McCONNELL DOWELL
CREATIVE CONSTRUCTION™

TASMANIAN
PLANNING COMMISSION

Endorsed

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FLOOD MANAGEMENT PLAN

NEW BRIDGEWATER BRIDGE

DOC NO: 2024-MCD-0000-PLA-PRJ-00056

CLIENT: DEPARTMENT OF STATE GROWTH

PROJECT: NEW BRIDGEWATER BRIDGE PROJECT

LOCATION: BRIDGEWATER, TASMANIA, AUSTRALIA

PROJECT NO: 2024

Revision History

Rev	Date	Details	Author	Reviewer	Approver
A	22 July 2022	Issued for Internal Review	L Williams	E McPhillips	
B	27 July 2022	Issued for External Review	L Williams	DSG, IV, PWS & TPC	
C	15 Sept 2022	Revised following comments from DSG, IV, PWS & TPC	L Williams	DSG, IV, PWS & TPC	

MMS

Contents

1 INTRODUCTION & CONTEXT

1.1 Purpose

The Flood Management Plan (FMP) should be read in conjunction with the Design and Construction Environmental Management Plan and Hydrology and Flood Modelling Report (FMR) for the New Bridgewater Bridge Project. The FMR has been prepared to outline the severity of potential flooding events. To illustrate this, hydraulic modelling has been undertaken. Modelling includes:

- Existing site conditions for a 1% AEP flood at current and future climate conditions.
- Project design for current and future climate conditions have been developed.

The purpose of this Flood Management Plan is to describe how McConnell Dowell will minimise potential construction impacts on flooding and hydrology; and how construction activities will be managed in a flood event of any size affecting the Project area.

To achieve these objectives, McConnell Dowell will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to address potential flood impacts along the Project corridor.
- Take all reasonable and practical measures to mitigate environmental damage due to or during flood as a result of McConnell Dowell operations.
- Minimise the damage caused by construction materials and equipment contaminating lands and waters up and downstream during flooding.

1.2 Project Background

Figure 1 - Photograph of Current Vertical Lift Bridge completed in 1946

The Australian and Tasmanian governments have committed $786 million to the new river crossing at Bridgewater, which is the largest ever investment in a single transport infrastructure project in Tasmania's history.

The Bridgewater Bridge is a critical part of the transport and freight link between the state's north and south, and the project will support growth and commercial development in Hobart's outer northern suburbs.

The road and rail bridge carries the Midland Highway and South Railway Line across the Derwent River connecting Granton and Bridgewater. The current steel truss vertical lift was completed in 1946, the bridge accommodates a two-lane highway, a single-track railway, and a grade-separated footpath.

There are a number of network performance and safety issues associated with the existing bridge which impact road and vessel movements. The reliance on lift span operations for marine vessels can cause highway traffic delays, particularly during peak holiday periods, and the existing bridge maintenance costs are significant.

Final design for the new bridge and interchanges includes two lanes in each direction and new interchanges at Bridgewater and Granton.

Other features include:

- a speed limit of at least 80km/h
- a shared path for cyclists and pedestrians
- safety screens and barriers
- a navigation clearance consistent with the Bowen Bridge
- a grade separated interchange will connect the Brooker and Lyell highways
- better connections to local roads in Bridgewater and Granton.

Significant construction work will also include:

- earthworks, including cuttings and embankments and retaining walls to support the new bridge approaches and road upgrades
- temporary and permanent land reclamation
- temporary ancillary facilities during construction including water quality controls, site offices, construction / demolition compounds, pre-cast production and batching plants, stockpile sites
- permanent operational water quality controls and noise mitigation
- utility relocations
- temporary traffic staging
- site rehabilitation and landscaping works.

2 FLOOD MODELLING

The Riverine Model is used to simulate the hydraulic conditions of the River Derwent in the vicinity of the Project works. The primary functions of the Riverine model are to:

- Estimate the impacts on existing riverine flood levels as a result of the new bridge piers and reclamation area
- Demonstrate there is no increase in flood risk from development to the Watch House, 1, 2,4,5 and 7 Wallace Street, 1 to 5 Riverside Drive, and the former Black Snake in from a 1% AEP flood event in 2090

Figure 2 below presents the existing condition flood hazard categories resulting from the 1% AEP future climate (2090) event. Note that there exists extensive flooding on properties and roads on both sides of the river.

