EMERGENCY ACTION PLAN — CANIA DAM (ID 242)

ISSUE: 9.1 — September 2024 **Expiry:** 1 April 2026

Prepared by **Sunwater Limited**

Controlled Copy No.

Gated: No	Staffed: No

Type: Earth and rock-fill embankment

Project: Cania Dam EAP **File no.:** 08-005502/001

Address: Use Lat., Long.

Location: Lat. -24.650096° Long. 150.983634°
24°39'00.26"S 150°59'01.26"E

Approved by the delegate of the Chief Executive, Department of Regional Development, Manufacturing and Water until 1 April 2026.

Emergency activation quick reference – Dam Hazards

The Emergency Action Plan (EAP) for Cania 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 activating the EAP unless otherwise directed by the Flood Operations Decision Maker (FODM) or Dam Safety Technical Decision Maker (DSTDM). Should the IC be unavailable, the Local Event Coordinator (LEC), Owner's Regional Representative (ORR) or Dam Duty Officer (DDO) is responsible.**

Table 1: Emergency activation quick reference

Dam hazards and section numbers	Activation Levels			
	Alert	**Lean Forward**	**Stand Up 1**	**Stand Down**
Flood operations **See section 5**	• Storage above EL 331.00 m (FSL)	• Storage above EL 332.40 m (moderate flood level)	• Storage above EL 334.45 m (Flood of record—Jan 2013)	• Storage EL 331.10 m FSL
Piping: embankment, foundation, or abutments **See section 6**	• Increasing seepage through an embankment, the foundations, or abutments	• Increasing seepage through an embankment, the foundations, or abutments WITH cloudy water	• Piping condition has been established	• Risk assessment has determined that failure risk has reduced
Earthquake **See section 7**	• Earthquake confirmed or felt in the area, AND • Intensity less than 5 Modified Mercalli (MM)	• 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	• Risk assessment has determined that failure risk has reduced
Terrorist threat/ activity or high energy impact **See section 8**	• Not applicable	• Not applicable	• Possible terrorist activity noticed at the 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, AND sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced

Next page: Emergency activation quick reference – Other Emergency Situations

Emergency activation quick reference – Other Emergency Situations

The EAP for Cania 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 IC is responsible for activating the EAP unless otherwise directed by the FODM or DSTDM. Should the IC be unavailable, the LEC, ORR or DDO is responsible.**

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/ORR)	Communications Failure – Brisbane (IC/DSTDM)
	• Site managed (DDO - becomes LEC/ORR)	• Brisbane managed by Incident Controller (IC)	• Locally managed by Local Event Coordinator (LEC/ORR)
	Activation triggers for other emergency situations		
Comms Failure **See section 9**	• Unable to communicate to or from dam site	• Unable to communicate to or from local area	• Unable to communicate to or from Sunwater Brisbane

Table of contents

List of tables

List of figures

Document control

Authorisation of document

Name	Position/role	Signature	Date
[redacted]	EAP Program Lead — Prepared for submission	[redacted]	14/09/2024

Document revision history

Issue	Date	Prepared by	Reason for change	eDocs#
2	May 2008		Significant changes of Cania Dam Emergency Action Plan to reflect Sunwater Management structure and other minor changes.	HB# 825499
3	October 2011		Significant changes to all sections of Cania Dam Emergency Action Plan to reflect current Sunwater Management structure and other minor changes.	#1060297
4	October 2015		New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with Relevant Disaster Management Groups.	HB# 1827940
5	September 2016		Updates to notification & communication lists and Emergency Alert sections.	HB# 2026853
6	August 2017		Revised and reviewed Emergency Action Plan developed at expiry of approval. Also 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# 2130983
7	September 2018		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB# 2367747
7.1	September 2019		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Updated EA Polygon and added Downstream Notification map. Minor error corrections and other non-substantive changes.	HB# 2461452
8.0	April 2020		Revised and reviewed at expiry of approval. Minor error corrections and other non-substantive changes to improve readability and useability. Updated Emergency Alert Polygons to new format.	HB# 2505051
8.1	September 2020		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB# 2571772
8.2	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 # 2652753

Issue	Date	Prepared by	Reason for change	eDocs#
8.3	September 2022		Amended contacts and associated sections. 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 # 2724935
8.4	September 2023		Amended emergency alert request form to comply with AWS. Non-substantive updates as part of Annual Safety Statement. Minor error corrections and readability improvements.	# 2812057
9.0	October 2023		AWS added to Abbreviations and Business Terms and Definitions sections. Updated PAR with reference to 2022 CRA. Updated Dam Details Table 2. AWS Warning levels added to Action Tables in Flood Operations. Flood triggers revised. References to wave action in Action Tables and the direction to cease remedial works and ensure the safety of personnel, and photograph damage from a safe location to Piping Stand Up 2. Added 'confirmed' to Earthquake tables. FIA updated to 2019. EA polygon updated as per 2022 CRA. Monto floodplain mapping removed. Updated SDF and PMF inundation mapping in Appendix B. DS notification mapping updated and discharge curve revised based on 2020 CFD model. Contacts updated in Appendix A3 and A4.	# 2786912
9.1	September 2024		Wet Season Preparedness – contact update and minor amendments	# 2865408

Controlled document distribution list

Copy no.	Position	Location
1	Storage Supervisor	Sunwater, Cania Dam
2	General Manager—Burnett & Lower Mary	Sunwater, Bundaberg
3	Emergency Action Plan Lead	Sunwater, Brisbane
4	Local Disaster Coordinator & CEO—Local Disaster Management Group	North Burnett Regional Council, Gayndah
5	Officer in Charge—Monto Police	Police, Monto

Notes: Communication information for each 'Controlled Copy Holder' is attached in Appendix A.

