APPENDIX N.

Emergency Response Plan

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South Rockhampton Flood Levee
Rockhampton Regional Council
10-Apr-2019
Doc No. 60589157:REP-010

South Rockhampton Flood Levee

Concept Design Phase Emergency Response Plan - 2019 Update

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Concept Design Phase Emergency Response Plan - 2019 Update

Client: Rockhampton Regional Council

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South Rockhampton Flood Levee

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Foreword

The South Rockhampton Flood Levee (SRFL) Emergency Response Plan (ERP) should be read in conjunction with the SRFL Operations and Maintenance (O&M) Manual (AECOM, 2019).

Section 4.1.4 of The International Levee Handbook (CIRIA, 2013) states that a levee's O&M Manual, and associated emergency planning procedures, should be defined during the design phase; however **the first version of the manual and emergency procedures should not be issued until after completion of construction.**

It is noted that this document has been prepared at the concept design phase of the project and is related only to the available information at the conclusion of the concept design. This document, and the associated O&M Manual, will need to be further developed and finalised during subsequent stages of detailed design, construction and operation.

It is recommended that RRC liaise with Fitzroy River Water (FRW) and Queensland Rail (QR) to confirm responsibilities during an emergency event. The outcomes of which shall be reflected in this Emergency Response Plan. At this stage, it has been assumed that FRW will be responsible for pumping systems and QR responsible for gate structures across the North Coast Rail Line.

During the finalisation process, roles and responsibilities shall be set. It is noted that some roles and responsibilities in this Emergency Response Plan may be undertaken by members of the Local Disaster Management Group.

Section 9.0 contains a list of actions and inputs to this ERP, which need to be undertaken by Rockhampton Regional Council and Fitzroy River Water (in conjunction with other external agencies) during subsequent stages of the SRFL project.

In addition, any changes to applicable regulations would trigger a review and update of this Emergency Response Plan. Furthermore, all final approval documents and conditions should be included in this document.

The current revision status of this plan is shown in Section 1.8.

Glossary / Abbreviations

ALO	Agency Liaison Officer
BoM	Bureau of Meteorology
DNRM	Department of Natural Resources and Mines
ERL	Emergency Response Level
EMQ	Emergency Management Queensland
FRW	Fitzroy River Water
GL	Ground Level
LDC	Local Disaster Coordinator
LDCC	Local Disaster Coordination Centre
LDMG	Local Disaster Management Group
LDMP	Local Disaster Management Plan
LECT	Levee Emergency Coordination Team
ERP	Emergency Response Plan
O&M	Operations and Maintenance
PFD	Personal Floatation Device
PPE	Personal Protective Equipment
QAS	Queensland Ambulance Service
QPS	Queensland Police Service
QR	Queensland Rail
RGD	Rockhampton Gauge Datum
RPEQ	Registered Professional Engineer Queensland
RRC	Rockhampton Regional Council
SAP	Safe Access Procedure
SES	State Emergency Services
SOP	Standard Operating Procedure
SRFL	South Rockhampton Flood Levee
TMR	Transport and Main Roads

1.0 Introduction

1.1 Overview

In October 2018, Rockhampton Regional Council (RRC) re-engaged AECOM Australia Pty Ltd (AECOM) to deliver concept, detailed design updates and support the obtainment of Statutory Approvals for the South Rockhampton Flood Levee (SRFL) project.

1.2 Location and Context

Rockhampton is a large regional city located on the Fitzroy River approximately 640 kilometres north of Brisbane. The Rockhampton Regional Council area has a population of some 80,000 people and is a major service centre for the wider Central Queensland region. In addition to serving a range of industries including agriculture and mining, Rockhampton provides a full range of retail, education, health, social, government and professional services to a broad catchment.

The wider Central Queensland region that Rockhampton services and supports is experiencing continuing growth in mining and resources sectors, including Liquid Natural Gas and coal mining in particular. As a consequence, interruptions to logistics and services resulting from flooding in Rockhampton impact to varying degrees on the broader region and its industries.

The Central Queensland region is a world ranked producer and exporter of black coal and a major centre for mineral processing. The region hosts the coal-bearing Bowen and Galilee basins and also produces gold, silver, limestone, coal seam gas, magnesite and gemstones. There are currently 50 coal mines, 25 mineral mines and 30 medium to large (>50 000 tonnes per year) extractive quarries operating in Central Queensland.

1.3 Flooding Mechanisms

Flooding in the South Rockhampton area can occur as a result of three different flood mechanisms:

- Riverine flooding due to rainfall over the Fitzroy River catchment.
- Creek flooding due to rainfall over external creek catchments.
- Flash flooding due to rainfall over the local urban catchment.

Each of these are discussed in further detail below.

1.3.1 Flooding from Fitzroy River Events

The Fitzroy River, which flows through the city of Rockhampton in the state of Queensland, drains a catchment of approximately 142,000km^2 and is one of the largest catchments on the east coast of Australia. The catchment extends from the Carnarvon Gorge National Park in the West to Rockhampton on the central Queensland coast and is predominantly dominated by agriculture (grazing, dry land cropping, irrigated cotton and horticulture) and by mining (coal, magnesite, nickel and historically gold and silver).

Due to its immense size and fan-like shape, the Fitzroy River catchment is capable of producing severe flooding following heavy rainfall events in any of its major tributaries. These are the Dawson, Nogoa-Mackenzie and Connors-Isaacs Rivers which rise in the eastern coastal ranges and the Great Dividing Range and join together about 100 kilometres west of Rockhampton. Major floods can result from either the Dawson or the Connors-Mackenzie River catchments. Significant flooding in the Rockhampton area can also occur from heavy rain in the local area below Riverslea.

Rockhampton is the largest urban centre in Central Queensland and is located approximately 60 kilometres from the mouth of the Fitzroy River at Keppel Bay. The Fitzroy River at Rockhampton and adjacent townships has a long and well documented history of flooding with flood records dating back to 1859. The highest recorded flood occurred in January 1918 and reached 10.11 metres (8.65m AHD) on the Rockhampton flood gauge.

It must be noted that extensive social and economic impacts are also experienced in more frequent, flood events. As examples:

- Low lying areas of Port Curtis and Depot Hill are inundated at a gauge height of 7.0m which is equivalent to the Minor Classification given by BOM.
- The Depot Hill community is isolated at a gauge height of 7.5m which is equivalent to the Moderate Classification given by BOM.
- The Bruce Highway at Lower Dawson Road is cut at a gauge height of approximately 8.4m.
- Low lying areas of Allenstown are inundated at a gauge height of 8.5m which is equivalent to the Major Classification given by BOM.
- Depot Hill and Port Curtis have been impacted by 33 historical flood events over 7.0m in gauge height since records commenced in 1859.
- There have been 17 historical flood events over a gauge height of 8.0m in which the Bruce Highway (Lower Dawson Road) has been cut.

1.3.2 Flooding from Neerkol Creek and Lion Creek Events

The Neerkol Creek system stretches more than 21km west of Rockhampton and conveys flows from several minor systems, including Gracemere Creek and Middle Creek at Gracemere. Flows from Neerkol Creek can quickly exceed the naturally-leveed creek banks and overtop towards the neighbouring lagoons and the broad lower Fitzroy floodplain.

Major expansion of the Neerkol Creek influence area occurs at Fairy Bower where a significant proportion of flow crosses Fairy Bower Road to the west of the Neerkol Creek crossing in large flood events. In such events, flows ultimately fill the lower Fitzroy floodplain and overtop Nine Mile Road into Lion Creek.

Some of this water later returns to the lower Fitzroy floodplain when it overtops Nine Mile Road for the second time (south of Nine Mile Road Bridge). Flows remaining within Neerkol Creek split downstream of Fairy Bower Road, with low flows directed to Scrubby Creek by the man-made weir situated at the end of Neerkol Creek. Floodwaters within the lower Fitzroy floodplain recede in a similar fashion to a Fitzroy River breakout event, in which waters traverse the Bruce Highway and follow Gavial Creek to join the Fitzroy River west of Depot Hill. Large events which result in widespread inundation of floodplain areas and rural assets occur following long storm durations of more than 24 hours.

The smaller catchment of Lion Creek meanders between the mountainous ranges (which entails Mount Lion) northwest of Gracemere and tends west towards Malchi Nine Mile Road. A large proportion of flows in large events tend to overtop the natural banks of Lion Creek and cross the low-lying Malchi Nine Mile Road which then recharge the downstream wetlands, including Lower Gracemere Lagoon (a.k.a. Paradise Lagoons). Flows reaching this point follow a similar pattern through the Yeppen Floodplain as described above.

Lion Creek flows remaining within the channel cross the floodway at Nine Mile Road and replenish storage levels within Lion Lagoons. As floodwaters exceed the available storage (large or long duration events involving high volumes of runoff) flows roughly follow Nine Mile Road towards the Rockhampton Airport, with much of the flow filling the Lotus Lagoons at Pink Lily. Rare events result in a second overtopping of Nine Mile Road (as with the Neerkol Creek catchment) south of Nine Mile Road Bridge, following the system of lagoons towards Gavial Creek and ultimately Fitzroy River.

Larger flood events from either creek system can influence the other system, resulting in a shared lower catchment extending between Gracemere and Rockhampton. Figure 1 shows an overview of the Neerkol Creek and Lion Creek catchments.

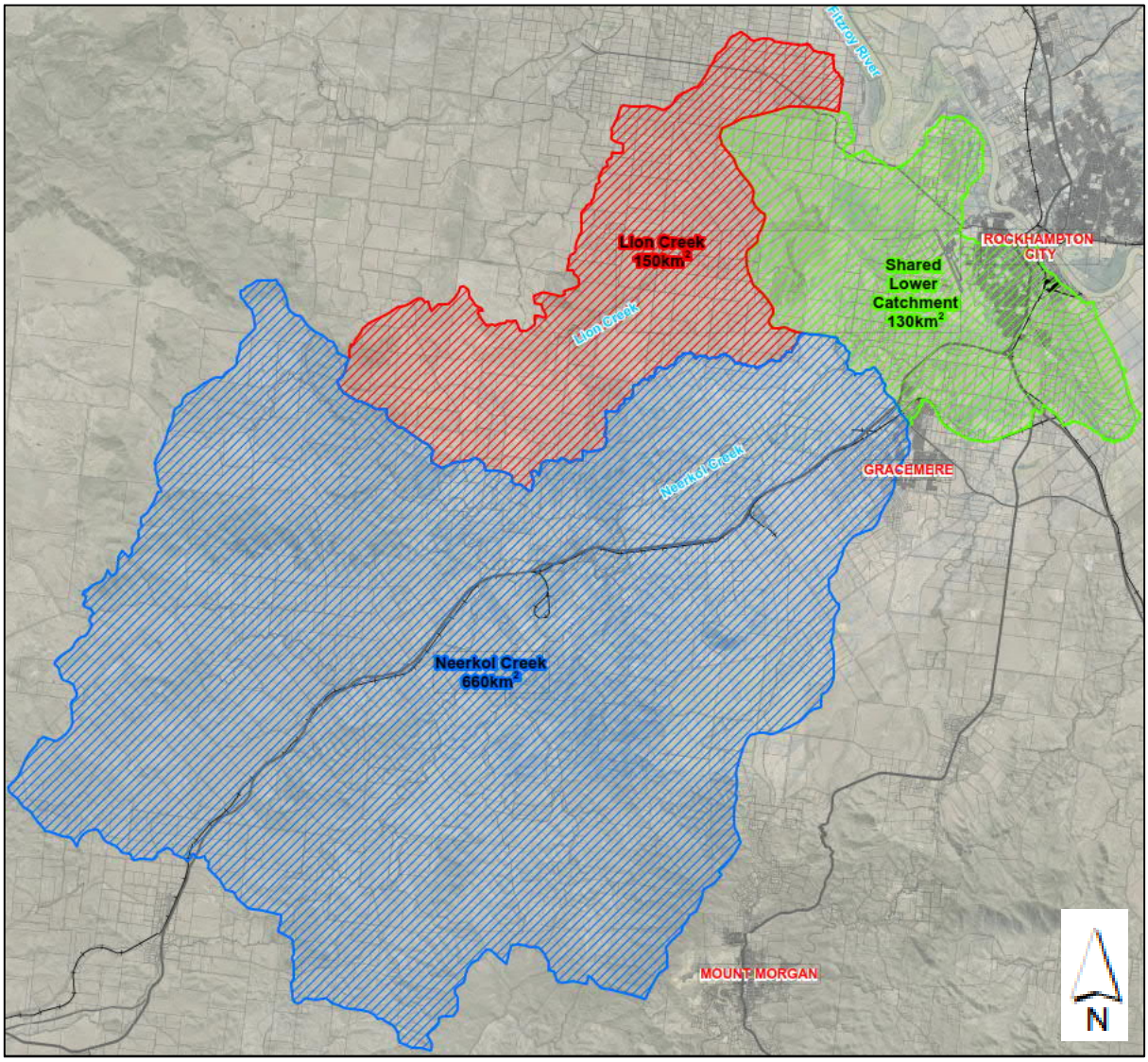

Figure 1 Neerkol Creek and Lion Creek Catchment Summary

1.3.2.1 Levee Activation during Creek Catchment Events

Initial modelling shows that Council could close levee gates between the Yeppen North connection and Hastings Deering, to prevent creek catchment runoff entering the leveed area. Review of the predicted Neerkol Creek / Lion Creek 1% AEP flood extent however, shows there may be minimal benefit in activating the levee system due to the limited existing impact within the leveed area.

