From: Justin Simons <justins@georgetown.tas.gov.au>
Sent: Thursday, 1 June 2023 12:28 PM
To: TPC Enquiry; Barlund, Paola
Cc: James Stewart; Andrew McCarthy; McCrossen, Samuel
Subject: George Town Draft LPS - Directions - Planning Authority 2
Attachments: QA - Flood-prone Hazard Areas Code - May23 (Depth_0.1m).pdf; 20230601 George Town Flood-Prone Area Rationalisation Memo.pdf

Categories:

Good afternoon,

Please find attached Council's response to Planning Authority 2 as per the Commissions Post Hearing Directions, including updated maps showing how the Flood- Prone Hazard Areas overlay
may be amended and a qualified explanation clarifying what areas are to be removed and what the thresholds should be.

Additional detail (map data) can be found in the following link if it is of interest.
https://www.dropbox.com/s/6xorphub0vbcw8v/OneDrive_2023-05-31.zip?dl=0

We also note the State Emergency Services are preparing a letter of advice regarding the thresholds used, however, due to the current weather and flood event in Huonville, it has not arrived in a timely manner, but will be forwarded as soon as it is received.

Kind regards

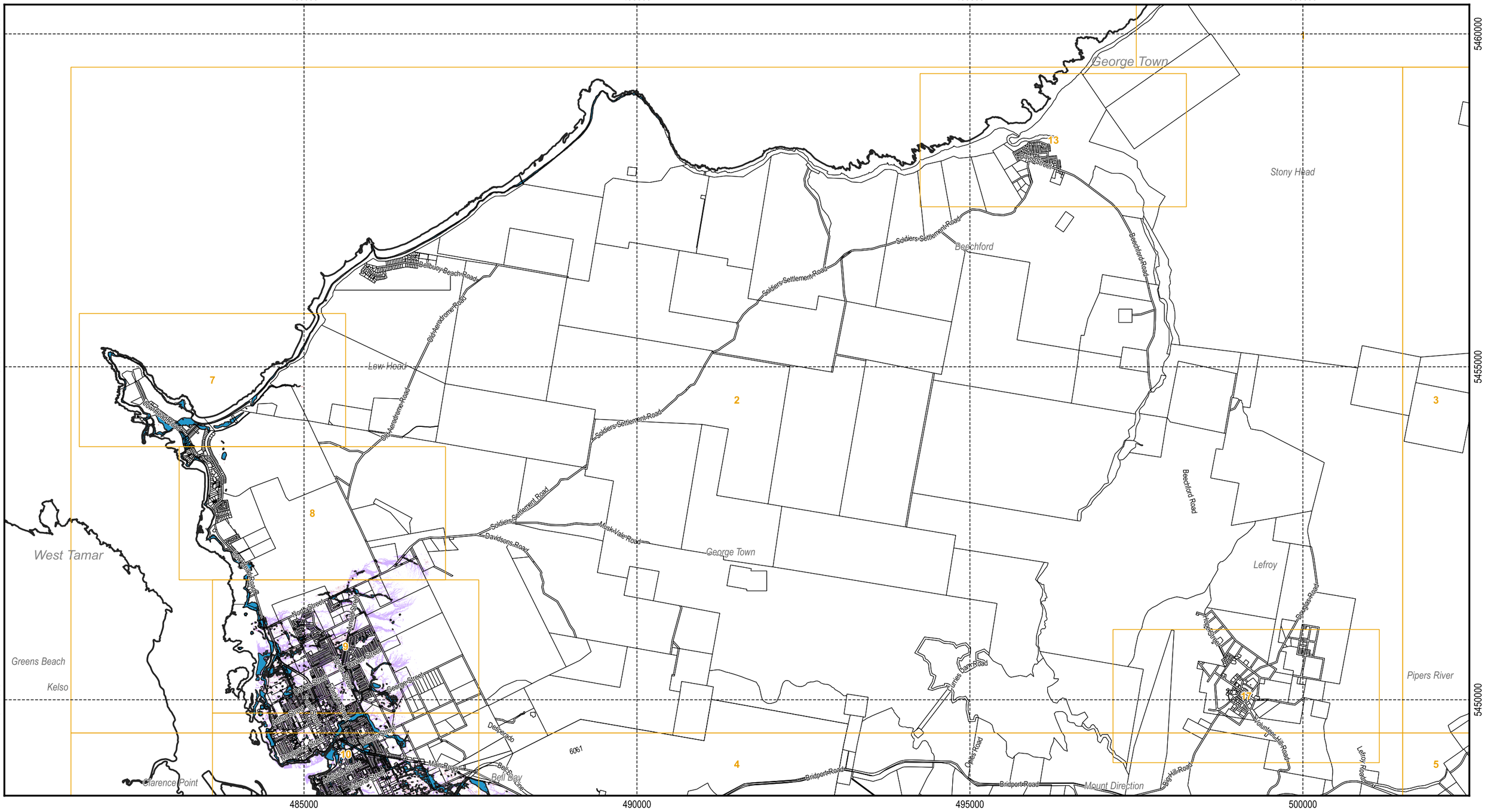
Justin Simons

Town Planner
DEVELOPMENT & ENVIRONMENT
George Town Council
PO Box 161 | George Town | TAS 7253
16-18 Anne Street | George Town | TAS 7253
T 03 6382 8813
W www.georgetown.tas.gov.au | E: justins@georgetown.tas.gov.au
Normal Hours of Work – Monday to Thursday & Second Friday 8-5

Progressive Prosperous Proud