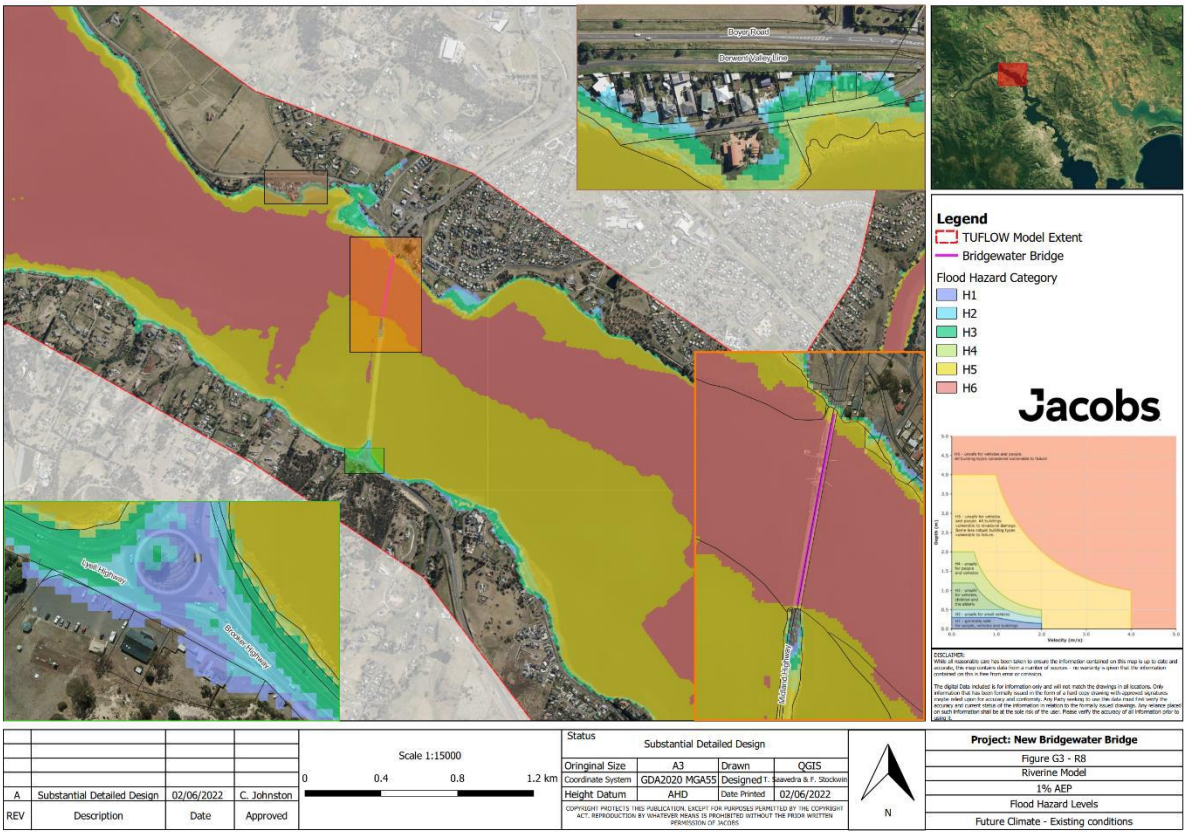

Figure 2 - Riverine Model - 1% AEP Future Climate - Existing Conditions hazard categories

The flood hazard categories for the properties listed in the PSTR are shown in Table 1.

Table 1 - Riverine Model - Existing Conditions 1% AEP future climate (2090) Flood Hazard Categories

Design Flood Event (AEP)	Watch House	1, 2, 4, 5 and 7 Wallace Street	1 to 5 Riverside Drive	Former Black Snake Inn
1% (2090)	H2 (riverine flows)	H3-4 (varies across properties)	H3-4 (varies across properties)	H1

The Project Scope & Technical Requirements (PSTR) (Clause 3.10 (a)) requires that State Roads are protected by physical means such that they remain safe for the public to use during a 1% AEP design flood event. This means the trafficable part of the State Road remains serviceable during a 1% AEP design flood event. Figure 3 shows the flood depths for the 1% AEP current climate event. The Riverine model results show that no State Roads are inundated by the 1% AEP existing climate event.