The absence of an Early Warning System in the upper catchment and the relatively short notice afforded by the Neerkol Creek / Lion Creek system (generally less than 12 hours), adds a complexity to safely activating the levee system prior to a creek event arriving at the levee site. This is particularly the case for the North Coast Rail Line flood gate which would require closure of the North Coast Rail Line and longer lead times due to the need for joint RRC and QR involvement. For Council to confidently plan to close the levee system during a creek catchment event, upper catchment gauging and monitoring would be needed, as well as an associated flood warning system.

The complexity of the creek system, coupled with the lack of early warning systems and short response time, suggests that further investigation would be required during detailed design to agree on the most appropriate response to levee activation.

Activation of the levee system and associated responsibilities during a creek catchment event have therefore **not been included in this Concept Phase Emergency Response Plan**.

1.3.3 Flooding from Local Urban Catchment Events

The South Rockhampton urban catchment covers approximately 10.8km^2 within the suburbs of The Range, Rockhampton City, Allenstown, Depot Hill and Port Curtis. The western catchment boundary follows the crest of the Range, which is roughly aligned to Agnes Street. Elevations along this ridgeline reach up to 65mAHD with moderate slopes (5% - 10%) directing stormwater runoff east through the City towards the primary drainage path, known locally as the 'Main Drain'.

The catchments within the Rockhampton City (adjacent to the Upper Main Drain) discharge towards the Fitzroy River, with runoff south of this catchment draining to both the Lower Main Drain (via overland flow paths) and the Fitzroy River (via an underground drainage system). These catchments have flat slopes in comparison to the upper reaches of the catchment.

The lower catchment south of the rail and main drain has little natural grade with the majority being below 6 mAHD. This wetland area is known as the Fiddes Street Lagoon area and commonly retains water during the wet season. Most of the lagoon area drains to the south-east via cross-drainage under Fiddes Street towards Gavial Creek, which outlets to the Fitzroy River.

The South Rockhampton urban catchment has a relatively short response time, in comparison to creek and riverine flooding mechanisms.

1.4 The South Rockhampton Flood Levee

The SRFL project represents one of the most significant regional flood mitigation projects currently proposed in Queensland. The SRFL was identified as a Priority 1 Structural Mitigation Measure in the 1992 Rockhampton Flood Management Study (CMPS&F, 1992). Construction of the levee will significantly reduce flood damage and social impacts for a large portion of the urban area in South Rockhampton.

The SRFL will be approximately 8.74km long, running from the Rockhampton CBD in the north (Fitzroy Street and Quay Street), to Jellicoe Street and Port Curtis Road in the south, and Upper Dawson Road (Yeppen North) in the west (refer to Figure 2). It will consist of sections of earth embankment, crib wall, vertical flood wall and temporary demountable levee structures (component lengths are summarised in Table 1).

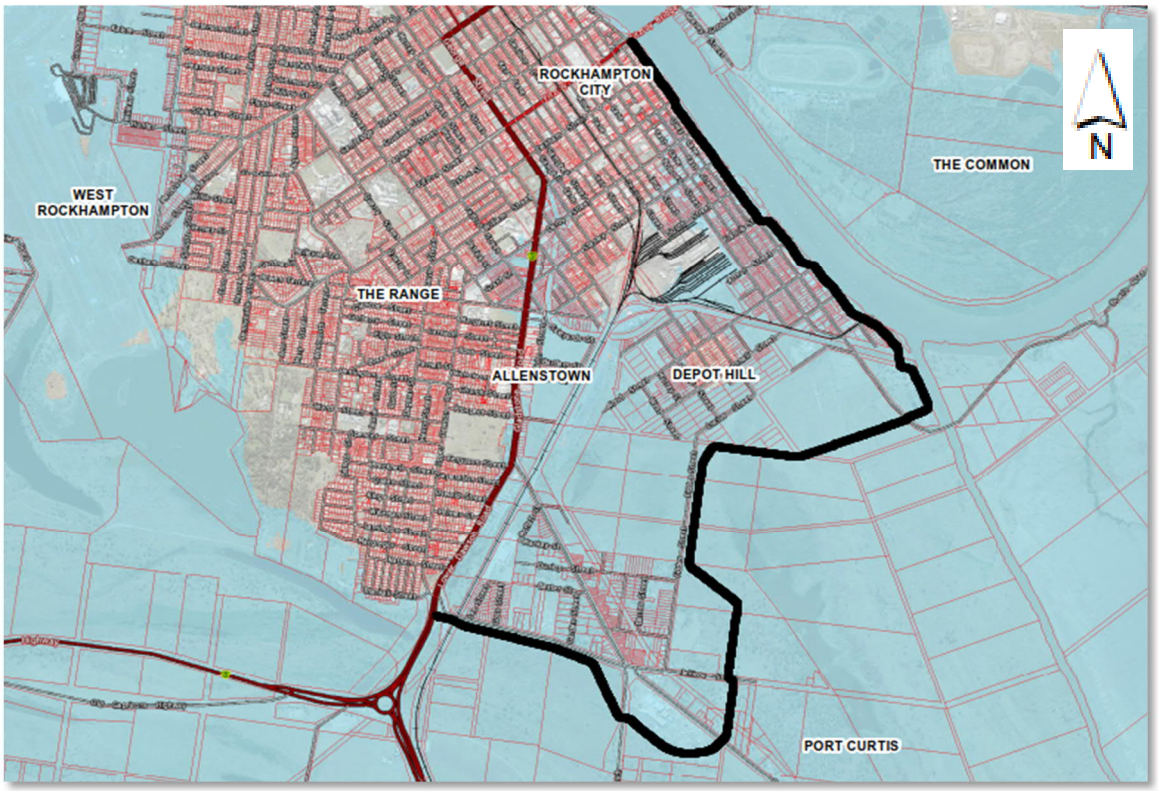

Figure 2 Location of the Proposed SRFL (Baseline Fitzroy River 1% AEP Flood Extents Shown)

The levee will be constructed to 1% Average Exceedance Probability (AEP) or 100 year Average Recurrence Interval (ARI) flood immunity with 600 mm freeboard. This will be equivalent to a 9.89 m gauge level (post SRFL construction).

The levee will incorporate flood gates on the major drainage channels and existing piped drainage networks that discharge outside the levee will be fitted with non-return devices to prevent river back-up. A system of landside drainage channels and three interior pump stations will discharge local catchment runoff should local rainfall events coincide with a regional Fitzroy River flood event.

Table 1 SRFL Component Lengths

Levee Type	Length (m)
Temporary Fully Demountable Wall	732
Composite Demountable / Permanent Levee Wall	967
Levee Emergency Spillway	420
Earth Embankment (incl. road ramps and gates)	5,892
Crib Retaining Wall	729
Total Levee Length	**8,740**

1.5 Project Delivery

The SRFL project is being delivered in two distinct stages, as detailed below.

1.5.1 Stage 1: Early Works (Pre-construction services)

Prior to construction starting on the SRFL project, early works will be completed. The works include land acquisition, stormwater, water and sewage relocations, river bank protection works and drainage works. Early works are anticipated to commence in 2019, and will be undertaken progressively throughout the year.

1.5.2 Stage 2: Main Contract

Council is committed to finalising the consultation, environmental and planning approvals, technical investigations and design of the SRFL project, to facilitate tendering and construction. The SRFL construction works are anticipated to start in late 2019.

The SRFL project has been declared a prescribed project by the Minister for State Development, Manufacturing, Infrastructure and Planning. Approvals for the project are yet to be obtained, and will be facilitated through the Infrastructure Designation process under the *Planning Act 2016*. This will include the preparation and exhibition of an Environment Assessment Report (EAR).

1.6 Purpose

The purpose of the Emergency Response Plan (ERP) is to pre-plan the coordination of the roles, responsibilities and actions to be taken proceeding, during and following an emergency event. This may include a Fitzroy River flood event, an internal local catchment rainfall event or a levee failure.

1.7 Scope

The ERP applies to the South Rockhampton Flood Levee (SRFL), and:

- Ensures appropriate notifications prior to, during and after an emergency event.
- Ensures necessary actions are taken prior to, during and after an emergency event.

The ERP does not cover the management of:

- Regular maintenance activities (refer to the SRFL Operations and Maintenance Manual).
- Security threats to the levee. It is recommended that a separate Security Plan be developed by Council if deemed necessary.

1.8 Document Control and Review

Table 2 provides the revision status of the ERP.

Table 2 Revision Status

Revision	Date	Description
0	September 2014	DRAFT Design Phase Emergency Response Plan
A	October 2014	Design Phase Emergency Response Plan
B	March 2019	Updated Draft Design Phase Emergency Response Plan (2019 Design)
C	April 2019	Concept Design Phase Emergency Response Plan (2019 Design)

Table 3 lists the controlled SRFL ERP copies which have been issued. Upon revision of the ERP, an updated copy is to be issued to all persons listed.

Table 3 Controlled Copy List

Copy	Position	Location
1	RRC General Manager – Regional Services	Rockhampton
2	FRW Manager	Rockhampton
3	RRC Manager Infrastructure Planning	Rockhampton
4	RRC Coordinator Strategic Infrastructure	Rockhampton
5	FRW Coordinator Network Operations	Rockhampton
6	Manager Community Assets and Facilities	Rockhampton
7	Senior Infrastructure Planning Engineer	Rockhampton
8	RRC Manager Civil Operations	Rockhampton
9	Manager Capital Works	Rockhampton
10	Maintenance Engineer	Rockhampton

The Senior Infrastructure Planning Engineer shall keep a record of the distribution and location of the ERP. The Senior Infrastructure Planning Engineer shall ensure that all copies are current and that duplicate (uncontrolled) copies are not used for emergency response. Records shall be kept of the locations and status of each copy.

The ERP shall be reviewed annually by RRC. Revisions shall be approved by the General Manager – Regional Services and shall include the Document Control Details and the Controlled Copy List.

Controlled copies of the ERP shall have a water mark or stamp on each page clearly indicating that it is a controlled original copy. All uncontrolled copies of the document shall not have this mark and shall alert users to the fact that the information contained in an uncontrolled document may not be current.

1.9 Local Disaster Management Plan

The Local Disaster Management Group (LDMG) should be informed of this document, for inclusion in the Local Disaster Management Plan (LDMP) and as an aid to the Fitzroy River Flood Sub-Plan.

The LDMP states that the control of the disaster response for a Fitzroy River Flood is the responsibility of the Cyclone and Storm Sub Committee and that the lead agency for the response is the Rockhampton Regional Council (RRC).

The LDMP is supported by the following sub-plans. Sub-plans which are most likely to be triggered in conjunction with the ERP are highlighted:

1. Evacuation Sub Plan
2. Communication Sub Plan
3. Cyclone East Coast Low and Severe Storm Threat Specific Sub Plan
4. Fitzroy River Flood Threat Specific Sub Plan
5. Environment and Public Health Sub Plan
6. Local Disaster Coordination Centre Sub Plan
7. Recovery Sub Plan
8. Activation LDMG Sub Plan
9. Dam Failure Sub Plan
10. Financial Management Sub Plan
11. Impact Assessment Sub Plan
12. Public Works and Engineering Sub Plan
13. Rescue Sub Plan
14. Logistics Sub Plan
15. Medical Services Sub Plan
16. Evacuation Centre Management Sub Plan
17. Tsunami Sub Plan
18. Bushfire Sub Plan
19. Marine Oil Spill Sub Plan
20. Emergency Animal Disease Sub Plan
21. Influenza Pandemic Sub Plan
22. Transport Sub Plan

1.9.1 Evacuations

Evacuations are the responsibility of Queensland Police Service and shall be carried out in accordance with the LDMP Evacuations Sub Plan.

The LDMP Evacuations Sub Plan is to be updated to incorporate additional evacuation information associated with the SRFL. Details of the SRFL evacuations associated with spillway overtopping, levee crest overtopping and levee failure are to be included in **Appendix H** during the construction phase of the project.

Where evacuation routes for residents outside the leveed area utilise roads that will be blocked by the levee, a notification and evacuation procedure shall be followed to ensure those residents are notified prior to gate structures and / or demountable barriers being installed. Residents are to be made aware that potential evacuation routes will be made inaccessible once gate structures and / or demountable barriers have been installed.

2.0 Procedural Flow Chart and Notification List

2.1 Procedural Flow Chart

The procedural flow chart summarises the actions that must be taken in an emergency. It should include names and essential contact information (e.g. home, office and mobile numbers), and should also include essential public agencies that need to be notified. Ultimately, the flow chart should outline the individuals that are to be notified, the prioritised order in which individuals are notified, and the responsibilities of all relevant parties.

The Emergency Preparedness Guidelines for Levees (US Homeland Security, 2012) notes that the procedural flow chart should be developed by the levee owner and operators. This is preferably undertaken during the construction phase. Once created during the construction phase of the project, the procedural flow chart is to be updated during each annual review of the ERP.

It is noted that a flow chart is to be developed for each of the emergency events detailed in Section 5.0.

2.2 Notification List

A preliminary version of the Notifications List is provided in **Appendix A**, which outlines the order of notifications as well as the names and contact details for each of the relevant parties. Each person should be contacted via mobile phone initially, then via work phone numbers (during office hours) or afterhours numbers, where provided.

The notification list is to be finalised during construction of the SRFL and updated during each annual review of the ERP.

2.2.1 Resources List

It is recommended that the contact details for businesses, individuals and groups that may be able to assist with flood defences should be collated for reference prior to and during a flood event. These could include: local contractors, flood defence equipment suppliers, hospitals, Queensland Rail, Transport and Main Roads, SES etc.