George Town Council acknowledges the pakana people as the traditional owners of the land on which we work, we acknowledge their living culture and connection to country. We acknowledge the Elders of the past, the Elders of the present and the Elders of the future and thank them for sharing this land with us .

Flood-Prone Hazard Areas Code - Proposed changes (D>0.1m, D.V>0.02m2/s, A>100m2)



Legend

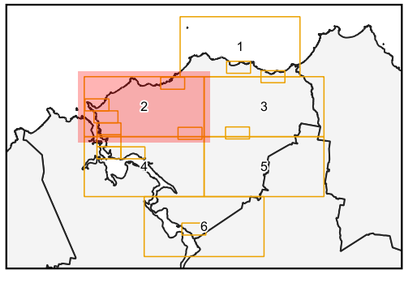
- Cadastral parcels
- Flood-Prone Hazard Areas Code
- Removed slow & shallow
- Removed puddles (area < 100m2)

N

Map 1 of 6

500 1,000 1,500 2,000 2,500 m

Scale: 1:55,000 when printed at A3
Coordinate system: GDA94 MGA Zone 55
Planning data from George Town Council
Base topographic data from the LIST © State of Tasmania
Print Date: 31/05/2023 Cadastre Date: 14/04/2022



Flood-Prone Hazard Areas Code - Proposed changes (D>0.1m, D.V>0.02m2/s, A>100m2)

485000 490000 495000 500000

5450000 5445000 5440000

Greens Beach
Kelso
Badger Head
Clarence Point
Beauty Point
York Town
Beaconsfield
West Tamar
George Town
Bell Bay
Rowella
Kayena
Sidmouth
Leifroy
Pipers River
Mount Direction
Long Reach
Hillwood

1 2 3 4 5 6 7 8 9 10 11 12

Main Road
Bell Bay Line
East Tamar Highway
Bell Bay Road
Old Bell Bay Road
Temma Road
Norfolk Street
Bridport Road
Currie Beach Road
Peters Road
Big Hill Road
Leifroy Road
Volunteers Hill Road
Dalrymple Road
Montrose Hill Road
Browns Road
Industry Road
Pine Glen Road
Greenhythe Road
Archers Road
Verings Road
Batman Highway
East Arm Road

Legend

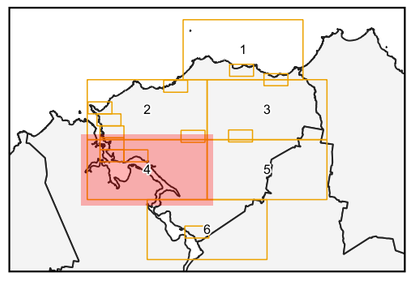
- Cadastral parcels
- Flood-Prone Hazard Areas Code
- Removed slow & shallow
- Removed puddles (area < 100m2)

