EMERGENCY ACTION PLAN — BURDEKIN FALLS DAM (ID 236)

ISSUE: 9.2 — September 2024 **Expiry:** 1 May 2027

Prepared by **Sunwater Limited**

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Approved by the delegate of the Chief Executive, Department of Regional Development, Manufacturing and Water until 1 May 2027.

Emergency activation quick reference – Dam Hazards

The Emergency Action Plan (EAP) for Burdekin Falls Dam covers dam hazards evaluated within Sunwater's Dam Safety Management Program.

Use the following table to select the relevant section of the EAP that deals with the dam hazard. **Note: The Incident Coordinator (IC) is responsible for the decision to activate the EAP. Should the IC be unavailable, the Local Event Coordinator (LEC) or Dam Duty Officer (DDO) is responsible for the decision. The FODM or DSTDM is responsible for informing the IC decision to activate the EAP.**

Table 1: Emergency activation quick reference

Dam Hazards and section numbers	Activation levels			
	Alert	Lean Forward	Stand Up	Stand Down
	Activation triggers for dam hazards			
Flood operations See ***section 5***	• EL 153.90m and rising (0.1m below FSL)	• Storage above FSL 154.00m	• Storage above EL 157.00m	• Storage level EL 154.30m and falling with no forecast increase in EL
Overturning/sliding of monoliths See **Section 6**	• Indications of movement of monoliths noted such as cracking, increased seepage, opening of joints	• Storage level at flood of record EL 160.85m, OR • Increase in movement, pressures, or seepage	• Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam, OR • Storage level at stability factor of safety 1.3, EL 167.49m	• Risk assessment has determined that sliding or overturning risk has reduced
Piping: embankment, foundation, or abutments See ***section 7***	• Increasing leakage through an embankment, the foundations, or abutments	• Increasing leakage through an embankment, the foundations, or abutments with cloudy water	• Piping condition has been established	• Risk assessment has determined that piping risk has reduced
Earthquake See ***section 8***	• Earthquake reported or felt in the area, AND • Intensity less than 5 Modified Mercalli (MM)	• Earthquake reported or felt in the area, AND • Intensity greater than or equal to 5MM, OR • Intensity less than 5MM and change detected during surveillance inspection	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	• Risk assessment has determined that failure risk has reduced
Terrorist threat/ activity or high energy impact See ***section 9***	• Not applicable	• Not applicable	• Possible terrorist activity noticed at dam or threat received • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) • Failure in progress or likely due to impact or explosion • Sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced

NOTE: EMERGENCY ACTIVATION QUICK REFERENCE CONTINUED NEXT PAGE

Emergency activation quick reference – Other Emergency Situations

The EAP for Burdekin Dam covers one other emergency situation evaluated within Sunwater's Dam Safety Management Program. Use the following table to select the relevant section of the EAP that deals with the other emergency situation. **Note: The Incident Coordinator (IC) is responsible for the decision to activate the EAP. Should the IC be unavailable, the Local Event Coordinator (LEC) or Dam Duty Officer (DDO) is responsible for the decision. The FODM or DSTDM is responsible for informing the IC decision to activate the EAP.**

Table 1: Emergency activation quick reference (continued)

Other emergency situations and section numbers	Activation levels		
	Communications Failure – Dam Site (DDO)	Communications Failure – Local Area (LEC/SM)	Communications Failure – Brisbane (IC/DSTDM)
	Activation triggers for other emergency situations		
Comms Failure See **section 10**	• Unable to communicate to or from dam site	• Unable to communicate to or from local area	• Unable to communicate to or from Sunwater Brisbane

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Document control

Authorisation of document

Name	Position/role	Signature	Date
	EAP Program Lead — Prepared for submission		12/09/2024

Document revision history

Version	Date	Prepared by	Reason for change	Hummingbird #
2	February 2008		Substantial review of Burdekin Falls Dam Emergency Action Plan to reflect Sunwater Management structure and updated inundation maps.	
3	October 2011		Significant changes to all sections of Burdekin Falls Dam Emergency Action Plan to reflect current Sunwater Management structure and other changes.	HB # 608675
4	October 2015		New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with Relevant Disaster Management Groups.	HB # 1685284
5	September 2016		Updates to notification & communication lists and Emergency Alert sections.	HB # 2022753
6	October 2017		New Emergency Action Plan developed with contact list updates and minor amendments.	HB # 2223834
7	July 2018		Revised and reviewed Emergency Action Plan includes: updates that reflect the Water Legislation (Dam Safety) Amendment Act 2017, implementation of changes to Sunwater management structure, new event management roles and addition of new Emergency Activation section (*Other Emergency Situations*).	HB # 2095187
8	December 2018		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB # 2367477
8.1	September 2019		Yearly update of contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB # 2460892
8.2	September 2020		Yearly update of contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB # 2570611
8.3	September 2021		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes such as removing Comprehensive Risk Assessments description (2.9) and simplifying FODM role in Activation triggers (5.2.1) including removing para 5.2.2.	HB # 2652440

Version	Date	Prepared by	Reason for change	Hummingbird #
8.4	September 2022		Yearly update of contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes. The Chemical Hazard section has been removed as it is not a Dam Safety Hazard and is dealt with in other more relevant documents.	HB # 2716015
9.0	March 2023		Minor change definition of dam crest failure in section 1.3. Amendments to dam details in section 3, including PAR and upgrade project. Amendments to stand up trigger descriptions for flood in section 5. Updates to maps in Appendix B. Minor error corrections and improvements to readability. Updated AWS messages. Added Townsville City Council LDMG to Appendix A3.	HB # 2743859
9.1	May 2023		Updated AWS messages. Added Townsville City Council LDMG to Appendix A3 and referenced in action tables. Added in lower gallery VWPs and Mount Graham Saddle Dams information in 3.5.2	#2788983
9.2	September 2024		Wet season preparedness - contact updates	#2865404

Controlled document distribution list

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2	Operations Manager—North	Sunwater, Clare
3	Emergency Action Plan Program Lead	Sunwater, Brisbane
4	Officer in Charge—Ayr Police	Police, Ayr
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6	Officer in Charge—Clare Police	Police, Clare
Notes: Communication information for each 'Controlled Copy Holder' is attached in Appendix A.		

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District Disaster Coordinator—Townsville District Disaster Management Group (DDMG 1)	Police, Townsville
Executive Officer—Mackay District Disaster Management Group (DDMG 2)	Police, Mackay
Local Disaster Coordinator—Local Disaster Management Group (LDMG 1)	Burdekin Shire Council
Local Disaster Coordinator—Local Disaster Management Group (LDMG 2)	Charters Towers Regional Council
Local Disaster Coordinator—Local Disaster Management Group (LDMG 3)	Whitsunday Regional Council
Local Disaster Coordinator—Local Disaster Management Group (LDMG 4)	Townsville City Council
Senior Flood Forecaster	Bureau of Meteorology, Brisbane
Note: Communication information for each 'Electronic Copy Holder' is in Appendix A.	

1. References, abbreviations, and definitions

1.1 References/associated documents

Ref.	Document title	Reference/location
A	Sunwater (internal) ref	Strategic Event Procedure
B	Sunwater (internal) Burdekin Falls Dam Operation and Maintenance Manual	Burdekin Falls_Dam_OM_Manual
C	Sunwater (internal) Burdekin Falls Dam Safety Condition Schedule	HB # 1740561
D	Queensland Disaster Management Guidelines	Quensland PPRR DM Guideline (disaster.qld.gov.au)
E	Queensland Rainfall and River Conditions (Flood Warning)	http://www.bom.gov.au/qld/flood/index.shtml?ref=hdr
F	Emergency Alert Protocol	HB # 2156253
G	Operations Centre Standard G (OC SOP) – Sunwater internal	eDOCS #2675933
H	Burdekin Falls Dam Consequence Assessment (HARC) February 2020 (Sunwater internal)	eDOCS # 254106
I	Burdekin Falls Dam Comprehensive Risk Assessment (CRA) December 2021	eDOCS # 2720029
J	Referable Structures Standard Operating Procedure SOP 12 Dam Logbooks	Policies, Procedures and Guidelines - SOP12 Dam Logbooks - All Documents - Default (Function and Activity) (sharepoint.com)
K	Sunwater (internal) Fatigue Management Procedure	Fatigue Management Procedure
L	Water Supply (Safety and Reliability) Act 2008	Water Supply (Safety and Reliability) Act 2008
M	Disaster Management Act 2003	Disaster Management Act 2003

1.2 Abbreviations and acronyms

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AMTD	Adopted Mean Thread Distance
ANCOLD	Australian National Committee on Large Dams
BOM	Bureau of Meteorology
CED	Chief Engineer Dams
CEO	Chief Executive Officer
CRA	Comprehensive Risk Assessment
CTG	Counter Terrorism Group
D/S	Downstream
DCF	Dam Crest Flood
DCL	Dam Crest Level
DDC	District Disaster Coordinator
DDMG	District Disaster Management Group
DDMP	District Disaster Management Plan
DDO	Dam Duty Officer
DDS	Director Dam Safety
DSR	Dam Safety Regulator
DSSC	Dam Safety Surveillance Coordinator
DSTDM	Dam Safety Technical Decision Maker
EAP	Emergency Action Plan
EA	Emergency Alert
EER	Emergency Event Report
EGMO	Executive General Manager Operations
EGME&WR	Executive General Manager Engineering & Water Resources
EL	Elevation Level
FCL	Fixed Crest Level
FODM	Flood Operations Decision Maker
FSL	Full Supply Level
GM	General Manager
IC	Incident Coordinator
IFHC	Incremental Flood Hazard Category
IGEM	Inspector-General Emergency Management
LB	Left Bank
LDC	Local Disaster Coordinator
LDMG	Local Disaster Management Group
LDMP	Local Disaster Management Plan
LEC	Local Event Coordinator
MAP	Manager Asset Planning
Max. OL	Maximum Operating Level
ME	Manager Environment
MM	Modified Mercalli
O&M	Operation & Maintenance
OB	Observation Bore
OC	Operations Centre
OCO	Operations Coordinator
OCDO	Operations Centre Duty Officer
OM	Operator Maintainer
OMGR	Operations Manager
OS	Operations Supervisor
ORR	Owner's Regional Representative
PAR	Population at Risk
PDSE	Principal Dam Safety Engineer
PFRM	Predictive Flood Routing Model
PLL	Probable Loss of Life
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PMPF	Probable Maximum Precipitation Flood
PWRE	Principal Water Resources Engineer
QDMC	Queensland Disaster Management Committee
QFD	Queensland Fire Department
QPS	Queensland Police Service
RB	Right Bank
RC	Regional Council
RCC	Roller Compacted Concrete
ROC	Regional Operations Centre
RDMW	Department of Regional Development, Manufacturing and Water
RPEQ	Registered Professional Engineer of Queensland
RSL	Reduced Supply Level
SCED	Senior Civil Engineer Dams
SCTN	Security and Counter Terrorism Network
SDCC	State Disaster Coordination Centre
SDF	Sunny Day Failure
SDTE	Senior Dam Technical Engineer
SES	State Emergency Service
SMS	Short Message Service
SMT	Sunwater Media Team
SO	Standby Operator
SOP	Standing Operating Procedure
SRT	Strategic Response Team
SS	Storage Supervisor
SWL	Storage Water Level
SWRE	Senior Water Resources Engineer
U/S	Upstream
VWP	Vibrating Wire Piezometer
WHS	Workplace Health & Safety
WQ	Water Quality

1.3 Business terms and definitions

The meaning of terms used in this section are set out in accordance with relevant legislation or as defined by operator requirements.

Term	Definition
Terms set out in section 352A of the Water Supply (Safety and Reliability) Act 2008 (Qld) – Amended (reference L)	
Dam hazard	A reasonably foreseeable situation or condition that may: • cause or contribute to the failure of the dam, if the failure may cause harm to persons or property, OR • require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property.
Dam hazard event	Means an event arising from a *dam hazard* if: • persons or property may be harmed because of the event, AND • a coordinated response, involving 2 or more of the following *relevant entities*, is unlikely to be required; each *local group* and *district group* for the EAP, each local government whose area may be affected, the Chief Executive, another entity the owner of the dam considers appropriate, AND • the event is not an *emergency event*.
Disaster management plan	A *district group* or local government, means the group's or local government's disaster management plan under the Disaster Management Act 2003 (reference M)
District group (District Disaster Management Group)	A district group established under the Disaster Management Act 2003, section 22 whose disaster district under that Act could, under the plan, be affected by a *dam hazard*.
Emergency event	Means an event arising from a *dam hazard* if: • persons or property may be harmed because of the event, AND • any of the following apply: – a coordinated response, involving two or more of the following relevant entities, is likely to be required; each local group and district group for the EAP, each local government whose area may be affected, the Chief Executive, another entity the owner of the dam considers appropriate, OR – the event may arise because of a disaster situation declared under the Disaster Management Act 2003 (reference M), OR – an entity performing functions under the State disaster management plan may, under that plan, require the owner of the dam to give the entity information about the event.
Local group (Local Disaster Management Group)	For an EAP, means a local group established under the Disaster Management Act 2003, (reference M), section 29 whose local government area could, under the plan, be affected by a *dam hazard*.
Notice response	A dam owner's written response to a notice following an assessment of an EAP by a local government or *district group*.

Term	Definition
Referable dam	A dam, or a proposed dam after its construction, will be a referable dam if: • a failure impact assessment of the dam, or the proposed dam, is carried out under the Act, AND • the assessment states the dam has, or the proposed dam after its construction will have, a category 1 or category 2 failure impact rating, AND • the Chief Executive has, under section 349 of the Act, accepted the assessment. Also, a dam is a referable dam if: • under section 342B of the Act, the owner of a dam is given a referable dam notice and, before the effective day for the notice, does not give the Chief Executive a failure impact assessment for the dam, AND • the Chief Executive has not, under section 349 of the Act, accepted a failure impact assessment of the dam.
Relevant entity	Means each of the following under the EAP for the dam: • the persons who may be affected, or whose property may be affected, if a *dam hazard event* or *emergency event* were to happen for the dam, e.g., the owners of parcels of farmland adjacent to the dam or residents of a township • each local group and district group for the EAP • each local government whose local government area may be affected if a dam hazard event or emergency event were to happen • the Chief Executive • another entity the owner of the dam considers appropriate e.g., the Queensland Police Service.
Terms consistent with Queensland Disaster Management Arrangements:	
Activation levels	The four levels of EAP activation are: • **Alert:** A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. • **Lean Forward:** An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated. • **Stand Up:** The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the Act. • **Stand Down:** Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present. The movement through these levels of activation is not necessarily sequential. It should be applied with flexibility and adaptability and be tailored to the location and event. Triggering one of these levels of activation may not necessarily mean a similar activation of LDMGs or DDMGs.

Term	Definition
Bureau of Meteorology flood level classifications	The three levels of flooding are: • **Minor flooding:** This causes inconvenience such as closing of minor roads and the submergence of low-level bridges and makes the removal of pumps located adjacent to the river necessary. • **Moderate flooding:** This causes the inundation of low-lying areas requiring the removal of stock and/or the evacuation of some houses. Main traffic bridges may be closed by flood waters. • **Major flooding:** This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas, widespread flooding of farmland is likely.
Concurrent Flooding	Flood flows downstream of a dam that are not a result of dam outflows, for instance those from adjacent catchments or from the sea, and which occur in the same period as downstream releases or flooding from the dam.
Dam crest flood failure	Dam crest flood is when failure occurs during a flood event with the water level at the crest of the non-overflow section of the dam embankment: • for an embankment dam, is the lowest point of the embankment crest • for a concrete dam, is the level of the non-overflow section of the dam, excluding handrails and parapets if they do not store water against them • for a concrete faced rockfill dam, is the lowest point of the crest structure.
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.
Downstream releases	Downstream releases are outflows from the dam made through appurtenant structures such as spillways or outlet works that are in accordance with the design of the dam.
Earthquake	A sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include: • settlement, sliding, or overturning of monoliths in the dam wall • initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works.
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above the Full Supply Level (FSL) resulting in a discharge from the spillway of the dam.
Piping	Internal scour caused by the water flow and seepage that occurs through earth dams, dam foundations, or dam abutments. The internal scour can lead to the formation of a pipe, which can lead to a failure of the dam.
Plane strike or other impact	The impact of a plane, meteorite, or other high energy item on or in close vicinity of a dam that could damage the dam structure or create a wave that could overtop the dam.
Probable maximum flood	Is the flood resulting from probable maximum precipitation coupled with the worst catchment conditions that can be realistically expected.
Probable maximum precipitation	Probable maximum precipitation is the theoretical greatest depth of precipitation physically possible based on generalised methods.
Probable maximum precipitation flood	The flood resulting from probable maximum precipitation coupled with standard catchment conditions that can be expected.

Term	Definition
'Sunny day' failure	'Sunny day' dam failure is where the failure occurs at the full supply level and there is no concurrent rain associated flooding.
Terrorist activity	A deliberate attempt to damage, fail or contaminate a dam.

Note: Sunwater has attempted to write the EAP to cope with all reasonably foreseeable emergency situations. However, there is considerable uncertainty about how any emergency situation might develop and progress. Factors such as the weather, the location, the mechanics, and the rate and size of any actual failure can considerably affect any resulting flood discharges. Therefore, a significant number of assumptions have had to be made in compiling sections of the EAP. Some variation in outcome should be expected where the event differs from the assumed behaviour.

2. Introduction

2.1 Context

Under the *Water Supply (Safety and Reliability) Act 2008* (the Act), (reference L), the owner of a referable dam must have an approved EAP for the dam. Referable dams, by definition, would put lives at risk if they were to fail.

This EAP has been prepared in accordance with Chapter 4 of the Act. The content requirements for EAPs are contained in section 352H of the Act.

Summary of legal requirements – Section 352H

Section 352H(1) of the Act requires that the EAP must identify each dam hazard for the dam;

and for each of these dam hazard types (e.g., flood operations, earthquake):

1. identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard; and
2. identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening; and
3. state when and how the owner of the dam plans to warn persons who may be harmed, or whose property may be harmed by an event caused by the dam hazard, if one happens, and/or there is a material increase in the likelihood of an occurrence, including the order of priority in which the persons or categories of persons are to be warned; and
4. state when and how the owner plans to notify the relevant entities for the dam, if a dam hazard event or emergency event happens or, there is a material increase in the likelihood of such an occurrence, including the order of priority in which the relevant entities are to be notified; and
5. state the actions the owner of the dam plans to take in response to a dam hazard event or emergency event.

In accordance with section 352H(2) of the Act, the EAP may provide for the dam owner to make arrangements with a relevant entity for warnings to be given by the relevant entity on behalf of the dam owner in appropriate circumstances.

Section 352HA of the Act states that before giving the Chief Executive an EAP, the owner of the dam must give a copy of the plan to each local government whose area may be affected by a dam hazard identified in the plan; and each district group for the plan.

Section 352HB of the Act states that the local government must assess the EAP for consistency with its disaster management plan. In its assessment, the local government must consult with the local district group for the plan.

Within 30 business days of receiving the EAP, the local government must give the owner of the dam a notice, which states whether it considers the plan is consistent with its disaster management plan; and if not, give reason why it considers the EAP is not consistent. The EAP must include any such notices, provided to the owner of the dam by a local government (or district group); and any responses which the owner gives to these notices. Section 352H(1) further stipulates that an EAP must include any other relevant matter prescribed by regulation.

The local governments whose areas may be affected by a dam hazard for Burdekin Falls Dam have been assessed as **Burdekin Shire Council, Charters Towers Regional Council, Whitsunday Regional Council and Townsville City Council.** Sunwater has provided the councils with a copy of the draft EAP for assessment.

Section 352HC of the Act states that a district group may review the EAP for consistency with its disaster management plan. The district groups for Burdekin Falls Dam are **Townsville** and **Mackay District Disaster Management Groups (DDMGs)**. Sunwater has provided the DDMGs with a copy of the draft EAP for review.

2.2 Purpose

The purpose of this EAP is:

- to minimise the risk of harm to persons or property if a dam hazard event or emergency event for the dam happens
- to identify dam hazards that could occur at Burdekin Falls Dam and the area likely to be affected for each hazard
- to prescribe emergency actions taken by the dam owners and operating personnel in identifying and responding to dam hazards and notifying relevant entities.

It is possible for more than one dam hazard condition to exist at Burdekin Falls Dam at the one time. In such a circumstance, it may be necessary to act on the procedures within separate sections simultaneously.

The focus of this EAP is the management of dam hazards conditions at Burdekin Falls Dam by the owner of the dam (Sunwater) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been developed to be consistent with and support the objectives of the Burdekin Shire Council, Charters Towers Regional Council, Townsville City Council and the Whitsunday Regional Council's Local Disaster Management Plans.

