Business Enterprise Centre / Businesses	Annually Annually 2017/18
	Enable a community which highly values professional development, training opportunities and engages with local service providers.	N. Encourage local businesses and industries to continue their engagement with and support for training programs and opportunities made available through the *Huon Valley Trade Training Centre* O. Encourage employers within the Huon Valley to implement skill development programs within their workforces by offering: - Apprenticeships - Traineeships - And other training opportunities P. Organise in conjunction with *Huon LINC*, the *Huon Valley Trade Training Centre* and local businesses, a training information day	Huon Valley Council / Trade Training Centre / Businesses Huon Valley Council / Businesses / Business Enterprise Centre Huon Valley Council / Huon LINC / Trade Training Centre / Businesses / Business Enterprise Centre	Annually 2017/18 2017/18

Pillar Four	Goal	Direction	Stakeholder	Timeframe
Leveraging from the Huon Valley's Geographical Location	Promote investment and development opportunities in the Huon Valley in targeted sectors including: tourism, agricultural and retail/service industries.	A. Produce relevant promotional materials for the purposes of attracting investment and development in key identified areas including: - Visitor accommodation - Visitor attractions and experiences - Downstream processing opportunities	Huon Valley Council	2015/16 & 2016/17
		B. Seek to attract investment and development for the commercial expansion of Huonville.	Huon Valley Council	2015/16
		C. Continue to support and liaise with developers in respect of Council's regulatory and development functions.	Huon Valley Council	Annually

	Continue the development of a regional marketing identity that promotes the Huon Valley's unique attributes and quality products, producers and experiences.	D. Progress implementation of the *Huon Valley Brand* (in accordance with the approved Implementation Plan), to achieve the following key outcomes:	Huon Valley Council	2015/16
		- Establish clear quality control criteria for retaining quality assurance with those products, producers and services who engage with and leverage from the *Huon Valley Brand*.	Huon Valley Council	2015/16
		- Implement regular monitoring processes for ensuring quality assurance measures are adhered when used under the *Huon Valley Brand*.	Huon Valley Council	Annually
		- Develop a marketing strategy aimed at promoting the *Huon Valley Brand* in an effort to entice investment and development, visitation and migration to the Huon Valley.	Huon Valley Council	2015/16
		- Establish a suitable governance model for overseeing the future progress of the *Huon Valley Brand*.	Huon Valley Council	2015/16
		- Consider the development of a regional prospectus that introduces and promotes the Huon Valley's strengths, advantages and opportunities for attracting new business development, tourism and residential migration.	Huon Valley Council	2016/17

Pillar Five	Goal	Direction	Stakeholder	Timeframe
Plan for an economy of the future	Progress the development of a Population Growth and Development Strategy for the Huon Valley.	A. Undertake a study of the region's key residential growth areas in order to determine residential and commercial expansion opportunities.	Huon Valley Council	2018/19
		B. Support any review and progress made with regards to stormwater needs and demands in the Huon Valley – with the particular aim of ensuring economic expansion and residential growth opportunities are maximised.	Huon Valley Council	2015/16
		C. Develop a 'promotional kit' designed to encourage families to relocate to the Huon Valley:	Huon Valley Council	2016/17
		- Establish regular communication links with the local real estate community as a means of promoting the 'kit' and acquiring community sentiment to identify relevant barriers to investment and development (commercial and residential); and	Huon Valley Council	2017/18
		- Consider the development of a regional prospectus that introduces and promotes the Huon Valley's strengths, advantages and opportunities for attracting new business development, tourism and residential migration.	Huon Valley Council	2016/17

	Ensure a highly skilled and competitive workforce which is provided with optimum opportunity to fulfil individual potential and further the economic prosperity of the Huon Valley.	D. Continue to lobby and advocate the State and Commonwealth Governments for improvements and commitment to ensuring suitably practical educational opportunities are available in the Huon Valley.	Huon Valley Council / State Government / Commonwealth Government	Annually
		E. Investigate opportunities for establishing a Huon Valley focused training strategy in conjunction with key stakeholders such as local businesses, Huon LINC, Huon Valley Trade Training Centre, Tas TAFE, University of Tasmania and local district high schools	Huon Valley Council / State Government / Huon LINC / Trade Training Centre / Tas TAFE / UTAS / High Schools	2017/18
		F. Continue to encourage a range of adult literacy programs to be provided to the community.	Huon Valley Council / State Government / Huon LINC	Annually
		G. Retain regular communication and dissemination of training opportunities between local training providers and industry	Huon Valley Council / Business Enterprise Centre / Businesses	Annually
		H. Encourage employees to utilise and support the opportunities offered through local training institutions such as the Huon Valley Trade Training Centre.	Huon Valley Council / Business Enterprise Centre / Businesses / Trade Training Centre	Annually
	Continue the delivery of health and wellbeing related programs and services that are relevant for enhancing the Huon Valley's overall wellbeing and liveability.	I. Support the aims of the *Huon Valley Rural Health Strategy* in enhancing the region's overall health and wellbeing for the benefit of improved economic related outcomes.	Huon Valley Council / State Government / Commonwealth Government / Service providers	Annually

	Capitalise on the opportunity presented by the Huon Valley's increasing ageing population to improve access to the range of 50+ services as per the Council's Positive Ageing Strategy.	J. Encourage the establishment of alternative, quality, affordable aged care housing options within easy reach of community and health services.	Huon Valley Council / Service providers	2018/19
	Continue to advocate on behalf of the community and lobby the State Government to ensure the continued provision of State Government services in the Huon Valley.	K. Undertake an audit of existing service providers and identify gaps L. Assist with the promotion of opportunities to further develop availability of additional locally based professional services	Huon Valley Council / State Government Huon Valley Council / State Government	2019/20 2019/20
	Identify and pursue opportunities that arise due to climate change.	M. Monitor, analyse and report on publications released from the State Government and nationally that relate to economic development in terms of how the outcomes might relate to the Huon Valley. N. Continue to support natural resource management initiatives and programs.	Huon Valley Council / State Government / Commonwealth Government Huon Valley Council	Annually Annually
	Enhance the ongoing contribution to the local economy by volunteers.	O. Encourage the Council to continue its support and recognise local volunteer effort.	Huon Valley Council	Annually

Pillar Six	Goal	Direction	Stakeholder	Timeframe
Resilient and Innovative Primary Industries	Encourage increased downstream processing of natural produce and resources.	A. Encourage networking between primary producers to identify opportunities for increased downstream processing.	Huon Valley Council / Businesses	Annually
		B. Identify opportunities for collaboration between processing businesses.	Huon Valley Council / Businesses	Annually
		C. Liaise with relevant advocacy groups such as *Fruit Growers Tasmania* and the *Tasmanian Salmonid Growers Association* to identify opportunities as they relate to Huon Valley producers across sectors.	Huon Valley Council / Fruit Growers Assoc. Tas	Annually
		D. Undertake a review of all agricultural zoned land within Council's Planning Scheme, with a view to maximise re-use opportunities as they apply to contemporary agricultural related uses.	Huon Valley Council	2017/18

	Maximise visitor access to the region's fresh, local produce	E. Encourage food and wine/cider producers in the Huon Valley to provide an interactive experience for visitor's onsite, wherever possible.	Huon Valley Council / Businesses	2017/18
		F. Encourage food and wine/cider producers in the Huon Valley to consider the provision of "farm gate" experiences or direct from the source selling opportunities.	Huon Valley Council / Businesses	2017/18
		G. Encourage cross promotion between producers and suppliers (eg. Local cafes and restaurants) to showcase food and wine/cider that is sourced from the region.	Huon Valley Council / Businesses	2016/17