A preliminary list of the types of contacts that should be collated is included in **Appendix B**.

3.0 Responsibilities

The SRFL is owned and operated by Rockhampton Regional Council (RRC). The emergency operation of the SRFL pump stations and associated infrastructure is the responsibility of Fitzroy River Water (FRW), a commercial business activity of RRC.

The RRC General Manager – Regional Services is responsible for the implementation and revision of this Emergency Response Plan.

The roles and responsibilities for the following positions are detailed below:

- Levee Incident Manager.
- Levee Incident Assistant.
- Event Monitor.
- Demountable Barrier and Traffic Coordinator.
- Communications Coordinator.
- Inspections Coordinator.
- Levee Structure Coordinator.
- Pump Station Coordinator.

Prior to completion and first issue of this ERP, an Organisational Chart is to be established to clearly identify the line of communication between RRC, FRW and emergency response personnel.

3.1 Levee Incident Manager

The Levee Incident Manager is responsible for the overall levee emergency response including identifying and implementing the level of emergency response and resolving issues within the levee emergency management structure. The Levee Incident Manager will be assigned by RRC when this Emergency Response Plan is triggered. During most events a single person will take on this role for the duration of the event; however this role may be assigned to multiple persons if the event takes place for an extended period of time.

The specific responsibilities of the Levee Incident Manager include:

- Determines if an emergency response at the levee should be activated.
- Approves the assignment of personnel to the roles listed in the ERP.
- Updates the LDMG on the levee response actions as they unfold and the ability of the levee to protect the leveed area.
- Notification to residents outside the levee that the Demountable Flood Barriers will be installed and their escape routes will be restricted.
- Advises the LDMG if evacuations should be made and what areas will be affected.
- Authorises the deployment of demountable flood barriers and approves the Demountable Flood Barrier Deployment Plan (refer **Appendix E** for a preliminary deployment plan).
- Approves broadcast information for the Communications Coordinator to disseminate to affected parties.
- Upgrades the risk level for the levee as each trigger level is reached and directs the Levee Incident Assistant to notify the emergency Coordinators.
- Request assistance from an REPQ qualified Engineer with suitable experience, if deemed necessary.
- Initiates recovery operations following consultation with the LDMG.

- Maintains a log of actions and decisions that are made as the event unfolds, including authorisations for materials and assignment of personnel (this may be assigned to the Levee Incident Assistant).
- Reviews and approves the post-event report.

3.2 Levee Incident Assistant (Internal Communications)

The Levee Incident Assistant is responsible for assisting the Levee Incident Manager in their role by providing administrative and communications support. This involves managing information as it comes through from the emergency Coordinators and disseminating this appropriately to the Levee Incident Manager and emergency Coordinators. This role may be assigned to multiple persons who will undertake the work in shifts.

The specific responsibilities of the Levee Incident Assistant include:

- Receiving information updates from all Coordinators and passing on the information to the Levee Incident Manager.
- Disseminating updates to all Coordinators regarding the overall emergency response.
- Tracking the flood progress as reports come through from the Event Monitor and uses this information to determine what areas could be flooded if the levee spillway or crest is overtopped.
- Providing administrative support to Coordinators where required.
- Maintaining a log of actions and decisions that are made as the event unfolds, including authorisations for materials and assignment of personnel.
- Preparing a post-event report including the actions log and submits this to the Levee Incident Manager.

The Levee Incident Assistant ensures the Coordinators are informed of what decisions are made and what activities other Coordinators are undertaking to respond to the emergency.

3.3 Event Monitor

The Event Monitor is responsible for tracking the flood status and BoM warnings throughout the event. This role may be assigned to multiple persons who will undertake the work in shifts. The specific responsibilities of the Event Monitor include:

- Monitoring water levels at Riverslea, The Gap and Rockhampton.
- Monitoring flood warnings, rain forecasts and strong wind warnings for Rockhampton.
- Maintaining a log of actions and decisions that are made as the event unfolds, including a timeline of water levels and BoM warnings.
- Informing the Levee Incident Manager and Levee Incident Assistant when each trigger level is reached and if local rainfall is predicted for Rockhampton.
- Continuing to record water levels in the log until all temporary barriers are removed.
- Preparing a post-event actions log and record of monitoring data for submission to the Levee Incident Assistant, for incorporation in the post-event report.

3.4 Demountable Barrier and Traffic Coordinator

The Demountable Barrier and Traffic Coordinator is responsible for pre-inspection, installation, maintenance, storage and removal of demountable barriers, and for liaison with local Queensland Police Service (QPS) and LDMG regarding road closures. This role may be assigned to multiple persons who will undertake the work in shifts.

The specific responsibilities of the Demountable Barrier and Traffic Coordinator include:

- Keeping an up to date list of all available flood defences, equipment, personnel and standbys.
- Ensuring there is access to all equipment and access to the levee prior to the installation trigger.
- Liaising with Communications Coordinator to inform road and rail operators of when barriers will be closed and keeping them updated on when they are expected to re-open.
- Coordinating traffic management plans for closure of barriers and liaison with the Communications Coordinator to ensure people outside the levee are informed before complete closure.
- Coordinating traffic management plan and public access restrictions to ensure only emergency personnel use the levee during the event.
- Ensuring access ramp gates are unlocked to allow clear access to the levee for emergency personnel.
- Liaising with Communications Coordinator to notify the public when barriers will be closed and providing updates for when they are expected to re-open.
- Coordinating installation of barriers as outlined in the Demountable Flood Barrier Deployment Plan approved by the Levee Incident Manager, including removal from storage, installation and final inspection in-place.
- Updating the Levee Incident Assistant as the event unfolds.
- Coordinating the removal of barriers as outlined in the Demountable Flood Barrier Removal Plan approved by the Levee Incident Manager, including in-place inspection and cleaning, dismounting, component inspection, final cleaning and storage.
- Maintaining a log of actions, photographs and decisions that are made as the event unfolds, including timelines, materials used and assignment of personnel (this may be assigned to an assistant).
- Preparing a post-event actions log and timeline record for submission to the Levee Incident Assistant for incorporation in the post-event report.

3.5 Communications Coordinator (External Communications)

The Communications Coordinator is responsible for assisting the LDMG with the dissemination of information to the public and press, direct contact with affected persons to arrange their evacuation and liaising with external agencies affected by the flooding. This role should be assigned to someone with experience and/or training in effective communications.

The specific responsibilities of the Communications Coordinator include:

- Assisting the LDMG with the dissemination of information to the public via media broadcasts on TV and radio, including flood magnitude, potential affected areas, levee closure to public access, road closures and barrier closures.
- Assisting with the coordination of door-to-door notification of residents in affected areas inside and outside the levee, including notification to stand-by, prepare to evacuate and evacuate.
- Liaising with road authorities (QPS, RRC, TMR, RACQ) and rail authorities (Queensland Rail, Aurizon) regarding road and rail closures and keeping them updated on when barriers / flood gates will be removed.
- Maintaining a log of actions and decisions that are made as the event unfolds, including a timeline of when various groups were informed of the situation (this may be assigned to an assistant).
- Preparing a post-event actions log and timeline record for submission to the Levee Incident Assistant for incorporation in the post-event report.

3.6 Inspections Coordinator

The Inspections Coordinator is responsible for on-site coordination of monitoring including the safety of persons on the levee. This role may be assigned to multiple persons who will undertake the work in shifts.

The specific responsibilities of the Inspections Coordinator include:

- Preparing and managing the roster for levee monitoring.
- Assembly of personnel to assist with monitoring.
- Activating the Safe Access Procedure (SAP) for the levee during a Fitzroy River flood event and monitoring compliance.
- Tracking who is on the levee, where they are on the levee and what activities are being undertaken, including vehicles and pump station operators.
- Ensuring monitoring teams have the required equipment.
- Ensuring monitoring teams are wearing appropriate personal protective equipment (PPE) including a personal floatation device (PFD) at all times.
- Initiating safety response for monitoring teams if triggered.
- Collecting reports from monitoring teams and passing them on to the Levee Structure Coordinator.
- Maintaining contact with the Emergency Services Staging Area.
- Maintaining a log of actions, photographs and decisions that are made as the event unfolds, including materials used and assignment of personnel (this may be assigned to an assistant).
- Updating the Levee Incident Assistant as the event unfolds.
- Preparing a post-event actions log and timeline record for submission to the Levee Incident Assistant for incorporation in the post-event report.

3.7 Levee Structure Coordinator

The Levee Structure Coordinator is responsible for maintaining the structural integrity of the levee where it is safe to do so. This role may be assigned to multiple persons who will undertake the work in shifts.

The specific responsibilities of the Levee Structure Coordinator include:

- Ensuring hazardous materials are removed from the vicinity of the levee in the preliminary response phase. This is to include a check that the removal of boats from the Fitzroy River has been completed (by others).
- Coordinating a full inspection in the preliminary phase and coordinating the response to any existing issues.
- Establishing a Staging Area (refer Section 4.9) near the levee and coordinating the stockpiling of materials. At minimum, this should include: sand, sandbags, plastic sheeting, earthmoving machinery, emergency lighting, back-up communications equipment, riprap for emergency erosion, sources of borrow materials, gravel to maintain levee access roads, flotation vests, portable pumps and lights.
- Reviewing reports from monitoring teams and coordinating the response to structural issues.
- Initiating and coordinating inspections by qualified RPEQ Engineer/s if warranted during the event and coordinating the implementation of recommended mitigation measures. This is to be authorised by the Levee Incident Manager prior to initiation.
- Updating the Levee Incident Assistant as the event unfolds.

- Maintaining a log of actions, photographs and decisions that are made as the event unfolds, including materials used and assignment of personnel (this may be assigned to an assistant).
- Coordinating removal of temporary defence measures implemented during the event.
- Coordinating post-event inspections of the levee by qualified persons.
- Preparing a post-event actions log and timeline record for submission to the Levee Incident Assistant for incorporation in the post-event report.

3.8 Pump Stations Coordinator

The Pump Stations Coordinator is responsible for the operation and repair of pump stations and the closure of through-levee structures (pipes and culverts). This role may be assigned to multiple persons who will undertake the work in shifts.

The specific responsibilities of the Pump Stations Coordinator include:

- Ensuring pump and generator parts, fuel supplies and fuel transport is available in the preliminary response phase.
- Maintaining an up to date contact list for contractors capable of undertaking repairs to the pump stations during an event.
- Coordinating a full inspection and testing of pump stations during the preliminary response phase.
- Coordinating the transport and storage of additional fuel supplies for the pump stations.
- Coordinating the closure of all backflow prevention devices (BPDs), cleaning screens/grates and closing off all through-levee structures.
- Ensuring qualified operators are on duty when pump station operation is imminent, even if pumps are automatically operated.
- Monitoring of SCADA.
- Ensuring emergency pumps are on standby.
- Coordinating repairs and the response to any problems with the pump stations during the event.
- Updating the Levee Incident Assistant as the event unfolds.
- Activating the Safe Access Procedure (SAP) for the levee during an internal flood event and monitoring compliance.
- Maintaining a log of actions and decisions that are made as the event unfolds, including materials used and assignment of personnel (this may be assigned to an assistant).
- Preparing a post-event actions log and timeline record for submission to the Levee Incident Assistant for incorporation in the post-event report.

4.0 Operational Procedures

Figure 3 provides an overview of the SRFL alignment and configuration. Details of the levee footprint, chainages, typical levee cross sections, long sections, demountable flood barriers, access ramps, pump station etc. shall be referenced in the current version of the drawings.