2.3 Scope

The Burdekin Falls Dam EAP covers:

- dam hazards evaluated within Sunwater's Dam Safety Management Program
- details about the dam that are relevant to a dam hazard
- identification of circumstances that indicates a material increase in the likelihood of a dam hazard and/or an emergency event happening
- triggers for activation of a tiered response to dam hazards and/or an emergency event happening
- roles and responsibilities in responding to a dam hazard
- notification, warning, and communication protocols
- inspection, monitoring, and reporting protocols during emergencies
- other relevant information that may assist with identifying the area affected by a dam hazard, and the management of such hazards and/or emergency events

2.4 Sunwater provides training

Training of the use and implementation of this EAP document is carried out at various times throughout the year, but specific pre-wet season training is undertaken in the months leading up to the wet season at each dam site.

During this time, Sunwater staff have work instructions for site preparations, and during July to September carry out checks on stores, supplies of fuel, on the current EAP such as contact details for individuals and dam information.

The EAP training that is carried out on site includes walkthroughs of new changes, scenario (role play) and Q & A to check the knowledge and competency of all those who attended. The training is presented to relevant Sunwater staff (DDOs, LECs and ICs) and disaster management stakeholders. DSTDM and FODM information sessions are carried out once a year with the same walkthrough of new changes and Q & A, but this is not specific to any one dam. New Sunwater employees in these various roles also have a walkthrough of the EAP.

Sunwater works towards carrying out a full test once annually involving each local council. Where there is more than one referable dam in a local area, the exercise could involve more than one dam, or the location will be rotated. This full test will involve the SDCC and include the (non- live) testing of emergency alerts.

2.5 Principles used in developing this EAP

- The LDMG has principal responsibility of managing any emergency situation within the community, with the support of the district and state disaster groups.

- Sunwater will aim to inform and support the LDMGs in the Burdekin, Charters Towers, Whitsunday and Townsville areas.
- The LDMGs will be the principal voice on all communication to the community during a disaster situation where practical.
- During a dam failure that occurs with little or no warning, Sunwater will undertake the following actions to ensure the community is informed as soon as possible:
  - maintain an up-to-date list of immediate D/S residents of Burdekin Falls Dam. The downstream limit is shown in Appendix B, Figure B3 by the zone labelled *Limit of downstream notification area*.
  - provide timely advice to the LDMGs
  - notify the immediate D/S residents via SMS
  - contact SDCC Watch Desk to send emergency notification to the dam emergency polygon.
- During a dam hazard the LDMGs in the Burdekin, Charters Towers, Whitsunday and Townsville areas will take the lead role in notifying all relevant persons. Sunwater will support the LDMGs by undertaking the following actions to ensure the community is informed as soon as possible:
  - maintain an up-to-date list of residents immediately downstream of Burdekin Falls Dam (D/S residents). The downstream limit is shown in Appendix B, Figure B3 by the zone labelled *Limit of downstream notification area*.
  - notify the Immediate D/S residents via SMS unless otherwise agreed with LDMGs.
- Sunwater will independently inform and support the Townsville and Mackay DDMGs.

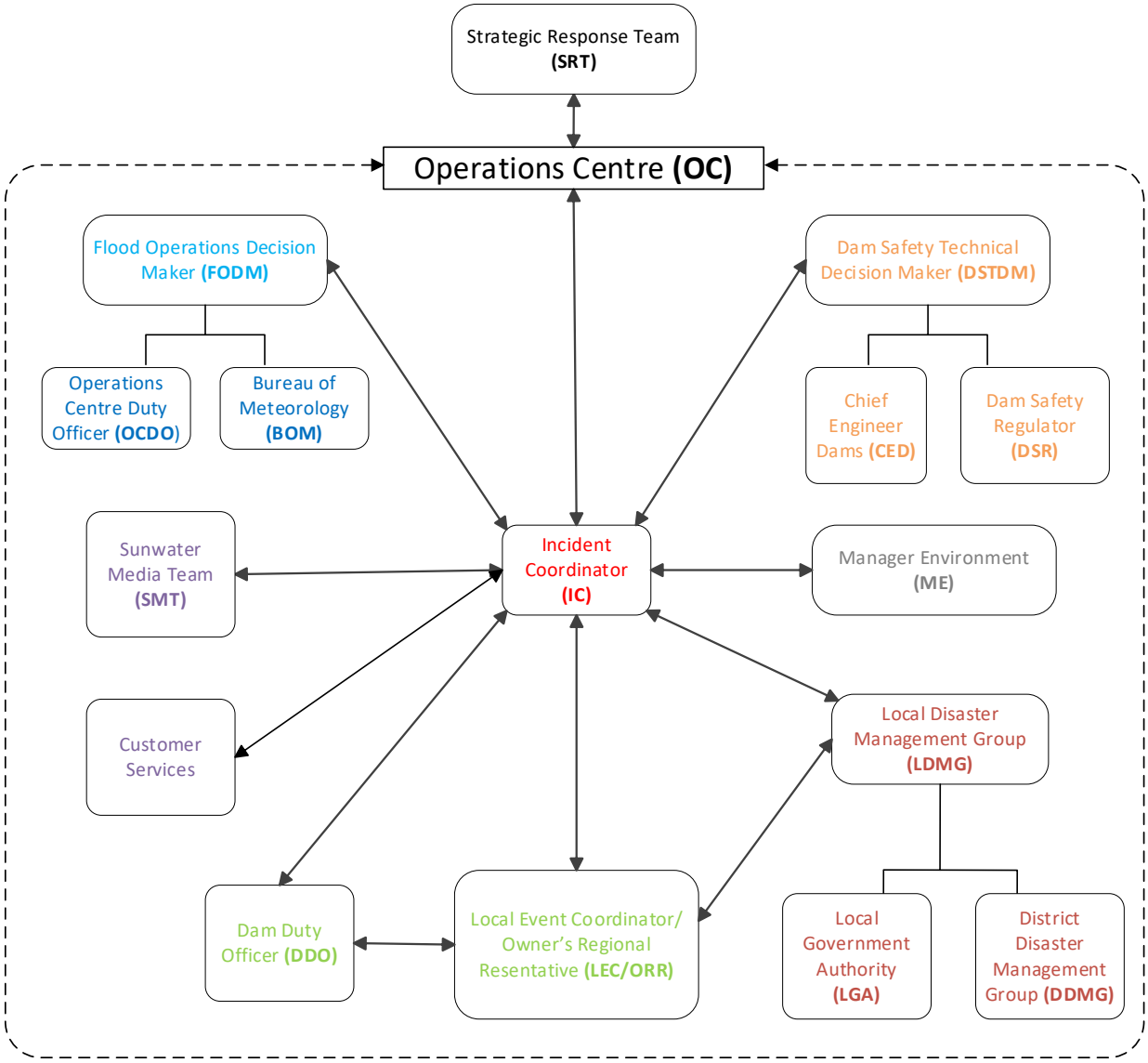
2.5 Fatigue Management Plan

Sunwater has a Fatigue Management Procedure (reference K). This document recognises fatigue as an important workplace hazard and has identified and outlined control processes to mitigate the risk of fatigue impaired HSE incidents. A copy of Sunwater's Fatigue Management Procedure can be provided upon request.

2.5.1 Dam emergency organisation within Sunwater

The Sunwater emergency management framework generally utilises the organisation's hierarchy and in-house experts as illustrated in Figure 1 below.

Figure 1: Sunwater emergency response organisation



Key aspects of the emergency management framework are:

- Central to the framework is the role of Incident Coordinator (IC) for any dam hazard at a dam. The IC will maintain overall responsibility for coordination of the EAP when activated.
- The DSTDM is primarily responsible for analysing dam safety and providing expert technical advice in this regard. They will be expected to discuss dam hazards with peers and other technical experts and make sound decisions to mitigate risks and to determine a response to incidents and emerging issues. The DSTDM is the key communication contact with the Dam Safety Regulator.
- The FODM has responsibility for all matters involving flood modelling and forecasting and determining the associated impact to Sunwater storages/infrastructure and EAP actions. The FODM may pre-emptively advise the IC to activate the EAP in accordance with available hydrology forecast information. For example, if an EAP trigger level is predicted to be exceeded based on forecast dam inflows derived from observed rainfall and streamflow conditions upstream of the dam, the EAP may be activated to the predicted level. Regarding the operation of the OC, the FODM must liaise with the IC as necessary to inform of decisions made.

- The IC is responsible for the decision to activate the EAP. The IC is the lead coordinator in the implementation of any EAP in events for Sunwater. Should the IC be unavailable, the Local Event Coordinator (LEC) followed by the Dam Duty Officer (DDO) is responsible for the implementation of the EAP. If the IC loses all communications during a dam hazard, then as a fail-safe position, the LEC followed by the DDO will assume the duties and responsibility of the IC. However, loss of communications could result in some communication processes defined in this EAP not being carried out.
- The FODM and DSTDM roles are filled by Registered Professional Engineers of Queensland (RPEQ) and are suitably qualified professionals who are able to make engineering decisions and provide engineering decisions as defined in the Professional Engineers Act of Queensland.

2.6 Community information

Sunwater with the assistance of the Burdekin, Charters Towers, Whitsunday and Townsville Councils will ensure community education around messaging and impacts of the EAP and its related events is undertaken and continually improved.

Sunwater currently provides information externally to customers, downstream residents and the community in a range of ways or channels in relation to dam hazards and emergency situations. Individuals can access information through Facebook, the Sunwater web page, Sunwater App and at several regional show/field days across regional Queensland where Sunwater may have stalls and information available.

Burdekin Falls Dam downstream residents are also provided information in text message/phone calls in the event of an activation of this EAP.

In the event of a dam failure or when required, Sunwater also have the use of the National Emergency Alert System to send a voice message or SMS. This service is provided by the State Disaster Coordination Centre and the process Sunwater follows is documented in Appendix A8.

A copy of all Sunwater approved EAPs are available to the public on the Sunwater website – https://www.sunwater.com.au/community/preparing-for-emergencies/emergency-management/

These copies are redacted to protect people's personal details.

2.7 Sunwater lessons learnt

Sunwater carries out Lessons Learnt workshops as part of its post event management. These Lessons Learnt can result in changes to the EAP. These are captured and if applicable to this document are implemented at the earliest opportunity and are made available in the next EAP update to the Regulator as part of Sunwater's continual improvement of its EAPs. The Lessons Learnt actions if relevant are provided to stakeholders, such as the LDMGs, DDMGs, other dam owners and RDMW as appropriate.

In addition, Sunwater requests any post event learnings regarding operational effectiveness and areas for improvement, be communicated internally utilising established systems and externally to the email address [redacted]

2.8 Downstream notifications lists

Sunwater has compiled the notification lists through an iterative process. At least every 5 years, Sunwater writes to all lot on plan landholders that are impacted in the downstream zones. In addition to individual letters, advertisements are placed yearly in local papers to capture any new residents in the areas. All year, applicable individuals can register to receive notifications for this EAP and are able to register either through the Sunwater website or by calling Sunwater Customer Enquires on 13 15 89.

3. Dam details

3.1 General Dam Information

Location: Burdekin Falls Dam is an 876m long, 57m high, mass-concrete dam, with associated Saddle Dams. The Main Dam and Saddle Dams are located on the Burdekin River, within the parish of Graham, County of Murray, in Charters Towers Regional Council area.

Catchment: The catchment area is 114,650km^2, which extends from the Seaview Range west of Ingham, south to the Drummond Range near Alpha, east to the coastal ranges of Mackay, and west beyond Charters Towers to the Lolworth, Montgomery, and Stopem Blockem Ranges.

Construction: The dam was constructed to full height in 1987 and is used to supply irrigation water and water supply to the coalfields in Moranbah.

Specification: The table below lists general specifications of Burdekin Falls Dam.

Table 2: Burdekin Falls Dam specifications

Description	Specification
Main Dam type	**Mass-concrete gravity**
Full supply level (FSL)	EL 154.00 m
Storage capacity at FSL	1,860,000 ML
Storage area at FSL	22,000 ha
Historical recorded flood—Feb 1991	Max EL 160.85 m (first filling conditions will apply above this level)
Main Dam crest level	EL 172.2 m (left abutment) EL 169.2 m (right abutment)
Maximum height of Main Dam above foundation	57 m (Main Dam)
Length across crest	142 m (left abutment) 230 m (right abutment)
Dam Crest Flood (DCF – right abutment)	1 in 21,000 AEP (2021 hydrology)
Spillway type	**Uncontrolled concrete ogee crest**
Spillway crest level	EL 154.00 m
Spillway capacity at DCF	6,013,500 ML/d (69,600 m^3)
Spillway crest length	504 m
Outlet control	3/3 m x 2 m high-pressure radial gates
Maximum spillway depth at DCF	15.2 m (Lowest DCL – Right abutment)
Left bank Saddle Dam	
Saddle Dam type	Earth and rockfill
Saddle Dam crest level	EL 171m
Length across crest	1,150m
Maximum height of Saddle Dam above foundation	36m

Description	Specification
Mt Graham North Saddle Dam	
Saddle Dam type	Earth and rockfill
Saddle Dam crest level	EL 171 m
Length across crest	1,400 m
Mt Graham South Saddle Dam	
Saddle Dam type	Earth and rockfill
Saddle Dam crest level	EL 171 m
Length across crest	2,100 m
Maximum height of Saddle Dam above foundation	13 m
Northern abutment Saddle Dam	
Saddle Dam type	Earth and rockfill
Saddle Dam crest level	EL 171 m
Length across crest	90 m
Maximum height of Saddle Dam above foundation	5 m

All levels are to Australian Height Datum, AHD.
Conversion for Dam is AHD = ((State Datum in feet x 0.3048)-0.293) m.

3.2 Population at risk

The following is derived from the Burdekin Falls Dam Consequence Assessment conducted by HARC in February 2020 (ref H, Sunwater internal) and informed relevant aspects of the Comprehensive Risk Assessment (ref I, Sunwater internal) as outlined in the following section. The following point summarises key findings of the assessment as it relates to Population at Risk:

- The estimated total Population at Risk for SDF scenario was 8,439 and total PAR for Dam Crest Flood scenario was 12,789. The sunny day failure is caused by the failure of the spillway and the dam crest flood failure is caused by the failure of the left bank saddle dam.

3.3 Upgrade project

A Comprehensive Risk Assessment (CRA) of Burdekin Falls Dam was finalised in December 2021 (ref I). The assessment concluded that the current individual and societal risks are unacceptable and recommended that a full upgrade for a standard's-based approach to ANCOLD fallback Acceptable Flood Capacity (AFC) be undertaken to reduce the inherent level of risk. For an 'Extreme' consequence dam, the AFC is the Probable Maximum Flood (PMF).

The proposed staged dam safety upgrade would involve:

- Stage 1: Improve under-drain system and anchoring of the downstream end of the spillway and rock foundations.
- Stage 2: Upgrade to Probable Maximum Precipitation Design Flood (PMPDF)—raise all Saddle Dams 2 m, install post-tensioned anchors in the Main Dam spillway.

3.4 General arrangement

The general arrangement drawings are in Appendix B.

3.5 Emergency inspections and monitoring

The Burdekin Falls Dam has been designed to conform to modern design standards, so that its failure is highly unlikely. To maintain the dam in a safe condition and detect any dam hazard, as soon as it begins to develop, or becomes apparent, the following is applicable to Burdekin Falls Dam.

3.5.1 Inspections

- **Routine Visual Inspection:** Conducted as per the ANCOLD Guidelines or as directed by the DSTDM.
- **Detailed Inspection:** Conducted annually.
- **Comprehensive Inspection**: Conducted 5 yearly.

3.5.2 Instrumentation and monitoring

To confirm the structural behaviour and safety of the embankment, the following instrumentation was installed, and is monitored, at Burdekin Falls Dam (Main and Saddle Dams).

Main Dam

- **Pore pressure measurement**
  - 8 VWP's installed in the lower gallery into the foundations. Refer to appendix B for the locations.
- **Water level measurement**
  - 5 observation bores located downstream on the right abutment
  - 12 uplift pressure monitoring wells located on both abutments at the downstream toe of the dam wall
  - 34 foundation relief wells (there are 190 foundation relief wells—34 have been prepared for carrying out measurements, 28 located in spillway monos, 3 in right abutment monos, and 3 in left abutment monos)
- **Seepage measurement**
  - 3 v-notch weirs located in the lower gallery.
- **Settlement/movement measurement**
  - 28 surface settlement points.
  - 11 Tiltmeters installed in the galleries, refer to appendix B for locations.
- **Seepage measurement**
  - 3 v-notch weirs located in the lower gallery.
- **Temperature measurements**
  - 2 thermistor arrays, refer to appendix B for the locations.

Left bank Saddle Dam

- **Pore pressure measurement**
  - 11 hydraulic piezometers
- **Water level measurement**
  - 2 observable bores—1 located outside instrumentation terminal building.
- **Seepage measurement**
  - 1 v-notch weir located at Chinamen Creek, downstream of the embankment, near the instrumentation terminal building.

- **Settlement/movement measurement**
    - 6 surface movement points and 6 pickets on the left abutment embankment crest.

NOTE: 4 total pressure cells and 2 electrical piezometers on the left bank Saddle Dam have been decommissioned.

Mount Graham Saddle Dams

- **Settlement/movement measurement**
    - 8 pickets on the Mount Graham North Saddle Dam
    - 13 pickets on the Mount Graham South Saddle Dam

Layout

The instrumentation layout drawings are in Appendix B.

4. Roles and responsibilities

Roles and responsibilities	Position holder
Owner • Liaise with the Board and Minister • Activate Sunwater Strategic Response and Business Continuity Plans if required • Ensure necessary resources are available to manage any event • Maintain an up-to-date list of notifiable D/S residents (Appendix A4) of Burdekin Falls Dam. The downstream limit is indicated in the drawing in Appendix B3 by the zone labelled Limit of downstream notification area. • At all times, aim to provide timely advice and support to the LDMGs in the affected local government areas and the DDMGs in the affected disaster districts. • During a dam hazard emergency event that occurs with little or no warning, undertake the following actions to ensure the community is informed as soon as possible: • notify the residents listed in Appendix A via SMS • contact SDCC Watch Desk to request an Emergency Alert campaign throughout the Burdekin Falls Dam Emergency polygons • During a dam hazard event that occurs with adequate warning; notify the residents listed in Appendix A via SMS, unless otherwise agreed with the LDMGs. • Record communications, notifications and observations as required	CEO EGMO EGME&WR
Owner's Head Office Representative • Authorise the issuing of EAPs, SOPs and O&M Manuals and Amendments • Facilitate dam safety training courses for Service Managers, Operations Supervisor, Dam Operators and other staff as appropriate and ensure that all staff required to undertake dam safety work are trained and accredited • Ensure that risks identified in CRAs, or other technical reports undertaken in relation to dam safety are Included in the EAP • Ensure visual inspections and instrumentation monitoring frequencies conform to ANCOLD Guidelines • Ensure all dam safety work orders, work instructions and lesson learned outcomes are fully implemented. • Ensure requirements of the Dam Condition Schedule are met • Ensure the work instructions are correct and the logbooks, SOPs, data books, and EAPs are reviewed annually as per the Condition Schedule • Undertake and prepare the five yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified in the Condition Schedule and that work orders are created for recommendations and work is undertaken as required • Undertake Annual Inspections and prepare reports within the time frames specified in the Condition Schedule and that work orders are created for recommendations and work is undertaken as required • Review the Dam Safety Instrumentation Database and evaluate data to verify the structural integrity of the dams on a regular basis and maintain a spreadsheet for verification for audit and quality control • Record communications, notifications and observations as required	GM Asset Integrity GM Asset Management
Owner's Regional Representative (ORR) • Liaise with the Storage Supervisor/Operator Maintainer • Arrange dam specific training and accreditation for relevant staff • Ensure competent, trained and accredited personnel operate the storages	GM North OCO OS

Roles and responsibilities	Position holder
• Undertake the role of LEC as required • Record communications, notifications and observations as required • Ensure all work orders, work instructions and lesson learned outcomes are fully implemented.	
Technical Advisor • Analyse the situation and provide expert technical advice • Discuss issues with peers and other technical experts and make sound decisions to mitigate the risk • Determine response to incidents and emerging issues • Record communications, notifications and observations as required	GM Environment
Dam Safety Technical Decision Maker (DSTDM) • Analyse the situation and provide expert technical advice in relation to dam safety • Discuss dam hazard with peers and other technical experts and make sound decisions to mitigate the risk • Determine response to incidents and emerging issues • Issue warning on dam failure and advise on protective measures • Ensure the EAP is implemented appropriately and carry out the DSTDM role as required • Maintain current RPEQ accreditation • Liaise with Regulator as required • Record communications, notifications and observations as required	Various personnel as per DSTDM roster
Flood Operations Decision Maker (FODM) • Maintain current RPEQ accreditation. • Provide hydrological advice in relation to predicted and actual dam outflows including assessment of weather and flood warnings and other related matters as identified in the OC SOP. • Interpret and apply rainfall data in accordance with the OC SOP, including, as required under the OC SOP, liaising with BOM. • Ensure the EAP is implemented appropriately and carry out the FODM role as required. • Record communications, notifications and observations as required.	Various personnel as per FODM roster
Operations Centre Duty Officer (OCDO) • Decide if a flood is imminent and record modes of operation • Extract data relative to the event from available sources • Utilise this data in predictive flood models and determine results from these models for approval by FODM • Liaise with the FODM or IC to update current flood situation and routing data • Record communications, notifications and observations as required	Various personnel as per OC roster
Sunwater Media Team (SMT) • Analyse sensitive issues, discuss with the Owner and issue media releases • Handle public and customer comments (including social media) and advise the Owner if necessary • Liaise with the IC and update SDMG of flood events • Record communications, notifications and observations as required	Various personnel as per Media Team roster
Incident Coordinator (IC) • Notify council of intent to use the Emergency Alert • Activate the EAP	Various personnel as per IC roster