Pillar Seven	Goal	Direction	Stakeholder	Timeframe
The Creative Cauldron	Work towards achieving an innovative community that supports, values and enjoys a vibrant and sustainable arts industry, and recognises and protects heritage.	A. Progress the implementation of the *Huon Valley Arts and Heritage Strategy and Action Plan 2012-2017*.	Huon Valley Council	Annually
		B. Expand the existing focus on the arts and other creative elements in and around Cygnet, and link with other similar experiences across the region.	Huon Valley Council	2019/20
		C. Use the profile and visitation of the *Cygnet Folk Festival* and other events to promote authentic local experiences.	Huon Valley Council / Event organisers	Annually

	Encourage the development of appropriate recreational and cultural opportunities throughout the Huon Valley.	D. Continue to support the maintenance of parks and reserves infrastructure throughout the Huon Valley.	Huon Valley Council	Annually
		E. Promote the public infrastructure currently available for the purposes of sporting, recreational and cultural use throughout the Huon Valley to the broader community.	Huon Valley Council / Sporting and recreational users	Annually
		F. Continue to investigate funding opportunities to pursue a partnership with *Sports Marketing Australia* aimed at attracting local and national sporting programs and events to the Huon Valley.	Huon Valley Council / Sports Marketing Australia	2016/17
		G. Support the aims of the *Huon Valley Walking Track Strategy* in enhancing the region's walking and recreational tracks and infrastructure.	Huon Valley Council	Annually
		H. Support and liaise on projects and activities that have broad economic benefits for the community and local businesses.	Huon Valley Council	Annually
		I. Work collaboratively to implement initiatives identified through the *Huon Valley Art Cooperative Initiative*.	Huon Valley Council / Business / Art sector	2015/16

PART E – MID CYCLE STRATEGIC REVIEW

Background

As a half way point to the life of the *Huon Valley Economic Development Strategy 2015-2020*, a mid-cycle review of the performance and effectiveness of the Strategy was undertaken in May-June 2018. The review considered the current state of play in terms of the Huon Valley's economic conditions, by evaluating the most recently released statistical data from key sources including the Australian Bureau of Statistics, the Department of Jobs and Small Business, Tourism Tasmania and other industry sectoral sources.

Discussion

In accordance with the Implementation and Performance Measures stipulated by the Strategy, the macroeconomic measurements have been reviewed and updated to provide an updated benchmark. These are reflected in the updated table (refer to Attachment A). When comparing these figures against those provided when the Strategy was first endorsed, there are considerable variances across a number of areas.

More jobs, higher income

According to the 2016 Census data collected by the Australian Bureau of Statistics the average weekly household income has increased from $868 in 2011, to $987 in 2016. Whilst the weekly household income has increased between each Census, the number of employed persons has decreased slightly.

According to data collected by the *Department of Jobs and Small Business – Small Area Labour Markets,* there were 8,338 persons employed as at the March quarter 2015, compared with 7,938 persons employed as at December quarter 2017. When comparing this information to the age demographic data obtained through the 2011 and 2016 Census, it identifies that a large proportion of the Huon Valley population are moving toward retirement age. According to the 2011 Census, 5,752 people were within the age range of 40-64 years, compared with 6,350 within the 45-69 age range as at the 2016 Census. The aging shift between the Census periods, coupled with an increase of migrating retirees to the area, could be attributing to this decline.

Greater economic diversity

In terms of the range of occupations held by those employed in the Huon Valley, the diversity of those occupations has remained relatively unchanged from the 2011 Census to that conducted in 2016.

2011 Census	2016 Census
• Labourers – 16.8%	• Professionals – 15.8%
• Technicians and Trades Workers – 15.9%	• Technicians and Trades Workers – 15.6%
• Professionals – 15.6%	• Labourers – 15.2%
• Managers – 13.7%	• Managers – 13.9%
• Clerical and Admin Workers – 12.2%	• Clerical and Admin Workers – 12.2%

While there have been marginal changes across most of the occupations identified, the most significant shift is reflected in the number of labourers employed in the Huon Valley – declining from 16.8% to 15.2%. When examining the reasons for the decline in those employed in this capacity, further Census data shows the majority of those persons employed in the Huon Valley, worked in Offshore Caged Aquaculture (5.1%); with other industries of employment including hospitals (except psychiatric hospitals) (3.3%), supermarket and grocery stores (2.8%), local government administration (2.5%) and primary education (2.5%). It is difficult to ascertain any other reasons for the decline, other than it may be reflective of the aging population and its progression towards retirement.

In terms of industry sector monitoring and ascertaining the value of key industry sectors, it has proved difficult to obtain any figures related to the Huon Valley for each segment – aquaculture and fishing, agriculture, and forestry. Figures were obtained for tourism however, the data encompasses that for the whole southern Tasmania region, and not specific to the Huon Valley. While these figures provide a synopsis for the overall performance for tourism in the region as a whole, it would certainly provide a skewed representation given Hobart's high proportion of visitation compared with the smaller regional areas. Further enquiries continue to be made to obtain statistical information for the performance of the region's other key sectors.

Stronger population growth

Population growth for the Huon Valley has continued to increase with a change of 1.5% (as at end June 2017) on the previous year (2016), with a total of 16,919 people residing in the local government area (LGA). Of this change, the biggest contributor has been the number of interstate residents migrating to the area, with approximately 139 individuals relocating to the Huon Valley from other parts of Australia. A further 35 people have migrating during the same period from overseas destinations. In terms of other areas experiencing equivalent growth, the Huon Valley is among the top five LGAs in Tasmania that has a high proportion of residential growth which is continuing in an upward trajectory.

Greater regional competitiveness

The Huon Valley has continued to experience an increase in building and construction activity – as would be expected given the region's increased population. The value of building approvals (residential) have increased from 2012-13 figures – increasing from $27 million to $29 million in 2015-16. The value of non-residential buildings have declined however, from $17 million in 2012-13 to just $4 million in 2015-16. This can be attributed to a number of significant commercial developments that were under development at the time, such as hatchery developments for the region's primary aquaculture companies, and a satellite earth station to support the National Broadband Network's satellite services to name but a few.

In terms of visitation to the Huon Valley, and as reflected in Tasmania's growth in tourism activity more generally, the region has equally experienced a flow on of this growth. According to Tourism Tasmania's Tasmanian Visitor Survey data reflective of the Jan 2017-Dec 2017 period, Huonville continues to experience a high proportion of visitors staying overnight, with 30,028 nights spent (compared with 26,279 nights in April 2014-March 2015). Cygnet reported 16,591 nights spent in the region, and Dover and Cockle Creek captured 11,828 and 6,027 nights respectively. Overall visitation to what is reported as the 'Huon Trail' region and encompasses both the Kingborough

and Huon Valley districts, have indicated growth in the number of visitors who spent one or more nights on the touring route – with 48,432 nights spent in 2014-15, compared with 69,635 nights in 2017.

Strategic Review

As a key component of the mid cycle review of the Huon Valley Economic Development Strategy 2015-2020, each of the Strategy's goals and directives have been considered, and progress documented in order to help evaluate and inform the strategy into the future. The table included as Attachment B – when considered with the performance of the macroeconomic measurements, has been progressively worked through and updated, in an effort to redefine the strategy as preparations are made for streamlining into one continuous strategy with an ability to respond to the economic needs of the region in a holistic and overarching way.