Electronic document distribution list

Printed electronic copies are considered uncontrolled copies.

Position	Location
Executive Officer—Bundaberg District Disaster Management Group	Police, Bundaberg
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	Water Supply (Safety and Reliability) Act 2008 — Current 08 March 2022	https://www.legislation.qld.gov.au/view/whole/pdf/inforce/current/act-2008-034
B	Queensland Disaster Management Act 2003 — Current 08 April 2022	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2003-091
C	Queensland Disaster Management Guidelines	http://www.disaster.qld.gov.au
D	Guidelines on Selection of Acceptable Flood Capacity for Dams (ANCOLD, 2000)	ANCOLD
E	Queensland Dam Safety Management Guidelines (DNRME 2020)	Queensland Dam Safety Management Guidelines (resources.qld.gov.au)
F	Australian Rainfall and Runoff (ARR) 2019	http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/)
G	Emergency action plan for referable dam guideline (RDMW 2023)	Emergency Action Plan for Referable Dam Guideline (resources.qld.gov.au)
H	Queensland State Disaster Management Plan 2023 (Queensland's Disaster Management Committee)	Interim-2023-QSDMP-V1.2.pdf (disaster.qld.gov.au)
I	Professional Engineers Act 2002 (RPEQ) 2013	https://www.legislation.qld.gov.au/view/pdf/inforce/2013-09-23/act-2002-054
J	Guidelines for the Development of Communication Education, Awareness and Engagement Programs (Australian Institute for Disaster Resilience 2010)	https://knowledge.aidr.org.au/media/1970/manual-45-guidelines-for-the-development-of-communication-education-awareness-and-engagement-programs.pdf
K	Queensland Emergency Alert Manual – M.1.174 (2023)	https://www.disaster.qld.gov.au/__data/assets/pdf_file/0027/339417/M1174-Queensland-Emergency-Alert-Manual.pdf
L	Sunwater website—Emergency Notification Service	https://www.sunwater.com.au/community/preparing-for-weather-events/stay-informed/emergency-notification-service/
M	Sunwater (Internal) Strategic Event Procedure	https://sunwater.sharepoint.com/sites/policies-and-standards/PoliciesAndStandards/Strategic%20Event.pdf
N	Sunwater (Internal) Cania Dam Safety Condition Schedule—September 2022	HB#2742773
O	Sunwater (Internal) Cania Dam Operation and Maintenance Manual	Cania Dam O&M Manual
P	Sunwater (Internal) Cania Dam 2022 Comprehensive Risk Assessment	HB# 2720028
Q	Guidelines on Dam Safety Management (ANCOLD, 2003)	ANCOLD ISBN: 0-731027620

Ref	Document title	Reference/location
R	Guidelines on Consequence Categories for Dams (ANCOLD, 2012)	ANCOLD ISBN: 978-0-9808192-5-0
S	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	https://www.resources.qld.gov.au/__data/assets/pdf_file/0005/78836/guidelines-failure-impact-assessment.pdf
T	Sunwater (Internal) Emergency Alert Protocol	HB # 2156253
U	Water Act 2000	https://www.legislation.qld.gov.au/view/pdf/2017-07-03/act-2000-034
V	Sunwater (Internal) Standing Operating Procedure (SOP) 12 – Dam Log Books	SOP12 Dam Log Books
W	Fatigue Management Procedure WHS42 (Sunwater Internal)	Fatigue Management Procedure