Roles and responsibilities	Position holder
• Ensure the EAP is implemented appropriately and carry out the IC role as required • Arrange Situation Reports and determine frequency, as required • Record communications, notifications and observations as required	
Local Event Coordinator (LEC) • Liaise with the Local Disaster Coordinator or proxy • Activate the EAP, when necessary • Ensure the EAP is implemented appropriately and carry out the LEC role as required • Record communications, notifications and observations as required	Various personnel as per LEC roster
Dam Duty Officer (DDO) • Complete accreditation to operate and maintain relevant storage • Ensure the EAP is implemented appropriately and carry out the DDO role as required • Take direction from the DSTDM and IC as requested • Arrange immediate site inspection and make informed assessment of the situation • Escalate any issue not covered in the EAP or where actions are not clear • Record communications, notifications and observations as required	SOM SS OM
Councils (Burdekin Shire, Charters Towers Regional, Whitsunday Regional and Townsville City) Council has legislated local government functions, as per Section 80 of the Disaster Management Act (2003). These include: • Ensure it has a disaster response capability • Approve its local disaster management plan • Ensure information about an event or a disaster in its area is promptly given to the District Disaster Coordinator for the disaster district in which area it is situated • Perform other functions given to the local government under the Act And as per Section 352HB of the Water Legislation (Dam Safety) Amendment Act (2017): • Must assess (in consultation with its LDMG) the EAP for consistency with the Local Disaster Management Plan	
Disaster Management Groups/Personnel - (In addition to requirements outlined in the Disaster Management Act 2003). LDMGs • Assist Sunwater and the Burdekin Shire Council, Charters Towers Regional Council, Whitsunday Regional Council and Townsville City Council to ensure community education around messaging and impacts of EAP related events is undertaken and continually improves • Work with Burdekin Shire Council, Charters Towers Regional Council, Whitsunday Regional Council, Townsville City Council and Sunwater to ensure the EAP is regularly exercised • Identify and coordinate the use of manpower and resources that may be required for an EAP event • Identify and provide advice to DDMG about support services required by the LDMG to manage an EAP event • Provide reports and make recommendations to the relevant DDMG about matters relating to EAP events and any support required QFD • Work with dam owner and LDMGs to ensure Emergency Alerts polygons are prepared, stored and tested DDMG • DDMG may review plan with consistency with the District Disaster Management Plan	LDMG DDMG QFD

Roles and responsibilities	Position holder
Dam Safety Regulator (DSR) • Liaise with relevant Minister on necessary actions • Approve this document as required under legislation • Liaise with the Chief Executive as required in administering (regulating) the *Water Supply (Safety and Reliability) Act 2008*	DDS

5. Dam hazard—flood operations

5.1 Overview

The emergency action described in this section (Dam hazard—flood operations) relates to:

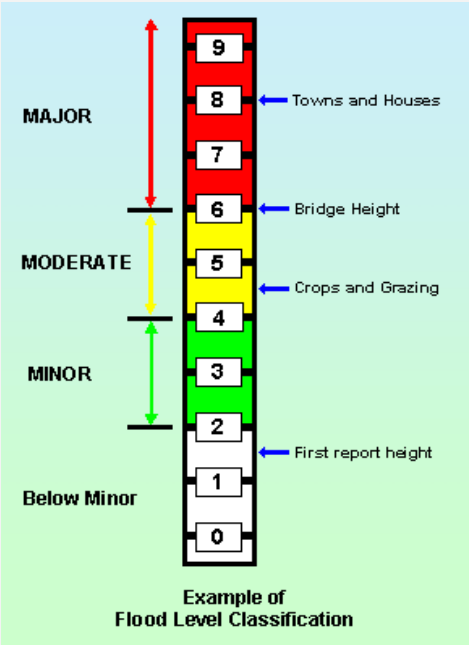
- A dam hazard where natural catchment inflows fill Burdekin Falls Dam to FSL 154.00m and the rate of inflow exceeds the capacity of the outlet works. The spillway will then discharge water downstream into the Burdekin River. These flood flows can create a downstream release hazard. Inflows will also cause the storage to temporarily rise to above the FSL of the storage. Note:
  - The greater the rate of inflow, the higher the storage will rise.
  - The higher the storage level rises, the greater the loads on the dam structure.
  - Although unlikely, the greater the loading, the higher the likelihood of a dam failure.
  - Typically, the level of surveillance is increased during flood operations (refer tables in this section).
  - Spillway discharge from the dam where there have been no indications that a dam failure may be initiating or in progress.

Table 3 provides the Bureau of Meteorology flood classification triggers for Burdekin Falls Dam, described as:

- For below minor flood, the water will be contained within the river and will not create a significant flood risk downstream.
- As the rate of discharge increases, there will be an impact on low-level road crossings of the Burdekin River and other infrastructure in the river such as pump sites.
- When the storage height exceeds minor flood level (3.0m over the spillway) EL 157.00m, low-lying areas next to water courses are inundated. Minor roads may be closed, and low-level bridges submerged. In urban areas, inundation may affect some backyards and buildings below the floor level, as well as bicycle and pedestrian paths. In rural areas, removal of stock and equipment may be required.
- When the storage height exceeds major flood level (8.0m over the spillway) EL 162.00m, in addition to the above, extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas may be required. Utility services may be impacted.

Detailed information on downstream flood impacts is presented in Appendix B.

Table 3: Flood classification triggers

	Flood classification level	Depth over spillway (m)	Storage elevation (m AHD)
	Major	8.00	162.00
	Moderate	5.50	159.50
	Minor	3.00	157.00

Source: Bureau of Meteorology

The following table shows historical floods experienced at Burdekin Falls Dam.

Table 4: Historical floods experienced at Burdekin Falls Dam

Flood rank	Date	Peak height EL (AHD)	Peak height (m over crest)	Peak Gauge Height at Inkerman Bridge (m)
1	February 1991	160.85m	6.85m	11.50
2	February 2009	160.73m	6.73m	11.55
3	February 2019	160.46m	6.46m	10.93
4	February 2009	159.22m	5.22m	10.80
5	March 2012	159.10m	5.10m	10.96

Note: Peak flood heights at the dam and Inkerman Bridge are not directly related due to many factors including but not limited to; initial dam level prior to rainfall, temporal and spatial rainfall variability, and inflows downstream of the dam (e.g., Bowen and Bogie Rivers).

5.2 Emergency actions

In the table below, each level of activation includes both its own actions and the actions of any lower level, unless those lower-level actions are superseded.

5.2.1 Activation triggers

Table 5: Flood emergency activation trigger summary

Alert	• EL 153.90m and rising (0.1m below FSL)
Lean Forward	• Storage above FSL 154.00m
Stand Up 1— greater than minor flood level	• Storage above EL 157.00m (Minor flood classification level)
Stand Up 2— greater than flood of record	• Storage above EL 160.85m (Flood of record February 1991)
Stand Up 3— greater than major flood level	• Storage above EL 162.00m (Major flood classification level)
Stand Up 4 — failure imminent	• Storage above EL 171.00m (allowing for wave action) OR; • As advised by the DSTDM
Stand Down	• Storage level EL 154.30m and falling with no forecast increase in EL

While this EAP is not activated until Burdekin Falls Dam reaches a level of 153.90m, Sunwater and Burdekin Shire Council, Charters Towers Regional Council, Whitsunday Regional Council and Townsville City Council will work cooperatively and will endeavour to share intelligence of any rainfall event as and when either organisation becomes aware of a situation that could result in the activation of the EAP.

The activation of Stand Up 4 requires consideration of wave action. For example, if the gauge reading was forecast to reach 1 m below the dam crest level and the DDO reported 1 m high waves, Stand Up 4 will be triggered. Furthermore, the DSTDM may also trigger this activation if there are any dam safety concerns as the storage approaches dam crest level.

5.2.2 Emergency actions

Table 6 to Table 11 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)
- Flood Operation Decision Maker (FODM)
- Operations Centre Duty Officer (OCDO).

Table 6: Flood operations—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up 1 — greater than minor flood level	Stand Up 2 — greater than flood of record	Stand Up 3 — greater than major flood level	Stand Up 4 — failure imminent	Stand Down
Activation trigger	• EL 153.90m and rising (0.1m below FSL)	• Storage above FSL 154.00m	• Storage above EL 157.00m	• Storage above EL 160.85m	• Storage above EL 162.00m	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• Storage level EL 154.30m and falling with no forecast increase in EL
Actions	• Inspect the dam daily (or as instructed by the DSTDM) and photograph/video the dam once whilst in Alert stage and record using approved forms and send to IC & DSTDM • Record the river levels at Sellheim 120002C, Mt Fullstop 120110A, Blue range 120107B, and Scartwater Station (on Sutton River) at 24-hour intervals • Undertake site preparations including but not limited to: – check fuel and operation of backup generator – check operations of sump pump – check communication systems (including backup, satellite/digital phones, fax, and internet) • Notify the SO	• As per previous activation level, AND • Inspect the dam daily (or as instructed by the DSTDM) and photograph/video and record using the approved forms and send to IC & DSTDM. Attention will be given to: – visual inspection of flow patterns over spillway and dissipator for evidence of scouring – inspect embankment for leaks, deformation, and erosion – check the seepage in the galleries and record the flow of v-notch weirs • Report any unusual readings or observations to the DSTDM & IC as soon as practical • Undertake road closures when storage level reaches EL 154.0m	• As per previous activation level, AND • Inspect the dam twice daily (or as instructed by the DSTDM) and photograph/video and record using the approved forms and send to IC & DSTDM • Daily inspections to include Saddle Dams from the time water level reaches the U/S toe at: – EL 158.00m Mt Graham Sth – EL 160.00m Mt Graham Nth • Read instrumentation daily (or as instructed by the DSTDM) for both the Main Dam and left Bank Saddle Dam, as detailed in Section 3.5.2	• As per previous activation level, AND • Undertake uplift pressure readings, if safe to do so • Daily inspections to include the northern Abutment Saddle from the time water level reaches the U/S toe at EL 166.00m	• As per previous activation level, AND • Undertake uplift pressure readings, if safe to do so	• As per previous activation level, AND • Record any crest movement (S6) or joint movement (S16) • Undertake visual surveillance across spillway from left abutment, looking for unusual flow in the spillway. Report to DSTDM and IC immediately **NOTE:** No additional uplift pressure readings required as completed in previous activation level, unless directed	• Return to routine surveillance activities and frequencies—inspect the dam for any damage and photograph any damage identified • Forward information for EER to IC email • Update Dam Logbook as per SOP 12 • Return to routine activities • Remove road closures when storage level drops below FSL 154.00m

DDO ALERT ACTIONS CONTINUED NEXT PAGE

ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO
e.g., taking photographs/video, dam inspections, instrument readings

Table 6 (Continued): Flood Operations—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up 1 — greater than minor flood level	Stand Up 2 — greater than flood of record	Stand Up 3 — greater than major flood level	Stand Up 4 — failure imminent	Stand Down
Activation trigger	• EL 153.90m and rising (0.1m below FSL)	• Storage above EL 154.00m	• Storage above EL 157.00m	• Storage above EL 160.85m	• Storage above EL 162.00m	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• Storage level EL 154.30m and falling with no forecast increase in EL
Actions	*(Continued)* • Record the Storage Level daily (or as instructed by the DSTDM) • Record rainfall daily • Record all communication • Update Dam Logbook as per SOP 12						
Internal notifications	1. IC 2. SO 3. LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • DSTDM	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As required	• As required	• As per previous activation level

Table 7: Flood operations—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up 1 — greater than minor flood level	Stand Up 2 — greater than flood of record	Stand Up 3 — greater than major flood level	Stand Up 4 — failure imminent	Stand Down
Activation trigger	• EL 153.90m and rising (0.1m below FSL)	• Storage above FSL 154.00 m	• Storage above EL 157.00m	• Storage above EL 160.85m	• Storage above EL 162.00m	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• Storage level EL 154.30m and falling with no forecast increase in EL
Actions	• Liaise with DDO, IC and LDMGs re: situation • Develop/implement staff roster • Record all communication **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 8: Flood operations—IC emergency action

Activation level	Alert	Lean Forward	Stand Up 1 — greater than minor flood level	Stand Up 2 — greater than flood of record	Stand Up 3 — greater than major flood level	Stand Up 4 — failure imminent	Stand Down
Activation trigger	• EL 153.90m and rising (0.1m below FSL)	• Storage above FSL 154.00 m	• Storage above EL 157.00m	• Storage above EL 160.85m	• Storage above EL 162.00m	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• Storage level EL 154.30m and falling with no forecast increase in EL
Actions	• **Liaise with Sunwater Customer Support to send SMS** • Liaise with the DDO, LEC, DSTDM, OCO and the FODM as required • Obtain catchment conditions from the DDO and liaise with FODM and obtain PFRM • Check the Clare Weir flood gates are in Automatic • Create Incident Report Record • **Update Sunwater intranet with dam status**	• As per previous activation level, AND • Ensure all abnormal observations or damage have been reported to DSTDM **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • Ensure DDO undertaking and reporting additional surveillance	• Deactivate EAP • Compile EER and deliver to DSR if required • Create Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	1. DDO 2. DSTDM 3. FODM 4. LEC/ORR 5. SMT 6. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level 1. SMT 2. SRT	• As per previous activation level
External notifications	1. DDMG 1 2. DDMG 2 3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • SDCC Watch Desk	• As per previous activation level

Table 9: Flood operations—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• When EL 153.90m and rising (preparedness)	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4**	Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level
Lean Forward	• Storage above FSL 154.00m	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level and whether any flood releases are due to commence Discuss any potential road/bridge closures
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater media team to send appropriate messaging via SMS**
Stand Up 1 — greater than minor flood level	• Storage above EL 157.00m	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? (storage is greater than minor flood level, as set by BOM) Advise of current storage level Advise of any forecasts you are aware of
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater media team to send appropriate messaging via SMS**

13 15 89 Sunwater Customer Support 24-hour contact line

Table 9 (Continued): Flood Operations—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up 2 — greater than flood of record	• Storage above EL 160.85m (Flood of record—Feb 1991)	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? (storage is greater than flood of record) Advise of current storage level Advise of any forecasts you are aware of
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater media team to send appropriate messaging via SMS**
Stand Up 3 — greater than major flood level	• Storage above EL 162.00m	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? (storage is greater than major flood level, as set by BOM) Advise of current storage level Advise of any forecasts you are aware of
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater media team to send appropriate messaging via SMS**

Table 9 (Continued): Flood Operations—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up 4 — failure imminent	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? (critical level—monoliths are now unstable and/or saddle dams also likely to flood) Advise of current storage level Advise of any forecasts you are aware of
		• SDCC Watch Desk	Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater media team to send appropriate messaging via SMS**
Stand Down	• Storage level EL 154.3m	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level Advise EAP has been deactivated

Table 10: Flood operations—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up 1 — greater than minor flood level	Stand Up 2 — greater than flood of record	Stand Up 3 — greater than major flood level	Stand Up 4 — failure imminent	Stand Down
Activation trigger	• EL 153.90m and rising (0.1m below FSL)	• Storage above FSL 154.00m	• Storage above EL 157.00m	• Storage above EL 160.85m	• Storage above EL 162.00m	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• Storage level EL 154.30m and falling with no forecast increase in EL
Action	• Provide technical advice to DDO and IC on a needs basis • Review surveillance reports and determine is any additional responses are required • Notify DSR • Record all communications	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • Evaluate uplift pressure readings	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level
External notifications	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 11: Flood operations—FODM emergency action

Activation level	Alert	Lean Forward	Stand Up 1 — greater than minor flood level	Stand Up 2 — greater than flood of record	Stand Up 3 — greater than major flood level	Stand Up 4 — failure imminent	Stand Down
Activation trigger	• EL 153.90m and rising (0.1m below FSL)	• Storage above FSL 154.00m	• Storage above EL 157.00m	• Storage above EL 160.85m	• Storage above EL 162.00m	• Storage above EL 171m (allowing for wave action) OR; • As advised by the DSTDM	• Storage level EL 154.30m and falling with no forecast increase in EL
Action	• Extract data from available sources • Update flood models as per SOP • Update and issue flood operations report • Record all communication	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• As per previous activation level, AND • DSTDM	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As required	• As required	• As per previous activation level

6. Dam hazard—overturning or sliding of monoliths

6.1 Overview

The emergency action described in this section relates to a potential emergency event due to overturning or sliding of one or more of the concrete monoliths.

If one or more monoliths become unstable, a dam failure may result. If movement is detected early, remedial actions may be possible depending on the nature of the damage.

The stability of the dam in its current configuration has been fully evaluated. Overturning or sliding of a monolith may be possible for the levels outlined in the Emergency Action Tables.

It is estimated from the 2021 CRA (HB# 2720029) that the stability of the spillway monoliths is affected for the partition at EL 167.2 m to EL 169.2 m. The stability of the monolith is affected as tension occurs at the heel. Due to this, Stand Up 1 is triggered at EL 167.2 m and Stand Up 2 is triggered at EL 169.2 m.

It is possible that an unstable situation could eventuate that would lead to a dam failure. The most likely cause of a change that could lead to an unstable situation would be scouring at or near the toe of a monolith during a flood.

The flood outlines in Appendix B are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by overturning or sliding of monoliths. The use of these flood outlines is prescribed below:

- Use the Sunny Day Failure (SDF) outline when a dam failure is in progress or likely due to overturning or sliding of monoliths and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the Probable Maximum Flood (PMF) outline when a dam failure is in progress or likely due to overturning or sliding of monoliths and concurrent flooding or downstream releases are occurring or expected to occur.

Notes: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in Section 1.3

If the DSTDM forms the view that significant scouring is occurring, then the need for evacuations should be considered by disaster management authorities.

6.1.1 Assessment of circumstances that indicates an increase in the likelihood of overturning

An earthquake is a circumstance that could indicate an increased likelihood of overturning. Inspections following an earthquake would identify if any movement had taken place which is the Alert status for overturning.

An increase in lake level beyond 160.85m is a circumstance that could indicate an increased likelihood of overturning. This circumstance is the trigger for the Lean Forward status for overturning.