A revised schedule has prepared to support the Strategy's implementation over the remaining period to 2020. A copy of which is included in Attachment C – however as a summary of the key changes to strategic directions and new opportunities moving towards the final two years of the Strategy are captured as follows:

Reference	Revised Direction	Comments	Revised Timeframe
1A	Completed.	Refer to 4A for next phase of this activity.	N/A
1B	Consolidated into 4A.	Refer to 4A.	N/A
1C	Review Council owned land identified as having potential for being developed for tourism related purposes, in accordance with land use/master plans and market interest to invest.	Linkages to 1A which has already been completed. Expression of interest need to be undertaken in order to test market interest key sites to gauge potential for development.	2018-19
1G	Strategically review Council's RV accommodation sites in accordance with the State Government's Economic Regulator requirements and in harmony with private operators.	Actively being pursued currently – to be completed in 2018-19.	2017-18 and 2018-19
1H	Support the sustainable operation of the Council's visitor information services.	Business planning and budgeting for sustainable ongoing operation of the Huon Valley Visitor Centre and the Geeveston Visitor Centre.	Annually

1I	Develop and implement marketing plans for the Huon Valley Brand, in accordance with the endorsed Brand and Style Guide, to ensure effective promotion of the Huon Valley is maintained.	Refer to 4A By 2019-20 aim to have transitioned from Southern Trove, to solely Huon Valley Brand centric.	Annually
1J	Consolidated into 1I.	Refer to 1I.	Refer to 1I.
1K	Consolidated into 1I.	Refer to 1I.	Refer to 1I.
2B	Proactively consider and facilitate the implementation of Council's strategic land use and master plans where they relate to strategic economic development outcomes.	Facilitate discussions between Council and business stakeholders, investors and developers to ensure service provisions are suitable for sustaining the projected population growth of the region.	Annually
2C	Consolidated into 2B.	Refer to 2B.	Refer to 2B.
2D	Proactively facilitate and support the development of a light industrial park in Huonville, within the context of 2B.	Identify opportunities and attractiveness for this site, and liaise between Council and relevant parties to ensure development progresses in the short to medium term.	Annually
2F	Consolidated into 2B.	Refer to 2B.	Refer to 2B.
2G	Review and consider potential implications imposed by the introduction of the Interim Planning Scheme and Codes, to ensure consistency with overall economic development aims and objectives.	Not limited to any one year – constant review and ongoing facilitation and liaison occurring with business/developers/investors, and the economic development and regulatory functions of Council.	Annually
2H	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
2I	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
2J	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
3B	Consider the development of an annual *Huon Valley Business Confidence Survey* to monitor trends and issues, identify opportunities for new business development support services, and to initiate direct stakeholder engagement with the broader Huon Valley business community.	Re-aligning with avenues for increasing engagement with business community and relevant industry stakeholders. Prioritising as a means of providing a critical benchmark for informing the next rendition of the *Huon Valley Economic Development Strategy*.	2018-19
3C	In collaboration with the Huon Valley Kingborough Business Enterprise Centre, explore the opportunity for the development of a commercial skills assistance program for Huon Valley businesses consisting of key components,	Reaffirming partnership with Huon Valley Kingborough Business Enterprise Centre through delivery of key initiative.	2018-19

	including: • A regular mystery shopping program; • Short course training programs (with guest speakers); and • Locally based mentoring program consisting of local business ambassadors.		
3E	On hold pending outcomes of Directions 3B and 3C.	Outcomes of 3B and 3C to inform next reiteration of the Economic Development Strategy in terms of the programs and support initiatives provided by Council.	N/A
3G	Undertake a promotional campaign to inform and educate new developers and existing businesses of Council's development facilitation support available through economic development.	Not limited to any one year – amended to reflect the consistent communication and networking that is occurring to promote the Council's facilitation and development support methods.	Annually
3I	Completed	Will consider re-activating if/when interest or new developments occur.	N/A
3J	Completed	Will consider re-activating if/when interest or new developments occur.	N/A
3M	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
3N	Encourage local businesses and industries to continue their engagement with and support for training programs and opportunities made available through the *Huon Valley Trade Training Centre*.	To be considered in the context of Direction 2B, and how it might be better utilised.	Annually
3O	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
3P	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
4A	Produce relevant promotional materials for the purposes of attracting investment and development.	Subject to the outcome of *Direction 1A*, consideration will be given to the type of promotion and range of tools to undertake this work.	2018-19
4B	Seek to attract investment and development for the commercial expansion of Huonville.	Not limited to any one year. Facilitate discussions between Council and business stakeholders, investors and developers to ensure service provisions are suitable for sustaining the projected population growth of the region.	Annually
4D	Progress implementation of the *Huon Valley Brand* (in accordance with the revised approved Implementation Plan).	Comprehensive review of former Implementation Plan to be undertaken, and development of new project plan to be developed outlining a realigned brand strategy with core objectives such as the former key outcomes, to be incorporated	2018-19 and 2019-20

		as/where consistent with the new approach.	
5A	Undertake a study of the region's key residential growth areas in order to determine residential and commercial expansion opportunities.	Refer to 2B, 2D and 2G.	2018-19 and 2019-20
5B	Support initiatives that address stormwater needs and demands in the Huon Valley – with a particular aim of ensuring economic expansion and residential growth opportunities are maximised.	Refer to 2B, 2D, 2G and 5A	Annually
5C	Undertake promotional activities for enticing new residents to the Huon Valley – to be underpinned by the Huon Valley's Population Growth Strategy	On hold pending outcome of *Direction 5A* Likely to be deferred to new iteration of HV Economic Development Strategy.	N/A
5E	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received. May need to be considered as part of the new iteration of the HV Economic Development Strategy.	N/A
5I	Support the aims of the Council's health and wellbeing strategies and activities with the view to improving the health and wellbeing of the community, and improving economic related outcomes.	Amended to reflect Council's new strategic approaches and to accommodate new focus of HV Health and Wellbeing Strategy.	Annually
5J	Encourage the establishment of alternative, quality, affordable aged care housing options within easy reach of community and health services.	Facilitate discussions between Council and business stakeholders, investors and developers to ensure service provisions are suitable for sustaining the projected aging population growth of the region.	Annually
5K	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
5L	Removed - Not actively being pursued at this time.	Will consider re-activating if/when interest or enquiries are received.	N/A
6A	Consolidated into 2B.	Refer to 2B.	Refer to 2B.
6B	Consolidated into 2B.	Refer to 2B.	Refer to 2B.
6D	Consolidated into 2B and 2G	Refer to 2B and 2G.	Refer to 2B and 2G.
7A	Support the implementation of Council's arts, heritage and cultural strategic objectives.	Recognition that a new Arts and Culture Strategy is currently being developed.	Annually.
7B	Support and facilitate cultural and heritage related events and community celebrations to enhance community cohesion, and attract visitation and interest to the region.	Consolidation of the former 7B and 7C, and recognising the increasing quality event offering now available throughout the year in the region.	Annually.

		Promotes increased collaboration between Council's Economic Development and Community Development units to deliver, support and facilitate such events and activities.	
7C	Refer to 7B.	Refer to 7B.	N/A
7F	Continue to investigate funding opportunities to pursue partnerships and collaboration aimed at attracting local and national sporting programs and events to the Huon Valley.	Facilitate discussions between Council and business stakeholders, investors and developer.	Annually.
7G	Support the aims of the *Huon Valley Walking Track Strategy* and other recreational development opportunities such as kayaking and others, with the view to enhancing the region's recreational opportunities and infrastructure.	Recognising the expansion of community infrastructure over and above walking tracks.	Annually.
7H	Support, liaison and facilitation on projects and activities that have broad economic benefits for the community, visitors and local businesses.	Recognising the support provided to undertake a feasibility study into bike trails in the Huon Valley (as per State Government 2018 election promise).	Annually.
7I	Removed - Not actively being pursued at this time.	Reactivation will be subject to strategic objectives outlined in the new iteration of the Council's Arts and Culture Strategy. Support will be extended where/when required within an economic development context.	N/A
NEW	Support and facilitate initiatives that serve in the development of alternative transport routes based on viability and benefit in economic terms to support local industry activities.	Recognising facilitation role in projects such as the Jeffrey's Track Feasibility Study.	N/A
NEW	Support and facilitate investment and development in key tourism infrastructure and accommodation needs, such as seasonal worker requirements and other tourism opportunities.	Recognising facilitation role in Council's role in seasonal worker accommodation, 100 room floating hotel concept, Recherche Bay Resort, and S/E cape walk development as/when they arise.	N/A
NEW	Support and embrace digital and technological advancements and opportunities to assist in improving and delivering economic programs, visitor and business experiences and initiatives.	Recognising direct role and opportunity through progressing initiatives such as the beacon project and others, in the region.	2018-19

Industry Engagement

The Council engages on matters relating to economic development with the Huon Valley community through a range of platforms based on economic development specific projects, strategy development, business networking, and across broader Council related activities such as planning, infrastructure, natural resource management and environmental health.