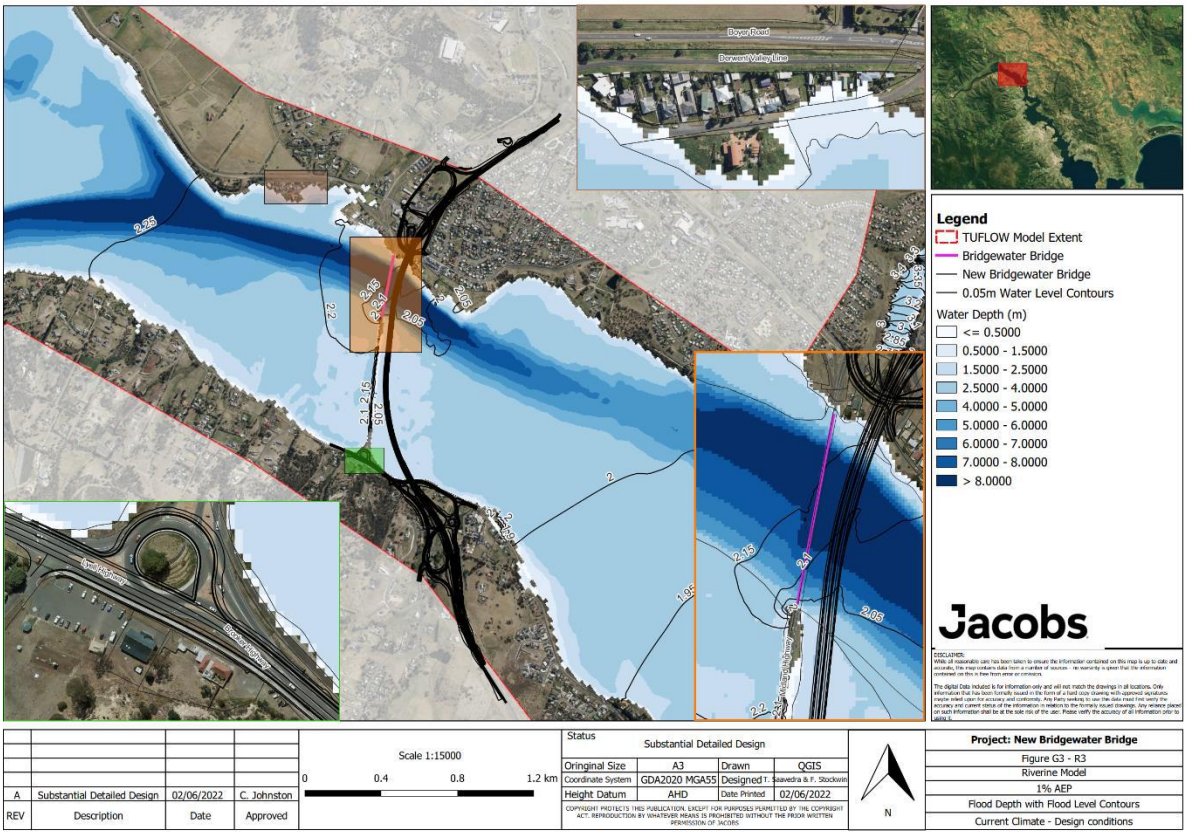

Figure 3 - Riverine Model - 1% AEP Current Climate - Design depths

The PSTR (Clause 3.10 (a)) requires that the Works must be designed such that flood impacts to infrastructure and properties will not be more than 25mm for all the design flood events.

Figure 4 shows the flood impacts caused by the presence of the Project Works for the 1% AEP current climate event.