6.2 Emergency action roles

Table 12 to Table 16 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)

Figure 2: Overturning or sliding of monoliths flowchart

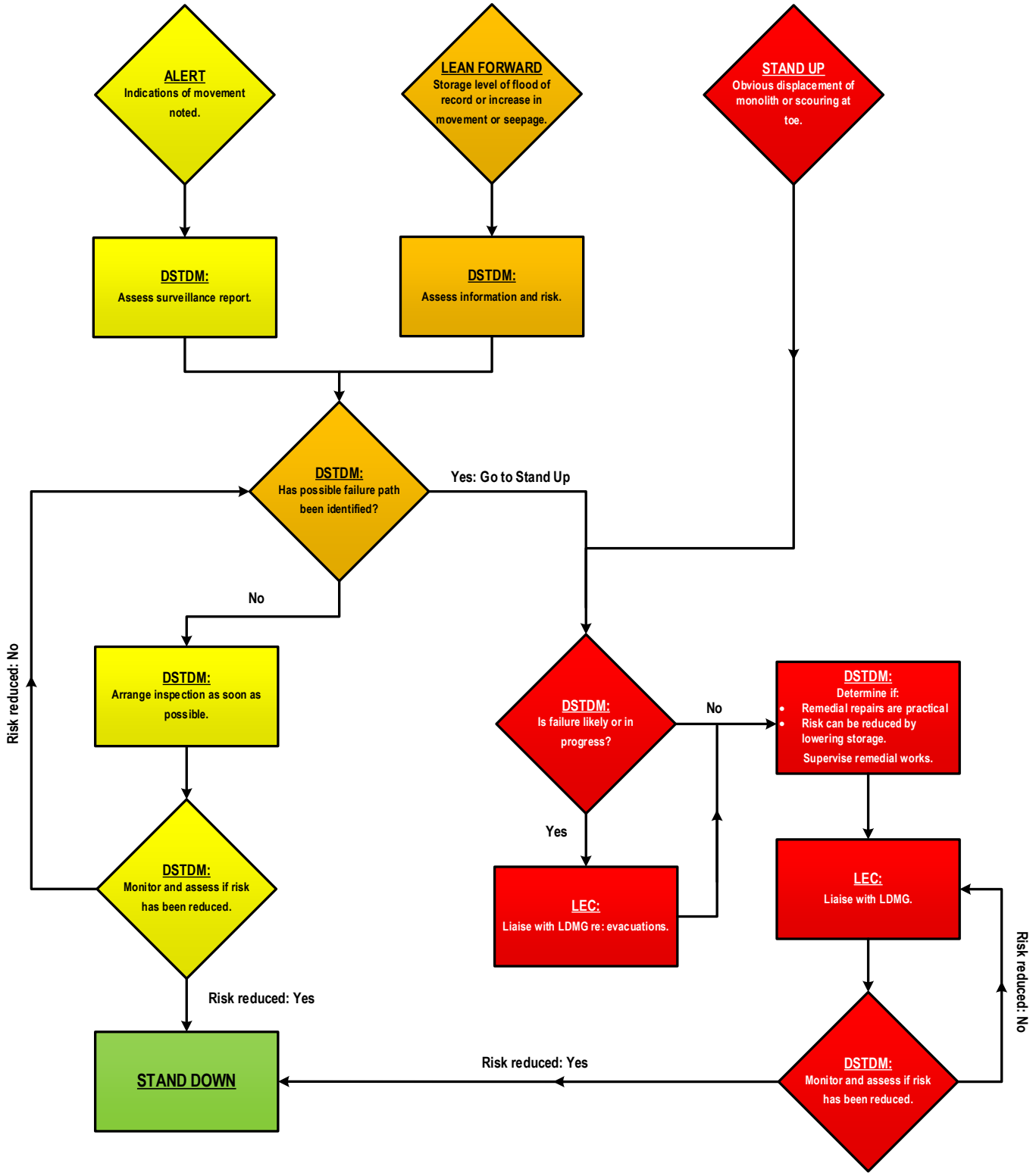


Table 12: Overturning or sliding of monoliths—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Indications of movement of monoliths noted such as cracking, increased seepage, or opening of joints	• Storage level at flood of record EL 160.85m, OR • Increase in movement, pressures, or seepage	• Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam, OR • Storage Level at EL 167.2m	• Failure in progress or likely due to sliding or overturning, OR • Storage Level at EL169.2 m	• Risk assessment has determined that sliding or overturning risk has reduced
Actions	• Measure, record and report foundation drain pressures to DSTDM. • Monitor dam every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable or as directed by the IC • Photograph/video the piping from a safe point and record using the approved forms and send to IC & DSTDM • Notify SO • Update Dam Logbook as per SOP 12 • Record all communication	• As per previous activation level, AND • Maintain photographic record	• As per previous activation level, AND • Lower the storage if directed • Close any affected roads if not already closed by others • Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public	• As per previous activation level, AND • Vacate the immediate vicinity of the dam	• Forward information for EER to IC email • Update Dam Logbook as per SOP 12 • Return to routine activities
Internal notifications	1. DSTDM 2. SO 3. IC 4. LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As per previous activation level

Table 13: Overturning or sliding of monoliths—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Indications of movement of monoliths noted such as cracking, increased seepage, or opening of joints	• Storage level at flood of record EL 160.85m, OR • Increase in movement, pressures, or seepage	• Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam, OR • Storage Level at EL 167.2m	• Failure in progress or likely due to sliding or overturning, OR • Storage Level at EL169.2 m	• Risk assessment has determined that sliding or overturning risk has reduced
Actions	• Liaise with IC and DDO re: situation • Record all communication **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level, AND • Liaise with LDMGs re: situation	• As per previous activation level, AND • Liaise with relevant council(s) regarding potential road/bridge closures	• As per previous activation level, AND • Liaise with LDMGs re: potential for evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 14: Overturning or sliding of monoliths—IC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Indications of movement of monoliths noted such as cracking, increased seepage, or opening of joints	• Storage level at flood of record EL 160.85m, OR • Increase in movement, pressures, or seepage	• Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam, OR • Storage Level at EL 167.2m	• Failure in progress or likely due to sliding or overturning, OR • Storage Level at EL169.2 m	• Risk assessment has determined that sliding or overturning risk has reduced
Actions	• Liaise with DDO, LEC, OCO and DSTDM re: situation • Create Incident Report Record • **Update Sunwater intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level, AND • Place machinery operators on standby if directed by DSTDM	• As per previous activation level, AND • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level, AND • Liaise with DDO, DSTDM, and LEC re: potential for evacuations	• Deactivate EAP • Compile EER and deliver to DSR if required • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	1. DDO 2. DSTDM 3. LEC/ORR 4. SMT 5. SRT	• As per previous activation level	• As per previous activation level	1. As per previous activation level	• As per previous activation level
External notifications	• As required	1. DDMG 1 2. DDMG 2	1. D/S Residents 2. SDCC Watch Desk	• As per previous activation level	• As per previous activation level

Table 15: Overturning or sliding of monoliths—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Indications of movement of monoliths noted such as cracking, increased seepage, or opening of joints	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4**	Phone	Describe current situation with dam—What is the event? *(unconfirmed instability of dam)* What is the status? *(under investigation)* Advise of current storage level Advise of any forecasts you are aware of
Lean Forward	• Storage level at flood of record, EL 160.85m, OR • Increase in movement, pressures, or seepage	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(unconfirmed instability of dam)* What is the status? *(under investigation)* Advise of current storage level Advise of any forecasts you are aware of
Stand Up—1	• Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam, OR • Storage Level at EL 167.2m	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with Dam—What is the event? *(confirmed instability of dam)* What is the status? *(prepare for possible evacuations)* Advise of current storage level Advise of any forecasts you are aware of Discuss any potential road/ bridge closures
		• SDCC Watch desk	Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**

Table 15 (Continued): Overturning or sliding of monoliths—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up—2	• Failure in progress or likely due to sliding or overturning, OR • Storage Level at EL169.2 m	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(possible dam failure)* What is the status? *(prepare coordinated evacuation)* Advise of current storage level Advise of any forecasts you are aware of
		• SDCC Watch desk	Phone & Email	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**
	• Dam failure in progress	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(dam failure)* What is the status? *(dam failure in progress move to higher ground—LDMG coordinate evacuation of affected downstream residents)* Advise of current storage level Advise of any forecasts you are aware of
		• SDCC Watch desk	Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**

Table 15 (Continued): Overturning or sliding of monoliths—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Down	• Risk assessment has determined that risk has reduced	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level Advise EAP has been deactivated

Table 16: Overturning or sliding of monoliths—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Indications of movement of monoliths noted such as cracking, increased seepage, opening of joints	• Storage level at flood of record, EL 160.85m, OR • Increase in movement, pressures or seepage	• Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam, OR • Storage Level at EL 167.2m	• Failure in progress or likely due to sliding or overturning, OR • Storage Level at EL169.2 m	• Risk assessment has determined that sliding or overturning risk has reduced
Action	• Review surveillance inspection of the dam and assess its condition as soon as possible • Determine if there are possible failure paths from reported damage • Assess results from foundation drain pressure measurements • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Monitor situation and assess risks • Notify DSR • Record all communication	• As per previous activation level	• As per previous activation level, AND • Assess risk and determine if failure likely or in progress • Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO). • Liaise with the IC • Determine if remedial repairs are practical	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level
External notification	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

7. Dam hazard—piping: Saddle/Main Dam embankment, foundation, or abutments

7.1 Overview

The emergency action described in this section relates to a potential emergency event due to a piping condition through the embankment (Main Dam or Saddle Dams), foundations, or dam abutment. An early indicator of a piping condition can be an increase in seepage or a new area of seepage. If the seepage water is cloudy or has become cloudy, this may indicate that material is being transported and a pipe is being established.

If a pipe is established and progresses, then a dam failure may result. If a potential pipe is detected early, remedial repairs maybe possible in the form of constructing a filter and weighting zone over the pipe exit if safe to do so.

The flood outlines in Appendix B are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by piping. The use of these flood outlines is prescribed below:

- Use the Sunny Day Failure (SDF) outline when a dam failure is in progress or likely due to piping and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the Probable Maximum Flood (PMF) outline when a dam failure is in progress or likely due to piping and concurrent flooding or downstream releases are occurring or expected to occur.

Notes: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in Section 1.3

7.1.1 Assessment of circumstances that indicates an increase in the likelihood of piping

An increase in seepage or a new area of seepage is a circumstance that could indicate an increased likelihood of piping. This circumstance is the trigger for the Alert status for piping.

Cloudy seepage water is a circumstance that could indicate an increased likelihood of piping. This circumstance is the trigger for the Lean Forward status for piping.

7.2 Emergency action roles

Table 17 to Table 21 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)

Figure 3: Piping: Saddle/Main Dam embankment, foundation, or abutments flowchart

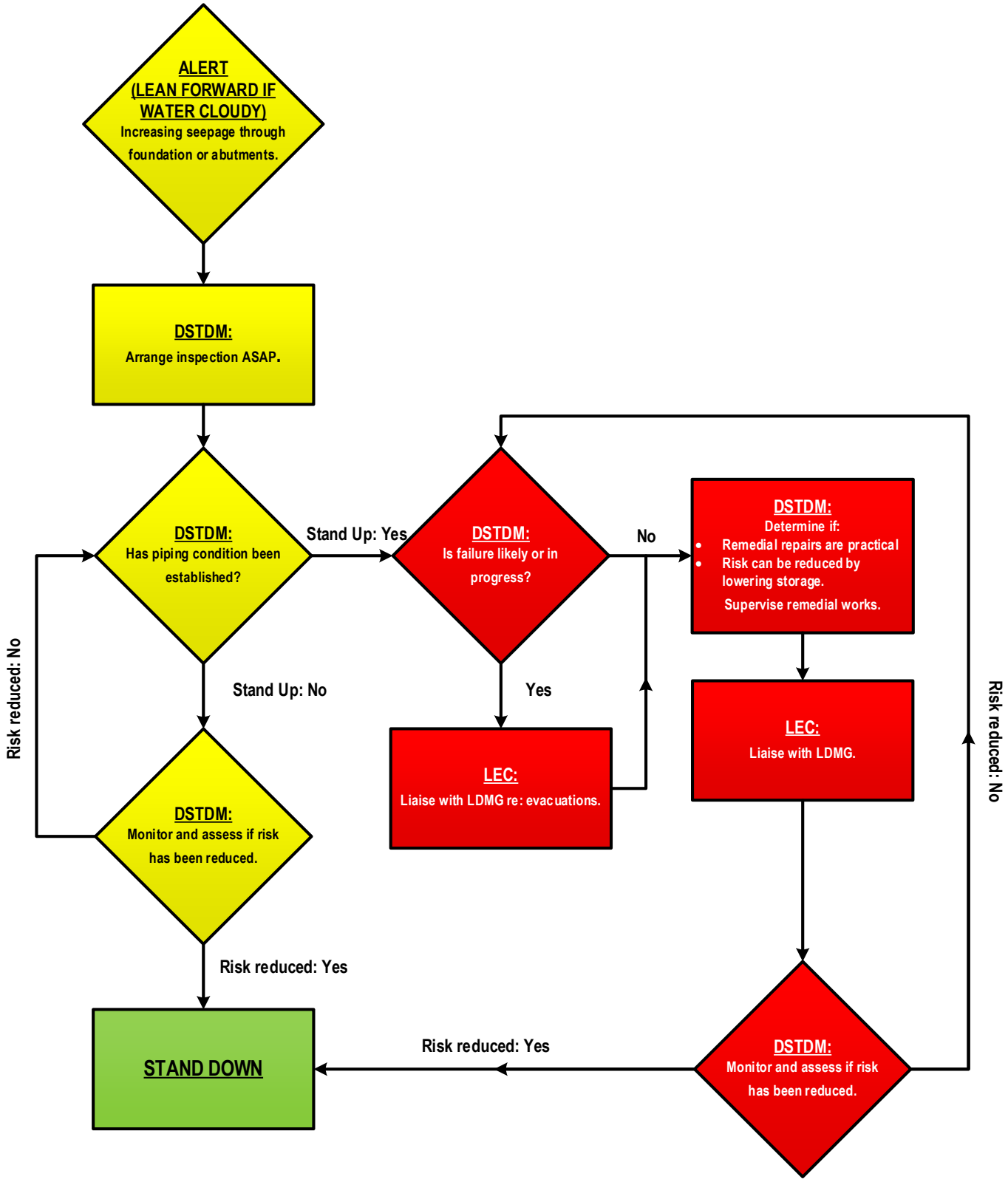


Table 17: Piping: Saddle/Main Dam embankment, foundation, or abutments—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing leakage through the embankment, the foundations, or abutments	• Increasing leakage through the embankment, the foundations, or abutments with cloudy water	• Piping condition has been established	• Failure in progress or likely due to piping, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that piping risk has reduced
Actions	• Monitor flows every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable, or as directed by the IC • Photograph/video the piping from a safe point and record using the approved forms and send to IC & DSTDM • Notify SO • Update Dam Logbook as per SOP 12 • Record all communication	• As per previous activation level	• As per previous activation level, AND • Support/supervise remedial works as required • Lower the storage if directed • Close any affected roads if not already closed by others • Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public	• As per previous activation level, AND • Vacate the immediate vicinity of the piping condition • Ensure remedial works cease and plant and personnel have been moved to a safe location • Record/photograph the piping damage and/or dam failure from a safe point	• Inspect the dam for any damage and photograph any damage identified during the event. • Forward information for EER to IC email • Update Dam Logbook as per SOP 12 • Return to routine activities
Internal notifications	1. DSTDM 2. IC 3. SO 4. LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As per previous activation level

Table 18: Piping: Saddle/Main Dam embankment, foundation, or abutments—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing leakage through the embankment, the foundations, or abutments	• Increasing leakage through the embankment, the foundations, or abutments with cloudy water	• Piping condition has been established	• Failure in progress or likely due to piping, and • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that piping risk has reduced
Actions	• Liaise with DDO, IC and LDMGs re: situation • Record all communication **NOTE 1**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level	• As per previous activation level, AND • Liaise with relevant council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 19: Piping: Saddle/Main Dam embankment, foundation, or abutments—IC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing leakage through the embankment, the foundations, or abutments	• Increasing leakage through the embankment, the foundations, or abutments with cloudy water	• Piping condition has been established	• Failure in progress or likely due to piping, and • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that piping risk has reduced
Actions	• Liaise with DDO, LEC, OCO and DSTDM re: situation • Create Incident Report Record • Complete Situation Report, unless otherwise directed. Update Sunwater intranet with dam status. **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level, AND • Investigate availability of machinery and materials (if insufficient stockpiles available) • Place machinery operators on standby if directed by DSTDM • Consider the need to appoint a recovery coordinator. The recovery coordinator is then responsible for the follow through on actions to close out all matters and works outstanding after the initial emergency is over.	• As per previous activation level, AND • Liaise with Sunwater Customer Support to send SMS to D/S residents and phone those without mobiles • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level, AND • Liaise with the DSTDM to confirm that dam failure is in progress • Confirm that remedial works have ceased if directed by the DSTDM and plant and personnel have been moved to a safe location • Liaise with DDO and DSTDM re: potential for evacuations	• Deactivate EAP • Compile EER and deliver to DSR if required • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	1. DSTDM 2. DDO 3. LEC/ORR 4. SMT 5. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level 1. SMT 2. SRT	• As per previous activation level
External notifications	• As required	• As per previous activation level, AND 1. DDMG 1 2. DDMG 2 3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4	• As per previous activation level, AND 1. D/S Residents 2. SDCC watch Desk	• As per previous activation level	• As per previous activation level

Table 20: Piping: Saddle/Main Dam embankment, foundation, or abutments—LEC & IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Increasing leakage through an embankment, the foundations, or abutments	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4**	Phone	Describe current situation with dam—What is the event? *(Unconfirmed piping risk)* What is the status? *(Unconfirmed leakage—Investigation continues)* Advise of current storage level Advise any issues you are aware of Standby for further advice
Lean Forward	• Increasing leakage through an embankment, the foundations, or abutments with cloudy water	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Unconfirmed piping risk)* What is the status? *(Unconfirmed leakage—Investigation continues)* Advise of current storage level Advise any issues you are aware of Standby for further advice
Stand Up—1	• Piping condition has been established	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Confirmed piping risk).* What is the status? *(Confirmed piping/leakage)* Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures Prepare for possible evacuations
		• SDCC Watch Desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**

Table 20 (Continued): Piping: Saddle/Main Dam embankment, foundation, or abutments—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up—2	• Failure likely due to piping, AND • Sufficient water in storage to create a dam failure risk	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Confirmed piping risk)* What is the status? *(Possible Dam Failure)* Advise of current storage level Prepare coordinated evacuations
		• SDCC Watch Desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**
	• Dam Failure in progress	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Confirmed piping risk)* What is the status? *(Dam Failure In Progress)* Advise of current storage level Coordinate evacuations of affected Downstream Residents and move people to higher ground
		• SDCC Watch Desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**
Stand Down	• Risk assessment has determined that piping risk has reduced	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with Dam—What is the event? *(Dam Safety Risk—piping)* What is the status? *(Dam hazard Stood Down)* Advise risk assessment has determined that piping risk has reduced, and EAP has been deactivated

Table 21: Piping: Saddle/Main Dam embankment, foundation, or abutments—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing leakage through the embankment, the foundations, or abutments	• Increasing leakage through the embankment, the foundations or abutments with cloudy water	• Piping condition has been established	• Failure in progress or likely due to piping, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that piping risk has reduced
Action	• Arrange an inspection of the dam to assess its condition as soon as possible, when safe to do so • Determine if piping condition has been established • Monitor situation and assess risks • Advise DSR on EAP activation	• As per previous activation level	• Assess risk and determine if failure likely or in progress • Liaise with the IC • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO) • Supervise* remedial repairs (if applicable) • Monitor situation and assess risks	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level
Internal notifications	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

* Supervise means provide technical oversight to the work. It does not necessarily mean on-site supervision.

8. Dam hazard—earthquake

8.1 Overview

The emergency action described in this section relates to a potential emergency event due to an earthquake causing damage to the dam embankment (Main Dam or Saddle Dams), foundations, or dam abutment. Damage could take the form of cracking or slumping of the embankment, deformation or land slip, or increased seepage.

If damage does occur, then a dam failure may result. If damage is detected early, remedial repairs may be possible depending on the nature of the damage.

The flood outlines in Appendix B are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by an earthquake. The use of these flood outlines is prescribed below:

- Use the Sunny Day Failure (SDF) outline when a dam failure is in progress or likely due to an earthquake and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the Probable Maximum Flood (PMF) outline when a dam failure is in progress or likely due to earthquake and concurrent flooding or downstream releases are occurring or expected to occur.