While this type of engagement is usually outward communication derived from Council, the primary source of inward dialogue relies upon the commitment of key representatives who form part of the Council's Huon Valley Economic Development Advisory Committee.

Huon Valley Economic Development Advisory Committee

The Huon Valley Economic Development Advisory Committee was first established to help inform the Council in the development of its initial economic development strategy in 2007-08. Serving as an Advisory Committee of Council, it was appointed by resolution to liaise with Council on the following:

- The development and implementation of the Huon Valley Economic Development Strategy.
- Any other matter referred to it by Council relating to economic development.

Operating in accordance with its Terms of Reference, the Committee was and continues to be limited to making recommendations to the Council on the following:

- The initial development of an economic development strategy for the Huon Valley.
- The implementation of the Huon Valley Economic Development Strategy once approved by the Council.
- Any strategic issues relating to economic development in the Huon Valley.
- Any other issue referred to it by the Council relating to economic development.

Membership to the Committee comprises of ten people of whom are appointed by Council, with two Councillors appointed by Council (or as is currently the case, the Commissioner), even community representatives and the General Manager (or their nominee).

Nominations are called for publicly by Council for the community representatives, with appointment based on the nominee:

- Being a Huon Valley resident or eligible to vote at the Huon Valley Council elections.
- Being self-employed, hold a senior position in a Company operating in the Huon Valley or be able to demonstrate a strong understanding and appreciation of business related matters.
- Demonstrating an ability to provide advice to the Council which meets the following:
    - Not politically biased;

- Strategic in nature;
- Considers a whole of Valley approach; and
- Not industry specific.

- Demonstrating an understanding of the role, function and service provided by Tasmanian Local Government.
- Demonstrating an understanding of the workings of State and Federal Governments.
- Demonstrating an understanding of the Huon Valley economy and have an interest in the economic wellbeing and future development of the Huon Valley.

The Committee currently meets once every month, with special meetings called when required. A quorum is required at each meeting, consisting of one more than half of its members if there is an even number of members or a majority of the whole number if there is an uneven number.

Considerations for alternative methods of economic development related engagement

As part of a broader review of its committees and engagement processes, the Council is embarking on a comprehensive review of the way in which it engages and consults across a range of operational areas, to ensure it does so using the most appropriate, efficient and resourceful means as possible. It is timely that these same considerations coincide with the mid-cycle review of the Strategy, as the core function of the Economic Development Advisory Committee has been established upon its responsibility to develop and implement of this important document.

Since the Committee's inception, it has (by the very nature of the membership scope and participant requirements) attracted a high calibre of participants who have shown a high degree of commitment and quality input into the Council's economic development program. However to ensure this kind of engagement is efficient, beneficial for all parties, and relevant, changes are required. The current Terms of Reference is limiting in both its scope and structure, providing very little, if at all, opportunity for the Committee to influence Council decisions or contribute to the manner in which projects are delivered and implemented overall. It has more recently been recognised that having an overarching level of engagement through either a committee or a 'brains trust' of select representatives is advantageous – through which the purpose and structure can be amended and opened up to allow for increased participation and less formality. This would enable a more robust, open discussion to be had with regard to specific projects, as well as the opportunity for more broad consultation across a range of economic development objectives.

The Committee have highlighted the value in the following:

- Information sharing and having the opportunity to discuss developments;
- Opportunity to clarify and seek advice relating to matters that are being discussed out in the community; and

- Being in the advantageous position where members can assist in sharing open information with others about what Council is doing, and what activities, events and opportunities are happening in the community.

While it is acknowledged that from time to time, there are matters raised and discussed that are confidential in nature and cannot be shared outside the Committee's meetings; by and large the information that is shared is very welcome and well regarded by its members. It is therefore proposed that the current committee structure be replaced with a series of alternative models that could include:

- A more informal, open and adaptable structure that enables wider representation and participation across a number of sectors, community groups and other industry/interest areas specific to the Huon Valley. In the form of an informal group, this avenue would replace the traditional Economic Development Advisory Committee yet still provide immediate input and feedback on the Council's economic development agenda.

- Establishing working groups to support the progress and implementation of major economic development projects – with participation to include select representation across relevant industry sectors and/or individual businesses.

- Hosting six monthly business forums for providing a wide range of economic related updates, including the opportunity to report back on business sentiment surveys and the progress of other key projects in a general information sharing platform. The forums could be coordinated as a roadshow, being held in each of the main townships in order to attract attendance from a range of business stakeholders as well as individuals and interested parties from within the community.

Conclusion

The *Huon Valley Economic Development Strategy 2015-2020* has a further two years remaining in the life of the Strategy. The objective of this review has been to analyse the progress and implementation of the document, to ensure it remains relevant and considers appropriate actions and directions pertinent to the Huon Valley community.

The realigned strategic directions as a result of the review have consolidated the Council's approach for the remaining period. It has provided the opportunity for a realistic stocktake of the priorities moving forward, establishing a solid footing for the next reiteration and the economic development program ensuring it is relevant and realistic in its objectives. The realignment of the strategic directions has positioned the progression of the Strategy to move towards a single continual document, based on the new consolidated structure and overarching objectives. From a review perspective, the revised approach will enable a more robust analysis of the Council's performance against the objectives and goals, thus mandating annual reviews to ensure targets are met.

In conjunction with the review of the Strategy, considerations have also been given to the current format of engagement through which the Council consults and discusses matters that relate to economic development. The Committee being the primary platform for such engagement is recognised as being insufficient, and too onerous and restrictive to adequately allow participation

from a broad spectrum of relevant parties. Further, a combination of engagement structures and techniques should be embraced to ensure advice, information and sharing of knowledge occurs both ways. The concept of holding business forums provides a proactive avenue for sharing information with a wide audience, and to seek immediate feedback and information back into the Council's economic development program.