1.2 Abbreviations and acronyms

ABC	Australian Broadcasting Corporation
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AMTD	Adopted Mean Thread Distance
ANCOLD	Australian National Committee on Large Dams
AWS	Australian Warning System
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
OCDO	Operations Centre Duty Officer
OCO	Operations Coordinator
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
RDMW	Department of Regional Development, Manufacturing and Water
ROC	Regional Operations Centre
RPEQ	Registered Professional Engineer of Queensland
RSL	Reduced Supply Level
SC	Shire Council
SCED	Senior Civil Engineer Dams
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
WHS	Workplace Health & Safety
WSSR	Water Supply (Safety and Reliability) Act
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 defined in accordance with the Water Supply (Safety and Reliability) Act 2008 (the WSSR Act) (reference A).	
Australian Warning System (AWS)	A national approach to information and warnings during emergencies like bushfire, flood, storm, extreme heat and severe weather.
Dam hazard	Means 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 two 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 (DMP)	Of a *district group* or local government, means the group's District DMP (DDMP) or local government's Local DMP (LDMP) under the Queensland Disaster Management Act 2003 (reference B).
District group (DDMG)	For an EAP, means a district group established under the Queensland Disaster Management Act 2003 (reference B), section 22 whose disaster district under that WSSR 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 2 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 Queensland Disaster Management Act 2003 (reference B), 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 (LDMG)	For an EAP, means a local group established under the Queensland Disaster Management Act 2003 (reference B), 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 WSSR 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 WSSR Act, accepted the assessment Also, a dam is a referable dam if: • under section 342B of the WSSR 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 WSSR 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 (QPS)
Terms consistent with *Queensland Disaster Management Guidelines*	
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 WSSR 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. **Notes:** 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
AWS warning levels	The three AWS warning levels are: • **Advice:** The first warning level of the Australian Warning System meaning an incident has started but there is no immediate danger. Stay up to date in case the situation changes. • **Watch and Act:** The second warning level of the Australian Warning System meaning there is a heightened level of threat. Conditions are changing – you need to start taking action now to protect you and your family. • **Emergency:** The third and highest warning level of the Australian Warning System meaning lives may be in danger and action should be taken immediately. **Notes:** These AWS warning levels do not change the Activation Levels of the EAP and are intended for external public-facing information only. There is no Stand Down equivalent in AWS warning levels.
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	The lowest elevation of the non-overflow crest section of the dam excluding handrails, parapets or wave walls that have not been designed to store water.
Dam crest flood (DCF)	The flood event which, when routed through the reservoir, results in a still water reservoir level equivalent to the lowest dam crest level.
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.

Term	Definition
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 (PMF)	The flood resulting from the probable maximum precipitation coupled with the worst flood-producing catchment conditions that can be realistically expected in the prevailing meteorological conditions.
Probable maximum precipitation (PMP)	The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin.
Probable maximum precipitation flood (PMPF)	The flood resulting from the probable maximum precipitation coupled with typical catchment conditions.
Stability, main embankment	High foundation pore pressure peaks may reduce the Factor of Safety against slip circle failure to an unacceptable level.
'Sunny day' failure (SDF)	A failure that occurs at the FSL and there is no concurrent rain associated flooding.
Terrorist activity	A deliberate attempt to damage or fail or contaminate a dam.

2. Introduction

2.1 Context

Under the WSSR Act, 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 WSSR Act and the Emergency Action Plan for Referable Dam Guideline (reference G) and Queensland State Disaster Management Plan 2023 (reference H). The content requirements for EAPs are contained in section 352H of the WSSR Act.

Summary of legal requirements – Section 352H

Section 352H(1) of the WSSR 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, or piping conditions):

- Identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard; and
- Identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening; and
- 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
- 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
- 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 WSSR 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 WSSR 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 WSSR 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 area may be affected by a dam hazard for Cania Dam has been determined as **North Burnett Regional Council (NBRC)**. Sunwater has provided the NBRC with a copy of the draft EAP for assessment.

Section 352HC of the WSSR Act states that a district group may review the EAP for consistency with its disaster management plan. The district group for Cania Dam is **Bundaberg DDMG**. Sunwater has provided the DDMGs with a copy of the draft EAP for review.

Note: Sunwater has attempted to write the EAP to cope with all reasonably foreseeable emergencies. However, there is considerable uncertainty about how any emergency 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.

2.2 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 Cania 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 to exist at Cania Dam at 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 at Cania 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 assessed and considered to be consistent with the North Burnett LDMP and associated disaster management sub plans.

2.3 Scope

The Cania 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 event or emergency event
- triggers for activation of a tiered response to dam hazard event or emergency event
- roles and responsibilities in responding to a dam hazard event or emergency event
- 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 event and/or emergency event, and the management of such.

2.4 Sunwater provides training

Training of the use and implementation of this EAP document is carried out at various times throughout the year. Specific pre-wet season training is undertaken leading up to the wet season. During this period, Sunwater staff complete work instructions for site preparations and from July to September carry out checks on; stores, supplies of fuel and 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. This on-site training is presented to relevant Sunwater staff (DDO's, 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 is also working towards carrying out exercises involving each local authority and disaster management stakeholders. 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 would involve the State Disaster Coordination Centre (SDCC) and include the (non- live) testing of Emergency Alerts. The test results relating to numbers of alerts generated will be shared with local authority and disaster management stakeholders.