Notes: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in Section 1.3

8.2 Emergency action roles

Table 22 to Table 26 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)

Figure 4: Earthquake flowchart

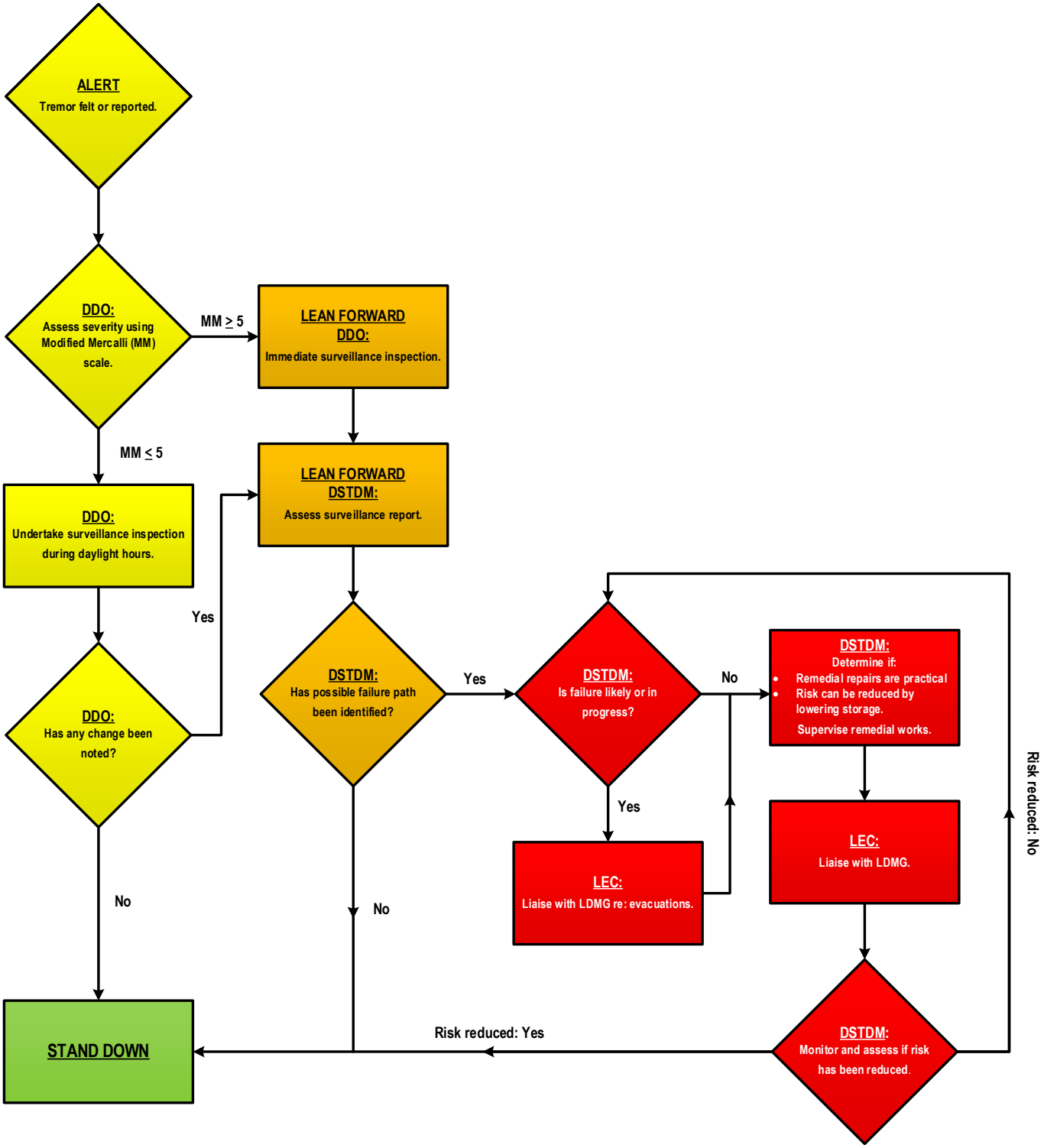


Table 22: Earthquake—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake confirmed (by DSTDM or felt in the area, AND • Intensity less than 5MM~	• Earthquake confirmed (by DSTDM or felt in the area, AND • Intensity greater than or equal to 5MM~, OR • Intensity less than 5MM~ and change detected during surveillance inspection	• Earthquake confirmed (by DSTDM or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has been determined that failure risk has reduced
Actions	• Inspect the dam wall, embankment, spillway structure, and abutments in daylight hours (if safe to do so) and report to the DSTDM and IC—photograph/video and record using the approved forms and send to IC & DSTDM • Check for leaks, deformation, erosion, and concrete damage • Notify SO • Update Dam Logbook as per SOP 12 • Maintain photographic record • Record all communication	• As per previous activation level, AND • Immediately inspect the dam wall, embankment, spillway structure, and abutments (if safe to do so) and report to the DSTDM and IC (unless inspection completed in Alert Stage)—photograph/video and record using approved forms and send to IC & DSTDM • Repeat the inspection as directed	• As per previous activation level, AND • Support/supervise remedial work as required • Lower the storage if directed • Close any affected roads, if not already closed by others • Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public • Vacate the immediate vicinity of the embankment	• As per previous activation level, AND • Ensure remedial works cease and plant and personnel have been moved to a safe location • Record/photograph the earthquake damage and/or dam failure from a safe point •	• Inspect the dam for any damage and photograph any damage identified during the event • Forward information for EER to IC email • Update Dam Logbook as per SOP 12 • Return to routine activities
Internal notifications	1. DSTDM 2. IC 3. SO 4. LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As per previous activation level

~ DDO to assess magnitude (MM scale) at dam location.

Table 23: Earthquake—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake confirmed (by DSTDM) or felt in the area, AND • Intensity less than 5 MM˜	• Earthquake confirmed (by DSTDM) or felt in the area, AND • Intensity greater than or equal to 5MM˜, OR • Intensity less than 5 MM˜ and change detected during surveillance inspection	• Earthquake confirmed (by DSTDM) or felt in the area, AND • A possible failure path has been identified	• Earthquake confirmed (by DSTDM) or felt in the area, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Liaise with IC and DDO re: situation • Record all communication **NOTE 1**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level	• As per previous activation level, AND • Liaise with DDO and relevant council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4 7. SDCC	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

˜ DDO to assess magnitude (MM scale) at dam location.

Table 24: Earthquake—IC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake confirmed* or felt in the area, AND • Intensity less than 5MM˜	• Earthquake confirmed* or felt in the area, AND • Intensity greater than or equal to 5MM˜, OR • Intensity less than 5MM and change detected during surveillance inspection	• Earthquake confirmed* or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has been determined that failure risk has reduced
Actions	• Record all communication • Liaise with DDO, OCO and DSTDM re: situation • Create Incident Report Record • **Update Sunwater intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level, AND • Investigate availability of machinery and materials (if insufficient stockpiles available) • Place machinery operators on standby if directed by DSTDM	• As per previous activation level, AND • Liaise with DDO and relevant council(s) regarding potential road/bridge closures • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level • Liaise with the DSTDM to confirm that dam failure is in progress • Confirm that remedial works have ceased if directed by the DSTDM and plant and personnel have been moved to a safe location • Liaise with DDO and DSTDM re: potential for evacuations	• Deactivate EAP • Compile EER and deliver to DSR if required • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	1. DDO 2. DSTDM 3. LEC/ORR 4. SMT 5. SRT 6. DDMG 1 7. DDMG 2 8. SDCC	• As per previous activation level	• As per previous activation level	• As per previous activation level 1. SMT 2. SRT	• As per previous activation level

˜ DDO to assess magnitude (MM scale) at dam location.

* 'Confirmed' is defined as an alert received from Geoscience Australia or other source that advises an earthquake >4.9 ML (Richter Scale) has occurred within a 200km radius of the dam

Table 25: Earthquake—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Earthquake confirmed or felt in the area, AND • Intensity less than 5MM	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4**	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk— Earthquake felt or reported in area)* What is the status? *(Under investigation)* Advise of current storage level Stand by for further information
Lean Forward	• Earthquake confirmed or felt in the area, AND • Intensity greater than or equal to 5MM, OR • Intensity less than 5MM and change detected during surveillance inspection	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk— Earthquake felt or reported in area)* What is the status? *(Under investigation)* Advise of current storage level Stand by for further information
Stand Up—1	• Earthquake confirmed or felt in the area, AND • A possible failure path has been identified	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake felt or reported in area)* What is the status? *(Possible earthquake damage to dam)* Advise of current storage level. Discuss any potential road/ bridge closures Activate emergency response
		• SDCC Watch Desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**

Table 25 (Continued): Earthquake—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up—2	• Failure likely due to earthquake, AND • Sufficient water in storage to create a dam failure risk	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake damage)* What is the status? *(Dam Failure Likely)* Advise of current storage level. Discuss any potential road/bridge closures Prepare coordinated evacuation
		• SDCC Watch Desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.** ***Develop messages in consultation with DSTDM***
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**
	• Dam Failure in progress	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake damage)* What is the status? *(Dam Failure In Progress)* Advise of current storage level Coordinate evacuation of Downstream Residents and move people to higher ground
		• SDCC Watch Desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to SDCC Watch Desk to send.**
		• D/S Residents	SMS (Phone for those without mobiles)	**Liaise with Sunwater Media Team to send appropriate messaging via SMS**
Stand Down	• Risk assessment has been determined that failure risk has reduced	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake damage)* What is the status? *(Dam hazard Stood Down)* Advise risk assessment has been determined, that failure risk has reduced, and that EAP has been deactivated

Table 26: Earthquake—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake confirmed* or felt in the area, AND • Intensity less than 5MM~	• Earthquake confirmed* or felt in the area, AND • Intensity greater than or equal to 5MM~, OR • Intensity less than 5MM~ and change detected during surveillance inspection	• Earthquake confirmed* or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has been determined that failure risk has reduced
Action	• Record all communication • Review surveillance inspection of the dam and assess its condition as soon as possible • Review instrumentation data and determine if any additional responses are required • Monitor situation and assess risks • Liaise with DDO • Advise DSR of EAP activation	• As per previous activation level, AND • Review surveillance inspection of the dam and assess its condition as soon as possible • Determine if there are any possible failure paths from reported damage	• As per previous activation level, AND • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Assess risk and determine if failure likely or in progress • Liaise with the IC • Determine if remedial repairs are practical • Supervise^ remedial repairs (if applicable) • Determine if risk can be reduced by lowering storage	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level	• As per previous activation level
External notifications	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

~DDO to assess magnitude (MM scale) at dam location.

* 'Confirmed' is defined as an alert received from Geoscience Australia or other source that advises an earthquake >4.9 ML (Richter Scale) has occurred within a 200km radius of the dam

^Supervise means provide technical oversight to the work. It does not necessarily mean on-site supervision.

9. Dam hazard—terrorist threat/activity or high energy impact

9.1 Overview

The emergency action described in this section relates to a potential emergency event due to a terrorist threat or activity or a high energy impact on the dam such as a plane crash or meteorite.

The vulnerability of Burdekin Falls Dam to a terrorist attack is low.

The flood outlines in Appendix B are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by terrorist threat/activity or high energy impact. The use of these flood outlines is prescribed below:

- Use the Sunny Day Failure (SDF) outline when a dam failure is in progress or likely due to terrorist threat/activity or high energy impact and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the Probable Maximum Flood (PMF) outline when a dam failure is in progress or likely due to terrorist threat/activity or high energy impact and concurrent flooding or downstream releases are occurring or expected to occur.

Notes: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in Section 1.3

9.1.1 Assessment of circumstances that indicates an increase in the likelihood of terrorist activity or high energy impact

Advice from authorities of a specific risk to water infrastructure is a circumstance that could indicate increased likelihood of a terrorist threat. If specific enough to name a dam, this circumstance would trigger Stand Up—1 activation level.

9.2 Emergency action roles

Table 27 to Table 31 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)

Figure 5: Terrorist threat/activity or high energy impact flowchart

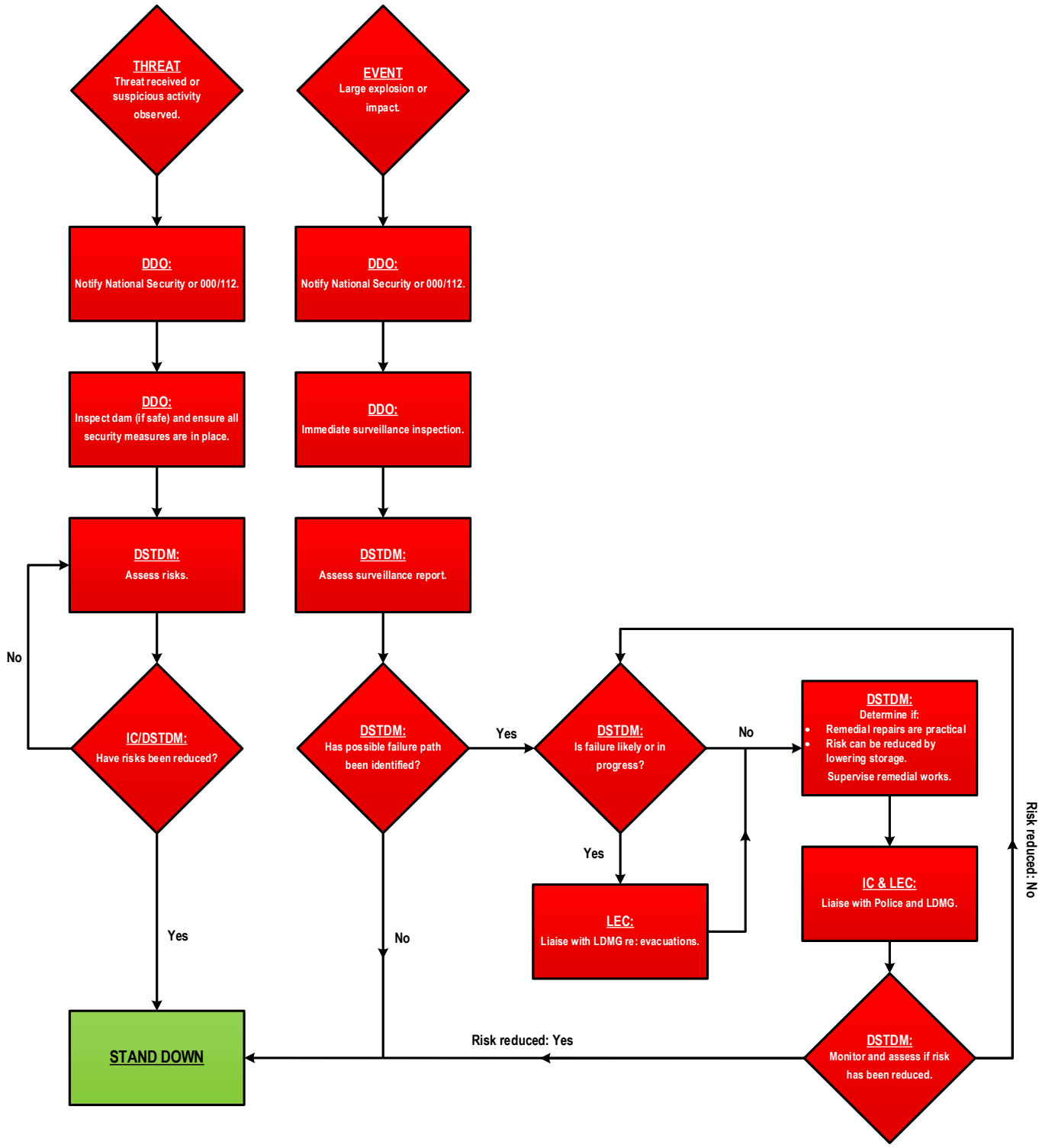


Table 27: Terrorist threat/activity or high energy impact—DDO emergency action

Activation level	Alert/Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• Not applicable	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• **In an emergency call 000.** • Record all communication • If any suspicious behaviour noticed, contact DSTDM for advice. If instructed by DSTDM, of if threat received, complete the following: • Inspect dam (if safe) and ensure all security measures in place (locked gates, etc.) • Photograph/video suspicious items from a safe point and record using the approved forms and send to IC & DSTDM • If Police appoint Incident Manager, support and follow instructions • Close any affected roads as directed • Notify SO Update Dam Logbook as per SOP 12	• As per previous activation level, AND • Undertake surveillance inspect dam (if safe) • Vacate the immediate vicinity of the affected area	• As per previous activation level, AND • Lower reservoir level, if directed • Inspect saddle dams	• Forward information for EER to IC email • Update Dam Logbook as per SOP 12 • Return to routine activities
Internal notifications	• Not applicable	1. DSTDM 2. IC 3. SO 4. LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• Not applicable	1. **#000 Emergency**	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 28: Terrorist threat/activity or high energy impact—LEC emergency action

Activation level	Alert/Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• Not applicable	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create an emergency event	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• Liaise with IC, DDO and LDMG re: situation • If Police appoint Incident Manager, support and follow instructions • Monitor situation and assess risks • Liaise with relevant council(s) regarding possible road/bridge closures • Record all communication	• As per previous activation level	• As per previous activation level, AND • Liaise with DDO and LDMGs re: potential for evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	• Not applicable	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As required
External notifications	• Not applicable	3. LDMG 1 4. LDMG 2 5. LDMG 3 6. LDMG 4	• As per previous activation level	• As per previous activation level	• As required

Table 29: Terrorist threat/activity or high energy impact—IC emergency action

Activation level	Alert/Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• Not applicable	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• Record all communication • Liaise with DDO, DSTDM and LEC • Contact National Security • If Police appoint Incident Manager, support and follow instructions • Create Incident Report Record • **Update Sunwater intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG1 is *Stood Up*	• As per previous activation level	• As per previous activation level, AND • Liaise with DDO, DSTDM, LEC and LDMG re: potential for evacuations • Mobilise resources to undertake remedial works if directed by DSTDM	• Deactivate EAP Event • Compile EER and organise delivery to the DSR if required • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	• Not applicable	1. DDO 2. DSTDM 3. LEC/ORR 4. SMT 5. SRT 6. DDMG 1 7. DDMG 2	• As per previous activation level	• As per previous activation level 1. SMT 2. SRT	• As per previous activation level
External notifications	• Not applicable	• CTG • DDMGs	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 30: Terrorist threat/activity or high energy impact—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	ALERT NOT APPLICABLE			
Lean Forward	LEAN FORWARD NOT APPLICABLE			
Stand Up—1	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2 • CTG	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Security threat/ impact/explosion, etc.)* What is the status? *(Received/noted terrorist threat)* Discuss any potential road/bridge closures Activate emergency response
Stand Up—2	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2 • CTG	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Security threat/ impact/explosion, etc.)* What is the status? *(Under Investigation)* Discuss any potential road/bridge closures (if not discussed at Stand Up—1) Prepare coordinated evacuation
		• SDCC Watch desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.**

Table 30 (Continued): Terrorist threat/activity or high energy impact—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up—3	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam failure risk	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Security threat/ impact/ explosion, etc.)* What is the status? *(Dam Failure Likely/In Progress)* Initiate evacuations
		• SDCC Watch desk	Email & Phone	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to SDCC Watch Desk to send.**
Stand Down	• Risk assessment has determined that failure risk has reduced	• **LDMG 1** • **LDMG 2** • **LDMG 3** • **LDMG 4** • DDMG 1 • DDMG 2	Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Security threat/ impact/explosion, etc.) What is the status? (Dam hazard Stood Down) Advise that failure risk has been reduced and EAP has been deactivated

13 15 89 Sunwater Customer Support 24-hour contact line

Table 31: Terrorist threat/activity or high energy impact—DSTDM emergency action

Activation level	Alert/Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• Not applicable	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam failure risk	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• Record all communication • Liaise with IC and DDO • Assess risks • Liaise with SRT • Notify DSR	• As per previous activation level	• As per previous activation level, AND • Liaise with DDO, IC, and LEC re: potential for evacuations	• Deactivate EAP event • If required, forward all relevant communication, including emails for EER to: [redacted] • Return to routine activities
Internal notifications	• Not applicable	1. IC 2. DDO 3. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• Not applicable	• DSR	• As per previous activation level, AND • D/S Residents • SDCC Watch Desk	• As per previous activation level	• As per previous activation level

* Supervise means provide technical oversight to the work. It does not necessarily mean on-site supervision.

10. Other emergency situation—communications failure

10.1 Overview

The emergency action described in this section (Other emergency situation—communications failure) relates to either:

- An emergency situation where all means of communication at the dam site have been lost.
- An emergency situation where all means of communication with the local area have been lost.
- An emergency situation where all means of communication with Brisbane site have been lost.

This section specifies actions and provides guidance for the three situations.

10.2 Emergency actions

Due to the large number of different possible scenarios, the table below only covers the most common or likely conditions.

10.2.1 Activation triggers

Table 32: Communications failure emergency activation trigger summary

Comms Failure – Site	• Unable to communicate to or from dam site (usually affects DDO)
Comms Failure – Local area	• Unable to communicate to or from local area (likely to affect LEC or SM)
Comms Failure – Brisbane	• Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM & will affect IC)

10.2.2 Assessment of circumstances that indicates the likelihood of communications failure escalating the activation level of a current Dam Hazard

The Operations Centre Duty Officer (OCDO) will assess the weather and flood warnings daily in accordance with the Operations Centre (OC) SOP. The OCDO will escalate to the Flood Operations Decision Maker (FODM) any warnings that have the potential to cause a significant communications failure.

The on-call IC will escalate to the FODM any local intelligence on conditions that could increase the probability of a significant communications failure.

The FODM will determine whether it is reasonably likely that there will be a significant communications failure within the subsequent 24 hours and assess the likely effect on current dam hazards. If required, the FODM will instruct the IC to escalate the activation level of any current dam hazards.