MID CYCLE STRATEGIC REVIEW - Attachment A

Outcome	Measure	Target	Benchmark (as at 2015)	Benchmark (as at 2018)	Source Agency	Indicator	New Data Released	Web Link
More jobs, higher income	Average wage	⇧	2011 average weekly household income $868.00	2016 average weekly household income $987.00	ABS (Census)	Median household income	5 yearly	ABS Census of Population and Housing, 2016
	Employment count	⇧	8,338 employed persons March Quarter 2015	7,938 employed persons December Quarter 2017	DJSB (Small Area Labour Markets)	Number of employed persons	Quarterly	Dept. of Jobs and Small Business - Small Area Labour Markets publication
Greater economic diversity	Employment by occupation concentration index	⇧	• Labourers – 16.8% • Technicians and Trades Workers – 15.9% • Professionals – 15.6% • Managers – 13.7% • Clerical and Admin Workers – 12.2%	• Professionals – 15.8% • Technicians and Trades Workers – 15.6% • Labourers – 15.2% • Managers – 13.9% • Clerical and Administrative Workers – 12.2%	ABS (Census)	Employment by Occupation	5 yearly	ABS Census of Population and Housing, 2016
	Industry sector monitoring	⇧	• Aquaculture and Fishing - $350 million (2012) • Agriculture - $45 million (2010-11) • Forestry - $25 million • Tourism	• Tourism – $1,085.2 billion in total tourism Gross Regional Product (GRP) for southern Tasmania	• Tas Salmonid Growers Assoc. • DPIPWE • ABS • Sustainable Timber Tasmania (formerly Forestry Tasmania) • Tourism Tasmania	Value by Key Industry Sector	Annually	Source as required
Stronger population growth	Population growth	⇧	0.7% growth over 2013/14	1.5% growth over 2016-17	ABS (Regional Population Growth, Aus 2016-17) Cat. No. 3218.0	Annual Population % Growth	Annually	ABS Regional Population Growth Australia - Cat. No. 3218.0
Greater regional competitiveness	Building approval levels (residential and non-residential)	⇧	Value of total residential building = $27 million; Value of total non-residential building = $17 million	Value of total residential building = $29 million; Value of total non-residential building = $4 million	ABS (Region Profile Huon Valley LGA 2015-16)	Annual residential and non-residential building approval value and growth	Annually	ABS Region Profile - Huon Valley LGA
	Visitor nights	⇧	Places stayed overnight • Huonville – 26,279 nights • Dover – 7,982 nights • Cygnet – 13,233 nights • Cockle Creek – 5,179 nights Total holiday visitors who spent one or more nights on a touring route • Huon Trail – 48,432 nights Year Ending: April 2014 – March 2015	Places stayed overnight • Huonville – 30,028 nights • Dover – 11,828 nights • Cygnet – 16,591 nights • Cockle Creek – 6,027 nights Total holiday visitors who spent one or more nights on a touring route • Huon Trail – 69,635 nights Year Ending: Jan 2017 – Dec 2017	Tourism Tasmania: Tasmanian Visitor Survey	Annual visitor night growth	Quarterly	Tourism Tasmania - Tasmanian Visitor Survey

MID CYCLE STRATEGIC REVIEW - Attachment B

PILLAR ONE				Huon Valley Destination Development			
GOAL 1.1 *To actively encourage investment in the Huon Valley in areas that have been strategically identified to improve the overall visitor amenity and service provisions/experiences throughout the region.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
1A	Strategically review the Council's Huon Valley Accommodation Prospectus and the Huon Valley Attractions and Experiences Prospectus to ensure relevance and consistency with key development policies and strategies.	2015-16	• Internal review of Council's owned land and associated Strategy commenced. • Accommodation Demand Study commenced in collaboration with Office of Coordinator-General.	✔			Activity completed.
1B	Maintain a range of communication tools for promoting investment and development opportunities with respect to accommodation and attractions/experiences in the Huon Valley.	Annually	• Existing materials still being disseminated. • Development of new material on-hold pending outcome of *Direction 1A.*		✔		Activity is still necessarily valid and current, and will be actively progressed during 2018-19 pending outcome of *Direction 1A*.
1C	Undertake any necessary actions to ensure that Council owned sites identified as being suitable for tourism development are investment ready.	2016-17	• Internal review of Council's owned land and associated Strategy commenced.		✔		Activity currently occurring well outside of the Strategy timeframe. Activity is still necessarily valid and current, and is on track to be completed during 2018-19.
1D	Liaise with, and support, private land owners to develop their sites to ensure they are investment ready.	Annually	• Development facilitation occurring on a regular basis and as enquiries are received.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
1E	Align activities where possible with State Government agencies such as *Invest Tasmania* and other support agencies to promote the investment and development opportunities available in the Huon Valley.	Annually	• Closer synergies and partnerships with the Office of the Coordinator-General and other stakeholders continue to be explored and established		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
1F	Support and facilitate any investment and/or development interest with the Council's regulatory and development processes to encourage development to proceed.	Annually	• Development facilitation occurring on a regular basis and as enquiries are received.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
1G	Strategically review the provision of Council owned/operated RV accommodation sites in accordance with the State Government's Economic Regulator requirements and in harmony with private operators.	Annually	• Comprehensive review of Council owned and privately operated sites being undertaken, supported by full community engagement.		✔		Activity is still necessarily valid and current, and is on track to be completed during 2018-19.

GOAL 1.2 *Establish and maintain an appropriate level of visitor information services 'on the ground' throughout the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
1H	Support the sustainable operation of the *Huon Valley Visitor Centre.*	Annually	• Continual improvements to budget and operational matters being made. • Relocation of Centre to Huonville CBD successfully completed in December 2017. • Ongoing review of operational plan undertaken.		✔		2018-19 business plan and budget to consider ongoing performance and goals for newly relocated Centre. Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
GOAL 1.3 *Maintain effective marketing and promotion of the region for the purposes of tourism through the Huon Trail and the Huon Valley Brand.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
1I	Develop marketing plans for the Huon Trail and the Huon Valley Brand which are differentiated in their aims and objectives to ensure effective promotion of the Huon Valley is maintained.	Annually	• Southern Trove (formerly Huon Trail) being temporarily supported whilst Huon Valley Brand destination marketing approach develops. • Huon Valley brand development stalled pending strategic re-evaluation. • Consideration continuing for ensuring better distinction between the two marketing approaches.		✔		Development of Huon Valley Brand is currently being undertaken well outside of the strategy and implementation timeframes. Re-evaluation of the Brand to occur in order to refocus and reposition the approach – Refer to *Direction 4D*. Transition from Southern Trove (Huon Trail) to solely supporting Huon Valley Brand destination marketing is subsequently behind schedule. Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
1J	Implement the endorsed marketing plans for the Huon Trail and the Huon Valley Brand ensuring effective promotion of the Huon Valley occurs.	Annually	• Southern Trove marketing activities continue to be progressed. • Huon Valley Brand stalled pending strategic re-evaluation.		✔		Refer to comments under *Direction 1I* and *Direction 4D*.
1K	Ensure all marketing and promotional activities undertaken by either the Huon Trail or the Huon Valley Brand occurs in accordance with their respective Brand and Style Guide.	Annually	• Southern Trove marketing activities continue to be progressed. • Huon Valley Brand stalled pending strategic re-evaluation.		✔		Refer to comments under *Direction 1I*.

PILLAR TWO				Huon Valley Economic Revitalisation			
GOAL 2.1 *Ensure the commercial centres of the Huon Valley are competitive and economically viable.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2A	Continue to invest in township development and presentation through streetscape and infrastructure initiatives.	Annually	• Capital works and infrastructure improvements continue to occur in accordance with Asset Renewal and New Asset management plans		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
2B	Seek to attract investment and development for the purposes of an expanded commercial area in Huonville – with emphasis on the establishment of a second major supermarket chain, multi-generational facility and transit centre.	2015-16	• Facilitation and discussions continue to occur. • Considerations being made in relation to the Huonville-Ranelagh Master Plan and key actions specified in the context of economic development.		✔		Activity occurring outside of the strategy timeframe. Validity and intended development to be re-evaluated, however identification of suitable land and development will continue over remaining life of Ec Dev Strategy.
2C	Support the development of a multi-service facility in Dover to improve the availability of medical, multi-generational and community wellbeing services to enhance the attractiveness of the area for employment and liveability.	Annually	• No opportunities being considered at this time.			✔	Activity is no longer a priority for Council in this context. Priority has changed to focus on addressing service demand and expansion opportunities for Council's Huonville childcare services in the context of the projected residential growth of Huonville (as per the Huonville-Ranelagh Master Plan).
GOAL 2.2 *Progress the development of an industrial park in Huonville.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2D	Continue to support the development of a light industrial park in Huonville.	2015-16	• Development progress has stalled, however development facilitation continues to occur with developer as/when required.		✔		Activity occurring outside of the strategy timeframe. Priority for this initiative has been recently elevated with economic development taking a facilitation role in identifying opportunities and attractiveness for this site to be actively pursued.
2E	Participate in any review of the availability and suitability of light industrial land in the Huon Valley.	2016-17	• Engagement occurred with respect to light industrial needs as part of the Huonville/Ranelagh Master Plan. • Further engagement to occur as new development opportunities arise and are actively explored		✔		Activity occurring outside of the strategy timeframe. Support provided as/when required.

			by Council.				
2F	Consider opportunities in other towns where industrial zoned uses may apply, including Cygnet, Geeveston and/or Dover.	2016-17	• No opportunities being considered at this time.			✔	Activity currently sits outside of the strategy timeframe. Need to review relevance and validity for ongoing inclusion under the Strategy.