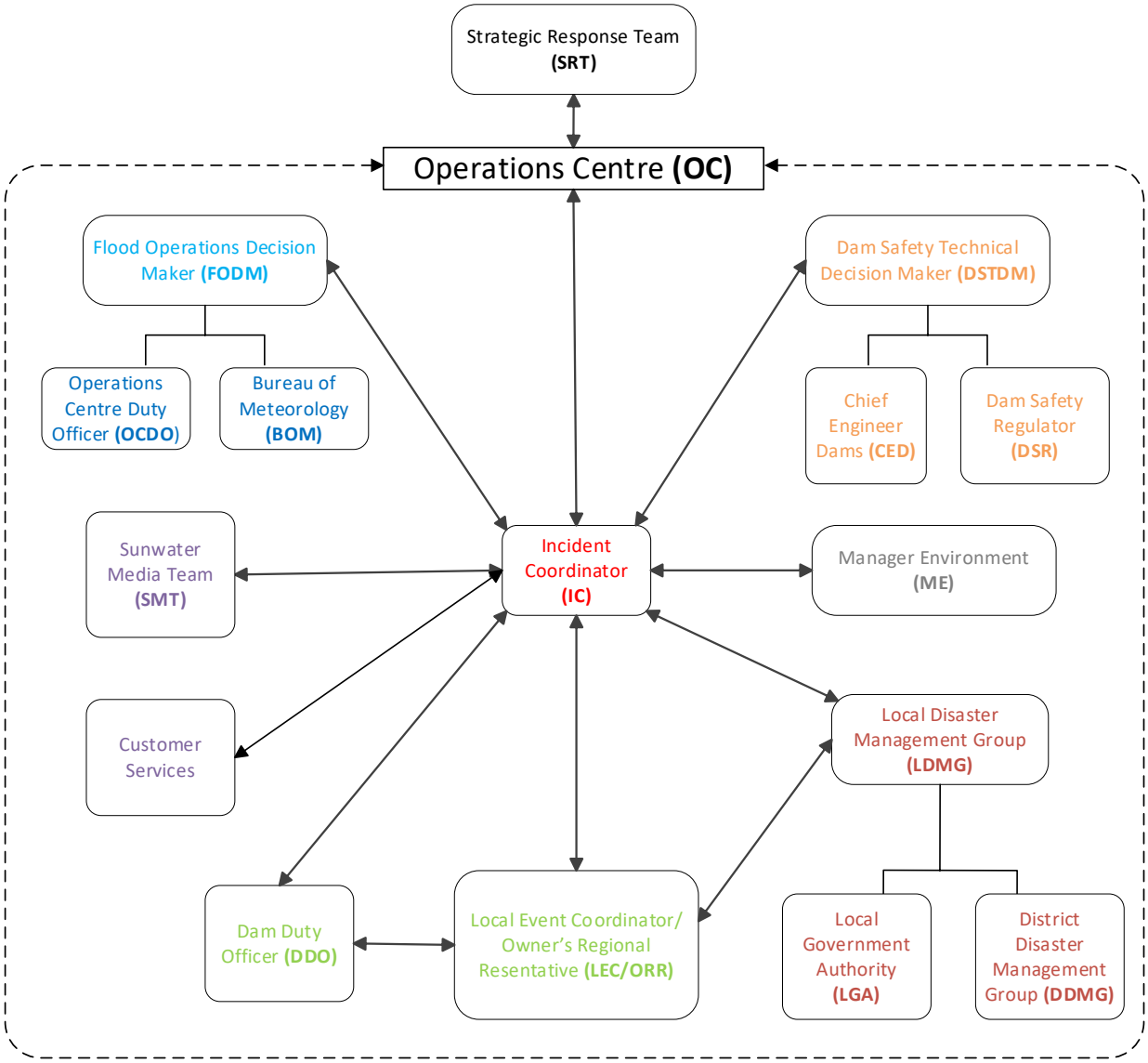
2.5 Fatigue Management Plan

Sunwater has a Fatigue Management Procedure (reference W). 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.

2.6 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

- 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 managing the dam hazard.
- The IC is responsible for the decision to activate the EAP. Should the IC be unavailable, the Local Event Coordinator (LEC) followed by the Dam Duty Officer (DDO) is responsible for the decision. 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 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.

- Sunwater's in-house engineering and technical staff will provide technical advice to the IC, LEC and DDO on an as needs basis. The Flood Operations Decision Maker (FODM) and Dam Safety Technical Decision Maker (DSTDM) will provide flood and dam engineering advice respectively during a dam hazard. Such advice will be provided within an established framework of Standing Operating Procedures (SOPs), models, standards, and manuals. This is an advisory role only and does not diminish the decision responsibility of the IC, LEC or DDO.
- If unusual circumstances develop during a dam hazard, it will be necessary to escalate to either the FODM or DSTDM. These roles are filled by Registered Professional Engineers of Queensland (RPEQ) and are suitably qualified professionals as defined in the Professional Engineers Act of Queensland (reference I). These decision-making roles are providing direct engineering supervision to the advisors through the established framework of SOPs, models, standards, and manuals or through direct supervision.

2.7 Community information

Sunwater with the assistance of the local councils will ensure community education around messaging and impacts of the EAP and its related events is undertaken and continually improved by incorporating actions from Lessons Learnt (section 2.8).

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

Notifiable D/S residents are also provided information in text message/phone calls in the event of an activation of this EAP.

In the event of an emergency event or when otherwise required, Sunwater and the affected local government also have the use of the National Emergency Alert System to send a voice message and SMS. This service is provided by Telstra and managed by the Queensland Police Service (QPS) at the SDCC. 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-weather-events/emergency-management/

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

2.8 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 Dam Safety Regulator (DSR) 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 the Department of Regional Development, Manufacturing and Water (RDMW) as appropriate.

In addition, Sunwater requests any post event learnings be communicated regarding operational effectiveness and areas for improvement.