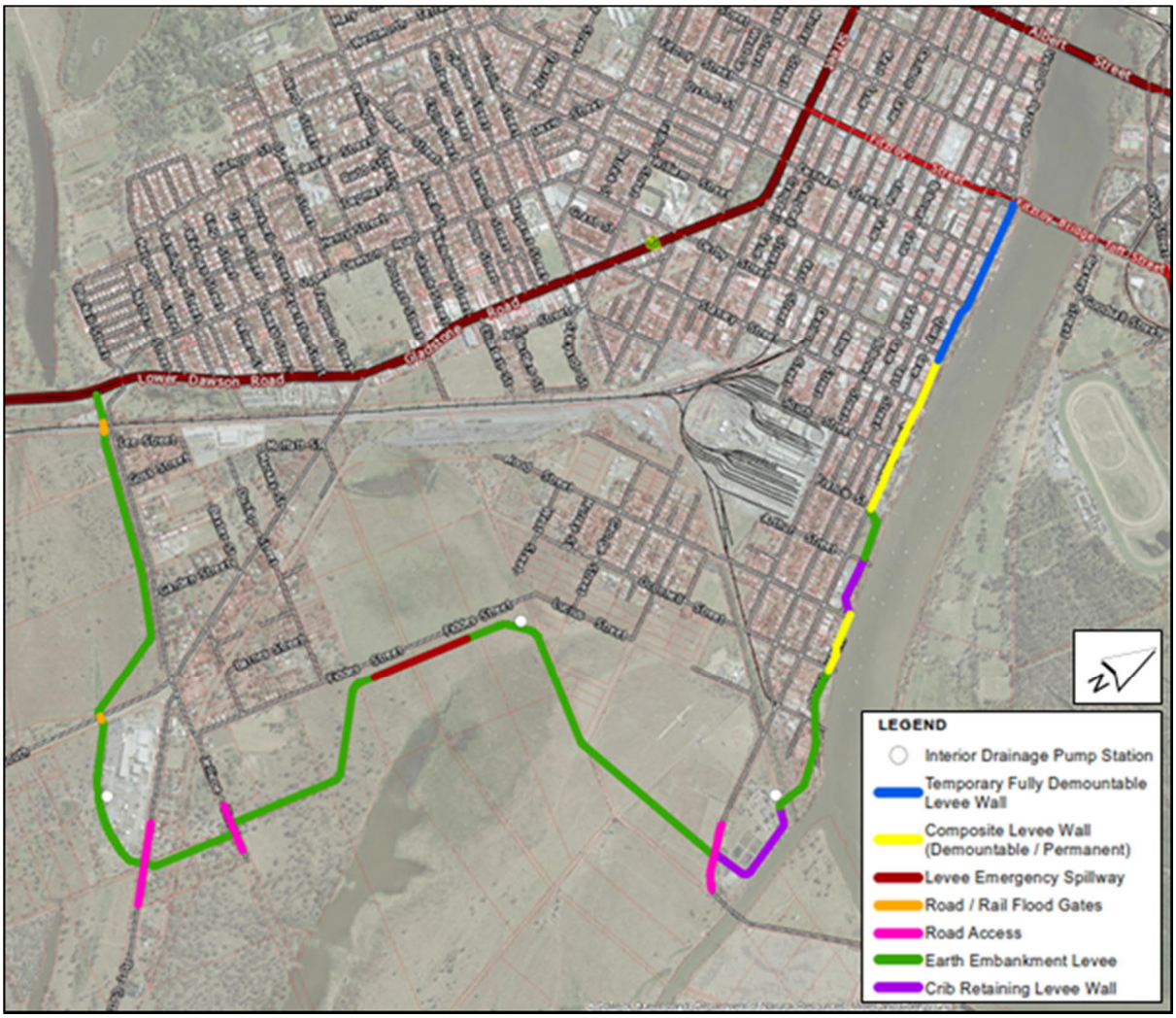

Figure 3 SRFL Overview

It is recommended that physical markers be installed along the levee alignment, to identify the Chainage of the location in reference to the construction drawings. This will assist emergency staff identify their position on the levee for reporting purposes.

4.1 Activation

RRC are responsible for the activation of the SRFL Emergency Response Plan and the notification of FRW and the LDMG that the plan has been activated. RRC will then liaise with FRW and the LDMG to carry out the actions in this plan as required.

The Chairperson of the Rockhampton LDMG has responsibility for activating the LDMG, the LDMP and the LDCC and determining the stage of activation required.

4.2 Mobilisation

The RRC General Manager – Regional Services will assign the Levee Incident Manager who will refer to this Emergency Response Plan and ensure the roles listed below are filled by appropriate persons.

A meeting of the Levee Emergency Coordination Team (LECT) will be held on the same day as the activation. The LECT is comprised of the following:

- Levee Incident Manager.
- Levee Incident Assistant.
- Demountable Barrier and Traffic Coordinator.
- Levee Structure Coordinator.
- Communications Coordinator.
- Inspections Coordinator.
- Pump Stations Coordinator.

The purpose of this meeting will be to:

- Estimate the magnitude of the flood.
- Determine an appropriate level of response.
- Verify that all Coordinators have access to the information they need.
- Other actions as identified by the LECT.

4.3 Demountable Flood Barriers

Pre-inspection of demountable flood barriers and equipment is to be carried out by the Civil Operations team in accordance with supplier's specifications and recommendations.

Demountable flood barriers along Jellicoe Street, at the Old Bruce Highway, along Quay Street and along the western bank of the Fitzroy River are to be installed in accordance with supplier's specifications and the Demountable Flood Barrier Deployment Plan (refer **Appendix E**).

When deployed and in place, inspection and monitoring of the demountable flood barriers shall be undertaken in accordance with the supplier's specifications and recommendations.

4.4 Backflow Prevention Devices

Backflow Prevention Devices shall be closed in accordance with suppliers' specifications. If located within access chambers, follow FRW Standard Operation Procedure (SOP) for accessing these areas as confined space restrictions may apply.

Close and secure BPDs on the ends of culverts/pipes in accordance with suppliers' specifications. Where the closure is automatic, inspection is to be undertaken to ensure correct operation has occurred.

Once waters recede, open valves using appropriate SOP. Remove debris and clean if required.

4.5 Embankment Monitoring

4.5.1 Alert / Preliminary Response

A Level 1 Inspection (refer **Appendix C** for details) of the embankment shall be undertaken when the Emergency Response Plan is activated.

The embankment shall be monitored at least once each day during preliminary flood response in accordance with the Level 2 Inspection procedure (refer **Appendix C** for details).

4.5.2 Stand Up / Full Response

When the full response is activated, continuous monitoring of the levee shall occur according to the Level 3 Inspection procedure (refer **Appendix C** for details).

4.6 Pump Station Operations

FRW are to develop a detailed operations procedure once the pump stations have been commissioned and operation details are finalised. The following points should be included in the plan for the emergency operation of the pump stations:

- Pump stations are to be inspected, tested and maintained as soon as possible after activation of this Emergency Response Plan.
- Details for on-site fuel storage.
- Details for off-site fuel supply.
- Details for refuelling pump stations prior to their operation.
- Details for transport of fuel to pump stations, including vehicle type, route, driver experience, authorised access to levee, movement on the levee (can't turn around), what to do if internal roads become inundated.
- Details for refuelling pump stations while operating during an event, considering the need to stop pumps to re-fuel and the operation of secondary pumps when the primary pump is non-operational.
- Details of pump start and stop levels.
- Monitoring details for automatic operation of each pump station and procedures for manual operation, should automatic operation become inoperable at any time. Pumps shall be able to be operated manually in the event the automatic system fails. A qualified person shall be at the staging area ready to investigate any problems at the pump stations if called to do so.
- Pump monitoring and maintenance procedures including frequency of inspections and activities to be carried out at each inspection.
- Details for switching between electric-power and generator-power.
- Details for installing and operating temporary pumps in case primary and secondary pumps fail.
- Details for recovery phase including inspection, cleaning, and repair.

4.7 Traffic Management Plans

The following traffic management plans (TMPs) will be initiated and coordinated by the Demountable Barrier and Traffic Coordinator, in cooperation with the QPS and LDMG, for the duration of the event:

- TMP for installation of demountable flood barriers at each road crossing – road reserve adjacent to Jellicoe Street, Old Bruce Highway and along Quay Street.
- TMP for installation and monitoring of demountable flood barriers along Quay Street and Victoria Parade.
- TMP for restricted access (local traffic only), to streets adjacent to the levee to allow access for emergency vehicles. This could include Jellicoe Street, Dunlop Street, Fiddes Street, Wood Street, Quay Street, and Victoria Parade.
- Public Access Restriction Plan to prevent public from accessing the levee during a flood event.

4.8 North Coast Rail Line Closure

Queensland Rail has the responsibility of operating the permanent swing gates across the North Coast Rail Line near Jellicoe Street. The Levee Incident Manager shall liaise with Queensland Rail to ensure the demountable flood barrier is correctly installed in coordination with the overall emergency response.

A preliminary procedure is proposed as follows:

- When BoM issues a flood warning, the Levee Incident Manager will authorise the Communications Coordinator to contact Queensland Rail to advise that the swing gate will need to be closed. The Communications Coordinator is to provide QR with an initial approximate timing for the installation.
- The Communications Coordinator will update Queensland Rail Agency Liaison Officer (ALO) daily with the recommended closure time for the rail gate.
- Queensland Rail shall close the swing gates, with the Levee Structure Manager and Levee Incident Manager in attendance. Queensland Rail are to complete the closure by the required timeframe and inform the Communications Coordinator when complete.
- The Levee Structure Manager and Levee Incident Manager shall inspect the North Coast Rail Line flood gate.
- Queensland Rail shall arrange monitoring of the gate during the event. This is to be supplemented by RRC monitoring from outside the corridor (from the adjacent embankment).
- If an issue with the rail gate is observed during levee monitoring, Queensland Rail will be notified.
- The Communications Coordinator will update Queensland Rail ALO every six hours with the expected opening time of the rail gate.
- Queensland Rail will open the swing gates as per the specifications and inform the Communications Coordinator when complete. The Levee Structure Manager and Levee Incident Manager shall inspect the gate opening.

4.9 Staging Area

A staging area should be established during the ‘Lean Forward’ phase (refer Section 0), at the Lucius Street staging area. The Levee Structure Coordinator will set up the staging area and coordinate the stockpiling of materials and equipment. The Inspections Coordinator will be based at this site during continuous monitoring.

RRC shall nominate other suitable areas, as required. An appropriate site would have the following features:

- Clear open area suitable for stockpile of materials.
- Sufficient space for movement of vehicles transporting materials, including heavy vehicles.
- Command centre with communications back to central command area.
- Rest area for off-duty personnel involved in levee monitoring, including a first aid station.
- Safely accessible during internal rainfall events.
- Still safely accessible should the spillway be overtopped.

The following actions will be coordinated from the staging area:

- Safe Levee Access inductions, sign-in and sign-out.
- Persons undertaking levee monitoring.
- Inspections Coordinator will be located here during full response.
- Stockpile sandbags, temporary barriers (Tiger Dams or the like), and other emergency stockpiles.

4.10 Recovery Operations

This section of the ERP considers the post-event actions required to return the levee to normal day-to-day operations following an emergency.

Recovery operations may be triggered by any of the following:

- Floodwaters drop to 0.5m below the base of the highest demountable flood barrier.
- Floodwaters drop to 0.5m below a peak level and no other peaks are expected.
- Another trigger at the Levee Incident Manager's discretion.

Level 3 monitoring shall continue until floodwaters drop to 0.5m below the base of the lowest demountable flood barrier (equivalent to approximately 6.65m RGD). However the inspections may be scaled back in 'dry' areas of the levee at the discretion and agreement of the Levee Incident Manager, Inspections Coordinator and Levee Structure Coordinator. The levee is considered 'dry' when water has receded to the waterside of the maintenance track.

The Levee Incident Manager will approve and release the Demountable Flood Barrier Removal Plan (refer **Appendix F**). The Communications Coordinator will pass this information on to the Demountable Barrier and Traffic Coordinator and relevant road and rail authorities. The Demountable Barrier and Traffic Coordinator will implement the approved removal plan. The barriers shall be inspected, removed, cleaned and stored as per the suppliers' specifications. Road closures shall be removed when safe to do so or, if damage to the road has occurred, referred to the relevant authority until roads are sufficiently repaired to allow public access.

The Demountable Barrier and Traffic Coordinator shall ensure all emergency repairs and emergency flood defences implemented during the event are recorded. Temporary measures deployed in response to problems during the emergency shall not be retained as permanent solutions. After the event, temporary measures shall be removed and, where necessary, permanent mitigation measures implemented.

Inspection of the pump stations shall be undertaken and any required maintenance and repairs to return this equipment to pre-flood condition, or flood readiness, shall be implemented. Excess fuel supplies shall be removed from the pump stations.

Deactivation of the staging area should commence once monitoring is scaled back from continuous (Level 3). Take note of the remaining materials and equipment then return them to storage. Once floodwaters have sufficiently receded, clean-up and repair waterside maintenance track shall commence, including the clean-up and repair of back flow prevention valves on levee outlet pipes and repairs to levee access track and ramps if required.

The Levee Structure Coordinator will organise a full inspection of the levee by a qualified engineer as soon as possible after floodwaters have receded. The recommendations that result from this inspection are to be included in the post-event report.

All Coordinators shall prepare post-event reports outlining the response to events, the adequacy of the response and the adequacy of the ERP. A debrief is to be held by all members of the LECT, in coordination with a wider LDMG debrief. RRC General Manager – Regional Services is to coordinate updates to the ERP in response to the debrief session and feedback on ERP adequacy.

4.10.1 Removal of Internal Flood Water after a Breach or Overtopping Event

It is noted that the volume of flood waters which can be held within the interior portion of the levee, to a spillway crest level of 8.05 mAHD, is approximately 10,150 ML. Removal of flood waters will be achieved through a combination of:

- Pump stations,
- Through-levee drainage structures (once tailwater recedes and 'forward' flow is re-induced).

Assuming the majority of flood waters are removed via the pump stations, which can pump a combined peak of approximately 1,500 ML/day, the expected timeframe for removal of flood waters is approximately 7 days. The use of additional pumps or other strategies to safely remove interior flood water is to be approved by Levee Incident Manager.

5.0 Emergency Events and Actions

5.1 Overview of Emergency Response Levels

The events listed in Table 4 are defined as emergency events for the SRFL and trigger the corresponding Emergency Response Level (ERL).

Table 4 Flood Trigger Events

Flood Description	ERL	Approximate Rockhampton Gauge Level * (mRGD)	Details
Fitzroy River Flood Warning Issued by BoM (Alert)	1	-	Section 5.2
Flood Waters Arrive in Rockhampton (Lean Forward)	2	3.2	Section 0
Flood Waters within 2m of Maintenance Track (Stand Up)	3	5.9	Section 5.4
Flood Approaching Spillway Crest and Rising	4	9.6	Section 5.5
Flood Approaching Levee Crest and Rising	5	10.2	Section 5.6
Levee Structural Problems Levee Crest Reduction Excessive Seepage Sand Boil Failure of Backflow Prevention Device	 6c 6d 6e 6f	-	 Section 5.7.2 Section 5.7.3 Section 5.7.4 Section 5.7.5
Levee Breach Embankment Breach Demountable Flood Barrier Failure	 7a 7b	-	 Section 5.8.1 Section 5.8.2
Local Rainfall Event with and without Fitzroy River Flooding	8	-	Section 5.9
Stand Down	0	-	Section 5.10

* Corresponding Rockhampton Gauge Level is based on the 0.01% AEP developed case event and incorporates a 0.3m buffer, to account for flood model uncertainty.