N

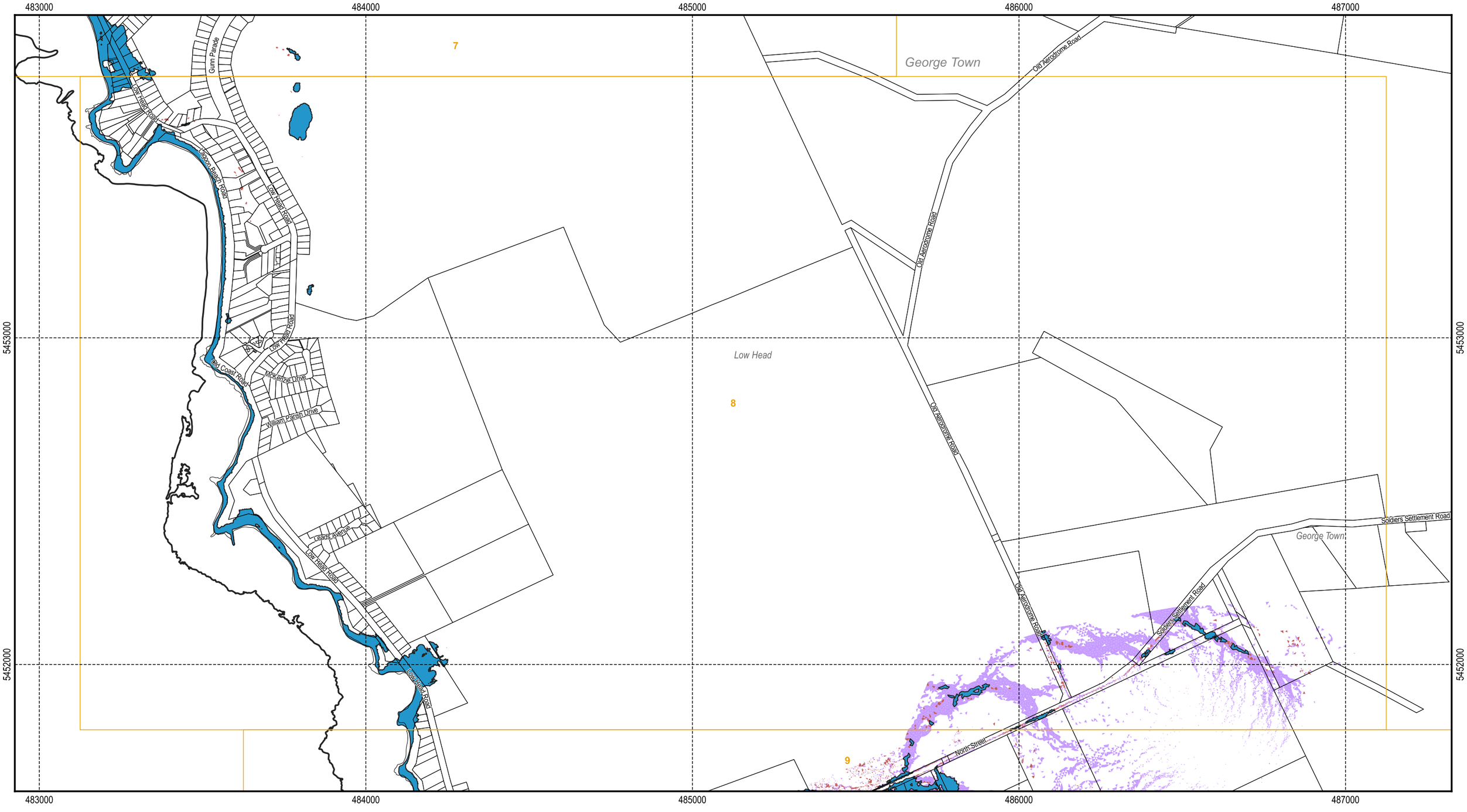
Map 2 of 6

500 1,000 1,500 2,000 2,500 m

Scale: 1:55,000 when printed at A3
Coordinate system: GDA94 MGA Zone 55
Planning data from George Town Council
Base topographic data from the LIST © State of Tasmania
Print Date: 31/05/2023 Cadastre Date: 14/04/2022



Flood-Prone Hazard Areas Code - Proposed changes (D>0.1m, D.V>0.02m2/s, A>100m2)



Legend

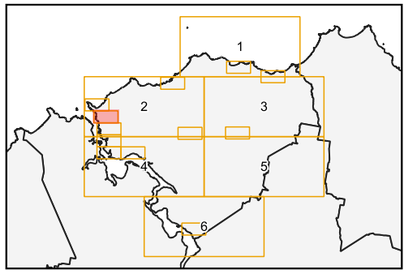
- Cadastral parcels
- Flood-Prone Hazard Areas Code
- Removed slow & shallow
- Removed puddles (area < 100m2)