10.2.3 Emergency action roles

Table 33 to Table 38 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)
- Flood Operations Decision Maker (FODM)

Table 33: Communications failure—DDO emergency action

Activation level	Comms Failure – Local Area	Comms Failure – Brisbane
Activation trigger	• Unable to communicate to local area including LEC or SM	• Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM
Actions	• As much as practicable, assume the role of LEC • Continue tasks in accordance with any other current emergency action • Every hour attempt communications by every means, noting the following: – Mobile phone - try texting instead of voice, much higher probability of success – Satellite Phone - needs to access open sky unless external antenna fitted – Fax - generally uses fixed landline and is therefore less likely to have failed – Social Media - e.g., Facebook (Internet may be available via landline) • Record all communication and attempts via dam logbook entries as per SOP 12 and communications log if EAP event is current	• Determine if LEC is in communication and if not, assume the LEC role as much as is practicable • Continue tasks in accordance with any other current emergency action • Every hour attempt communications by every means, noting the following: – Mobile phone - try texting instead of voice, much higher probability of success – Satellite Phone - needs to access open sky unless external antenna fitted – Fax - generally uses fixed landline and is therefore less likely to have failed – Social Media - e.g., Facebook (Internet may be available via landline) • Record all communication and attempts via Dam Logbook entries as per SOP 12 and communications log if EAP event is current
Internal notifications	1. IC 2. SO (if available)	1. LEC 2. SO (if available)
External notifications	• As required	• As required

Table 34: Communications failure—LEC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Brisbane
Activation trigger	• Unable to communicate to dam site	• Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM
Actions	• Every hour attempt communications by every means, noting the following: – Mobile phone - try texting instead of voice, much higher probability of success – Satellite Phone - needs to access open sky unless external antenna fitted – Fax - generally uses fixed landline and is therefore less likely to have failed – Social Media - e.g., Facebook (Internet may be available via landline) • Record all communication and attempts • Assume that the DDO is carrying out LEC role at site as much as practicable • Liaise with IC • Liaise with DSTDM • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action	• Issue Sunwater Incident Alert • Every hour attempt communications by every means, noting the following: – Mobile phone - try texting instead of voice, much higher probability of success – Satellite Phone - needs to access open sky unless external antenna fitted – Fax - generally uses fixed landline and is therefore less likely to have failed – Social Media - e.g., Facebook (Internet may be available via landline) • Record all communication and attempts • Liaise with the DDO and assume IC role • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal notifications	1. IC 2. DSTDM 3. SO (if available)	1. DDO 2. DSTDM (if available) 3. SO
External notifications	4. LDMGs	4. LDMGs 5. DDMGs

Table 35: Communications failure—IC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Local Area
Activation trigger	• Unable to communicate to dam site	• Unable to communicate to local area including LEC and SM
Actions	• Issue Sunwater Incident Alert • Every hour attempt communications by every means, noting the following: – Mobile phone - try texting instead of voice, much higher probability of success – Satellite Phone - needs to access open sky unless external antenna fitted – Fax - generally uses fixed landline and is therefore less likely to have failed – Social Media - e.g., Facebook (Internet may be available via landline) • Record all communication and attempts • Liaise with LEC • Liaise with DSTDM • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action	• Issue Sunwater Incident Alert • Every hour attempt communications by every means, noting the following: – Mobile phone - try texting instead of voice, much higher probability of success – Satellite Phone - needs to access open sky unless external antenna fitted – Fax - generally uses fixed landline and is therefore less likely to have failed – Social Media - e.g., Facebook (Internet may be available via landline) • Record all communication and attempts • Liaise with the DDO and carry out functions of the LEC as much as practicable • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal notifications	1. LEC 2. DSTDM 3. SO (if available)	1. DDO (if available) 2. DSTDM 4. SO (if available)
External notifications	4. DDMGs	4. LDMGs (if available) 5. DDMGs (if available)

Table 36: Communications failure—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Comms Failure – Site	• Unable to communicate to or from dam site, AND • DDO is at dam site	• IC/LEC • DSTDM • SO (if available) • **LDMGs** • DDMGs	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?
Comms Failure – Local Area	• Unable to communicate to or from local area including LEC and SM	• DDO (if available) • DSTDM • SO (if available) • **LDMGs** (if available) • DDMGs (if available)	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?
Comms Failure – Brisbane	• Unable to communicate to or from Sunwater Brisbane	• DSTDM (if available) • **LDMGs** • DDMGs	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?

Table 37: Communications failure—DSTDM emergency action

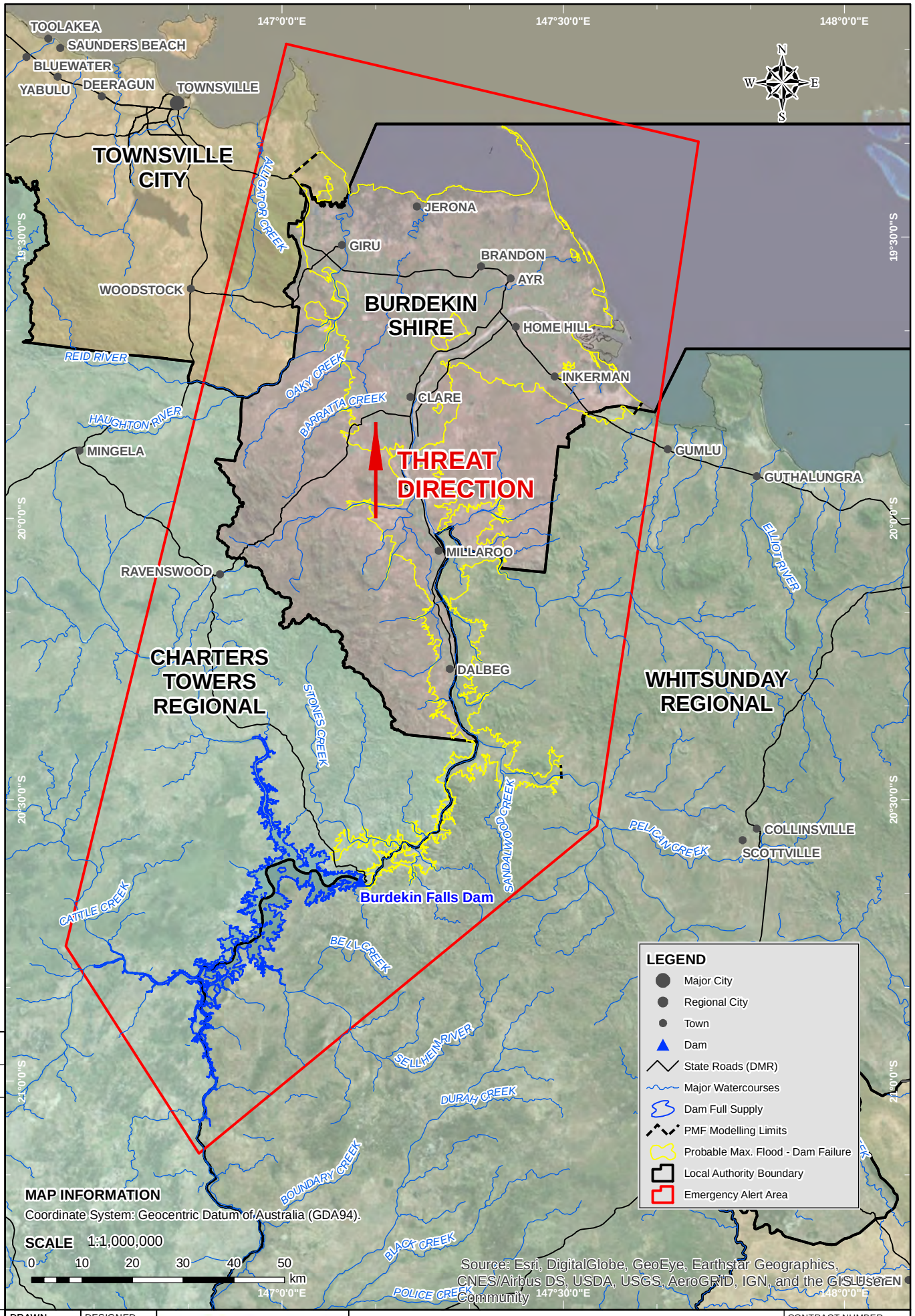
Activation level	Comms Failure – Site	Comms Failure – Local Area
Activation trigger	• Unable to communicate to dam site	• Unable to communicate to local area including LEC and SM
Actions	• Provide technical advice to IC/LEC on a need's basis • Record all communication • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action	• Provide technical advice to IC on a need's basis • Record all communication • Assume that the DDO is assisting IC with LEC role • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal notifications	1. IC 2. LEC And CEO (if time permits)	1. IC 2. DDO (if available) And CEO (if time permits)
External notifications	5. DSR	3. DSR

Table 38: Communications failure—FODM emergency action

Activation level	Comms Failure – Site	Comms Failure – Local Area
Activation trigger	• Unable to communicate to dam site	• Unable to communicate to local area including LEC and SM
Actions	• Liaise with IC • Record all communication • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action	• Liaise with IC • Record all communication • Assume that the DDO is assisting IC with LEC role • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal notifications	1. IC 2. LEC 3. DSTDM	1. IC 2. DDO (if available) 3. DSTDM
External notifications	• Not applicable	• Not applicable

APPENDIX A NOTIFICATION AND COMMUNICATION LISTS

Appendix A1 to Appendix A6 have been redacted



Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-WSRW-38-01-05-01 EAP Mapping\Drawings\ArcMap\Emergency Alerts\249570-B.mxd
Printed: Monday, 03/09/2018 03:36:44 PM

MAP PRODUCED BY:
WATER RESOURCES & DAM SAFETY
TEL. (07)3120 0000

REVISION	DATE	REMARKS	CKD	MH
B	03/09/18	ALERT AREA AMENDED	MB	MH
A	23/01/18	ISSUED FOR USE	MB	PSD

DRAWN IDH | DESIGNED
CHECKED MB | CHECKED
APPROVED M. HUGHES 23/1/2018

BURDEKIN FALLS DAM
EMERGENCY ACTION PLAN
EMERGENCY ALERT AREA

CONTRACT NUMBER
DRAWING NUMBER 249570 | REV. B
SHEET 1 OF 1
DATE JANUARY 2018

Appendix A8: Dam failure emergency alert request

Queensland emergency alert request guidelines

An Emergency Alert Request form should be completed, if required (see Sections 5 to 10 for actions), and sent to the SDCC Watch Desk to activate the Burdekin Falls Dam Emergency Polygon.

Instructions

- This form is not to be used for flood UNLESS a flood has triggered an emergency event.
- Print off the following Queensland Emergency Alert Request form.
- Telephone the SDCC Watch Desk on [redacted] and tell them your intention to use the Emergency Alert for an emergency event for Burdekin Falls Dam.
- A KML Polygon for this dam is stored in the Sunwater area of the Disaster Management Portal in the Emergency Alert area. Ask the SDCC operative to locate the polygon. It will be a KML file called [redacted]
- Give them your phone number, confirm their name, and end the call after advising the form will be sent shortly.
- IC and DSTDM will work together to craft a message relevant to the hazard and discuss with the LDMG if there is time.
- Fill in the form and send to SDCC watch desk email: [redacted] This form must come from the IC, DSTDM, or member of the Executive.
- Phone back to check the message has been sent and ask for an email to confirm.
- Send an internal Incident Alert to advise of completion.
- This form MUST be sent from a Sunwater email address. If Sunwater email is not functional, they can confirm identification through the RDMW (Regulator), if required.
- Use the following text to complete the emergency alert request:

Filename:	Voice Message:	SMS:
[redacted]	FLOOD EMERGENCY WARNING from Sun Water. People in the Lower Burdekin region must LEAVE IMMEDIATELY. Burdekin Falls Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. More information here: Burdekin Shire Council disaster dot burdekin dot q el dee dot gov dot ay you, Charters Towers Regional Council get ready dot charters towers dot q el dee dot gov dot ay you or Whitsunday Regional Council disaster dot Whitsunday are see dot q el dee dot gov dot ay you or call Triple zero if your life is in danger.	FLOOD EMERGENCY WARNING from Sunwater: People in the Lower Burdekin region must LEAVE IMMEDIATELY. Burdekin Falls Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. More information: Burdekin Shire Council https://disaster.burdekin.qld.gov.au, Charters Towers Regional Council http://getready.charterstowers.qld.gov.au or Whitsunday Regional Council http://disaster.whitsundayrc.qld.gov.au. Call 000 if your life is in danger.

The following two pages contain a pre-filled Emergency Alert Request form for Burdekin Falls dam:

Queensland Government

PHONE THE SDCC WATCH DESK [redacted] – ADVISE EA IS BEING DEVELOPED

EMERGENCY ALERT REQUEST

Location of Alert: Burdekin Falls Dam (e.g. Suburb, Town)	**Date:**
LGA/Agency requesting:	**Time:**

Requesting Officer (e.g. Disaster Coordinator/Incident Controller)
Name:
Agency/Position:

Telephone:
(SDCC Watch Desk may telephone you)

Email:

Advised **LDC/LDMG**: ☐ YES **DDC/DDMG**: ☐ YES **Neighbouring LDMG/LGA**: ☐ YES ☐ N/A

Send Alert **Immediately**: ☐ YES **Scheduled**: ☐ YES Date & Time / / : hrs

Event Type
☐ Cyclone ☐ Storm Tide ☐ Flash Flood ☐ Flood
☐ Bushfire ☐ Fire Incident ☐ Smoke / Toxic Plume ☐ Chemical Spill
☐ Tsunami (Sent as Location Based Text Message ONLY)
☒ Other (please specify): Catastrophic Dam Failure

Distributed by: (Channel)
☒ Voice (Landline only) ☒ SMS – Location Based (Location of phone at time of distribution) ☐ SMS – Service Address Based (Registered billing address)

Message Severity
☒ Emergency Warning (Activates SEWS) ☐ Watch & Act ☐ Advice

Threat Direction Required? (e.g. Fire, Chemical Spill, Dam Spill) ☐ YES ☐ N/A

Threat location indicated on map? Only For Emergency Warning Voice & Service Address SMS ☒ YES ☐ N/A

EA Messaging Filename (Doc, Pdf):

Polygon Filename, (Kml, Kmz, Gml, GeoJSON):

Number of polygons _____ (if multiple, attach list in order of priority)

Supplied via: ☒ DM Portal ☐ Email ☐ Verbal ☐ Other
Other (please specify):

Supplied via: ☒ DM Portal ☐ Email ☐ Verbal ☐ Other
Other (please specify):

Voice: Type or handwrite, max 4000 characters incls spaces. (Ideally message should be < 450 characters)

FLOOD EMERGENCY WARNING from Sun Water. People in the Lower Burdekin region must LEAVE IMMEDIATELY. Burdekin Falls Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. More information here: Burdekin Shire Council disaster dot burdekin dot q el dee dot gov dot ay you, Charters Towers Regional Council get ready dot charters towers dot q el dee dot gov dot ay you or Whitsunday Regional Council disaster dot Whitsunday are see dot q el dee dot gov dot ay you or call Triple zero if your life is in danger.

SMS: Type or handwrite, use capitals for clarity, max 612 characters incls spaces. (Ideally should be < 160 characters incl. spaces)

FLOOD EMERGENCY WARNING from Sunwater: People in the Lower Burdekin region must LEAVE IMMEDIATELY. Burdekin Falls Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. More information: Burdekin Shire Council https://disaster.burdekin.qld.gov.au, Charters Towers Regional Council http://getready.charterstowers.qld.gov.au or Whitsunday Regional Council http://disaster.whitsundayrc.qld.gov.au. Call 000 if your life is in danger.

Remove EA from websites:
☐ 12 hrs ☐ 24 hrs ☐ 48 hrs ☐ Specify Date & Time: ☐ Check back in 12 hrs:
☐ Replace previous EA message / / : hrs Contact #:_____

Requesting Officer: **Signature:** **Date:** / /

Send to [redacted] to confirm receipt

FOR USE BY SDCC

EA Request Form completed by: SDCC Watch Desk ☐ Requesting Officer ☐

Notification of any delays provided to Requestor: ☐ YES ☐ NO

EA User Name:
Signature: Date: / /

Emergency Alert No:

Authorising Officer Name:
Signature: Date: / /

EMS EA Campaign Report ID:

Report provided to Requestor on EA outcomes: ☐ YES ☐ NO

The EA Manual, EA Quick Reference Guide, EA Request Form Template are available at: www.disaster.qld.gov.au

DO NOT SEND THIS PAGE

(Sunwater internal use only)

Emergency Alert (EA) Request instructions

Complete ALL initial fields, especially contact details, and check applicable boxes.

STEP 1.	EA Polygon Area (e.g., detailed description and location reference to allow positive identification of message area, including street names with cross street, areas of interest such as parks, rivers, dams, coastal areas) it is preferable to attach a map identifying the message area. If a Threat Direction has been requested, please clearly indicate it on the map. Check applicable box.
STEP 2.	Enter the Polygon file name/s.
STEP 3.	*Sunwater Polygons are all in *.kml format.* Check applicable box.
STEP 4.	*Sunwater Messaging/spatial data is always supplied via DMportal.* Check applicable box. Enter the file name.

Voice Message: Either type or handwrite the required message in CAPITALS. As the message will be translated by a text-to-speech process it is important that words are not unintelligible when translated e.g., "qld" used in a web site address must be entered as "Q L D", similarly the word "DOT" must be entered into a web address instead of a full stop.
An Emergency Warning message must start with "EMERGENCY EMERGENCY" Do not use special characters.

SMS: Either type the message or handwrite the characters into the boxes.
Capitals only required as per normal grammar rules, but an Emergency Warning message must start with "EMERGENCY EMERGENCY" (in capitals). Do not use special characters.

Voice example:

EMERGENCY. EMERGENCY. SUN WATER ADVISE IMMINENT FAILURE OF CANIA DAM. RESIDENTS DOWNSTREAM OF THE DAM NEED TO ACT TO PROTECT LIFE AND LEAVE IMMEDIATELY. FAILURE OF THE DAM WILL RESULT IN EXTREMELY DANGEROUS FLOODING DOWNSTREAM INCLUDING: MOONFORD AND MONTO. DO NOT DELAY. LEAVE NOW. CENTRAL MONTO AND BILOELA ARE SAFE LOCATIONS.

SMS example:

EMERGENCY. EMERGENCY. Sunwater advise imminent failure of Cania Dam. Take action to protect life and leave now. Moonford and Monto are at risk. Info on ABC Radio. Central Monto & Biloela are safe.

If using template EA messages, please provide the appropriate variables that are in the template message guides. Refer to the Queensland EA Manual for copies of the template message guides.

APPENDIX B Drawings, maps and emergency control measures

B1 Drawings
B2 Flood Impact
B3 Inundation maps
B4 Locality plan
B5 Catchment Area

NOTE: Actual levels may differ from those shown in flood inundation maps due to variations in assumptions made in the models to actual flood events.

FIG. 3

A1-82000

14 523·034 E
717 186·866 N

Diversion Closure Structure

Intake Structure

Access Road

Parking Area

Axis Bearing 39° 51' 43"

Elevator Shaft

Outlet Works

LEFT BANK

RIGHT BANK

Construction Access Road

Parking Area

Access Road

Aeration Splitter Pier

Burdekin River

Outlet Channel Culverts

PLAN
Scale 'a'

RIGHT BANK

LEFT BANK

EL 169·20

EL 154·00

EL 172·20

Diversion Outlets

Aeration Splitter Pier

Outlet Works

ELEVATION
Scale 'a'

NOTE : LEVELS DATUM – AHD (derived).
AZIMUTH DATUM – Burdekin Falls Grid

AXIS

EL 169·20
M.W.L 169·10
F.S.L. 154·00
0·72
1·0
UPSTREAM
DOWNSTREAM
12·0
EL 121·50
Primary Foundation Grout Hole
Drilled Foundation Drain
Consolidation Grouting
Secondary Foundation Grout Hole

SECTION (X)
Scale 'b'

AXIS

φ150 Formed drains @ 3 m crs

F.S.L. 154·00
EL 151·50
EL 145·50
EL 146·360
EL 140·50
0·87
1·0
DOWNSTREAM
UPSTREAM
φ150 Formed Drains @ 3 m crs
Underdrains
Aeration Splitter Pier
"A" Mono
Bed Access Road
"S" Mono
EL varies 119·0-122·0
"F" Mono
EL 119·00 (typical)
Grouted Anchor Bars
φ150 Formed Drains @ contraction joints only.
Consolidation Grouting
Drilled Foundation Drain
Grout Curtain
Drilled Foundation Drain
60·0

SECTION (Y)
Scale 'b'

AXIS

EL 172·20
EL 169·30
EL 162·40
Trashracks
EL 155·90
F.S.L. 154·00
EL 149·40
EL 142·90
Baulks
EL 136·40
Drop Boards
EL 129·90
EL 123·40
Fixed Wheel Gate Slot
DOWNSTREAM
0·72
1·0
Radial Gate
EL 127·40
EL 123·80
EL 120·00
Bulkhead Gate

SECTION (Z)
Scale 'c'

REVISION					
2-3-84	B	Tender to Working Drg.		CRC	
23-6-83	A	Axis co-ordinate 'B' corrected	AG	RC	
DATE		REMARKS	ZONE	CKD	PSD

SCHEDULE OF DRAWING	
A1-G5078	Access Roads - Arrangement
A1-G5120	Spillway - Concrete & Arrangement
A1-G5056	Foundation Drainage Details
A1-G5061	Curtain Grouting of Foundation
A1-G5037	Monolith Numbers.
A1-G5018	Galleries - Arrangement
A1-G1G53	Spillway - Typical Section.