5.2 Fitzroy River Flood Warning Issued by BoM (Alert)

When BoM issue either a minor, moderate or major flood warning for the Fitzroy River, the following actions shall be taken. This is the preparatory response to an expected Fitzroy River flood.

Specific activities for the Levee Emergency Coordination Team are outlined below.

Levee Incident Manager	Levee Incident Assistant
- Activate this Emergency Response Plan. - Ensure emergency response roles are suitably assigned. - Confirm preliminary estimate of flood level at Rockhampton. - Determine what level of response is required. - Notify Local Disaster Management Group that the Emergency Response Plan is activated and keep them updated as the situation develops.	- Undertake notifications as per Notification List. - Notify all Coordinators what level of response will be required, as decided by the Levee Incident Manager. - Receive updates from Coordinators and pass updates on to Levee Incident Manager. - Update Coordinators with the response activities that other Coordinators are undertaking. - Determine the expected inundation extents if the levee was to fail and identify affected parties.

Communications Coordinator	Event Monitor
- Assist Levee Incident Assistant with notifications as per Notification List - Establish initial communications with external parties: Emergency Services, SES, TMR, RACQ, QR, Aurizon. Update these parties as per the preliminary response communications plan. - Assist RRC and LDMG with initial media communications. - As part of an overall LDMP Evacuation Plan, assist in contacting parties outside the levee that are expected to be inundated. Advise them to prepare to evacuate. - Update Levee Incident Assistant daily.	- Monitor water levels at Riverslea, The Gap and Rockhampton at least every three hours, or more frequently as required by the event. - Monitor flood warnings and storm warnings for Rockhampton, including potential local events at least every three hours, or more frequently as required by the event. - Update Levee Incident Manager (or Levee Incident Assistant): • Every three hours, and • Immediately when an elevated trigger is reached, and • Immediately when local rain events are forecast for Rockhampton. - Monitor tidal levels.

Demountable Barrier and Traffic Coordinator	Levee Structure Coordinator
- Receive and review lists of temporary barrier equipment, Traffic Management Plans, installation procedures, personnel, etc. - Initial contact with suppliers to ensure availability of standby supplies. - Pre-inspection of temporary barriers including verification of access to equipment. - Update Levee Incident Assistant daily.	- Organise full pre-inspection of levee (Level 1 inspection) and respond to any issues. - Initial contact with RPEQ engineer/s to ensure they are available and on standby for when waters arrive. - Receive and review lists of stockpiles, suppliers, personnel, etc. - Initial contact with suppliers to ensure availability of standby supplies. - Ensure hazardous materials are removed from the vicinity of the levee including removal of boats from the Fitzroy River. - Update Levee Incident Assistant daily. - If damage is observed inform the Levee Incident Assistant.

Inspections Coordinator	Pump Stations Coordinator
- Receive and review lists of inspection equipment, safety equipment, personnel, etc. - Collect monitoring equipment in preparation for distribution to monitoring teams. - Notify monitoring groups that they may be required and to be on standby. - Prepare rosters for monitoring throughout the event. - Initiate Levee Safe Access Procedure and inform other Coordinators. - Coordinate Level 2 monitoring (once daily). - Update Levee Incident Assistant daily.	- Organise full pre-inspection of pump stations and respond to any issues. - Initial contact with operators and contractors to ensure they are available and on standby for when waters arrive. - Receive and review lists of stockpiles, suppliers, personnel, emergency pumps, etc. - Ensure fuel supplies and fuel transport is available. - Initial contact with suppliers to ensure availability of standby supplies. - Update Levee Incident Assistant daily.

5.3 Flood Waters Arrive in Rockhampton (Lean Forward)

This represents the commencement of active response. The following activities shall be completed prior to the arrival of floodwaters:

- Persons outside the levee have been notified to evacuate prior to demountable flood barrier installation and road closures.
- Demountable flood barriers have been installed.
- Staging area has been established.
- Personnel are ready to start continuous monitoring.

Specific activities for the Levee Emergency Coordination Team are outlined below.

Levee Incident Manager	Levee Incident Assistant
- Upgrade the response level when triggered. - Continue updating the Local Disaster Management Group as the situation develops. - Modify and approve the Demountable Flood Barrier Deployment Plan (refer **Appendix E**). - Coordinate establishment of Emergency Services staging area, and inform Inspections Coordinator.	- Notify all Coordinators that the response level has been upgraded. - Notify all Coordinators of the approved Demountable Flood Barrier Deployment Plan, starting with Demountable Barrier and Traffic Coordinator and Communications Coordinator. - Receive updates from Coordinators and pass updates on to Levee Incident Manager. - Update Coordinators with the response activities that other Coordinators are undertaking.

Communications Coordinator	Event Monitor
- Inform external parties of Demountable Flood Barrier Deployment Plan timing and other relevant details: TMR, RACQ, QR, Aurizon. - Continue updating media and ensure media broadcasts are made every six hours. Include information on road closures. - Inform parties outside the levee that their evacuation routes are to be blocked, and when the demountable barriers will close their evacuation routes. - Keep a record of when persons outside the levee have safely evacuated. Initiate emergency response if people have not checked-in by the time demountable barriers are going in. - Update Levee Incident Assistant daily.	- Monitor water levels at Riverslea, The Gap and Rockhampton at least every three hours, or more frequently as required by the event. - Monitor flood warnings and storm warnings for Rockhampton, including potential local events at least every three hours, or more frequently as required by the event. - Update Levee Incident Manager (or Levee Incident Assistant): • Every three hours, and • Immediately when local rain events are broadcast for Rockhampton.

Demountable Barrier and Traffic Coordinator	Levee Structure Coordinator
- Ensure access ramp gates are unlocked. - Implement Public Access Restriction Plan. - Implement approved Demountable Flood Barrier Deployment Plan. - Implement Traffic Management Plans. - Update Levee Incident Assistant daily.	- Establish Staging Area and stockpile materials in preparation. - Update Levee Incident Assistant daily. - If damage is observed inform the Levee Incident Assistant and respond with the relevant ERLs.

Inspections Coordinator	Pump Stations Coordinator
- Coordinate monitoring groups and distribute monitoring rosters. - Ensure Levee Safe Access Procedure is being followed. - Coordinate Level 2 monitoring (every eight hours). - Ensure monitoring personnel are wearing appropriate PPE including a PFD at all times. - Update Levee Incident Assistant daily.	- Ensure operators are available 24 hours a day, 7 days a week until the pump stations are no longer required during the event. - Coordinate closure of BPDs on through-levee drainage structures - Coordinate delivery of additional fuel to pump stations. - Coordinate pump station monitoring. - Coordinate response to any issues. - Update Levee Incident Assistant daily.

5.4 Flood Waters within 2m of Maintenance Track (Stand Up)

This ERL is triggered in response to flood waters approaching the SRFL. Specific activities for the Levee Emergency Coordination Team are outlined below.

Levee Incident Manager	Levee Incident Assistant
- Upgrade the response level when triggered. - Continue updating the Local Disaster Management Group as the situation develops.	- Notify all Coordinators that the response level has been upgraded. - Receive updates from Coordinators and pass updates on to Levee Incident Manager. - Update Coordinators with the response activities that other Coordinators are undertaking.

Communications Coordinator	Event Monitor
- Continue updating external parties regarding temporary barrier closures other relevant details: TMR, RACQ, QR, Aurizon. - Continue updating media and ensure media broadcasts are made every six hours. Include information on temporary barrier and road closures. - Update Levee Incident Assistant every six hours.	- Monitor water levels at Riverslea, The Gap and Rockhampton at least every hour, or more frequently as required by the event. - Monitor flood warnings and storm warnings for Rockhampton, including potential local events at least every hour, or more frequently as required by the event. - Update Levee Incident Manager (or Levee Incident Assistant): • Every three hours, and • Immediately when local rain events are broadcast for Rockhampton.

Demountable Barrier and Traffic Coordinator	Levee Structure Coordinator
- Coordinate the continuation of the Public Access Restriction Plan. - Coordinate the continuation of the Demountable Flood Barrier Deployment Plan. - Coordinate the continuation of the Traffic Management Plans. - Update Levee Incident Assistant every six hours.	- Respond to structural issues as reported by the monitoring teams. - Update Levee Incident Assistant every six hours. - If damage is observed inform the Levee Incident Assistant and respond with the relevant ERLs.

Inspections Coordinator	Pump Stations Coordinator
- Organise final vehicle inspection along waterside maintenance track. - Commence continuous monitoring (Level 3). - Ensure monitoring personnel are wearing appropriate PPE including a PFD at all times. - Regularly update the Emergency Services Staging Area with what is happening on the levee. - Update Levee Incident Assistant every six hours.	- Coordinate pump station monitoring. - Coordinate response to any issues. - Coordinate delivery of additional fuel to pump stations as required. - Update Levee Incident Assistant every six hours.

5.5 Flood Approaching Spillway Crest and Rising

The primary goal is the safety of people, especially those in close proximity to the spillway and emergency teams on or near the levee. The LDMG are expected to coordinate the following activities:

- Notification of affected residents and commercial properties.
- Evacuations, where they are required.

Specific activities for the Levee Emergency Coordination Team are outlined below.

Levee Incident Manager	Levee Incident Assistant
- Upgrade the response level when triggered. - Recommend the LDMG take action to protect properties or evacuate depending on the expected flood peak. - Continue updating the Local Disaster Management Group as the situation develops.	- Notify all Coordinators that the response level has been upgraded. - Receive updates from Coordinators and pass updates on to Levee Incident Manager. - Update Coordinators with the response activities that other Coordinators are undertaking.

Communications Coordinator	Event Monitor
- Continue updating external parties regarding temporary barrier closures other relevant details: TMR, RACQ, QR, Aurizon. - Continue updating media and ensure media broadcasts are made every hour. Include information on evacuations. Include information on temporary barrier and road closures. - Update Levee Incident Assistant every six hours.	- Monitor water levels at Riverslea, The Gap and Rockhampton at least every 30 minutes, or more frequently as required by the event. - Monitor flood warnings and storm warnings for Rockhampton, including potential local events at least every 30 minutes, or more frequently as required by the event. - Update Levee Incident Manager (or Levee Incident Assistant): • Every hour, and • Immediately when local rain events are broadcast for Rockhampton.

Demountable Barrier and Traffic Coordinator	Levee Structure Coordinator
- Move personnel away from spillway. - Assist QPS with the implementation of internal levee road closures, to the extent of expected inundation. - Coordinate the continuation of the Public Access Restriction Plan. - Update Levee Incident Assistant every six hours.	- Move personnel away from spillway. - Respond to structural issues as reported by the monitoring teams as long as it is safe to do so. - Update Levee Incident Assistant every three hours. - If damage is observed inform the Levee Incident Assistant and respond with the relevant ERLs.

Inspections Coordinator	Pump Stations Coordinator
- Notify monitoring teams that they must not access the spillway. - Continue Level 3 (continuous) monitoring. - Ensure monitoring personnel are wearing appropriate PPE including a PFD at all times. - Regularly update the Emergency Services Staging Area with what is happening on the levee. - Update Levee Incident Assistant every three hours. - Initiate transition of staging area to a safe location if the current staging area is expected to be inundated by the size of the event.	- Move personnel away from the spillway. - Coordinate pump station monitoring. - Coordinate response to any issues. - Update Levee Incident Assistant every three hours.

5.6 Flood Approaching Levee Crest and Rising

The primary goal is the safety of people, especially those in close proximity to the SRFL and inspection teams on or near the levee. If the flood is expected to be of sufficient magnitude to overtop the levee crest, or rise to within 0.5m of overtopping the levee crest, then the emergency response should be established during the preliminary stages following notification from BoM.

The LDMG are expected to coordinate the following activities:

- Notification of affected residents and commercial properties.
- Additional evacuations, where required.

Specific activities for the Levee Emergency Coordination Team are outlined below.

Levee Incident Manager	Levee Incident Assistant
- Upgrade the response level when triggered. - Recommend the LDMG take action to protect properties or evacuate depending on the expected flood peak. - Continue updating the Local Disaster Management Group as the situation develops.	- Notify all Coordinators that the response level has been upgraded. - Receive updates from Coordinators and pass updates on to Levee Incident Manager. - Update Coordinators with the response activities that other Coordinators are undertaking.

Communications Coordinator	Event Monitor
- Continue updating external parties regarding temporary barrier closures other relevant details: TMR, RACQ, QR, Aurizon. - Continue updating media and ensure media broadcasts are made every hour. Include information on evacuations. Include information on temporary barrier and road closures. - Update Levee Incident Assistant every six hours.	- Monitor water levels at Riverslea, The Gap and Rockhampton at least every 30 minutes, or more frequently as required by the event. - Monitor flood warnings and storm warnings for Rockhampton, including potential local events at least every 30 minutes, or more frequently as required by the event. - Update Levee Incident Manager (or Levee Incident Assistant): • Every hour, and • Immediately when local rain events are broadcast for Rockhampton.