GOAL 2.3 *Review the Huon Valley Interim Planning Scheme in the context of economic development needs and demands.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2G	Review and consider potential implications imposed by the new Codes underpinning the Council's Planning Scheme to ensure consistency (where possible) with overall economic development strategy aims and objectives.	2017-18	• Regular meetings and liaison with Council's Environmental and Development Services department to discuss planning implications and issues arisen from economic development related activity and projects. • Refer also to *Direction 2E*.		✔		Activity is ongoing – not limited to any one particular year. Refer also to *Direction 2E.*

GOAL 2.4 *Work with key industry partners to identify untreated fresh water needs to meet fish bathing, irrigation and industrial water needs.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2H	Investigate opportunities for smaller scale irrigation opportunities and requirements for the benefit of local agricultural, viticulture and aquaculture developments.	2017-18	• No opportunities being considered at this time.			✔	Activity currently sits outside of the strategy timeframe. Need to review relevance and validity for ongoing inclusion under the Strategy.

GOAL 2.5 *Consider the opportunity for development of commercial marinas at key locations such as Franklin, Cygnet, Dover and/or Port Huon.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2I	Undertake investigations into the demand and supply for supporting the development of further commercial marinas in the Huon Estuary.	2018-19	• No actions to report at this time.			✔	Need to review relevance and validity for ongoing inclusion under the Strategy.
2J	Investigate opportunities and potential for floating pier model similar to that applied at Brooke St Pier, Hobart.	2018-19	• No actions to report at this time.			✔	Need to review relevance and validity for ongoing inclusion under the Strategy.

GOAL 2.6 *Retain commitment to the development and maintenance of smaller scale waterway infrastructure.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2K	Continue to support and invest in Council owned marine infrastructure.	Annually	• Refer to Council's Recreation Services Unit. • Support provided to the implementation of the Council's Marine Facilities Strategy where/when required.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
GOAL 2.7 *Strike for improvements to road network throughout the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
2L	Lobby and advocate State and Commonwealth Governments to prioritise upgrading and maintenance of existing arterial road network to meet national standards, with specific attention to primary transport routes including: • Realignment of Channel Highway, Huonville • Huon Highway corridor between Geeveston and Dover • Lune River Road, Lune River (Hastings to Cockle Creek) • Hastings Caves Road, Hastings • Arve Road, Geeveston	Annually	• Continue to lobby and advocate for improved road infrastructure as outlined. • The following 2018 state election commitments were made by the Tasmanian Liberals to take place during their term in Government, including: • $12.5 million for sealing Hastings Caves Road • $2 million for improvements on Arve Road, leading to Hartz Mountains National Park.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

PILLAR THREE		**Huon Valley: Open for Business**				
GOAL 3.1 *Encourage the growth of existing businesses in the Huon Valley to optimise employment opportunities and economic expansion.*						
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
3A	Continue to identify and communicate training and funding opportunities that may be of interest and relevance to local businesses.	Annually	• In collaboration with the *Huon Valley Kingborough Business Enterprise Centre* to communicate to Huon Valley businesses.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

3B	Consider the development of an annual *Huon Valley Business Confidence Survey* to monitor trends and issues, and identify opportunities for new business development support services for local businesses.	2015-16	• No actions to report at this time.			✔	Activity currently sits outside of the strategy timeframe. As a critical benchmark this activity should become a priority within the 2018-19 year so it can inform the next rendition of the Economic Development Strategy.
3C	Explore opportunity for the development of a commercial skills assistance program for Huon Valley businesses consisting of key components including: • A regular mystery shopping program; • Short course training programs (with guest speakers); and • Locally based mentoring program consisting of local business ambassadors.	2017-18	• Some aspects conducted in collaboration with the *Huon Valley Kingborough Business Enterprise Centre* – such as short course training programs.		✔		Activity currently sits outside of the strategy timeframe; however is still valid and relevant to the outcomes and objectives of the Strategy. Need to re-evaluate suitable timeframe for progressing outstanding facets of *Direction 3C*, to ensure maximum benefit is achieved.
3D	Continue to liaise with and support initiatives progressed by the *Huon Valley Business Enterprise Centre.*	Annually	• Regular liaison and collaboration occurring between Council and the *Huon Valley Kingborough Business Enterprise Centre*. • Gratuity support continuing.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
3E	Retain commitment to Council initiatives and other programs such as the *Buy Local* campaign, and *Build your Business Brochure* to support local businesses and the community.	Annually	• Initiatives under review to ensure relevance and value to business community.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy. Review to consider opportunities for progressing *Direction 3C*.

GOAL 3.2 *Ensure Council support for and involvement in economic development programs and initiatives is sustained.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
3F	Ensure economic development involvement is embedded in Council's regulatory and development services processes with particular emphasis on commercial related development opportunities.	Annually	• Development facilitation occurring on a regular basis and as enquiries are received. • Referrals and regular meetings are held internally between Economic Development Council's regulatory areas to discuss issues and development matters.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
3G	Undertake a promotional campaign to inform and educate new developers and existing businesses of Council's development facilitation support available through economic development.	2015-16	• Campaign not undertaken however, consistent communication and networking methods are being utilised and are suitably engaging with potential developers and existing businesses about		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

			economic development support.				
3H	Be pro-active in the identification of grant funding opportunities which will advance positive economic development outcomes.	Annually	• Actively reviewing and referring support programs to business network throughout the Huon Valley, and in conjunction with the *Huon Valley Kingborough Business Enterprise Centre*.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

GOAL 3.3

Liaise with NBN Co and other information technology agencies to prepare the Huon Valley for being able to take advantage of high speed internet.

Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
3I	Undertake discussions with *TasmaNet* to consider the expansion of the current *Memorandum of Understanding (MOU)* for the provision of free wireless internet outlets in high traffic areas in the Huon Valley.	2016-17	• Change of focus and priority for *TasmaNet* has led to a removal of the free wireless provisions in the Huon Valley.	✔			No further partnership opportunities available with *TasmaNet* at this stage, however alternative opportunities may be explored if/when the opportunity arises.
3J	Continue to disseminate information to local businesses and residents about the availability and progress of the installation of the National Broadband Network in the Huon Valley.	Annually	• National Broadband services are fully operational, available and being utilised by Huon Valley residents and businesses. • Services available in the Huon Valley include a mix of fibre to the node, fixed wireless and satellite solutions.	✔			Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

GOAL 3.4

Encourage improved networking and communication between established businesses within the Huon Valley.

Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
3K	Continue to work with and support initiatives of the *Huon Valley Business Enterprise Centre.*	Annually	• Regular liaison and collaboration occurring between Council and the *Huon Valley Kingborough Business Enterprise Centre*. • Gratuity support continuing.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
3L	Continue to maintain the *Huon Valley Business Database* and subsequent *Huon Valley Directory* (hard copy and online – www.huonvalleydirectory.com.au).	Annually	• Both primarily being administered by the *Huon Valley Kingborough Business Enterprise Centre*. • *2017-18 Huon Valley Kingborough Directory* produced and distributed.		✔		Business contacts and information continue to be collated, particularly with respect to development facilitation. Directory whilst being administered now by third party, is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
3M	Encourage the establishment of a Huon Valley wide Chamber of Commerce organization with the view of empowering the local business community and promote	2017-18	• No actions to report at this time.			✔	Activity currently sits outside of the strategy timeframe. Need to review relevance and validity for ongoing inclusion

	collaboration between businesses.						under the Strategy.