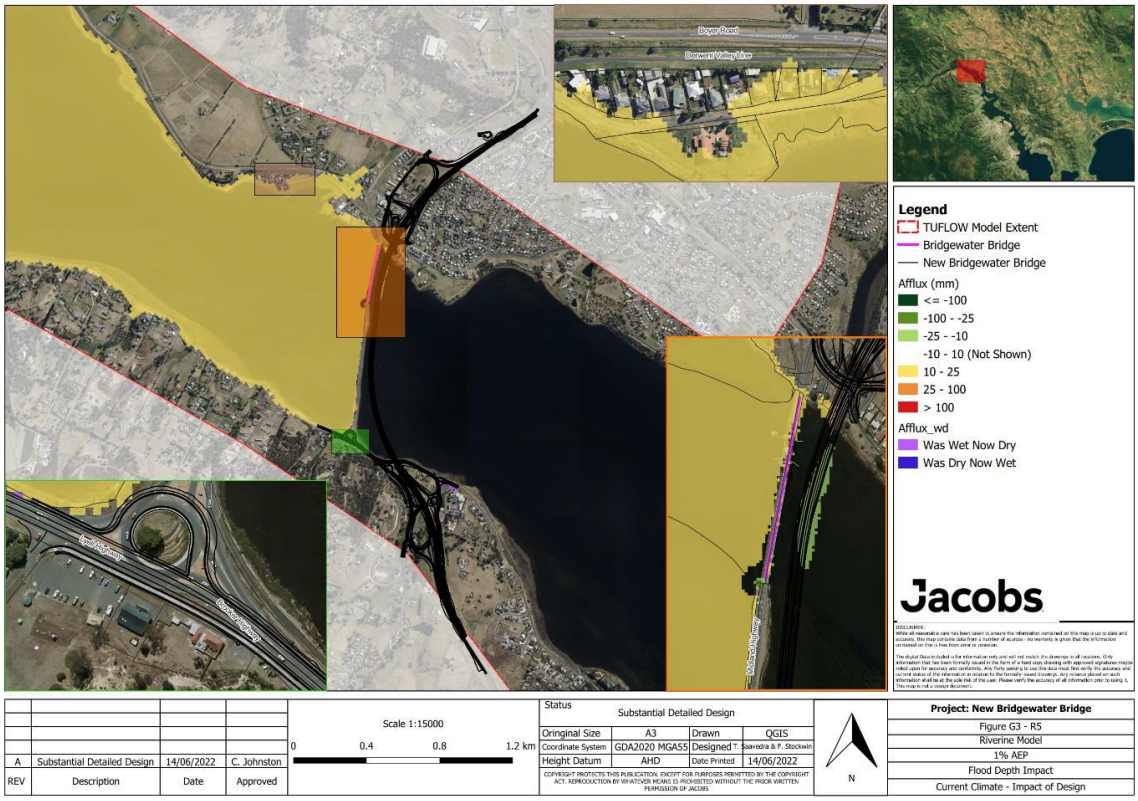

Figure 4 - Riverine Model - 1% AEP Current Climate – Design flood impacts

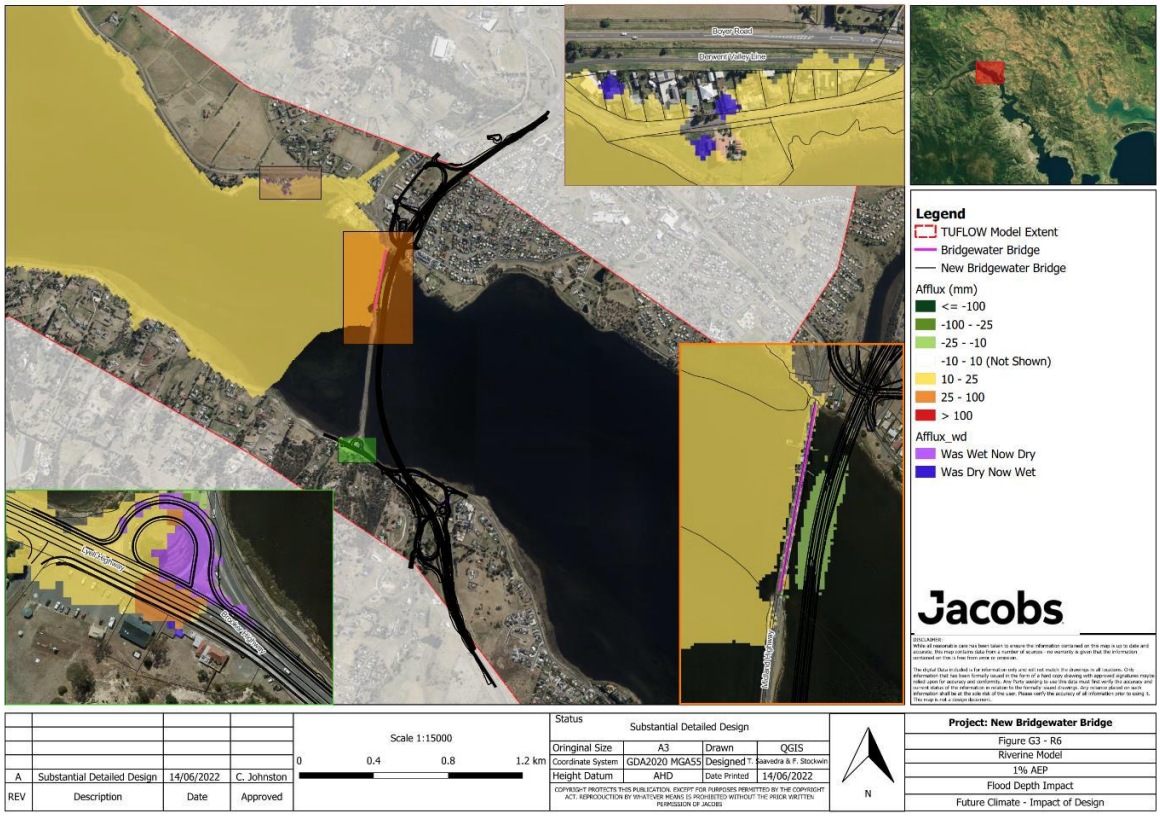

Figure 5 - Riverine Model - 1% AEP Future Climate – Design flood impacts

Figure 5 shows the change in River Derwent flood levels for the 1% AEP future climate event as a direct result of the presence of the Project Works. At each property the impacts as a result of the presence of the Project Works are not more than 25mm. The table below summarises this impact. Based on the results of the Flood modelling, no mitigations are required.

Table 2 - Riverine Model - 1% AEP future climate Flood impacts at selected properties

Design Flood Event (AEP)	**Watch House**	**1, 2, 4, 5 and 7 Wallace Street**	**1 to 5 Riverside Drive**	**Former Black Snake Inn**
1% (2090)	24mm	12mm	11mm	<1mm

3 ENVIRONMENTAL ASPECTS AND IMPACTS

There is potential during construction of the Project for works to result in adverse impacts on the flood regime and the surrounding community. This is due to the installation of temporary bridges/jetties, barges, land reclamation and construction of new piers. The risk will progressively reduce as the temporary bridge and barges are removed.

The following construction activities could potentially be impacted by flooding:

- Construction and operation of ancillary facilities
- Installation of the barges and associated activities
- Operation of temporary bridge and associated activities
- In-stream works such as piling
- Civil work in the foreshore and low-lying area including land reclamation areas
- Damage to erosion and sediment controls which could result in sedimentation, water contamination if storage areas are breached and/or sediment basins breached.

3.1 In-Stream Work

In-stream works may locally impact upon flood levels influencing flood behaviour and potentially resulting in flood impacts that are slightly greater than for the existing and operational phases, depending on the stage of construction. These flood levels and flood behaviours are likely to vary throughout each phase of the construction of the new bridge new obstructions being constructed (i.e. new piers) and obstructions being removed.

In-stream works are exposed to the impact of flooding as higher flow velocities generally occur in the river compared to overbank or floodplain areas. The river level will likely only experience a very minor increase as outlined in the above figures. Incomplete construction work may also be significantly damaged during a flood event, which may then require significant rectification work, or full removal and replacement.