Demountable Barrier and Traffic Coordinator	Levee Structure Coordinator
- Move personnel away from levee. - Assist QPS with the continued implementation of internal levee road closures, to the extent of expected inundation. - Coordinate the continuation of the Public Access Restriction Plan. - Update Levee Incident Assistant every six hours.	- Move personnel away from levee. - Respond to structural issues as reported by the monitoring teams as long as it is safe to do so. - Update Levee Incident Assistant every three hours. - If damage is observed inform the Levee Incident Assistant and respond with the relevant ERLs.

Inspections Coordinator	Pump Stations Coordinator
- Notify monitoring teams that they must not access the levee. - Continue continuous monitoring from a safe distance and where safe to do so. - Regularly update the Emergency Services Staging Area with what is happening on the levee. - Update Levee Incident Assistant every three hours. - Initiate transition of staging area to a safe location if the current staging area is expected to be inundated by the size of the event.	- Move personnel away from the spillway. - Coordinate pump station monitoring. - Coordinate response to any issues. - Update Levee Incident Assistant every three hours.

5.7 Levee Structural Problems

5.7.1 Comments on Emergency Repairs

The information provided in this section is advice, subject to the conditions that arise and the judgement of qualified persons. Repairs should be as recommended by a qualified, experienced, well-informed RPEQ engineer. The decision to implement any of the measures outlined in this section should be approved by the Levee Incident Manager and a qualified, experienced, well-informed RPEQ engineer. At all times, care shall be taken in relation to:

- Overloading the levee with the additional weight of bulk fill materials.
- Slope failure due to the vibration associated with heavy machinery on the levee when floodwaters are near the levee crest.
- Heavy machinery must not be permitted on the levee once seepage has been observed.

The safety of people working on and around the levee shall be paramount.

Emergency measures shall be temporary, therefore able to be removed after flood waters recede.

5.7.2 Levee Crest Reduction

During the pre-flood Level 1 inspection, pay attention to the crest of the levee. Repair any holes, washouts, depressions or settlement on the levee crown and embankments with compacted fill. If this cannot be achieved, use sandbags. Source materials from borrow areas distant from the levee not adjacent to it, as this can contribute to instability.

5.7.3 Excessive Seepage

Seepage is expected through the levee to some degree. If however seepage is excessive or is suspected to be causing damage or erosion, the following measures are recommended:

- Restrict or prohibit heavy vehicle movements on the levee as soon as seepage starts. The consequences could be slope failure.

- Do not control seepage by pumping water out as this can contribute to internal erosion and increased instances of sand boils.

Table 5 lists some options that could be used to combat excessive seepage.

Table 5 Options to Mitigate Excessive Seepage

Option	Benefits	Issues
Line the waterside with impermeable sheeting (plastic or geotextile)	Reduces infiltration Can be implemented over a long area or a small trouble spot	Must be implemented before water arrives Acquisition of materials Disposal of material post-flood
Construct a seepage berm on the landside of the levee using impervious material	Can be implemented during high water	Acquisition of materials Disposal of material post-flood Space requirements Ability to lay filter layers or geotextile while constructing
Construct a seepage berm on the landside of the levee using semipervious material	Can be implemented during high water	Acquisition of materials Disposal of material post-flood Space requirements Ability to lay filter layers or geotextile while constructing Some acceptable seepage will emerge on the surface
Construct a seepage berm on the landside of the levee using sand	Can be implemented during high water Requires less material than impervious or semipervious berms	Acquisition of materials (as pervious as possible) Disposal of material post-flood Space requirements Ability to lay filter layers or geotextile while constructing

5.7.4 Sand Boil

A sand boil occurs when uplift due to saturation of lower soil layers exceeds the effective stress (downward pressure) from upper soil layers resulting in heaving and rupturing of the top layers.

To prevent the formation of sand boils, a seepage berm as described in Table 5 can be constructed.

Once a sand boil is present, do not attempt to plug it by placing material on top. This will cause the rupture to occur at some other location. The best mitigation is to place a ring of sandbags (or other temporary wall-type structure) around the area, approximately 1m away from the edges of the observed ground disturbance.

Activities:

- Monitoring teams are to notify the Levee Structure Coordinator that a sand boil has been identified.
- Monitoring teams are to mark the location clearly.
- Boils within 60m of levee toe are more critical; however all sand boils should be monitored closely.
- Monitor the sand boil for the following signs:
  - Enlargement,
  - Increased discharge of material,
  - Discharge of clear water is not a significant problem; however this water should be drained to prevent ponding near the levee.
- If action is warranted, create a sandbag ring around the boil.

5.7.5 Failure of Backflow Prevention Device

If a BPD fails to close, immediate action shall be taken. Emergency closures should be temporary, therefore able to be removed after the waters recede.

If water levels are still low or the water has not yet reached the structure, consider blocking the outlet using timber, metal plates, tarps, sandbags or other means.

If the outlet structure cannot be plugged, take immediate action at the inlet structure by building a sandbag or earth ring.

5.7.6 Failure of Pump Stations

In the event of problems at the pump stations, respond to issues as per the operations manual provided by the supplier. Ensure only competent and qualified technicians perform the required repair works especially to mechanical and electrical systems.

5.8 Levee Breach

5.8.1 Embankment Breach

Structural response to a levee breach should only be undertaken if safe to do so. The response is unlikely to completely fix the issue and is aimed at reducing further collapse of adjacent sections rather than preventing inundation of the protected areas.

Options that can be considered to react to a breach are presented in Table 6.

Table 6 Levee Breach Mitigation Options

Option	Benefits	Issues
Abandon the levee and evacuate	Protection of people	No protection of properties Cascading effect of the breach
Construct a landside berm	Stabilise the embankment to prevent failure	Acquisition of materials Disposal of materials post-flood Movement of plant in wet conditions
Raise the levee crest	Prevent overtopping	Acquisition of materials Disposal of materials post-flood Movement of plant in wet conditions, and plant on top of the levee
Fill the breach (similar to raise the levee crest but at this stage the breach has fully formed)	Prevent damage to adjacent levee sections	Acquisition of materials Disposal of materials post-flood Movement of plant in wet conditions, and plant on top of the levee Selection of repair alignment (on the same alignment or waterside or landside of levee)

The most appropriate material to use to fill a developing or existing breach is large rocks. However, this type of material can be difficult to remove from the breach area to fully repair the levee.

Refer to SRFL Failure Analysis Report (AECOM, 2014) for details of potential inundation areas. Mapping has been appended to this report indicating flood areas in the event of levee failure for quick reference by the LECT (refer **Appendix G**).

Activities:

- Monitoring teams should look for the following symptoms of an impending breach:
  - Movement of levee embankment.
  - Slope failure.
  - Waterside erosion.
  - Washout of levee crest.
- If any of these signs are observed, monitoring teams should immediately contact the Levee Structure Coordinator (or the Inspections Coordinator who will pass on the information).
- The Levee Structure Coordinator will send the RPEQ Levee Engineer to inspect the area and then coordinate the response to fulfil the Levee Engineer's recommendations.
- The Levee Structure Coordinator will inform the Levee Incident Assistant who may instruct the Communications Coordinator to commence evacuations of areas that could be affected.

5.8.2 Demountable Flood Barrier Failure

Monitoring of the demountable flood barriers shall be undertaken in accordance with the supplier's specifications and recommendations, which should include comments on signs of potential failure.

Should indications of impending failure become apparent, employ mitigation measures as recommended in the supplier's specifications and / or as recommended by the Levee RPEQ Engineer.

If mitigation measures cannot be employed, initiate evacuation of the areas that could be affected.

Refer to SRFL Failure Analysis Report (AECOM, 2014) for details of potential inundation areas. Mapping has been appended to this report indicating flood areas in the event of levee failure for quick reference by the LECT (refer **Appendix G**).

5.9 Local Rainfall Event with and without Fitzroy River Flooding

Details of local rainfall events, including concurrent events with Fitzroy River flooding, can be referenced in the SRFL Internal Drainage Report (AECOM, 2019). The Internal Drainage Report includes inundation mapping, which should be included in this ERP.

The activities for levee operation take precedence. The following indicate additional activities:

Levee Incident Manager	Levee Incident Assistant
- Determine if a response to the local rainfall event is warranted. - Notify Local Disaster Management Group that a local rainfall event is predicted. - Recommend / initiate evacuations if warranted.	- Notify Pump Stations Coordinator of predicted local storm. - Notify Communications Coordinator if additional evacuations are warranted.

Communications Coordinator	Event Monitor
- Notify media of situation and arrange updated broadcasts. - Update Levee Incident Assistant regularly.	- Fitzroy River flood monitoring frequency takes precedence. - Monitor BoM weather warnings for Rockhampton at least every hour, or more frequently as required. - Update Levee Incident Manager (or Levee Incident Assistant) every two hours.

Pump Stations Coordinator
- Ensure operators are on standby 24/7 until the pump stations are not required or the emergency passes. - Station at least one qualified technician at the staging area to respond to any problems. - Coordinate ongoing delivery of fuel if required. Be aware of vehicle restrictions on the levee. - Update Levee Incident Assistant regularly. <u>Flood Approaching Spillway</u> - Operate pumps if necessary to remove seepage. - Once spillway is overtopped, pumps must cease operation. <u>Flood Approaching Levee Crest</u> - Turn off all pump stations. - Secure hazardous components (electrical, fuel, etc.). - Evacuate personnel from levee area.

5.10 Stand Down

Once the Levee Event Coordinator decides the emergency event has passed (i.e. flood waters have receded, levee breach has been repaired etc), a Stand Down order shall be issued to all emergency personnel. The following task shall be undertaken once the Stand Down order has been issued:

- All personnel are to demobilise from the levee area.
- The Staging Area is to be disassembled.
- All stockpiles are to be removed.
- Remaining emergency equipment is to be inspected, cleaned (if necessary), transported back to the storage area and stored in the designated area.
- All other tasks noted in Section 6.0.

6.0 Emergency Event Reporting

6.1 Action Logs

An Action Log shall be maintained by all personnel allocated responsibilities in this Emergency Response Plan. The log shall be a chronological recording of activities and decisions made throughout the event and must be commenced at the activation of this Emergency Response Plan.

The log should include what decisions were made, what directions were given and by whom, what equipment was used, what actions were assigned to others, what went wrong and how it is dealt with. At the conclusion of the event, each coordinator is required to submit their action log to the Levee Incident Manager as part of their post-event report.

The Action Log and photographs will differ between coordinators. Table 7 outlines initial requirements.

Table 7 Action Log Requirements

Event Monitor	All Coordinators
A description of the incident / event Time and date of the incident / event Time and date of all actions Regular recordings of water level Regular recordings of rainfall Regular recordings of BoM warnings Instrumentation recordings Details of communications that take place during the emergency Any further comments considered necessary Comments regarding the adequacy of the Emergency Operations and recommendations for improvement	A description of the incident / event Time and date of the incident / event Time and date of all actions, including: • Decisions that are made, and by whom • Orders that are received, and from whom • Inventory of equipment that is used • Actions that the Coordinator assigns to others • Problems that arise and how they are dealt with • Details of communications that take place during the emergency Any further comments considered necessary Comments regarding the adequacy of the Emergency Operations and recommendations for improvement

6.2 Supplies Inventory

The International Levee Handbook recommends recording an inventory of equipment, materials and supplies as they are used, including personnel. An inventory which has been updated during an event can then be used to inform future responses to floods and assess the adequacy of existing supplies in the post-event report.

A list of spare equipment, materials and personnel required to assist with flood defence has been included in **Appendix D**.

6.3 Post Event Report

An Emergency Event Report should be produced if flood waters approach within 2m of the levee, noted as ‘Stand Up’ phase. No report is required if the emergency does not progress beyond the ‘Lean Forward’ phase.

Generally an Emergency Event Report should contain:

- A description of the event.
- Action logs.
- Instrumentation readings (where appropriate).
- Description of any observed damage and the response that was taken.
- Photographs / Videos.
- Details of communication which took place during the emergency.
- Lists of equipment that was used.
- Comment on the adequacy of the Emergency Response Plan.
- Any recommendations or suggested changes to the Emergency Response Plan.

RRC is responsible for implementing the recommendations contained in the Emergency Event Report. Comprehensive inspections and ultimately audits undertaken by the Regulator, will evaluate the levee owners response to Emergency Event Reports.

It is recommended that the Emergency Event Report be prepared in liaison with all parties that were involved in the emergency to ensure all issues and/or successes from the event are captured in the report. This will include the LDMG, the SES and local emergency services personnel.

7.0 Communications Plan

7.1 Internal Communications

The LDMP Communication Sub Plan outlines how communications are performed during an emergency.

The Levee Incident Manger will communicate with the Local Disaster Management Group and liaise with the agencies supporting the emergency response.

The Coordinators will check in with the Levee Incident Assistant by mobile phone or email as regularly as outlined in the ERLs or immediately once a problem has been identified. The Levee Incident Assistant will pass on information to the Levee Incident Manager.

Coordinators will communicate with their teams using mobile phones and radios, whichever is easier and can adequately initiate action.

7.2 External Communications

7.2.1 Public Education

The community should be well informed of the protection provided by the levee and the residual risks of inundation as a result of levee failure or overtopping. They should know that protecting their properties and evacuation may still be required with the levee in place.

Persons outside the levee should be familiar with the levee operation prior to flood events. This would include awareness of the Demountable Flood Barrier Deployment Plan and safe evacuation routes.

Public education may include community meetings, public noticeboards or the distribution of published materials. Direct contact with the community should occur at least annually, prior to the onset of the flood season. The type of information that could be conveyed includes, but is not limited to:

- Level of protection provided by the levee, and residual risks to the community.
- Loss of material from the levee surface is not always a cause for alarm. Mulch on the surface is intended as a sacrificial layer and could potentially be removed during a flood event.
- Overview information regarding levee emergency management such as roads that would normally be closed and access to the levee would be limited to authorised personnel only.