2.9 Downstream notification lists

Sunwater has compiled the notification lists through an iterative process. At least every five 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. Throughout the year, individuals can register to receive notifications for this EAP and are able to register either through the Sunwater website (reference L) or by calling the Sunwater call centre on 13 15 89.

3. Roles and responsibilities

Roles and responsibilities	Position holder

Owner (Sunwater)
• Liaise with the Board and Minister.
• Activate Sunwater Strategic Response (reference M) and Business Continuity Plans if required.
• Ensure necessary resources are available to manage any dam hazard and emergency events.
• Maintain an up-to-date list of notifiable D/S residents (Appendix A4) of Cania Dam. The downstream limit is indicated in the drawing in Appendix B1 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 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 A4 via SMS
  ○ contact SDCC Watch Desk to request an Emergency Alert campaign throughout the Cania Dam emergency polygon (Appendix A7)
• Where a dam hazard event occurs with adequate time to warn downstream residents, notify the residents listed in the EAP via SMS (unless otherwise agreed with the LDMGs)
• Record communications, notifications and observations as required.
	CEO
	EGMO
	EGME&WR

Roles and responsibilities	Position holder
Owner's Head Office Representative • Authorise the issuing of EAPs, SOPs and O&M Manuals (reference O) 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 (reference N) are met • Ensure the work instructions are correct and the logbooks, SOPs, Data Books and EAPs are reviewed annually as per the Dam Condition Schedule (reference N). • Undertake and prepare the five yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified in the Dam Condition Schedule (reference N) 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 Dam Condition Schedule (reference N) 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.
• Undertake the role of LEC as required:
  ○ liaise with the LDC or proxy.
  ○ activate the EAP, when necessary.
  ○ ensure the EAP is implemented appropriately and carry out the LEC role as required.
• Ensure all work orders, work instructions and lesson learned outcomes are fully implemented.
• Record communications, notifications and observations as required.
	GM Burnett & Lower Mary
	OCO
	OS

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

Roles and responsibilities	Position holder
Dam Safety Technical Decision Maker (DSTDM) • Maintain current RPEQ accreditation. • Analyse the situation and provide expert technical advice in relation to dam safety. • Discuss dam hazards 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. • Liaise with DSR 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
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 QDMC of flood events. • Record communications, notifications and observations as required.	Various personnel as per Media Team roster
Incident Coordinator (IC) • Notify LDMGs, or councils if LDMGs not Stood Up, of intent to use the Emergency Alert. • Activate the EAP, when necessary. • 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.	Various personnel as per IC roster
Local Event Coordinator (LEC) • Refer to ORR role.	
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

Roles and responsibilities	Position holder
North Burnett Regional Council Councils have legislated local government functions, as per Section 80 of the Queensland Disaster Management Act 2003 (reference B). 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 DDMG for the disaster district in which area it is situated. • Perform other functions given to the local government under the Queensland Disaster Management Act 2003 (reference B). And as per Section 352HB of the WSSR Act: • Must assess (in consultation with its LDMG) the EAP for consistency with the LDMP.	
Queensland Police Service (QPS) Manage the initial situation based on local operational procedures; including but not limited to: • conduct emergency operations. • coordinate and support Sunwater during a declared emergency at the dam. • liaise with relevant organisations. • evacuation of persons if required. • control of essential traffic. • security of specific area.	Local Police

Roles and responsibilities	Position holder
Disaster Management Groups/Personnel – (In addition to requirements outlined in the Queensland Disaster Management Act 2003 (reference B). LDMG • As per IGEM review recommendation, work together with Sunwater and the councils to ensure community education around messaging and impacts of EAP related events is undertaken and continually improves. • Work with councils and Sunwater to ensure the EAP is regularly exercised. • Identify and coordinate the use of resources and support services that may be required for an EAP event, noting that for safety events unique to the dam Sunwater will approach councils to initiate. • During a dam hazard/emergency event, **providing they are Stood Up**, the LDMGs in the affected local government areas will take the lead role in notifying the broader community. • Identify and provide advice to the relevant DDMGs about support services required by the LDMG to manage an EAP event. • Provide reports and make recommendations to the relevant DDMGs about matters relating to EAP events. QFD • Work with dam owner and LDMGs to ensure Emergency Alert polygons are prepared, stored and tested at the State Watch Desk. And as per Section 352HC of the WSSR Act: DDMG • May review the EAP for consistency with the DDMP.	LDMG QFES DDMG
Dam Safety Regulator (DSR) • Liaise with relevant Minister on necessary actions. • Approve this document as required under legislation. • Liaise with Chief Executive as required in administering (regulating) the WSSR Act.	DDS

4. Dam details

4.1 General dam information

Location: Cania Dam is situated on Three Moon Creek at AMTD 110.1 km. Cania Dam is an earth and rock-fill embankment dam, located approximately 40 km north-west of Monto.

Catchment: Three Moon Creek rises in the Dawes Range and flows in a southerly direction to become a tributary of the Burnett River. The dam catchment is bounded to the north and the west by the Dawes Range, and to the east by the less rugged, elevated land between Monal Creek and Three Moon Creek. The catchment elevations vary from about EL 900 m in the headwaters to EL 331 m at the dam.