SCALES (before reduction)

'a' 0 50 100 150 200 m (1:2 000)

'b' 0 10 20 30 40 50 m (1:500)

'c' 0 10 20 30 m (1:300)

DESIGN	DRAFTING
PREP	DR H.Dodd
CKD	CKD
SUPV	SUPV
SUBMITTED	SUBMITTED

Queensland Water Resources Commission

RECOMMENDED

APPROVED

BURDEKIN FALLS DAM
MAIN DAM
GENERAL ARRANGEMENT

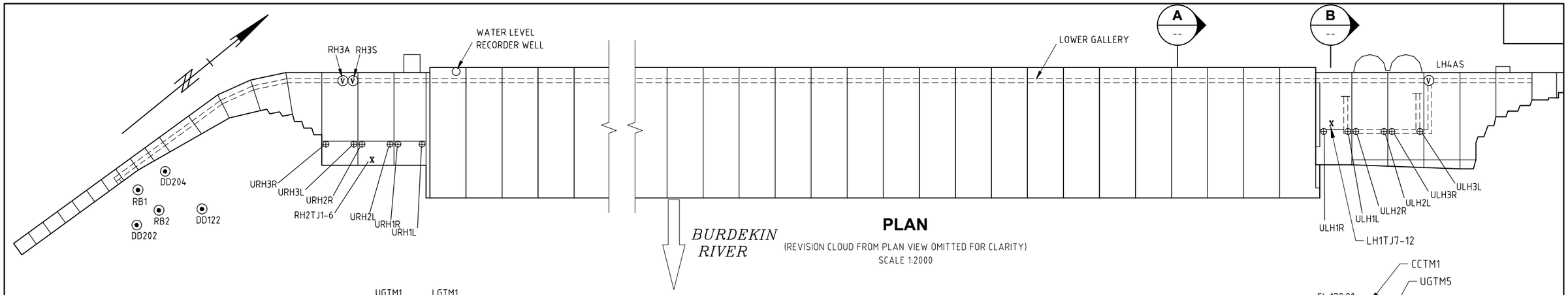
CONTRACT NUMBER

DRAWING NUMBER A1-82000

DATE 19-2-86

A | B

82000B.tif



UPLIFT PRESSURE MONITORING WELL

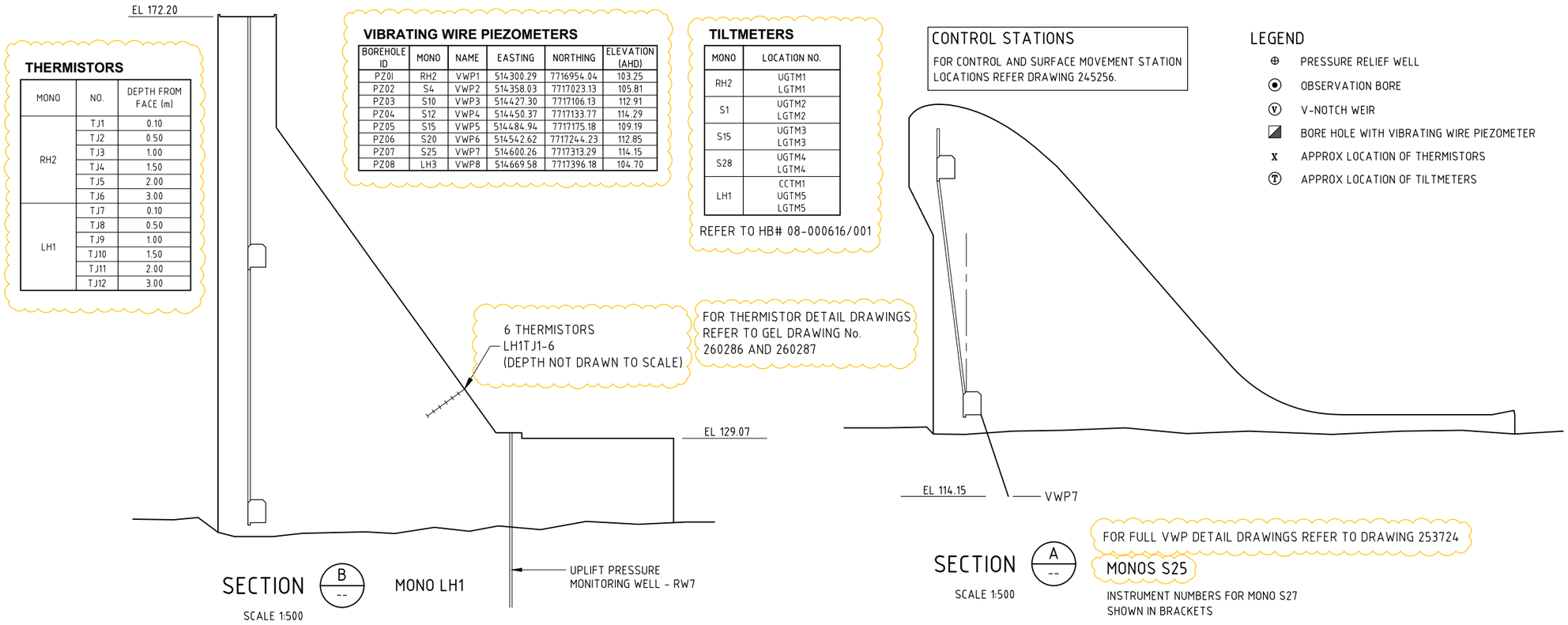
	LOCATION	EL TOP OF CASING
ULH1R	LH1 APRON	128.929
ULH1L	LH1 APRON	129.452
ULH2R	LH2 APRON	129.501
ULH2L	LH2 APRON	129.492
ULH3R	LH3 APRON	129.505
ULH3L	LH3 APRON	129.488
URH1L	RH1 APRON	121.333
URH1R	RH1 APRON	121.309
URH2L	RH2 APRON	121.319
URH2R	RH2 APRON	121.275
URH3L	RH3 APRON	121.325
URH3R	RH3 APRON	121.308

GROUNDWATER LEVEL OBSERVATION BORE

NAME	LOCATION	EL TOP OF CASING
RB-1	SEE PLAN	164.27
RB-2	SEE PLAN	162.31
DD122	SEE PLAN	157.03
DD202	SEE PLAN	163.03
DD204	SEE PLAN	157.526

SEEPAGE MEASUREMENT V-NOTCH WEIR

NAME	LOCATION
LH4AS	LH4 LOWER GALLERY
RH3S	RH3 LOWER GALLERY
RH3A	RH3 LOWER GALLERY



THERMISTORS

MONO	NO.	DEPTH FROM FACE (m)
RH2	TJ1	0.10
	TJ2	0.50
	TJ3	1.00
	TJ4	1.50
	TJ5	2.00
	TJ6	3.00
LH1	TJ7	0.10
	TJ8	0.50
	TJ9	1.00
	TJ10	1.50
	TJ11	2.00
	TJ12	3.00

VIBRATING WIRE PIEZOMETERS

BOREHOLE ID	MONO	NAME	EASTING	NORTHING	ELEVATION (AHD)
PZ01	RH2	VWP1	514300.29	7716954.04	103.25
PZ02	S4	VWP2	514358.03	7717023.13	105.81
PZ03	S10	VWP3	514427.30	7717106.13	112.91
PZ04	S12	VWP4	514450.37	7717133.77	114.29
PZ05	S15	VWP5	514484.94	7717175.18	109.19
PZ06	S20	VWP6	514542.62	7717244.23	112.85
PZ07	S25	VWP7	514600.26	7717313.29	114.15
PZ08	LH3	VWP8	514669.58	7717396.18	104.70

TILTMETERS

MONO	LOCATION NO.
RH2	UGTM1 LGTM1
S1	UGTM2 LGTM2
S15	UGTM3 LGTM3
S28	UGTM4 LGTM4
LH1	CCTM1 UGTM5 LGTM5

REVISION	DATE		REMARKS	CKD	PASSED
	18/09/23	F	INSTRUMENTS UPDATED	BC	C. ROGERS
	31/08/15	E	GALLERIES, CONTROL STNS NOTE & REF/ ADDED	KP	K/ EHM
	19/11/14	D	GW OBSERVATION BORES DD202 & 204 ADDED	MC	KLE
	22/2/11	C	MONO 28 ADDED	MC	AN
	02/04/01	B	MODIFICATIONS TO TITLE BLOCK	GM	KLE
	21/10/00	A	MODIFICATIONS TO LABELS	A	A

REFERENCE DRAWINGS	
245256	MAIN DAM, SURFACE MOVEMENT STATIONS
102276	LEFT BANK SADDLE DAM - INSTRUMENTATION LAYOUT

SCALES (A3 SIZE)

0 50 100 METRES 1:2000

0 5 10 15 20 25 METRES 1:500

DRAWN	DESIGNED
SFD	AJN
CHECKED	CHECKED
SFD	H.K.
APPROVED	
K.L. EHM	
3.01.01	

sunwater

BURDEKIN FALLS DAM
MAIN DAM
INSTRUMENTATION LAYOUT

CONTRACT NUMBER

DRAWING NUMBER 102275 | REV. F

SHEET 1 OF 1

DATE OCTOBER 2000

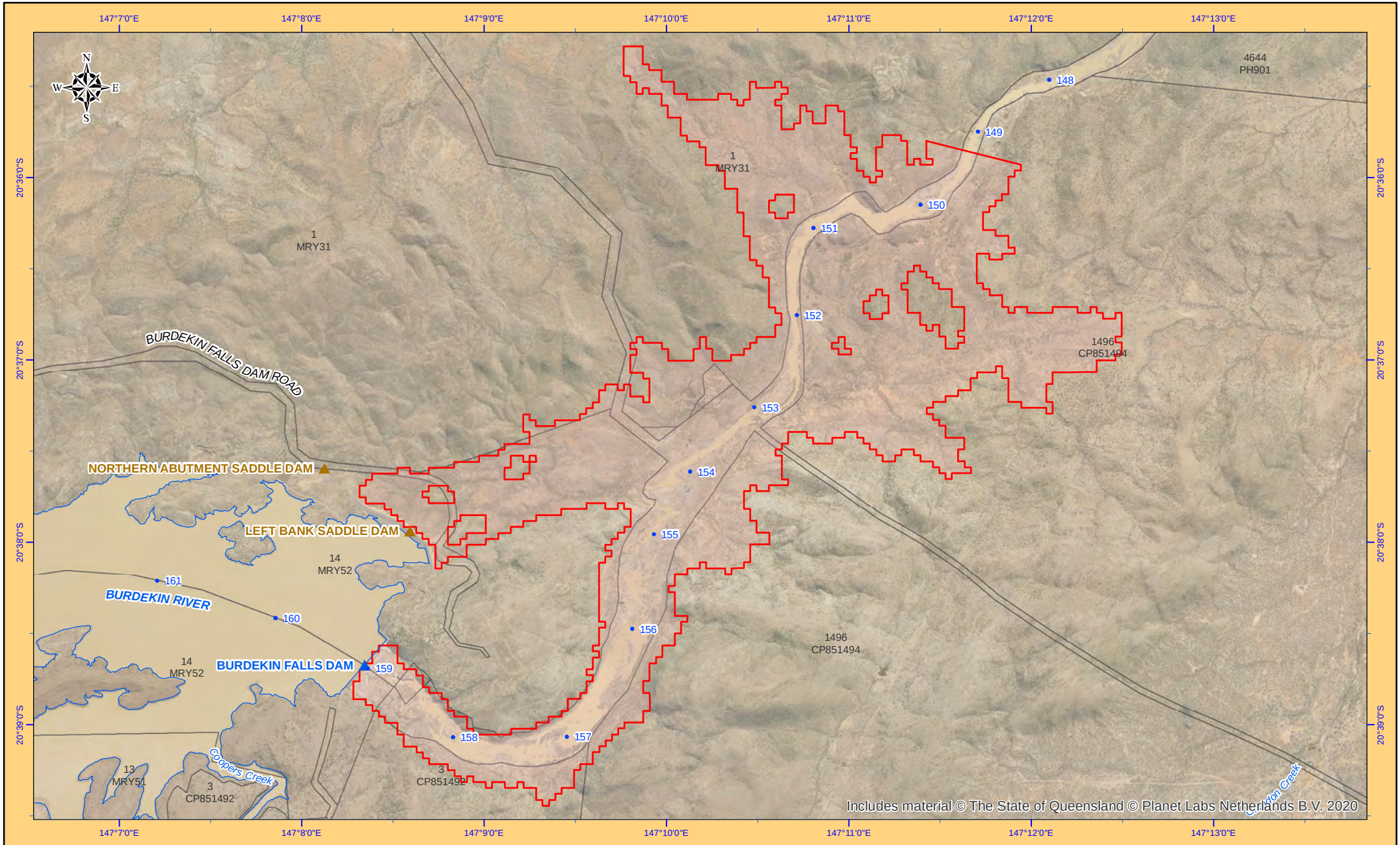
Drawing Produced By:
Sunwater Ltd
Tel: (07) 3120 0000

CAD File: S:\BW Asset Delivery\SW-Burdekin Haughton WSS\R-WABB-01-07-01 - Burdekin Falls Dam Deformation Survey 2014\Drawings\AutoCAD\102275-F.dwg
DATE PLOTTED: 21 September 2023 10:26 AM BY : MATTHEW FARMER

Appendix B2: Downstream notification area

Downstream notification area

Figure B3 (next page) indicates the Downstream Notification Area for outflows from Burdekin Falls dam.



MAP INFORMATION

Coordinate System: Geocentric Datum of Australia (GDA2020).

SCALE (A4 SIZE)

0 500 1,000 1,500 2,000 2,500 m 1:50,000

LEGEND

- AMTD (Markers)
- Burdekin Falls Dam FSL
- Limit of Downstream Notification Area

BURDEKIN FALLS DAM DOWNSTREAM NOTIFICATION AREA

NOTES

Areas further downstream will become progressively more impacted by other rainfall and inflows that occur downstream of the dam (not shown here).

sunwater

DRAWING No. 250708 C

Document: S:\BW_WaterResources\GIS_Data\SW_Burdekin Haughton WSS\BurdekinFallsDam_CRA2017\Drawings\ArcMap\250708-C.mxd
Printed: Wednesday, 14/12/2022 07:07:44 AM

Appendix B3: Inundation maps

The following is a complete list of the Inundation maps for Burdekin Falls dam. However, due to the space requirements of the large volume of individual maps, only the Keymaps and Overview inundation plans (for illustrative purposes) are presented in the EAP. The individual Inundation maps are available from Sunwater by request.

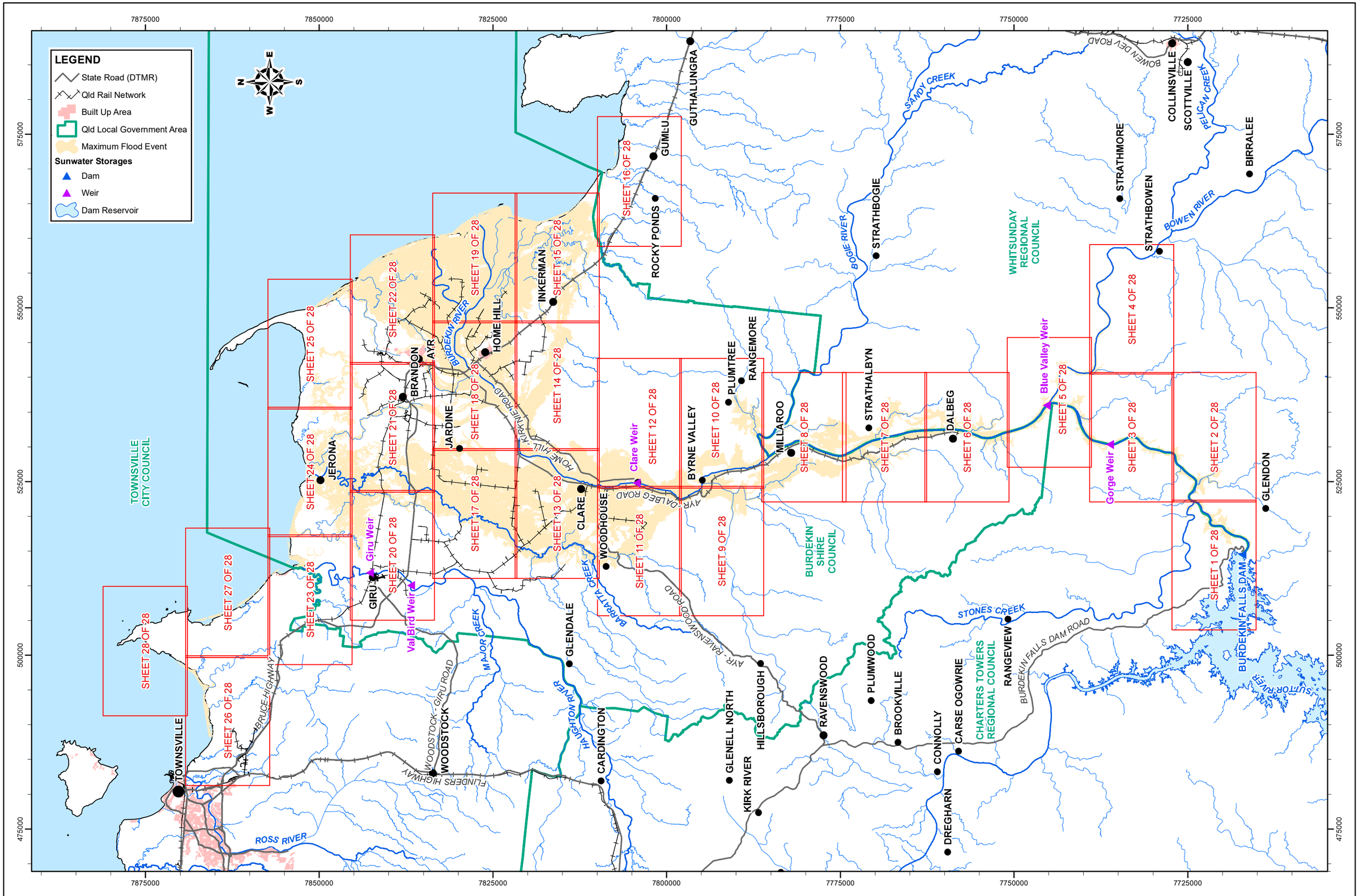
Drawings:

- SDF—Sunny Day Failure:
  - **Keymap**
  - **Overview**
  - Maps
- PMF—Probable Maximum Flood:
  - **Keymap**
  - **Overview**
  - Maps

Disclaimer: Every effort has been made to ensure the currency of the flood inundation maps reproduced in this EAP. However, as the maps have been extracted from external sources, their accuracy cannot be guaranteed. Please refer to the Local Disaster Management Plan for the most current information.

[Intentionally blank]

Document: S:\BW_WaterResources\GIS_Data\SW_Burdekin Haughton WSS\BurdekinFallsDam_CRA2017\Drawings\ArcMap\250783-C.mxd
Printed: 23/06/2023



MAP PRODUCED BY:
SUNWATER LTD
TEL: (07) 3120 0000

REVISION					
09/08/23	C	TITLE UPDATED	LH	MGH	
14/12/22	B	UPDATED DECEMBER 2022	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA2020), Zone 55.

DRAWING REFERENCE
250785 - Sunny Day Failure (1:50,000 Map Series)
250790 - Sunny Day Failure (Overview)

SCALES (A3 SIZE)
0 5 10 15 20 25 km 1:500,000

DRAWN	DESIGNED
ES	
CHECKED	CHECKED
	LH
APPROVED	
M.G. HUGHES 9/8/2023	RPEQ: 18351

sunwater

BURDEKIN FALLS DAM
DAM BREAK ANALYSIS 2020
SUNNY DAY FAILURE
INUNDATION PLAN
KEYMAP

CONTRACT NUMBER

DRAWING NUMBER	REV.
250783	C

SHEET 1 OF 1

DATE NOVEMBER 2018

Document: S:\BW_WaterResources\GIS_Data\SW_Burdekin Haughton WSS\BurdekinFallsDam_CRA2017\Drawings\ArcMap\250790-B.mxd
Printed: Wednesday, 14/12/2022 10:44:43 AM

Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000

7,850,000 7,800,000 7,750,000

550,000 500,000

LEGEND

- Settlements
- Major Road
- Secondary Road

Flood Modelling

- PAR - Dam Failure
- Model Limits
- Sunny Day Failure

Sunwater Storages

- Dam
- Weir
- Burdekin Falls Dam FSL

GUTHALUNGRA, GUMLU, INKERMAN, AYR, HOME HILL, BRANDON, JERONA, CLARE, MILLAROO, DALBEG, COLLINSVILLE, SCOTTVILLE, GIRU, RAVENSWOOD, WOODSTOCK, TOWNSVILLE

CLARE WEIR, BLUE VALLEY WEIR, GORGE WEIR, GIRU WEIR, VAL BIRD WEIR, BURDEKIN FALLS DAM

ELLIOT RIVER, FINLEY CREEK, SANDY CREEK, ARMSTRONG CREEK, ELM CREEK, BOGIE RIVER, ABBOT CREEK, PETER DELEMOTHE ROAD, BOWEN DEVELOPMENTAL ROAD, GOPAL CREEK, SPUSH CREEK, TABLE MOUNTAIN CREEK, STRATHMORE CREEK, TEN MILE CREEK, FREDERICK CREEK, PELICAN CREEK, BOWEN RIVER, ROCKY CREEK, GLENMORE CREEK, RED HILL CREEK, GOLDSMITH CREEK, GLENELLA CREEK, SMOKO CREEK, MOONLIGHT CREEK, DRAUL CREEK, MOLONGLE CREEK, GLENBLAZES CREEK, BOUNDARY CREEK, DILLON CREEK, ROCKY PONDS CREEK, BORA CREEK, CARSELIS CREEK, HERBERT CREEK, FISH CREEK, JET CREEK, YELLOW END CREEK, TEATREE CREEK, STOLTZ CREEK, PLUMTREE CREEK, KIRKNIE CREEK, BEACH ROAD, PLANTATION CREEK, KIRKNIE ROAD, DESMOND CREEK, SANDALWOOD CREEK, KING CREEK, BILLY GAN CREEK, MARY CREEK, BONNIE DOON CREEK, BURDEKIN RIVER, DINGO CREEK, EIGHT MILE CREEK, ELPHINSTONE PASS CREEK, LAGOON CREEK, MILLAROO CREEK, SPRING CREEK, DIME CREEK, BULL CREEK, CHARLIE CREEK, CAP CREEK, COLLINS CREEK, BLENDON CREEK, GLENROY CREEK, AYR DALBEG ROAD, AYR RAVENSWOOD ROAD, FENCE CREEK, BARRATTA CREEK, LANDERS CREEK, BROWN CREEK, STONES CREEK, DEEP CREEK, BILL CREEK, LULU CREEK, SUTTOR RIVER, BURDEKIN FALLS DAM ROAD, GIRU WEIR, VAL BIRD WEIR, CAPE CLEVELAND ROAD, BRUCE HIGHWAY, ALLIGATOR CREEK, WOODSTOCK GIRU ROAD, MAJOR CREEK, HAUGHTON RIVER, OAKY CREEK, REID RIVER, FLINDERS HIGHWAY, ROSS RIVER, CONNOLLY CREEK, ELPHINSTONE CREEK, BARRABAY CREEK, KIRK RIVER, ST PAULS CREEK, PINNACLE CREEK, CATTLE CREEK, YARD CREEK, LOW CREEK

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

REVISION					
14/12/22	B	UPDATED DECEMBER 2022	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55.