7.2.2 Public Broadcasts During Events

The safety of people is the primary concern. The purpose of public notifications is to ensure the community is aware of the situation and prepared to act if necessary.

Media broadcast information shall be consistent with that of the LDMG, SES and emergency services and should include:

- Expected flood magnitude and the relative levee protection provided;
- Road closures and when they will come into effect;
- Status of evacuations, including areas that need to prepare and areas that need to evacuate; and
- Where to find more information.

Direct contact with affected persons to coordinate evacuations may be required and should be undertaken by persons with effective communications training or experience. This is to be coordinated with the LDMG in accordance with the LDMP.

7.2.3 Evacuation Plan

The LDMP Evacuation Sub-Plan shall be updated to integrate evacuations associated with the SRFL. Details of the SRFL evacuations associated with spillway overtopping, levee crest overtopping and levee failure are to be included in **Appendix H** during the construction phase of the project.

Affected areas are shown in the inundation mapping included in **Appendix G**.

8.0 Emergency Response Plan Testing and Review

8.1 Testing

This ERP shall be periodically tested through the completion of simulated emergency event drills. These drills could be either field or desktop tests and should be used to refresh and train staff that are likely to be involved if an event occurs. Operational staff should participate in drills on a bi-annual basis.

Where larger scale drills require the coordination between the RRC, the Local Disaster Management Group, the SES, External Agencies and authorities, these exercises should be undertaken every five years.

Basic training and exercise activities include:

- Physical operation of project features (e.g. BPDs, pump stations, demountable flood barriers).
- Notification of emergency response personnel.
- Test of communications/backup communications systems.
- Mobilisation of monitoring teams and monitoring project features.
- Basic flood fight techniques.
- Coordination and control (between volunteers, patrols, operators, nearby levee districts, highway department, State emergency operations centre, etc.).
- Levee inspections, to establish timeframes and personnel requirements.

8.2 Review

It is recommended that this ERP be reviewed as follows:

- Annually to ensure contact details, personnel and appendices are up to date and current.
- Immediately following any emergency event, to assess adequacy.
- A detailed review every five years.

Once the ERP has been revised, the updated version (or the affected pages) shall be distributed to all involved parties, as per the distribution list. The distribution of copies and the notification flowchart (if issued separately) must be controlled and documented to ensure simultaneous updating of all copies.

Updates should be made promptly. In addition, it is recommended that the entire ERP is reprinted and distributed to all parties at least every five years.

9.0 ERP Finalisation and Issue

This ERP will require further refinement and finalisation as the SRFL progresses to construction and commissioning. To assist with this finalisation, Table 8 provides a list of the sections that require further information prior to issue of the first version.

Table 8 ERP Finalisation Actions

Section	Task	Agency
-	RRC to liaise with LDMG, FRW and QR to finalise roles and responsibilities during an emergency event. The outcomes of which shall be reflected in this Emergency Response Plan.	RRC / FRW / QR / LDMG
1.8	**Issue updated controlled copies** of the ERP to all personnel on the Controlled Copy List.	RRC
1.9	**Inform the LDMG** of this document for inclusion in the LDMP.	RRC
1.9	**Review the LDMP** in light of the procedures recommended in this ERP, including but not limited to the Evacuations Sub-Plan, Fitzroy River Flood Sub-Plan and Communications Sub-Plan.	LDMG
-	Develop **inundation mapping** with reference to the comments provided in **Appendix G**.	RRC / FRW / LDMG
-	Develop a **notification procedure** to warn property owners and residents outside the levee prior to demountable barrier installation.	RRC / LDMG
2.1	Develop a **procedural flow chart** to show the actions that must be taken in an emergency.	RRC / FRW
2.2	Update the **notifications list**.	RRC / FRW
2.2.1	Develop a **list of businesses**, individuals and groups that may be able to assist with **flood defences**. Preliminary information is included in Appendix B.	RRC / FRW
3.0	Develop a **list of persons** suitable to take on **each role** listed in this section including current contact details.	RRC / FRW
4.1	Hold a **workshop** to establish how levee emergency activation and response will best fit within the **existing LDMP**.	RRC / FRW / LDMG
4.3	Include in Appendix E the specifications and procedures for inspecting, installing and monitoring **demountable flood barriers**, when they are available.	RRC / FRW
4.4	Include the specifications and procedures for inspecting, securing and monitoring **BPDs**, when they are available.	RRC / FRW
4.5	Develop procedures, checklists and training for **levee monitoring** tasks including the Safe Access Procedure. Some preliminary information is provided in Section 4.5 and Appendix C.	RRC / FRW
4.6	Develop a plan for **pump station operation** during Fitzroy River flood events, local flood events and concurrent events. Section 4.6 provides some guidance on what could be included.	FRW
4.7	Hold a workshop to establish how best to address **road closures** and traffic management for the installation and monitoring of demountable flood barriers. Include the resulting procedures in the ERP.	RRC / FRW / LDMG / QPS / SES
4.7	Develop a plan for **restricting public access** during flood events.	RRC / FRW
4.8	Hold a workshop with QR regarding the **rail flood gate** deployment, including but not limited to advance notification of closure, personnel training for installation and removal, storage of equipment, monitoring during an event and response to problems in the rail corridor. Include the resulting procedures in the ERP.	RRC / FRW / QR / LDMG

Section	Task	Agency
4.9	Determine a suitable **staging area** and secondary staging area based on the criteria provided in Section 4.9.	RRC / LDMG
-	Develop a list of **property owners outside the levee** who will need to be notified of flood wall closures. This should be a controlled list included in an additional appendix.	RRC
-	Develop a list/map showing the properties inside the levee that could be affected by **levee failure, spillway overtopping and levee overtopping**. This should be controlled information included in **Appendix G**.	RRC
6.1	Develop a **template for the Action Log** to assist in event reporting.	RRC / FRW
6.2	Develop a detailed **list of spare equipment**, materials and personnel required to assist with flood defence. This should include equipment types, quantities and potential suppliers. A table of recommended items is provided in **Appendix D**.	RRC / FRW
7.2.1	Develop a **plan for public education** considering the comments provided in Section 7.2.1. Consider preliminary development of publications for distribution.	RRC / FRW / LDMG
7.2.2	Discuss with LDMG how to integrate **public broadcast information** regarding the levee into the existing LDMP.	RRC / FRW / LDMG
7.2.3	Discuss with LDMG the **revision of the Evacuation Sub-Plan** to integrate evacuations associated with the levee into the existing LDMP. Details of the SRFL evacuations associated with spillway overtopping, levee crest overtopping and levee failure are to be included in **Appendix H** during the construction phase of the project.	RRC / FRW / LDMG
-	Consider developing a **security plan** which will outline how to ensure the security of the levee during everyday operations and emergency operations. No security measures have been built into the ERP at this time. Some preliminary notes on security plans are provided in **Appendix I**.	RRC
-	Develop **contingency plans** for situations when floods are predicted and the levee structure is compromised due to repairs (for example to the pump stations, permanent features of the demountable flood barrier systems or pipes through the levee).	RRC
-	Consider developing a **flood response plan for the construction stage** of this project.	RRC
-	Develop **flood defences mapping** with reference to the comments provided in Section 11.11.	RRC / FRW
-	The South Rockhampton Sewage Treatment Plant operational procedure is to be updated to reflect additional infrastructure incorporated in SRFL design and actions required within this ERP.	FRW

10.0 References

CIRIA (2013), *The International Levee Handbook*, CIRIA, London.

Rockhampton Regional Council (2014), *South Rockhampton Flood Levee – Failure Analysis Report,* prepared by AECOM, 2014.

Rockhampton Regional Council (2019), *South Rockhampton Flood Levee – Internal Drainage Assessment Report,* prepared by AECOM, 2019.

Rockhampton Regional Council (2019), *South Rockhampton Flood Levee – Operations and Maintenance Manual,* prepared by AECOM, 2019.

Appendix A

Preliminary Notifications List

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Appendix A Preliminary Notifications List

The preliminary Notifications List is provided in Table 9 and outlines the order of notifications as well as the names and contact details for each of the relevant parties. Each person should be contacted via mobile phone initially, then via work phone numbers (during office hours) or afterhours numbers, where provided.

Table 9 Notification List

Order of Contact	Title / Name	Mobile Number	Work Phone Number	A/H Phone Number	Facsimile Number	Email Address
	Rockhampton Regional Council					
1	Manager Infrastructure Planning / Deputy Local Disaster Coordinator (Martin Crow)	0408 368 642	07 4936 8401	0408 368 642	1300 22 55 79	martin.crow@rrc.qld.gov.au
1	General Manager – Regional Services / Local Disaster Coordinator (Peter Kofod)	0419 494 660	07 4936 8458	0419 494 660	1300 22 55 79	peter.kofod@rrc.qld.gov.au
1	Coordinator Strategic Infrastructure – Regional Services (Stuart Harvey)	0402 366 980	07 4936 8914	0402 366 980	1300 22 55 79	stuart.harvey@rrc.qld.gov.au
1	Senior Infrastructure Planning Engineer – Floodplain Management (Monishaa Prasad)	0413 495 966	07 4936 8915	0413 495 966	1300 22 55 79	monishaa.prasad@rrc.qld.gov.au
1	Manager Civil Operations (David Bremert)	0419 795 135	-	0419 795 135	1300 22 55 79	david.bremert@rrc.qld.gov.au
	Fitzroy River Water					
1	Manager Fitzroy River Water (Jason Plumb)	0419 765 046	07 4936 8750	0419 765 046	1300 22 55 79	jason.plumb@rrc.qld.gov.au
1	Coordinator Network Operations Fitzroy River Water (Evan Davison)	0438 368 231	07 4936 8722	0438 368 231	1300 22 55 79	evan.davison@rrc.qld.gov.au

Order of Contact	Title / Name	Mobile Number	Work Phone Number	A/H Phone Number	Facsimile Number	Email Address
	Local Counter Disaster Groups, Rockhampton		**Emergency**	**General No.**		
2	Police	–	000	07 4932 3500	–	–
2	State Emergency Service	–	000	1300 369 003	–	–
2	Qld Fire Service – Urban Division	–	000	07 4927 1488	–	–
2	Ambulance	–	000	07 4931 7100	–	–
	External Organisations					
3	Department of Natural Resources and Mines (DNRM)					
3	Department of Transport and Main Roads (TMR)					
3	Queensland Rail (QR)					
3	Aurizon					
4	Proficient and experienced Dam Engineer who is a Registered Professional Engineer Queensland (RPEQ)					

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Appendix B

Resource Contacts

Appendix B Resource Contacts

The following provides some guidance for the preparation of a Resource Contacts list. This is not intended to be an exhaustive list and RRC may decide to include only some, all or additional resource contacts.

It is noted that maintaining some of these lists could be difficult as businesses close and new ones open. These lists should therefore be reviewed at the start of each flood season by the person who oversees the pre-flood season inspection of the equipment.

Contractors

Include a list of contractors who have worked on the levee at any time. This would include inspection and repairs of all components of the levee (embankment, crib wall, composite wall, demountable flood barriers, pump stations). In an emergency, the Coordinators should be able to call on at least some of these contractors to assist with emergency repairs.

Personnel required for access to stockpiled materials

Include a list of personnel who are responsible for providing access to stockpiled materials. Access to stockpiles will be critical during an emergency situation. In the preliminary response phase Coordinators will need to ensure that all materials and equipment that may be required can be accessed quickly.

The types of materials and equipment that could be required are presented in **Appendix D**.

Equipment suppliers

Include a list of suppliers that are able to provide essential equipment and backup equipment for an emergency.

Consider the list of equipment included in **Appendix D**.

Consider the install of temporary barriers, failure of temporary barriers, repairs to levee embankment, operation and maintenance of pump stations, failure of pump stations, levee monitoring and failure of backflow prevention devices.

Fuel suppliers

Include a list of suppliers that are able to provide supplies to operate the pump stations in an emergency, including fuel suppliers, and fuel transport vehicles.

Levee engineer

Include a list of contact persons capable of inspecting problems with all structural components of the levee and recommending temporary or permanent repair solutions during and after an event. Must be RPEQ certified and should preferably be familiar with the SRFL.

Pump station engineers / technicians

Include a contact list of persons qualified to respond to emergencies at the pump stations, including but not limited to the following issues: electrical, mechanical, pump removal, ventilation, fire, and fuel leak.

Persons outside the levee

Include a contact list of people who reside or own properties outside the levee, where their evacuation route/s will be cut by the installation of demountable flood barriers. This is to include phone numbers, addresses and maps with clearly marked primary and secondary evacuation routes. These properties are the first priority for evacuations when a flood warning is issued.

Local media

Include a contact list of local media service providers including radio and television. These parties will be contacted to assist by providing community broadcasts throughout flood events to inform the public.

Appendix C

Inspection and Monitoring Procedures

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Appendix C Inspection and Monitoring Procedures

This section contains guidance on the preparation of a Levee Inspection Procedure and Levee Monitoring Procedure. These procedures shall be clarified and finalised during the final construction stages of the project.