The topography of the catchment is generally well-timbered, hilly to mountainous terrain in the upper catchment, with drier, eucalypt woodland in the lower catchment. The reaches above Cania Gorge are characterised by a wide, deep channel, whereas the reaches below are narrower and shallower with a flood plain extending beyond the banks downstream of the gorge. Three Moon Creek flows through massive alluvial deposits that form the aquifers that provide the major source of irrigation and town water supplies for users in the Monto and surrounding areas.

Mean annual rainfall over the catchment varies from just over 900 mm in the higher part to just over 700 mm in the lower part.

The chief land uses in the area are cropping and improved pasture grazing for dairy and beef cattle. The main crops grown are wheat, lucerne and sorghum.

Construction: The dam was completed in 1982, chiefly to supply irrigation water through ground water exchange. The Cania Dam was constructed through a ridge extending from the right abutment of the embankment and is an earth and rock-fill construction. The spillway is situated separately from the main dam wall and is an ungated concrete control crest with unlined excavated chute.

Specification: The table below lists general specifications of Cania Dam.

Table 2: Cania Dam specifications

Description	Specification
Dam type	**Earth and rock-fill embankment**
Full Supply Level (FSL)	EL 331.00 m
Historical recorded max storage—Jan 2013	EL 334.45 m
Dam Crest Level (DCL)	EL 338.00 m
Dam height	47 m above downstream toe
Dam length	350 m
Dam height above lowest foundation level	54 m (approx.)
Storage capacity at FSL	88,580 ML
Storage area at FSL	760 Ha
Catchment area	280 km^2
Spillway type	**Un-gated concrete crest**
Spillway crest level	EL 331.00 m
Spillway width	90 m
Spillway design capacity	3,150 m^3/s (272,160 ML/d) at EL 337.75 m
Spillway capacity for DCF	3,400 m^3/s (293,760 ML/d) at EL 338.00 m

Description	Specification
Outlet works	**Irrigation (stream recharge) outlet:** 1 x 2100 mm nominal diameter precast concrete and steel pipe that bifurcates to 2 x 900 mm dia. MS pipes. Each 900 mm dia. pipe is fitted with a 900 mm dia. guard valve (butterfly valve) and a 750 mm dia. regulating valve (cone dispersion valve)
Outlet capacity (at FSL)	7.5 m^3/s (1 valve) 12.5 m^3/s (2 valves) Based on Drawing 44829-C.

All levels are to Australian Height Datum (AHD).

4.2 Population at risk

In the Consequence Assessment performed in the 2022 Comprehensive Risk Assessment (reference P):

- The dam was assessed for flood events as an 'Extreme' consequence. Cania Dam is also classified for Sunny Day Failure (SDF) as an 'Extreme' consequence category.
- The incremental Population at Risk (PAR) for flood failure and SDF are 299 and 375 respectively.
- Assumptions on concurrent downstream flooding conditions were made for dam failure during flood scenarios based on correlation of rainfall and streamflow between Cania Dam and the downstream catchment. A strong correlation was found with downstream catchment to Monto and a weak to moderate correlation was found with Nogo River (Wuruma Dam).

The downstream notification area and extreme flood event inundation maps are provided in Appendix B.

4.3 General arrangement

The general arrangement drawings are in Appendix B1.

4.4 Emergency inspections and monitoring

Cania 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 Cania Dam.

4.4.1 Inspections

The following inspections are to be carried out:

- **Routine Visual Inspection**: Conducted as per routine surveillance Work Order or as directed by the DSTDM.
- **Detailed Inspection:** Conducted annually.
- **Comprehensive Inspection**: Conducted five-yearly.

4.4.2 Instrumentation and monitoring

To confirm the structural behaviour and safety of the embankment, the following instrumentation was installed, and is monitored at Cania Dam.

- **Settlement/movement measurement**

- 25 surface settlement points—10 along the crest of the dam, 6 on the upstream face, and 9 on the downstream face
- 19 hydraulic piezometer installations (O&M, s3.3)
- 1 electrical settlement installation (not in use)

- **Seepage measurement**

- 1 seepage weir

The location of instrumentation and monitoring equipment is detailed in Appendix B1.

5. Dam hazard—flood operations

5.1 Overview

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

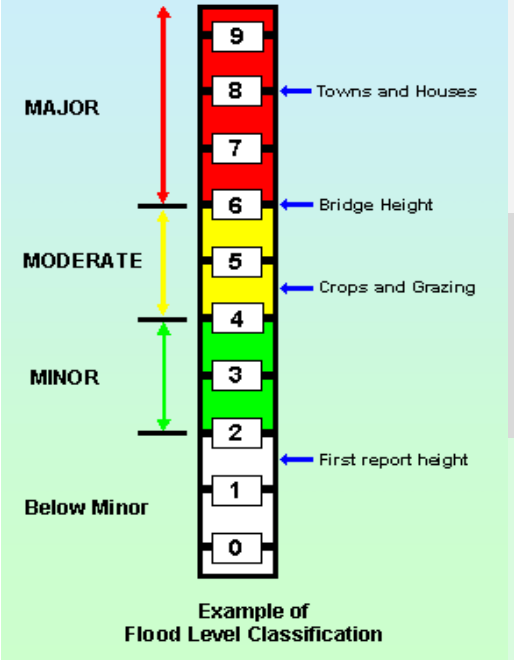
- A dam hazard where natural catchment inflows fill Cania Dam FSL 331.00m and the rate of inflow exceeds the capacity of the outlet works. The spillway will then discharge water downstream into Three Moon Creek. These flood flows can create a dam hazard. Inflows will also cause the storage to temporarily 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.