N

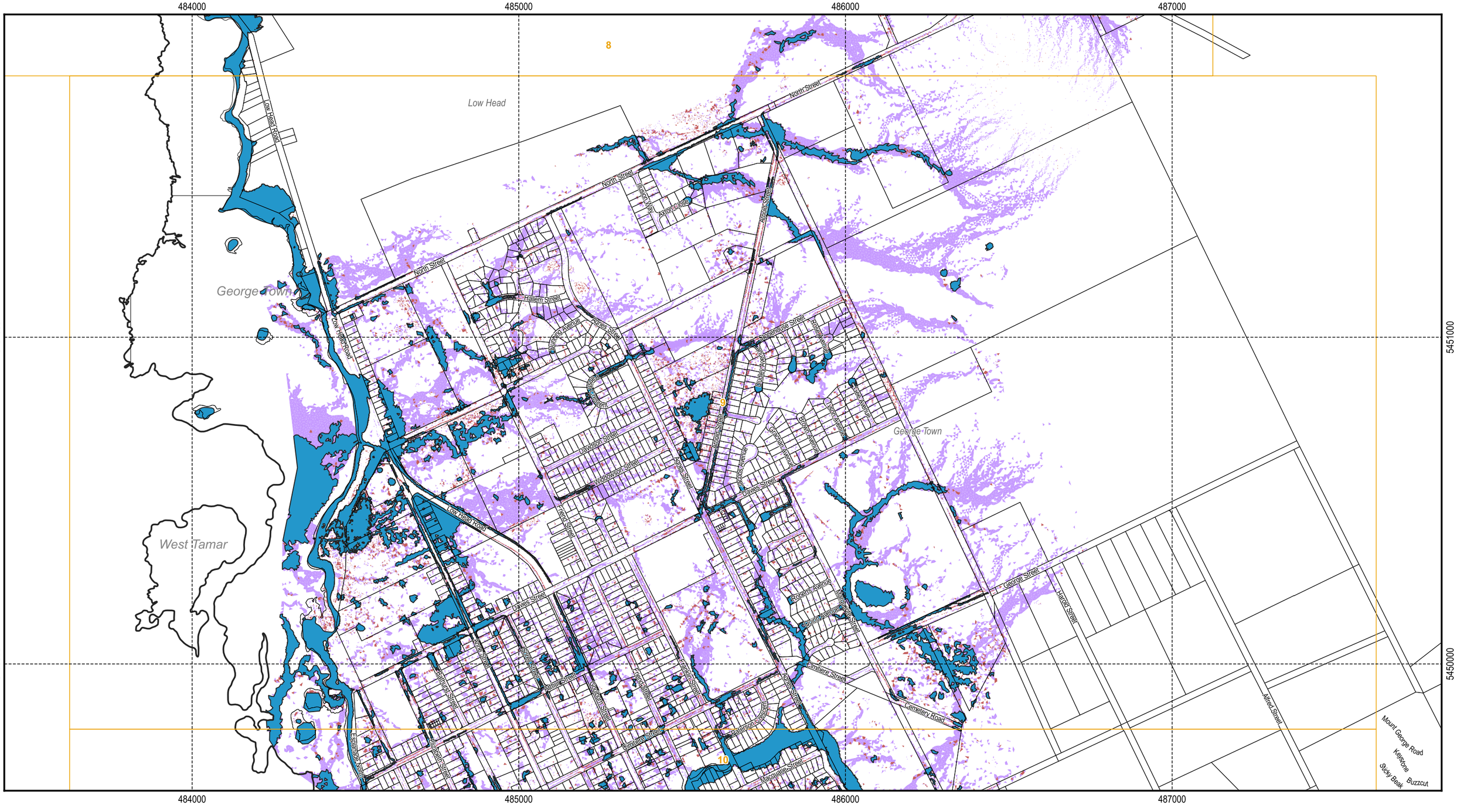
Map 3 of 6

100 200 300 400 500 m

Scale: 1:11,000 when printed at A3
Coordinate system: GDA94 MGA Zone 55
Planning data from George Town Council
Base topographic data from the LIST © State of Tasmania
Print Date: 31/05/2023 Cadastre Date: 14/04/2022



Flood-Prone Hazard Areas Code - Proposed changes (D>0.1m, D.V>0.02m2/s, A>100m2)



Legend

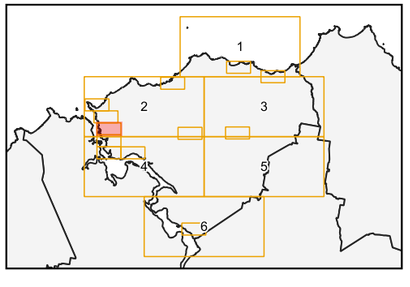
- Cadastral parcels
- Flood-Prone Hazard Areas Code
- Removed slow & shallow
- Removed puddles (area < 100m2)