3.2 Civil Work in Foreshore and Low-Lying Areas

Civil work in foreshore and low-lying areas (including land reclamation) may be subject to low-velocity inundation during a flood event. If not appropriately managed, hazardous and/or inert materials could be washed into the river causing water pollution. Incomplete civil construction work could also be significantly damaged during a flood event, which then may require significant rectification work, or full removal and replacement. Similar impacts could be caused if a very high tide and/or storm surge cause water to breach the banks of the river.

3.3 Emergency, Flood response and Communication

Please refer to the Emergency Response & Incident Plan (ERIP) for the emergency response protocols of the Project. This plan will be continually updated as construction progresses and site conditions change.

In terms of Flood Response, the Tasmanian SES is the legislated Combat Agency for floods and is responsible for the control of flood operations. This includes the coordination of other agencies and organisations for flood management tasks. The SES will issue warnings through TasALERT and via all radio channels. McConnell Dowell will be in regular contact with the SES prior to (where appropriate) and during an emergency and flood.

The contact details for the SES are listed below:

If the SES requires support in flood conditions, MCD can provide in the way of traffic control or as otherwise directed by the SES.

The Project team would generally not be responsible for communicating any flood management information to the community. In general, where there is a flood emergency, the Emergency Response Team would liaise with the SES, who would be dealing directly with the community.

The ERT will notify the site personnel of possible flood risk; notification to evacuate; what evacuation route to use; and when it is safe to return. Details of all emergency response procedures and protocols along with the key contacts are included in the ERIP.

A Traffic and Transport Liaison Group (TTLG) has also been established and will meet monthly to discuss the changing project conditions. Any changes to traffic will be documented and provided to the relevant authorities at the TTLG.

McConnell Dowell will host a workshop with emergency services with the objective of identifying potential emergency situations and reviewing the emergency management processes and protocols.

4 ENVIRONMENTAL CONTROLS

4.1 Monitoring of Site and Flood Alerts

The seven-day forecasting systems operated by the Bureau of Meteorology (BoM) which includes, weather warnings, flood warnings and watches, alerts and other productswill be monitored on a daily basis by the project WHS team. This information informs daily tool box briefings and assists the Project team in planning of the works including early notification of potential impending flood events and timely implementation of mitigation measures.

If any flood warning is issued after review of the BOM websites, the Project WHS team will increase monitoring of the SES, TasALERTS, NRE Tasmania Water (https://nre.tas.gov.au/) websites and also local radio stations and the Construction Manager and Superintendent will arrange to prepare the site as per the measures detailed in Section 4.2. Tide gauges on the BoM website will be regularly monitored when a Flood alert is posted noting each classification levels are detailed in Table 3 for Minor, Moderate, Major Flood which will provide good information to the Project.

Table 3 – Flood Classification Levels

	Minor	Moderate	Major
Derwent Rv blw Meadowbank Dam	4.1	6.1	7.3
Derwent Rv at Macquarie Plains	4	5	6.7
Derwent Rv at New Norfolk	2	4	6
Jordan Catchment			
Jordan Rv at Apsley	0.9	2	2.5
Jordan Rv at Mauriceton	n/a	2	2.5

In addition to the BoM gauges and Flood Classification Levels detailed in Table 3, the Project Team has installed a tide indicator located onsite at existing bridge pier to accurately monitor tide and river levels in real time. This gauge will be monitored in addition to the BoM websites to monitor flood levels.

All information from these sources will be monitored daily by the environmental and construction team to provide on site correlation with flood warnings (not just the Major 1% AEP events).

If a flood risk is identified, notification will be distributed to the work crews via the Emergency Response Team.

4.2 General Site Controls during a Flood Warning

Flood mitigation controls can be broken down into three steps;

1. general flood pre-preparedness,
2. actions prior to flooding and,
3. actions during flooding.

The actions for general flood pre-preparedness can be implemented following a minor flood warning by the BoM or via other monitoring devices The actions prior to flooding should be implemented when there is a moderate or major flood warning as described by BoM. These decisions will be taken by the Superintendent in consultation with the Construction Manager and WHS Manager.