The area likely to be affected by this dam hazard is described as:

- As the rate of discharge increases, there will be an impact on low-level road crossings of Three Moon Creek and other infrastructure in the creek such as pump sites.
- When the storage height exceeds the major flood level (3.0 m over the spillway) EL 334.00 m, 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, including tables and maps, is presented in Appendix B.

Table 3: Flood classification triggers

	Flood Classification Level	Depth over Spillway (m)	Storage Elevation (m AHD)
	Major	3.00	334.00
	Moderate	1.40	332.40
	Minor	0.60	331.60

Source: Bureau of Meteorology

The following table shows historical floods experienced at Cania Dam.

Table 4: Historical floods experienced at Cania Dam

Flood rank	Date	Peak height (m) EL	Peak height (m) over spillway crest
1	Jan 2013	334.45	3.45
2	Feb 2015	333.62	2.62
3	Oct 2017	331.68	0.68
4	Jan 2011	331.35	0.35
5	Mar 2012	331.34	0.34

5.2 Emergency actions

In the following action tables, 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

EAP Flood Activation Trigger	Trigger Summary	AWS Warning Level
Alert	• Storage above EL 331.00 m (FSL)	**Advice**
Lean Forward	• Storage above EL 332.40 m (moderate flood level)	**Watch and Act**
Stand Up 1	• Storage above EL 334.45 m (flood of record—Jan 2013)	**Emergency**
Stand Up 2	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	
Stand Down	• Storage below EL 331.00 m (FSL)	

While this EAP is not activated until Cania Dam reaches the Alert trigger, Sunwater and the North Burnett Regional Council LDMG 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.

In respect of forecast rainfall, as is identified in the roles and responsibilities of the FODM, regard must be had to the OC SOP.

The activation of Stand Up 2 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 2 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 action roles

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

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Controller (IC)
- LEC and IC external communication plan
- Dam Safety Technical Decision Maker (DSTDM)
- Flood Operations Decision Maker (FODM).

Table 6: Flood operations—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 331.00 m (FSL)	• Storage above EL 332.40 m (moderate flood level)	• Storage above EL 334.45 m (flood of record – Jan 2013)	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	• Storage below EL 331.00 m (FSL)
Actions	• Record all communication • Inspect the dam daily (or as instructed by the DSTDM) and photograph/video and record using approved forms and send to IC & DSTDM • Undertake site preparations (if not already complete) including but not limited to: – check fuel and operation of backup generator – check communication systems (including backup, satellite and landline phones, fax, internet) • Read dam instrumentation as instructed by the DSTDM, as per section 4.4 in this EAP • Notify the SO • Record the Storage Level twice daily (or as instructed by the DSTDM) using the gauge boards and confirm the accuracy of gauging station • Operations staff to be prepared with food, water, and provisions on site prior to road being cut off by water • Record rainfall—daily • Update Dam Logbook as per SOP 12	• As per previous activation level, AND • Inspect the dam twice daily (or as instructed by the DSTDM) and photograph/video and record using 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 – obvious signs of seepage – signs of bank erosion and rock unravelling – inspect embankment for leaks, deformation and erosion • Report any unusual readings or observations to the DSTDM and IC as soon as practical	• As per previous activation level, AND • If safe to do so, inspect the dam 6-hourly (or as instructed by the DSTDM) and photograph/video and record using approved forms and send to IC & DSTDM	• As per previous activation level	• Return to routine surveillance activities and frequencies. • Inspect the dam and photograph any damage identified during the event • Forward all communication and inspection sheets for EER to • Update Dam Logbook as per SOP 12
Internal notifications	• IC • SO • LEC	• IC • SO • DSTDM (as required) • LEC	• IC • SO • DSTDM (as required) • LEC	• IC • SO • DSTDM (as required) • LEC	• Inform all previously notified contacts of stand down
External notifications	• As required	• As required	• As required	• As required	• Inform all previously notified contacts of stand down
AWS Warning Level	**Advice**	**Watch and Act**	**Emergency**		

Table 7: Flood operations—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 331.00 m (FSL)	• Storage above EL 332.40 m (moderate flood level)	• Storage above EL 334.45 m (flood of record – Jan 2013)	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	• Storage below EL 331.00 m (FSL)
Actions	• Record all communication • Liaise with DDO, IC and LDMG • Develop/implement staff roster • Ensure all abnormal observations or damage has been reported to DSTDM and IC • Liaise with relevant Council(s) regarding potential road/bridge closures • **NOTE:** Helicopter must be used to access dam as first crossing is inundated	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward all communication and inspection sheets for EER to: • Return to routine activities
Internal notifications	• DDO • IC	• DDO • IC	• DDO • IC	• DDO • IC	• Inform all previously notified contacts of stand down
External notifications	• LDMG	• LDMG	• LDMG	• LDMG	• Inform all previously notified contacts of stand down
AWS Warning Level	**Advice**	**Watch and Act**	**Emergency**		