REFERENCE DRAWINGS
250785 - Sunny Day Failure (1:50,000 Map Series)

SCALES (A3 SIZE)
0 4,900 9,800 14,700 19,600 24,500 m
1:500,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES 3/12/2018	RPEQ: 18351

sunwater

BURDEKIN FALLS DAM
DAM BREAK ANALYSIS 2017
SUNNY DAY FAILURE
(MAIN DAM FAILURE)
OVERVIEW INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER 250790 | REV. B

SHEET 1 OF 1

DATE NOVEMBER 2018

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MAP PRODUCED BY:
SUNWATER LTD
TEL: (07) 3120 0000

LEGEND

- State Road (DTMR)
- Qld Rail Network
- Built Up Area
- Qld Local Government Area
- Maximum Flood Event

Sunwater Storages

- Dam
- Weir
- Dam Reservoir

BURDEKIN SHIRE COUNCIL
TOWNSVILLE CITY COUNCIL
WHITSUNDAY REGIONAL COUNCIL
CHARTERS TOWERS REGIONAL COUNCIL

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COLLINSVILLE
SCOTTVILLE
BIRRALEE
STRATHMORE
STRATHBOWEN
GLENDON
RANGEVIEW
STRATHBOGIE
GUTHALUNGRA
GUMLU
ROCKY PONDS
INKERMAN
HOME HILL
AYR
BRANDON
JERONA
JARDINE
GIRU
CLARE
WOODHOUSE
PLUMTREE
RANGEMORE
BYRNE VALLEY
MILLAROO
STRATHALBYN
DALBEG
GLENDALE
WOODSTOCK
CARDINGTON
GLENELL NORTH
HILLSBOROUGH
RAVENSWOOD
PLUMWOOD
BROOKVILLE
CARSE OGOWRIE
CONNOLLY
DREGHARN
TOWNSVILLE

BOWEN DEV ROAD
PELICAN CREEK
BOGIE RIVER
SANDY CREEK
BOWEN RIVER
Blue Valley Weir
Gorge Weir
Clare Weir
Giru Weir
Val Bird Weir
KIRKWIE ROAD
HOME HILL
BURDEKIN RIVER
AYR-DALBEG ROAD
BARRATTA CREEK
AYR-RAVENSWOOD ROAD
STONES CREEK
BURDEKIN FALLS DAM ROAD
BURDEKIN FALLS DAM
LAKE DALRYMPLE
BURDEKIN RIVER
BRUCE HIGHWAY
WOODSTOCK - GIRU ROAD
MAJOR CREEK
HALIFAX RIVER
FLINDERS HIGHWAY
ROSS RIVER

7875000 7850000 7825000 7800000 7775000 7750000 7725000
575000 550000 525000 500000 475000

REVISION					
DATE		REMARKS	CKD	PSD	
14/12/22	A	ISSUED FOR USE	LH	MGH	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA2020), Zone 55.

DRAWING REFERENCE
250787 - Probable Maximum Flood (1:50,000 Map Series)
250798 - Probable Maximum Flood (Overview)

SCALES (A3 SIZE)
0 5 10 15 20 25 km 1:500,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	LH
APPROVED	
M.G. HUGHES 14/12/2022	RPEQ: 18351

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BURDEKIN FALLS DAM
DAM BREAK ANALYSIS 2017
PROBABLE MAXIMUM FLOOD INUNDATION PLAN
KEYMAP

CONTRACT NUMBER

DRAWING NUMBER	REV.
256768	A

SHEET 1 OF 1
DATE DECEMBER 2022

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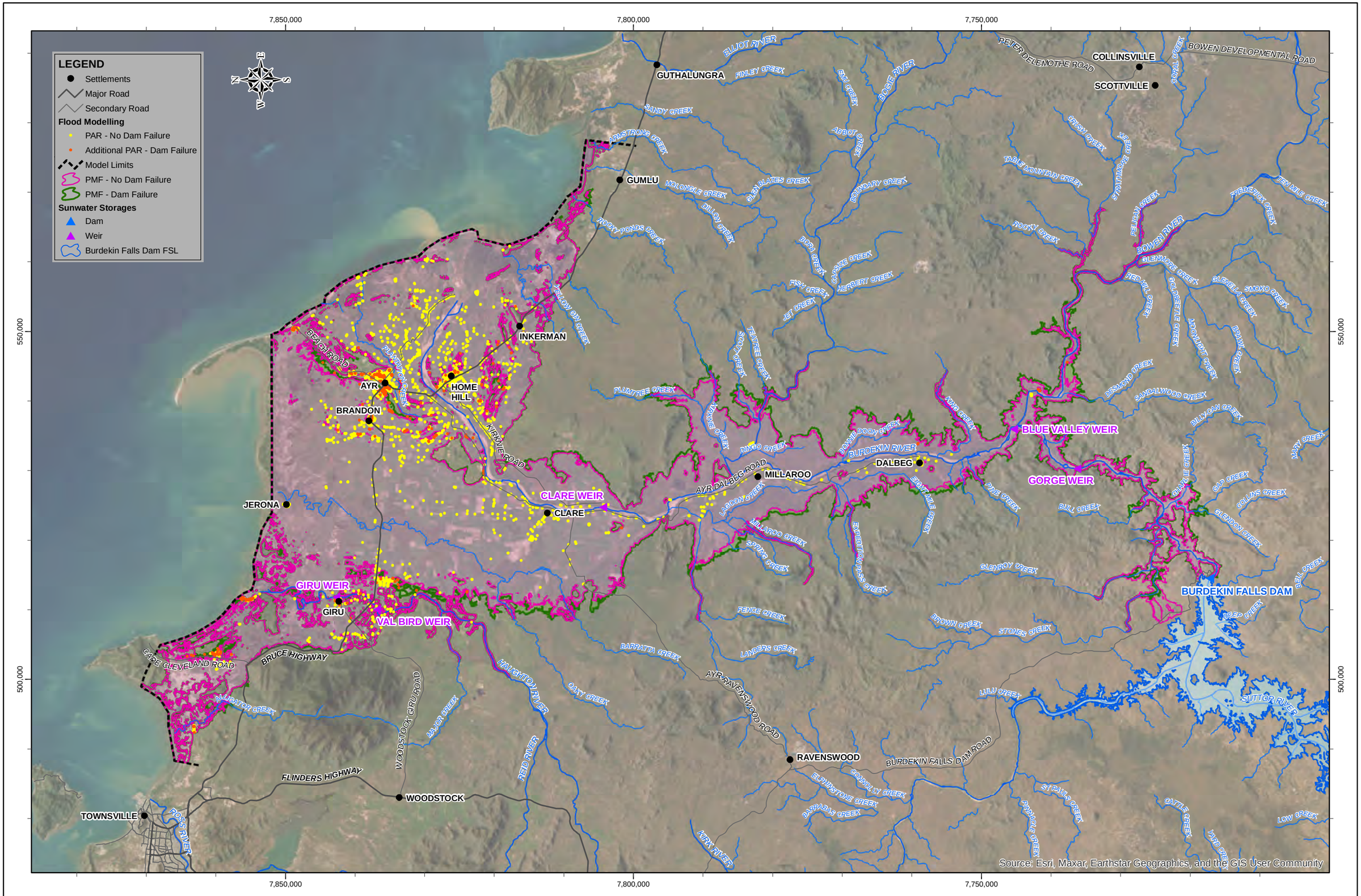

REVISION					
14/12/22	B	UPDATED DECEMBER 2022	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55.

REFERENCE DRAWINGS
250787 - Probable Maximum Flood (1:50,000 Map Series)

SCALES (A3 SIZE)
0 4,900 9,800 14,700 19,600 24,500 m
1:500,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES 3/12/2018	RPEQ: 18351

sunwater

BURDEKIN FALLS DAM
DAM BREAK ANALYSIS 2017
PROBABLE MAXIMUM FLOOD
(MAIN DAM FAILURE)
OVERVIEW INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER 250798
REV. B
SHEET 1 OF 1
DATE NOVEMBER 2018

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

Appendix B4: Locality plan

Figure B4: Burdekin Falls Dam locality plan

MAP PRODUCED BY:
INFRASTRUCTURE DEVELOPMENT
TEL: (07) 3120 0000

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Printed: Thursday, 07/11/2013 11:22:08 AM

N
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INGHAM
TOWNSVILLE
CHARTERS TOWERS
HUGHENDEN
BOWEN
MORANBAH
BARCALDINE
EMERALD

DRY RIVER
RUNNING RIVER
STAR RIVER
CLARKE RIVER
BASALT RIVER
FANNING RIVER
KIRK RIVER
BURDEKIN RIVER
BOGIE RIVER
CAPE RIVER
CAMPASPE RIVER
ROLLSTON RIVER
SELLHEIM RIVER
SUTTOR RIVER
BOWEN RIVER
BROKEN RIVER
BELYANDO RIVER
Lake Dalrymple

LOCALITY PLAN

CAIRNS
TOWNSVILLE
MOUNT ISA
MACKAY
ROCKHAMPTON
GLADSTONE
BUNDABERG
IPSWICH

LEGEND

- Gauging Stations
- Major City
- Regional City
- Creeks
- Rivers
- Burdekin Dam
- Burdekin Dam Catchment
- Catchment Basins

MAP INFORMATION
Coordinate System: Geocentric Datum of Australia (GDA94).

SCALES (A3 SIZE)
0 20,000 40,000 60,000 80,000 100,000 m 1:2,000,000

[redacted]

BURDEKIN RIVER CATCHMENT LAYOUT PLAN

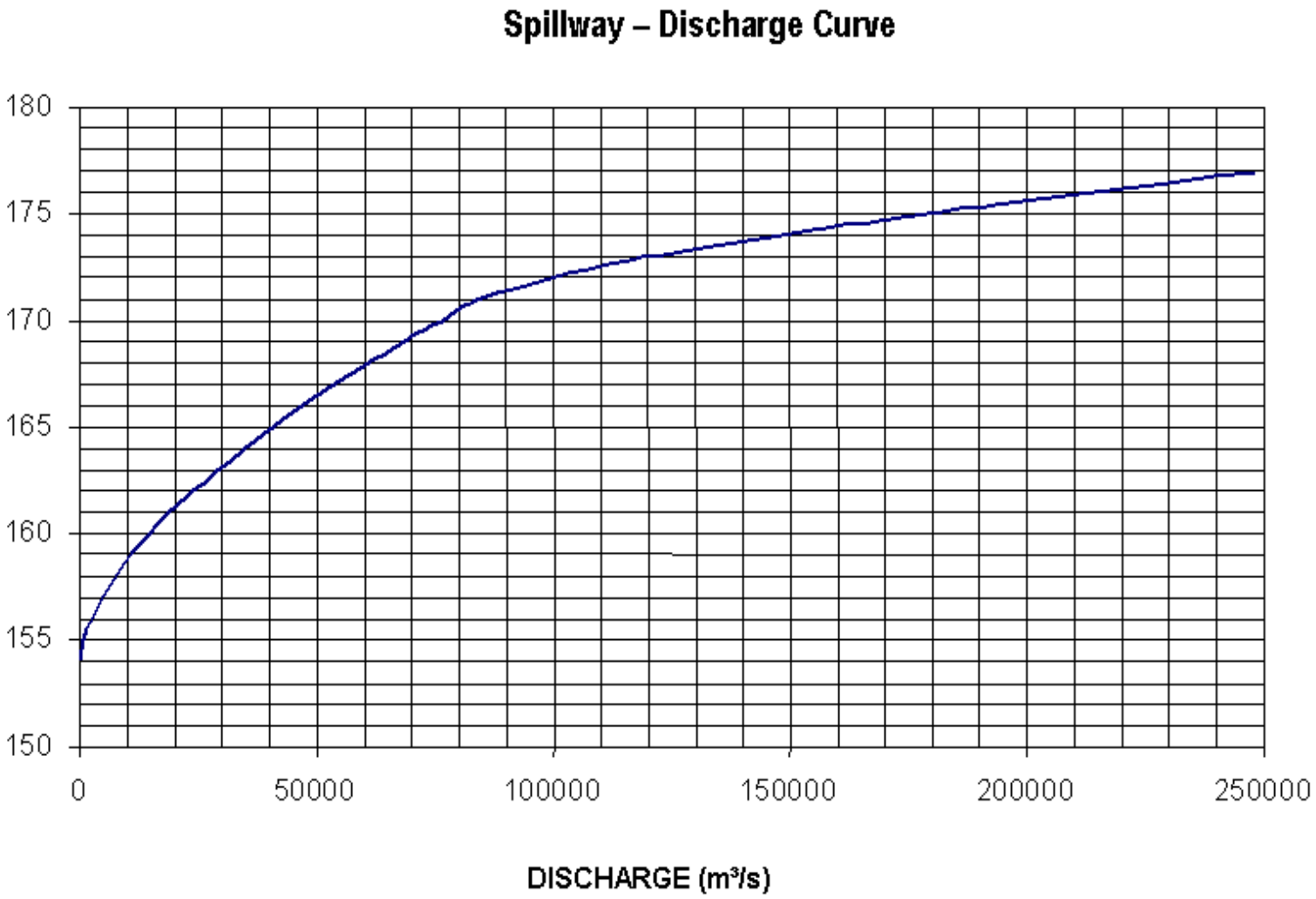
DRAWING No. 243808-A

APPENDIX C Equipment and technical information

Appendix C1 has been redacted

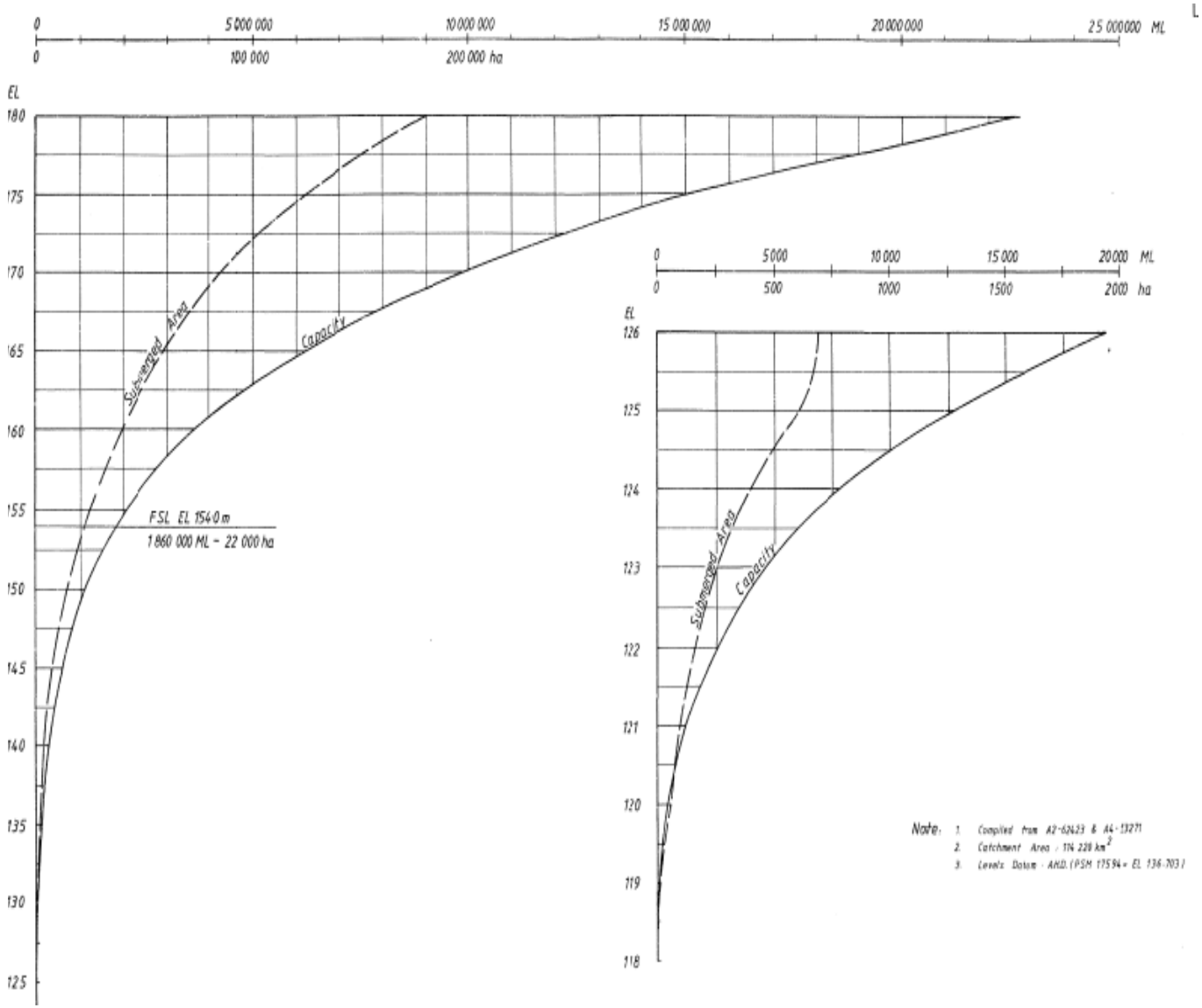
Appendix C2: Burdekin Falls Dam spillway discharge curve

Figure C1: Burdekin Falls Spillway discharge curve



Appendix C3: Burdekin Falls Dam storage curve

Figure C2: Burdekin Falls Dam storage curve



Appendix D Interaction with local government and district groups

Not used, for Sunwater internal use only.

Annexe — Burdekin Falls Dam SMS Messages

	Advice Stay informed 	**Watch and Act** Prepare to leave 	**Emergency** Leave immediately To be issued in consultation with council 
SMS	ADVICE from Sunwater. Burdekin Falls Dam is spilling excess water into the Burdekin River. People downstream of Burdekin Falls Dam should STAY INFORMED and MONITOR CONDITIONS. Water flows from Burdekin Falls Dam expected to remain within beds and banks of river/may contribute to widespread/localised/overland flooding. Expect increased river flows in 6-12 hours/later today/ overnight/tomorrow. There is no immediate danger. More information here: bit.ly/RecandSafety	FLOOD WATCH AND ACT from Sunwater. Excess water spilling from Burdekin Falls Dam into the Burdekin River has increased significantly. Water flows from Burdekin Falls Dam may contribute to dangerous/widespread flooding downstream of Burdekin Falls Dam. Expect increased river flows in 6-12 hours/later today/overnight/tomorrow. People downstream of Burdekin Falls Dam must PREPARE TO LEAVE in case the flood gets worse. Call Triple Zero (000) if your life is in danger. Call the SES on 132500 for flood help. More information here: bit.ly/RecandSafety	FLOOD EMERGENCY WARNING from Sunwater: People in the Lower Burdekin region must LEAVE IMMEDIATELY. Burdekin Falls Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. More information here: Burdekin Shire Council https://disaster.burdekin.qld.gov.au/, Charters Towers Regional Council http://getready.charterstowers.qld.gov.au/ or Whitsunday Regional Council http://disaster.whitsundayrc.qld.gov.au/. Call 000 if your life is in danger.