In preparing the procedures for levee inspections and monitoring, consider the information provided in The International Levee Handbook (p 397, 404-406):

- Have access to documents about levee history including previous breach points that will require closer inspection.
- State how many people are required, what processes they will follow, what they will be looking for, utilise tick box checklists, photos from specific points, etc.
- State the different inspections for different parts of the levee, being embankment, composite wall, demountable flood barriers, etc.
- State what sub-sections the levee should be split into and how many people are responsible for each section.
- Have a supervisor/coordinator who knows what groups are on the levee, what they are doing and relays their observations back to 'command.'
- Inspection teams for sub-sections with 3 people per team and back-up teams to take over when each 'shift' is over.
- Consider using volunteers as well as RRC labour force.
- Monitoring teams should have a communications plan whereby they check-in with coordinator at specific times for safety.
- Consider day patrols and night patrols differently, and ensure appropriate equipment for night time.
- Consider how to patrol when overtopping is imminent.
- Consider how to evacuate when overtopping is imminent.
- Patrol teams should know the progress of community evacuations. If they see anyone in evacuated areas, they need to know who/how to report it (prevent looting, etc.).
- No one is permitted on the waterside of the sheet pile wall – must be observed from the dry side only.
- No one other than QR personnel are permitted within the rail corridor. Monitoring teams must remain outside the corridor. Queensland Rail may be required to have monitoring teams. The reaction to possible structural issues must be coordinated in case problems (sand boils, temporary barrier failure) occur inside the rail corridor.
- Monitoring teams should be made aware that mulch placed on riprap areas is sacrificial and will be washed away during a flood. Teams should be trained to know the difference between normal loss of material and dangerous loss of material.

Levee Safe Access Procedure (SAP)

The safety of persons accessing the levee is paramount. The following notes are proposed to contribute to the development of a procedure for essential personnel to safely access the levee during and emergency.

The levee will be closed to public access prior to the installation of the flood walls, if public access is permitted during non-emergency times.

The SAP will be initiated by the Inspections Coordinator.

The SAP applies to all persons accessing the levee including monitoring teams, qualified inspectors brought in to assess damage, pump station operators, pump station refuel vehicles, commander of

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Emergency Services staging area, and any other persons. In the event that the Emergency Services are called to respond to an emergency situation at the levee, they may be exempt from the SAP though it is strongly recommended they are met and accompanied by someone working within the requirements of the SAP (i.e. someone who has been inducted and is signed-on to access the levee).

Every person needing access to the levee will be required to undergo a brief safety induction (similar to a pre-start) at the start of each shift. This can be delivered in an informal way by any person who has been inducted for that shift using a simple checklist. Perhaps a large notice board could be set up at the staging area which outlines the hazards for the shift, which can be updated as the event unfolds.

The induction should outline the hazards that may be encountered, the safety controls in place, and the safety procedures to be followed. The daily induction is recommended due to the changing situation as water rise, pump stations operate, Emergency Services establish a staging area on the levee, and repairs are made to the levee.

Before ascending the levee, individuals and teams will need to sign-on that they are going to the levee and indicate what section of the levee they will be on/near and when they expect to return. Persons will then sign-out when they return to the staging area and go off-duty.

Persons on the levee will be required to check-in with the staging area every 30 minutes via radio to notify that all persons are OK and relay any issues. Issues may be relayed back in between regular check-in times.

Vehicle Movements

Vehicles will be given access as required and must enter and leave the embankment through the access points they are permitted to use. All traffic movements should be one-way: for example ascend via odd numbered ramps and descend via even numbered ramps. This will create counter-clockwise movements, from Jellicoe Street to Hastings Deering to Quay Street. All ramps will need to be clearly signed with their number and the direction of travel. It is highly recommended that a similar movement protocol is part of everyday access and outlined in the O&M Manual.

Teams

The International Levee Handbook and Emergency Preparedness Guidelines for Levees recommend the following.

Embankment monitoring:

- Teams of three walking the levee, with persons located at the landside toe and on top of the crest and on the dry side of the sheet pile wall inspecting the wet side of the levee.
- Take photographs, note any problems and relay information back to the person in charge.

Floodwall monitoring:

- Do not walk along the top of the floodwall.
- Monitor the landside of the floodwall for potential problems. This includes the floodwall itself and the ground adjacent to it.
- Check the waterside of the floodwall using ladders or adjacent earth embankments.

All inspections shall be undertaken under the direction of a Registered Professional Engineer of Queensland (RPEQ).

Level 1 Inspection

This involves a full pre-inspection of the levee to ensure it is in an adequate condition to withstand the expected flood. Closure of through-levee drainage structures may occur at this time, well in advance of the arrival of floodwaters.

Level 2 Monitoring

The levee should be monitored regularly as floodwaters approach to ensure the levee is in an operational condition. This should start out as once daily and increase to twice daily as waters approach.

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This type of monitoring could occur using vehicles or by team(s) on foot. It would involve inspections along the waterside, landside and crest of the levee to observe any issues with the levee structure and observe the rise of floodwaters.

Level 3 Monitoring (Continuous)

At this stage, consider teams of three people walking the levee continuously to observe water levels and identify any issues.

Vehicle movements should be restricted to critical movements only such as emergency services, repairs and refuelling pump stations.

The sheet pile wall at the crest of the levee is a restriction to observing the waterside of the embankment. Waterside monitoring is recommended for areas which have fast current to try and detect scour issues. If access to the waterside is not possible on foot, consider inspections by boat if safe to do so.

Appendix D

Equipment

South Rockhampton Flood Levee

Appendix D Equipment

Some of the types of equipment, materials and personnel that could be assembled to assist with flood response are listed in Table 10.

Table 10 Recommended Equipment and Personnel

Element	Equipment / Materials	Personnel
Levee Monitoring	Monitoring instructions Radios (including back-up equipment) Cameras Clipboards / Checklists / Log book Stationary (pens, highlighters etc) Depth markers / probing rod Torches / lights / glow sticks PPE including Personal Floatation Device (PFD) Rope / safety line Markers (paint / stakes / cones) for sand boils or other issues	RRC / FRW staff Volunteers
Pump Stations	Spare pumps Fuel and fuel transport Cranes / plant	Inspectors Technicians Operators
Levee Structural Repairs / Support	Mobile pumps to control internal drainage / excessive seepage** Plastic sheeting Sandbags Sandbag filling machines / shovels Rip rap** Fill material** Plant Spare demountable flood barrier components (floodgate panels)	Inspectors Labour
Rescue	Boats First aid kits Ambulances on location or on call	SES QAS First aid personnel
Traffic Management	Safety barriers Speed signs Vehicles	Traffic controllers QPS support or coordination
Night time	Lighting at ramps Lighting at pump stations Lighting at staging area Generators to run lights, if required	

** These materials may not need to be stockpiled initially, but contact with suppliers capable of providing this in an emergency should be made and their contact details easily available. These materials must be safely accessible even in wet conditions, and stockpiling may be required to achieve this.

Spare demountable flood barrier components refer to the proprietary products that are installed as part of normal flood operations at the levee. This includes the demountable barriers across roads and rail, and the demountable barrier along Quay Street.

Appendix E

Demountable Flood Barrier Deployment Plan

Appendix E Demountable Flood Barrier Deployment Plan

A preliminary Demountable Flood Barrier Deployment Plan is provided below. The Levee Incident Manager will approve this plan, which will be carried out by the Demountable Barrier and Traffic Coordinator. This plan will require further refinement during construction of the levee and associated infrastructure.

RRC are to conduct testing during the construction phase of the project, to establish the time taken to install each demountable flood barrier at road crossings, the rail crossing (in conjunction with QR) and along the western embankment of the Fitzroy River. The time taken to deploy the flood barrier is to include storage access, pre-inspection, cleaning (if necessary), loading and transport to site, unloading, installation and final in-place inspection. There should also be a 'buffer' allowance to account for unforeseen issues.

RRC are then to 'work backwards' from the deadlines noted below to establish a Rockhampton Gauge Trigger (in meters Rockhampton Gauge Datum, m RGD) for each of the actions detailed below. The Rockhampton Gauge Deadlines shown in Table 11 include a 0.3m buffer, to account for flood model uncertainty. The trigger levels are intended to ensure each demountable flood barrier is installed prior to flood waters rising to the base of the barrier.

Table 11 Demountable Flood Barrier Deployment Plan

Deadline	Action (To Be Completed Before Deadline)	Time	Trigger (mRGD)
BoM Warning Issued	Pre-inspection of all temporary equipment (all equipment, not just required equipment).	-	-
BoM Warning Issued	Contact contractors to ensure standby equipment is available in case of failure of primary equipment.	-	-
ASAP following BoM Warning	Inform road and rail authorities of the approved Demountable Flood Barrier Deployment Plan (TMR, RRC, RACQ, Aurizon, Queensland Rail).	-	-
24 hrs before barrier install	Implement Public Access Restriction Plan	TBC	TBC
6.85mRGD	Implement first stage of Quay Street Traffic Management Plan (TMP) at the road crossing near the SRSTP.	TBC	TBC
7.15mRGD	Implement Old Bruce Highway TMP. Installation of Old Bruce Highway road crossing demountable flood barrier (~Chainage 1440).	TBC	TBC
7.25mRGD	Full implementation of Quay Street TMP. Installation of vehicle access demountable flood barrier (~Chainage 7550).	TBC	TBC
7.50mRGD	Continued implementation of Quay Street TMP. Installation of 2 by vehicle access demountable flood barrier (~Chainage 7615 and ~Chainage 7670).	TBC	TBC
7.75mRGD	Continued implementation of Quay Street TMP. Installation of vehicle access demountable flood barrier (~Chainage 7460).	TBC	TBC
7.90mRGD	Continued implementation of Quay Street TMP. Installation of vehicle access demountable flood barrier (~Chainage 7380).	TBC	TBC
8.20mRGD	QR to complete Installation of North Coast Rail Line rail swing gates (~Chainage 130).	TBC	TBC
8.70mRGD	Continued implementation of Quay Street TMP. Installation of vehicle access demountable flood barrier (~Chainage 7810).	TBC	TBC

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Deadline	Action (To Be Completed Before Deadline)	Time	Trigger (mRGD)
9.10mRGD	Implement Wharf St TMP. Installation of Wood St to O'Connell demountable flood barrier (~Chainage 6645 to 6905).	TBC	TBC
9.15mRGD	Continued implementation of Quay Street TMP. Installation of Francis St to Derby St demountable flood barrier (~Chainage 7355 to 8055).	TBC	TBC
9.15mRGD	Continued implementation of Quay Street TMP. Installation of Derby St to Royal St demountable flood barrier (~ Chainage 8055 to 8790).	TBC	TBC

Appendix F

Demountable Flood Barrier Removal Plan

South Rockhampton Flood Levee

A preliminary Demountable Flood Barrier Removal Plan is provided below. The Levee Incident Manager will approve this plan, which will be carried out by the Demountable Barrier and Traffic Coordinator. This plan will require further refinement during construction of the levee and associated infrastructure.

The Rockhampton Gauge Triggers shown in Table 12 include a 0.3m buffer, to account for flood model uncertainty. The trigger levels are intended to ensure each demountable flood barrier is removed after flood waters have receded below the base of the barrier.

Note that no demountable flood barrier is to be removed until flood waters have receded below the base of the barrier and are falling, with no forecast increase in flood elevations.

Table 12 Demountable Flood Barrier Removal Plan

Trigger	Action
9.15m RGD	Removal of Derby St to Royal St demountable flood barrier (~ Chainage 8055 to 8790). Removal of Quay Street TMP.
9.15m RGD	Removal of Francis St to Derby St demountable flood barrier (~ Chainage 7355 to 8055). Removal of Quay Street TMP.
9.10m RGD	Removal of Wharf St (Wood St to O'Connell St) demountable flood barrier (~ Chainage 6645 to 6905). Removal of Wood St to O'Connell St TMP.
8.70m RGD	Removal of vehicle access demountable flood barrier (~Chainage 7810). Removal of Quay Street TMP, accept for traffic management near SRSTP.
8.20m RGD	QR to open North Coast Rail Line swing gates (~Chainage 130).
7.90m RGD	Removal of vehicle access demountable flood barrier (~Chainage 7380).
7.75m RGD	Removal of vehicle access demountable flood barrier (~Chainage 7460).
7.50m RGD	Removal of 2 by vehicle access demountable flood barrier (~Chainage 7615 and ~Chainage 7670).
7.25m RGD	Removal of vehicle access demountable flood barrier (~Chainage 7550).
7.15m RGD	Removal of Old Bruce Highway road crossing demountable flood barrier (~Chainage 1440). Removal of Old Bruce Highway TMP.

Appendix G

Inundation Mapping

South Rockhampton Flood Levee

Mapping produced in the Hydraulic Assessment Report (AECOM, 2019) and Failure Analysis Report (AECOM, 2019) should be collated and inserted as **Appendix G**.

Any additional inundation mapping required by RRC, FRW or the LDMG is to also be included in **Appendix G** of this Emergency Response Plan.

Appendix H

Evacuation Notifications

South Rockhampton Flood Levee

This page is to be replaced by a list of affected residents and businesses, in the event of spillway overtopping, levee crest overtopping or levee failure. This is to be accompanied by associated mapping.

Appendix I

Security Plan Notes

South Rockhampton Flood Levee

A security plan could be developed to address security issues associated with the levee and personal security for persons involved in emergency operations. Some elements that could be included in a security plan are listed below, as noted within the International Levee Handbook (CIRIA 2013):

- Coordination with law enforcement agencies.
- Reporting and managing security incidents.
- Physical security.
- Communications and cyber-security.
- Employee and contractor identification.
- Security contracting.
- Coordination with emergency / operational plans.
- Security issues associated with routine activities – maintenance, tourism, public access.