GOAL 3.5 *Enable a community which highly values professional development, training opportunities and engages with local service providers.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
3N	Encourage local businesses and industries to continue their engagement with and support for training programs and opportunities made available through the *Huon Valley Trade Training Centre*.	Annually	• Council no longer playing an active role on the Trade Training Centre Board.				Need to consider avenues for increasing usage and linkages between industry, trainees and training providers through this facility. Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
3O	Encourage employers within the Huon Valley to implement skill development programs within their workforces by offering: • Apprenticeships • Traineeships • And other training opportunities	2017-18	• Collaboration and referrals to businesses occurring between Council and the *Huon Valley Kingborough Business Enterprise Centre*.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
3P	Organise in conjunction with *Huon LINC*, the *Huon Valley Trade Training Centre* and local businesses, a training information day.	2017-18	• No actions to report at this time.			✔	Activity currently sits outside of the strategy timeframe. Need to review relevance and validity for ongoing inclusion under the Strategy.

PILLAR FOUR		**Leveraging from the Huon Valley's Geographical Location**				
GOAL 4.1 *Promote investment and development opportunities in the Huon Valley in targeted sectors including: tourism, agricultural and retail/services industries.*						
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
4A	Produce relevant promotional materials for the purposes of attracting investment and development in key identified areas including: • Visitor accommodation • Visitor attractions and experiences • Downstream processing opportunities.	2015-16 and 2016-17	• Existing materials still being disseminated. • Development of new material on-hold pending outcome of *Direction 1A*.		✔		Activity currently sits outside of the strategy timeframe; however is still necessarily valid and current, and will be actively progressed during 2018-19 pending outcome of *Direction 1A*. With respect to downstream processing opportunities, this aspect needs to be reviewed to ensure relevance and validity for ongoing inclusion under the Strategy.
4B	Seek to attract investment and development for the commercial expansion of Huonville.	2015-16	• Facilitation and discussions continue to occur as questions over suitable sites are raised and investigated.		✔		Activity occurring outside of the strategy timeframe. Validity and intended development to be re-evaluated, however liaison with developers over suitable land and

			• Considerations being made in relation to the Huonville-Ranelagh Master Plan and key actions specified in the context of economic development.				development will continue over remaining life of Ec Dev Strategy.
4C	Continue to support and liaise with developers in respect of Council's regulatory and development functions.	Annually	• Development facilitation occurring on a regular basis and as enquiries are received. • Referrals and regular meetings are held internally between Economic Development Council's regulatory areas to discuss issues and development matters.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
4D	Progress implementation of the *Huon Valley Brand* (in accordance with the approved Implementation Plan), to achieve the following key outcomes: • Establish clear quality control criteria for retaining quality assurance with those products, producers and services who engage with and leverage from the *Huon Valley Brand*. • Implement regular monitoring processes for ensuring quality assurance measures are adhered when used under the *Huon Valley Brand*. • Develop a marketing strategy aimed at promoting the *Huon Valley Brand* in an effort to entice investment and development, visitation and migration to the Huon Valley. • Establish a suitable governance model for overseeing the future progress of the *Huon Valley Brand*. • Consider the development of a regional prospectus that introduces and promotes the Huon Valley's strengths, advantages and opportunities for attracting new business development, tourism and residential migration.	2015-16 2015-16 Annually 2015-16 2015-16 2016-17	• Implementation of the *Huon Valley Brand* has stalled pending review of approach and documentation such as suitable governance models and approach. • Implementation has been minimal with social media and some presence at local events through the arm of the *Huon Valley Visitor Centre*, primarily the only activities ongoing from initial Product of the Huon campaign and brand launch conducted in 2015-16. • Initial meetings have been conducted with Huon Valley Brand Ambassadors – further engagement and formalization of the Ambassador network to occur once governance structures are clarified and confirmed.		✔		Activity occurring outside of the strategy timeframe and that stipulated by the *Huon Valley Brand Implementation Plan*. Comprehensive review of former Implementation Plan to take place, and development of new project plan to be progressed for realigning brand strategy to core objectives of the activity. New timeframes to be set with activity to become a priority – thus taking place over the remaining life of Ec Dev Strategy.

PILLAR FIVE							Plan for an Economy of the Future
GOAL 5.1 *Progress the development of a Population Growth and Development Strategy for the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5A	Undertake a study of the region's key residential growth areas in order to determine residential and commercial expansion opportunities.	2018-19	• Considerations being made in the context of the Huonville/Ranelagh Master Plan. • Further considerations to be made as/when land strategy work is progressed.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy. Proposed that this be considered as a critical project for the final year (2019-20) of the Strategy so as to inform the new rendition of the Economic Development Strategy.
5B	Support any review and progress made with regards to stormwater needs and demands in the Huon Valley – with a particular aim of ensuring economic expansion and residential growth opportunities are maximised.	2015-16	• Grant funds received for Main Drain project ($1.614 million). • Contributing to working groups regarding National Disaster Resilience Study – addressing stormwater issues for Huonville.		✔		Activity occurring outside of the strategy timeframe; however still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
5C	Develop a 'promotional kit' designed to encourage families to relocate to the Huon Valley: • Establish regular communication links with the local real estate community as a means of promoting the 'kit' and acquiring community sentiment to identify relevant barriers to investment and development (commercial and residential); • Consider the development of a regional prospectus that introduces and promotes the Huon Valley's strengths, advantages and opportunities for attracting new business development, tourism and residential migration.	2016-17 2017-18 2016-17	• No actions to report at this time, as activity has stalled post establishment of the *Huon Valley Brand* core project.			✔	Activity currently sits outside of the strategy timeframe; however still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy. Reference also to *Direction 5A* with the progress of a Population Growth Strategy.
GOAL 5.2 *Ensure a highly skilled and competitive workforce which is provided with optimum opportunity to fulfil individual potential and further the economic prosperity of the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5D	Continue to lobby and advocate the State and Commonwealth Governments for improvements and commitment to ensuring suitably practical educational opportunities	Annually	• Increase in number of local High Schools now offering years 11 and 12 courses with Huonville and Dover District High Schools now accommodating these		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

	are available in the Huon Valley.		under their existing curriculum. • Continue to support and advocate for suitable opportunities that improve student retention and expand the course offerings/qualifications available locally.				
5E	Investigate opportunities for establishing a Huon Valley focused training strategy in conjunction with key stakeholders such as local businesses, *Huon LINC*, *Huon Valley Trade Training Centre*, *Tas TAFE*, *University of Tasmania* and local district high schools.	2017-18	• No actions to report at this time.			✔	Activity currently sits outside of the strategy timeframe. Need to review relevance and validity for ongoing inclusion under the Strategy.
5F	Continue to encourage a range of adult literacy programs to be provided to the community.	Annually	• Work in conjunction with local providers including the *Huon LINC* and *Huon Valley Works* programs to offer a variety of courses, and to promote to a broad audience.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
5G	Retain regular communications and dissemination of training opportunities between local training providers and industry.	Annually	• Continue to promote and communicate opportunities to businesses in collaboration with the *Huon Valley Kingborough Business Enterprise Centre*.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
5H	Encourage employees to utilise and support the opportunities offered through local training institutions such as the *Huon Valley Trade Training Centre*.	Annually	• Continue to promote and communicate opportunities to businesses in collaboration with the *Huon Valley Kingborough Business Enterprise Centre*.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

GOAL 5.3 *Ensure a highly skilled and competitive workforce which is provided with optimum opportunity to fulfil individual potential and further the economic prosperity of the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5I	Support the aims of the *Huon Valley Rural Health Strategy* in enhancing the region's overall health and wellbeing for the benefit of improved economic related outcomes.	Annually	• Council currently undertaking the development of a new Huon Valley Health and Wellbeing Strategy that will encompass the former *Huon Valley Rural Health Strategy*, *Huon Valley Positive Ageing Strategy* and the *Huon Valley Access Strategy*.				Activity is still necessarily valid and current, and will continue in conjunction with the objectives of the new Strategy.