General Flood Pre-Preparedness

- Ensure evacuation routes, including existing roads are kept clear as much as reasonably practical. Evacuation routes are outlined during project inductions and prestart talks. Changes to evacuation routes will be communicated through toolbox talks.
- All fuel cells, jerry cans, other hydrocarbon containing materials and chemicals shall not be permanently stored within the 5% AEP, noting the deck level of the barges and temporary bridge is above the 1% AEP, so they will not need to be relocated.
- Ensure good housekeeping to minimise the amount of loose items in flood prone areas.
- Ensuring loose materials that may form floating debris are not stockpiled in large volumes in flood prone areas.
- Where viable ablution blocks won't be placed in flood prone areas.
- Environmental controls will be inspected to ensure they are in good condition and will be effective in flood conditions (where practicable), particularly where runoff poses a risk.
- Local Areas that are subject to potential scouring shall be protected where practicable if it is considered the scouring effect will create excessive damage.
- All scaffold materials will be secured to avoid the risk of mobilisation in flood waters. Footings will be protected with temporary controls.

Actions prior to Flooding

- Evacuate all workers from the area.
- Ensure sandbags, sand and suitable pumps and other flood management equipment is readily available for use during a flood.
- All plant and equipment that can be moved out of the anticipated flood zone shall be relocated accordingly, where practical.
- Where feasible loose equipment will be removed or relocated to higher areas during a flood, equipment which cannot be moved, will be secured.
- When it isn't viable for ablution blocks to be placed out of flood prone areas their waste storage tanks will be emptied and secured prior to a flood event.
- Electrical equipment and/or temporary generators will be moved as a priority upon the issue of a flood warning.
- Works over the river will stop and plant and equipment will be secured on barges and/or temporary bridges as the deck levels are above the 1% AEP.
- Barges will be made safe by the barge supervisor and marine crew, for example, by inspecting spud piles are secured.
- Environmental controls will be inspected within the flood response period. If necessary, maintenance will be undertaken to make good any damaged controls and instal additional controls if required. In some instances, environmental control will be removed during large flood events to ensure they don't end up downstream.
- The site area will be inspected and any material that may form floating debris or obstructions or hazards during flooding will be removed or secured, where practical.

Actions during Flooding

- Site will be monitored by either the responsible ERT member or site supervisor
- Where immediate action can be taken to mitigate the risk of flooding impacts, it should only be taken in consultation or under the direction of the responsible ERT member or site supervisor
- Workers must not enter or travel through floodwater – walking or driving
- Workers to stay clear of creeks, drains, causeways, gutters, streams, fallen trees, power lines and damaged buildings
- Workers must not re-enter the site until advised by the ERT or Project Manager

4.3 Utility Service Access

Construction will be staged so that existing utilities can be accessed at all times and not experience increased impacts during flooding and large rainfall events. Controls include:

- Manholes, service pit lids and access points will be free from obstruction. Stockpiles, road barriers, and other materials will not be placed above them or in an area likely to increase afflux.
- Sediment controls will be established as to not funnel additional water into service pits.
- Flow paths are to be inspected prior to a flood/rainfall event to ensure that no service pits will be flooded. Diversions or sandbags will be installed if required.
- Existing access tracks are to remain unchanged, if alternate routes are required, they will be constructed out of material suitable for all weather access.

4.4 Post Flood

As flood waters recede the site shall be inspected, and remediation works implemented. Items include:

- The flood affected areas will be inspected and any damage recorded and remediated where required. Specific flood monitoring template to be used to record area and observations.
- Dewatering areas of trapped water as per the required dewatering process
- Removing mud with a vac-truck
- Ensure perimeter fences are secure
- Cleaning the site of flood debris
- Repairing scour
- Check for damage and repairing as appropriate
- Remediating access roads
- Reinstate any damaged environmental controls
- Inspecting Temporary Bridge and Barges prior to works commencing

5 REFERENCES

Table 5-1: References

Document Number	Document Title
2024-JAC-1065-REP-FLD-0001	Hydrology and Flood Modelling Report
2024-MCD-0000-PLA-PRJ-00015	Erosion, Sediment Control and Drainage Management Plan
2024-MCD-0000-PLA-PRJ-00013	Emergency Response & Incident Plan
2024-JAC-2020-REP-CIV00001-B	South West Civil Works – Design Report