N

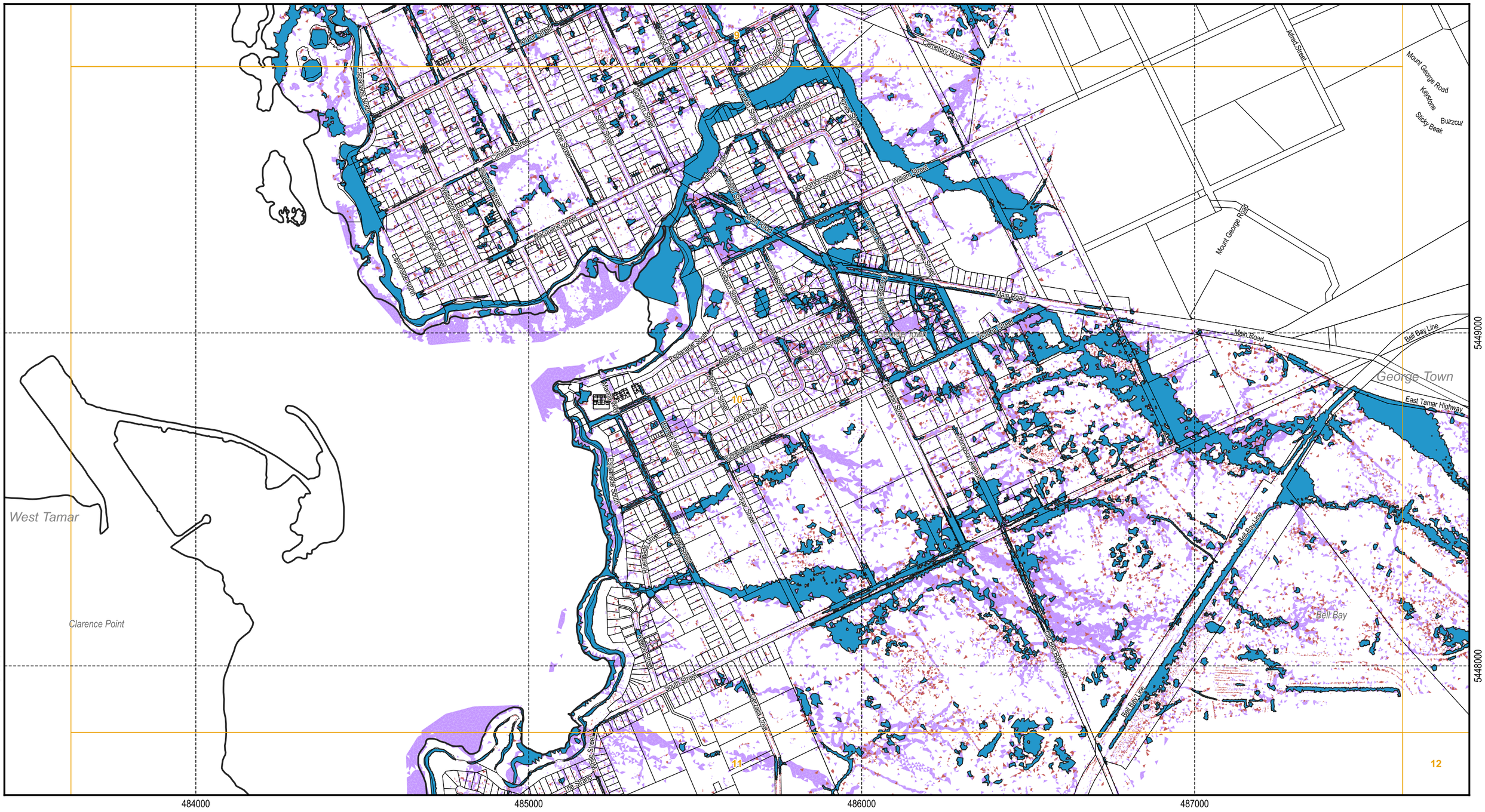
Map 4 of 6

100 200 300 400 500 m

Scale: 1:11,000 when printed at A3
Coordinate system: GDA94 MGA Zone 55
Planning data from George Town Council
Base topographic data from the LIST © State of Tasmania
Print Date: 31/05/2023 Cadastre Date: 14/04/2022



Flood-Prone Hazard Areas Code - Proposed changes (D>0.1m, D.V>0.02m2/s, A>100m2)