GOAL 5.4 *Capitalise on the opportunity presented by the Huon Valley's increasing ageing population to improve access to a range of 50+ services as per the Council's Positive Ageing Strategy.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5J	Encourage the establishment of alternative, quality, affordable aged care housing options within easy reach of community and health services.	2018-19	• Considerations being made in relation to the outcomes identified by the Huonville-Ranelagh Master Plan and in the context of ensuring services continue to meet demand (particularly with respect to population growth projections). • Outcomes will also be in accordance with the objectives of the new *Huon Valley Health and Wellbeing Strategy* that is being derived from the former *Huon Valley Positive Ageing Strategy*.		✔		Activity occurring outside of the strategy timeframe. Validity and intended development to be re-evaluated, however identification of suitable land and development will continue over remaining life of Ec Dev Strategy.
GOAL 5.5 *Continue to advocate on behalf of the community and lobby for State Government to ensure the continued provision of State Government services in the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5K	Undertake an audit of existing service providers and identify gaps.	2019-20	• No actions to report at this time.			✔	Need to review relevance and validity for next rendition of Ec Dev Strategy.
5L	Assist with the promotion of opportunities to further develop availability of additional locally based professional services.	2019-20	• No actions to report at this time.			✔	Need to review relevance and validity for next rendition of Ec Dev Strategy.
GOAL 5.6 *Identify and pursue opportunities that arise due to climate change.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5M	Monitor, analyse and report on publications released from the State Government and nationally that relate to economic development in terms of how the outcomes might relate to the Huon Valley.	Annually	• Reviewed as reports and publications are released.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
5N	Continue to support natural resource management initiatives and programs.	Annually	• Continue to support NRM programs and initiatives as they relate to business and tourism needs and issues.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

GOAL 5.7 *Enhance the ongoing contribution to the local economy by volunteers.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
5O	Encourage the Council to continue its support and recognise local volunteer effort.	Annually	• Recognition provided annually as part of the Council's Australia Day Awards program and as/when deemed necessary. • Nominations provided by Economic Development as part of southern regional tourism organisation programs including Southern Stars Awards program.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

PILLAR SIX				**Resilient and Innovative Primary Industries**			
GOAL 6.1 *Encourage increased downstream processing of natural produce and resources.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
6A	Encourage networking between primary producers to identify opportunities for increased downstream processing.	Annually	• Development facilitation occurring on a regular basis and as enquiries are received.		✔		Needs to be reviewed to ensure relevance and validity for ongoing inclusion under the Strategy.
6B	Identify opportunities for collaboration between processing businesses.	Annually	• Development facilitation occurring on a regular basis and as enquiries are received.		✔		Needs to be reviewed to ensure relevance and validity for ongoing inclusion under the Strategy.
6C	Liaise with relevant advocacy groups such as *Fruit Growers Tasmania* and the *Tasmanian Salmonid Growers Association* to identify opportunities as they relate to Huon Valley producers across sectors.	Annually	• Liaison with *Fruit Growers Tasmania* with respect to seasonal worker accommodation provisions and how to ensure suitable accommodation is available to support the intermittent workforce.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
6D	Undertake a review of all agricultural zoned land within the Council's Planning Scheme, with a view to maximise re-use opportunities as they apply to contemporary agricultural related uses.	2017-18	• Considerations being made in the context of the Huonville/Ranelagh Master Plan. • Further considerations to be made as/when land strategy work is progressed.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

GOAL 6.2

Maximise visitor access to the region's fresh, local produce.

Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
6E	Encourage food and wine/cider producers in the Huon Valley to provide an interactive experience for visitor's onsite, wherever possible.	2017-18	• Development facilitation occurring on a regular basis and as enquiries are received.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
6F	Encourage food and wine/cider producers in the Huon Valley to consider the provision of 'farm gate' experiences or direct from the source selling opportunities.	2017-18	• Development facilitation occurring on a regular basis and as enquiries are received. • Promotion of farm gate experiences shared with visitors via the *Huon Valley Visitor Centre* and *Southern Trove.*		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
6G	Encourage cross promotion between producers and suppliers (eg. Local cafes and restaurants) to showcase food and wine/cider that is sourced from the region.	2016-17	• No actions to report at this time.			✔	Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

PILLAR SEVEN — **The Creative Cauldron**

GOAL 7.1

Work towards achieving an innovative community that supports, values and enjoys a vibrant and sustainable arts industry, and recognises and protects heritage.

Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
7A	Progress the implementation of the *Huon Valley Arts and Heritage Strategy 2012-2017.*	Annually	• Strategy currently being reviewed and new Strategy being developed. • Consultation with Economic Development taking place as part of the development of new rendition of Strategy.		✔		Activity is still necessarily valid and current, and will continue in conjunction with the objectives of the new Strategy.
7B	Expand the existing focus on the arts and other creative elements in and around Cygnet, and link with other similar experiences across the region.	2019-20	• Consultation and liaison between Economic Development and Community Services occurs to assist new and existing ideas and initiatives to advance and progress.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

7C	Use the profile and visitation of the *Cygnet Folk Festival* and other events to promote authentic local experiences.	Annually	• Consultation and liaison between Economic Development and Community Services occurs to assist new and existing ideas and initiatives to advance and progress. • Promotion of events undertaken via the *Huon Valley Visitor Centre* and via the *Southern Trove*.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
GOAL 7.2 *Encourage the development of appropriate recreational and cultural opportunities throughout the Huon Valley.*							
Direction		Strategy Timeframe	Actions	Completed	In Progress	Not Commenced	Comments
7D	Continue to support the maintenance of parks and reserves infrastructure throughout the Huon Valley.	Annually	• Consultation and liaison between Economic Development and Community Services occurs as/when required.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
7E	Promote the public infrastructure currently available for the purposes of sporting, recreational and cultural use throughout the Huon Valley to the broader community.	Annually	• Promotion occurs through the *Huon Valley Visitor Centre* and via the *Southern Trove* for visitors and locals to be aware and to utilise.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
7F	Continue to investigate funding opportunities to pursue a partnership with *Sports Marketing Australia* aimed at attracting local and national sporting programs and events to the Huon Valley.	2016-17	• Activity not progressed.			✔	Needs to be reviewed to ensure relevance and validity for ongoing inclusion under the Strategy.
7G	Support the aims of the *Huon Valley Walking Track Strategy* in enhancing the region's walking and recreational tracks and infrastructure.	Annually	• Consultation and liaison between Economic Development and Community Services occurs as/when required. • Promotion of Huon Valley's walking and recreational tracks occurs via the *Huon Valley Visitor Centre* and the *Southern Trove*.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.
7H	Support and liaise on projects and activities that have broad economic benefits for the community and local businesses.	Annually	• Consultation and liaison between Economic Development and Community Services occurs as/when required. • Development facilitation occurring on a regular basis and as enquiries are received.		✔		Activity is still necessarily valid and current, and will continue over remaining life of Ec Dev Strategy.

7I	Work collaboratively to implement initiatives identified through the *Huon Valley Arts Cooperative Initiative.*	2015-16	• Consultation and liaison between Economic Development and Community Services occurs as/when required. • Progression on hold post development of new *Huon Valley Arts and Heritage Strategy*.			✔	Progress commenced but has stalled. Needs to determine whether it is still valid and relevant, and will be subject to the outcomes identified under the new Arts and Heritage Strategy.