Legend

- Cadastral parcels
- Flood-Prone Hazard Areas Code
- Removed slow & shallow
- Removed puddles (area < 100m2)

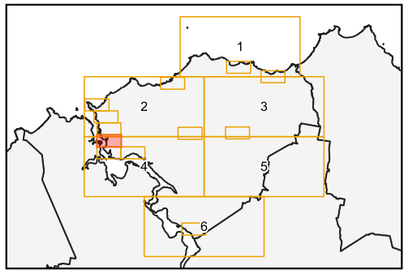
N

Map 5 of 6

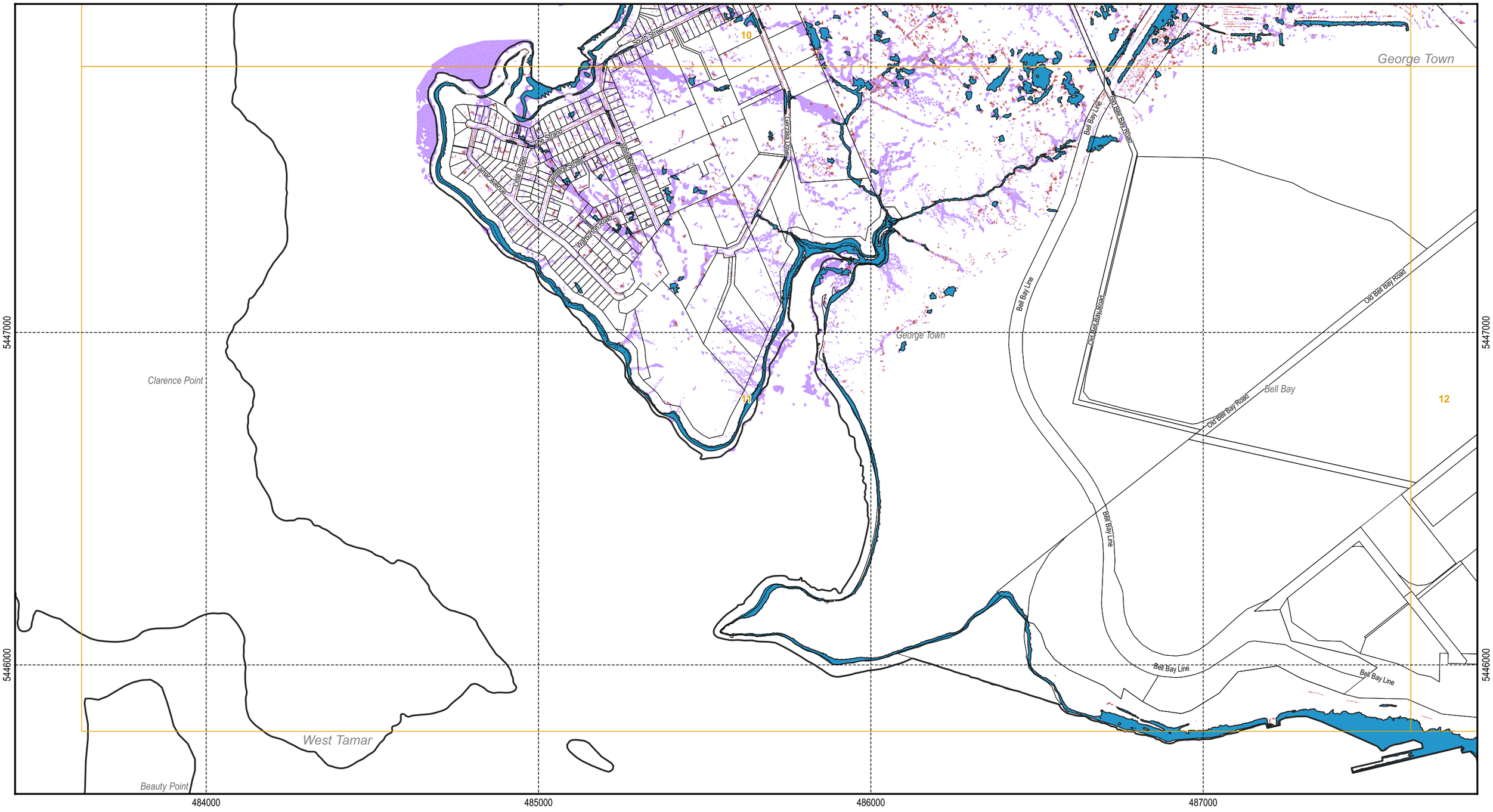
100 200 300 400 500 m

Scale: 1:11,000 when printed at A3
Coordinate system: GDA94 MGA Zone 55
Planning data from George Town Council

Print Date: 31/05/2023 Cadastre Date: 14/04/2022



Flood-Prone Hazard Areas Code - Proposed changes (D>0.1m, D.V>0.02m2/s, A>100m2)



Legend

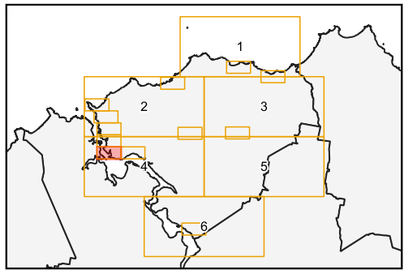
- Cadastral parcels
- Flood-Prone Hazard Areas Code
- Removed slow & shallow
- Removed puddles (area < 100m2)

N

Map 6 of 6

100 200 300 400 500 m

Scale: 1:11,000 when printed at A3
Coordinate system: GDA94 MGA Zone 55
Planning data from George Town Council
Base topographic data from the LIST © State of Tasmania
Print Date: 31/05/2023 Cadastre Date: 14/04/2022



Legend

Depth (m)

- 0.07 - 0.15
- 0.15 - 0.30
- 0.30 - 0.45
- 0.45 - 0.60
- 0.60 - 0.80
- 0.80 - 1.20
- 1.20 - 1.80
- 1.80 - 6.21
- Cadastre Boundaries

N

0 0.5 1 km

flüssig SPATIAL

The information provided in this map is for geographical representation only. All information should be feild verified before use.

Legend

- Cadastre Boundaries

Velocity (m/s)

- 0.1 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 10.0

N

0 0.5 1 km

flüssig SPATIAL

The information provided in this map is for geographical representation only. All information should be feild verified before use.

HYDRODYNAMICA

44 Penquite Road
LAUNCESTON TAS 7250
M: 0431 208 450
E: cameron.oakley@h-dna.com.au
ABN: 16 944 299 350

MEMO **1 June 2023**

Re: FLOOD PRONE HAZARD AREAS OVERLAY AMEMENDMENT FILTERING

Introduction:

George Town Council (GTC) is in the process of rationalising their flood mapping for the George Town Local Provisions Schedule. The mapping relies 1% AEP climate change flood extent, depth and hazard obtained through the hydrological and hydraulic modelling of the catchment documented in the George Town Stormwater System Management Plan (Flussig, 2019).

The raw modelling outputs display a significant amount of shallow, low risk flooding, amongst some more significant flow paths and hazards. Surface water of as little as 10mm depth is displayed in these results, which cannot be defined as flooding at all. If this map was adopted without filtering it would result in almost all properties in the township being located within the Flood Hazard Area, which is incorrect and would lead to a significant burden requiring the Code to be addressed for all proposed development . In the 1% AEP climate change event it would be expected that the catchment would be wet, but this does not equate to flooding in most areas shown in the raw modelling output.

In order to reduce this to practical levels GTC applied a filter which removed all flood depths under 300mm and velocities of less than 0.1 m/s. The Planning Commission, however, has directed GTC to provide expert advice regarding the suitability of the filtering. They noted that other Councils had applied filtering of their flood areas, but more detail was requested as to why the specific depth and velocity thresholds were selected.

This memo documents the rationale behind the section of new thresholds, and why they are appropriate for adoption. It should be noted that Hydrodynamica was not engaged to review or assess George Town Stormwater System Management Plan itself.

HYDRODYNAMICA

44 Penquite Road
LAUNCESTON TAS 7250
M: 0431 208 450
E: cameron.oakley@h-dna.com.au
ABN: 16 944 299 350

Flood Hazard Context:

The relevant industry document relating to practices in assessing flood hazards is Australian Rainfall and Runoff 2019; more specifically Book 6 Chapter 7 Safety in Design Criteria'. This chapter provides hazard thresholds which relate to the vulnerability of the community when interacting with floodwaters.

Tables 6.7.3 and 6.7.4 document Hazard Vulnerability Classifications (HVCs), which were originally described by Smith et al. (2014). These define how floodwater depth, velocity, and the product of depth and velocity relate to the safety of people, vehicles, and buildings. The tables are reproduced below:

Table 6.7.3. Combined Hazard Curves - Vulnerability Thresholds (Smith et al., 2014)

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings.
H2	Unsafe for small vehicles.
H3	Unsafe for vehicles. children and the elderly.
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Table 6.7.4. Combined Hazard Curves - Vulnerability Thresholds Classification Limits (Smith et al., 2014)

Hazard Vulnerability Classification	Classification Limit (D and V in combination)	Limiting Still Water Depth (D)	Limiting Velocity (V)
H1	D*V ≤ 0.3	0.3	2.0
H2	D*V ≤ 0.6	0.5	2.0
H3	D*V ≤ 0.6	1.2	2.0
H4	D*V ≤ 1.0	2.0	2.0
H5	D*V ≤ 4.0	4.0	4.0
H6	D*V > 4.0	-	-

Figure 1. Hazard Vulnerability Descriptions and Limits (reproduced from Australian Rainfall and Runoff 2019)

It can be seen in Figure 1 that HVCs range from H1 to H6, with limiting depth, velocities and depth-velocity products increasing the hazard.

HYDRODYNAMICA

44 Penquite Road
LAUNCESTON TAS 7250
M: 0431 208 450
E: cameron.oakley@h-dna.com.au
ABN: 16 944 299 350

Thresholds Adopted in Previous Submission:

By filtering out flood depths of less than 300mm and velocities of less than 0.1m GTC effectively eliminated the H1 HVC, which is defined as 'generally safe for vehicles, people, and buildings.' Although such flooding is defined as generally safe it may still result in the internal flooding of buildings, which are required to have have finished floor levels (FFL) a minimum 100mm above the finished ground level (FGL).

The Tasmanian Planning Scheme's Flood-Prone Areas Hazard Code requires buildings, works, and subdivisions within a flood-prone hazard area to achieve and maintain a 'tolerable risk' from a flood. 'Tolerable' is subjective and it is possible that flooding 299 mm deep is not a 'tolerable' risk in some circumstances, although it may be 'safe'. Therefore, the thresholds have been revised in this new submission.

Revised Flood-Prone Hazard Area:

After reviewing the original flood mapping, and GTCs proposed thresholds, Hydrodynamica and GTC propose a Flood-Prone Hazard Area based on the following revised thresholds:

- Depth > 0.1m (100mm); or
- Depth x velocity product >0.02m^2/s; and
- Ponding >100 m^2 in total area

For comparison we understand that Clarence City Council (CCC) the following thresholds:

- Depth > 0.05m (50mm);
- Depth x velocity product >0.2 m^2/s;
- Low depth x velocity cut-off < 0.01 m^2/s;
- Ponding >500 m^2 in total area

Also, for comparison, we understand that Glenorchy City Council (GCC) adopted the following thresholds:

HYDRODYNAMICA

44 Penquite Road
LAUNCESTON TAS 7250
M: 0431 208 450
E: cameron.oakley@h-dna.com.au
ABN: 16 944 299 350

- Depth > 0.05m (50mm);
- Depth x velocity product >0.02m^2/s;
- Ponding > 100 m^2 in total area

The thresholds adopted by these other Councils are very similar to those now proposed by GTC. The proposed flood depth threshold is slightly higher (100mm versus 50mm), the depth-velocity product is less than CCC and the same as GCC, and the ponding size threshold is also less than CCC and the same as GCC.

It is our opinion that the proposed levels are appropriate, as the depths removed are extremely unlikely to have removed any flooding which would enter a dwelling. The removed flooding is marginal outdoor flooding which holds little to no risk to people or property. Flooding of less than 100mm depth would require a velocity of 2 m/s in order to raise the risk to a H2 HVC level, at which point it becomes unsafe for small vehicles. Although York Creek runs through the urban area, which results from runoff from the elevated Mount George and George Town Sugarloaf, the George Town urban area itself relatively flat and not subject to significant velocities.

We therefore have high confidence that flooding areas removed represent nominal wetness of a catchment caused by an extreme rainfall event, which in any other context would not be considered flooding.

Cameron Oakley

B. TECH (Env.), B. ENG (Hons), MBA

HYDRODYNAMICA

Licensed Building Services Provider No. 949718126

HYDRODYNAMICA

44 Penquite Road
LAUNCESTON TAS 7250
M: 0431 208 450
E: cameron.oakley@h-dna.com.au
ABN: 16 944 299 350

References:

Australian Rainfall and Runoff 2019

Smith, G.P., Davey, E.K. and Cox, R.J. (2014), Flood Hazard UNSW Australia Water Research Laboratory Technical Report 2014/07 30 September 2014.