Table 8: Flood operations—IC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 331.00 m (FSL)	• Storage above EL 332.40 m (moderate flood level)	• Storage above EL 334.45 m (flood of record – Jan 2013)	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	• Storage below EL 331.00 m (FSL)
Actions	• Record all communication • Liaise with Sunwater Media on-call, FODM and/or DSTDM to send appropriate messaging • Liaise with the DSTDM and the FODM • Create Incident Report Record • **Update Sunwater intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG is *stood up*	• As per previous activation level, AND • Ensure all abnormal observations or damage has been reported to DSTDM	• As per previous activation level	• As per previous activation level	• Complete all Internal and external notifications • Forward all communications including relevant emails for EER to [redacted] • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	• DDO • DSTDM • FODM • LEC/ORR • SMT • SRT	• DDO • DSTDM • FODM • LEC/ORR • SMT • SRT	• DDO • DSTDM • FODM • LEC/ORR • SMT • SRT	• DDO • DSTDM • FODM • LEC/ORR • SMT • SRT	• Inform all previously notified contacts of stand down
External notifications	• D/S Residents • DDMG	• D/S Residents • DDMG	• D/S Residents • DDMG	• D/S Residents • DDMG	• Inform all previously notified contacts of stand down
AWS Warning Level	**Advice**	**Watch and Act**	**Emergency**		

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

[redacted]

Table 9: Flood operations—LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text	AWS Warning Level
Alert	• Storage above EL 331.00 m (FSL)	• **LDMG** • DDMG	• 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	Advice
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call, FODM and/or DSTDM to send appropriate messaging** **Refer to Annexe for sample message**	
Lean Forward	• Storage above EL 332.40 m (moderate flood level)	• **LDMG** • DDMG	• Phone	Describe current situation with dam: What is the event? What is the status? Advise of current storage level Discuss any potential road/bridge closures	Watch and Act
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call, FODM and/or DSTDM to send appropriate messaging** **Refer to Annexe for sample message**	
Stand Up 1	• Storage above EL 334.45 m (flood of record – Jan 2013)	• **LDMG** • DDMG	• Phone	Describe current situation with dam: What is the event? What is the status? Advise of current storage level Advise of any forecasts you are aware of	Emergency
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call, FODM and/or DSTDM to send appropriate messaging** **Refer to Annexe for sample message**	

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

Activation level	Trigger for communications	Group to contact	Method	Message text	AWS Warning Level
Stand Up 2	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	• **LDMG** • DDMG	• 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	Emergency
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call, FODM and/or DSTDM to send appropriate messaging** **Refer to Annexe for sample message**	
Stand Down	• Storage below EL 331.00 m (FSL)	• **LDMG** • DDMG	• Phone	Describe current situation with dam: What is the event? What is the status? Advise of current storage level Advise EAP has been deactivated	
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call, FODM and/or DSTDM to send appropriate messaging** **Refer to Annexe for sample message**	

Table 10: Flood operations— DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 331.00 m (FSL)	• Storage above EL 332.40 m (moderate flood level)	• Storage above EL 334.45 m (flood of record – Jan 2013)	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	• Storage below EL 331.00 m (FSL)
Actions	• Record all communication • Provide technical advice to DDO and IC on a needs basis • Review surveillance reports and determine is any additional responses are required • Notify DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward all communications including relevant emails for EER to • Return to routine activities
Internal notifications	• DDO • IC	• DDO • IC	• DDO • IC	• DDO • IC	• Inform all previously notified contacts of stand down
External notifications	• DSR	• DSR	• DSR	• DSR	• Inform all previously notified contacts of stand down
AWS Warning Level	**Advice**	**Watch and Act**	**Emergency**		

Table 11: Flood operations—FODM emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 331.00 m (FSL)	• Storage above EL 332.40 m (moderate flood level)	• Storage above EL 334.45 m (flood of record – Jan 2013)	• Storage above EL 338.00 m (overtopping, allowing for wave action) OR • As advised by the DSTDM	• Storage below EL 331.00 m (FSL)
Actions	• Record all communication • Forecast flood level based on observed rainfall and BoM forecast rainfall • Extract relevant data from available sources • Update Flood models as per OC	• As per previous action level	• As per previous action level	• As per previous action level	• If required, forward all relevant communication, including emails for EER to [redacted] • Return to routine activities
Internal notifications	• IC • DSTDM	• IC • DSTDM	• IC • DSTDM	• IC • DSTDM	• Inform all previously notified contacts of stand down
External notifications	• n/a	• n/a	• n/a	• n/a	• n/a
AWS Warning Level	**Advice**	**Watch and Act**	**Emergency**		

6. Dam hazard—piping: embankment, foundation, or abutments

6.1 Overview

The emergency action described in this section relates to a potential dam hazard 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 may be 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

6.1.1 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.

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 Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM).

Figure 2: Piping: embankment, foundation, or abutments flowchart

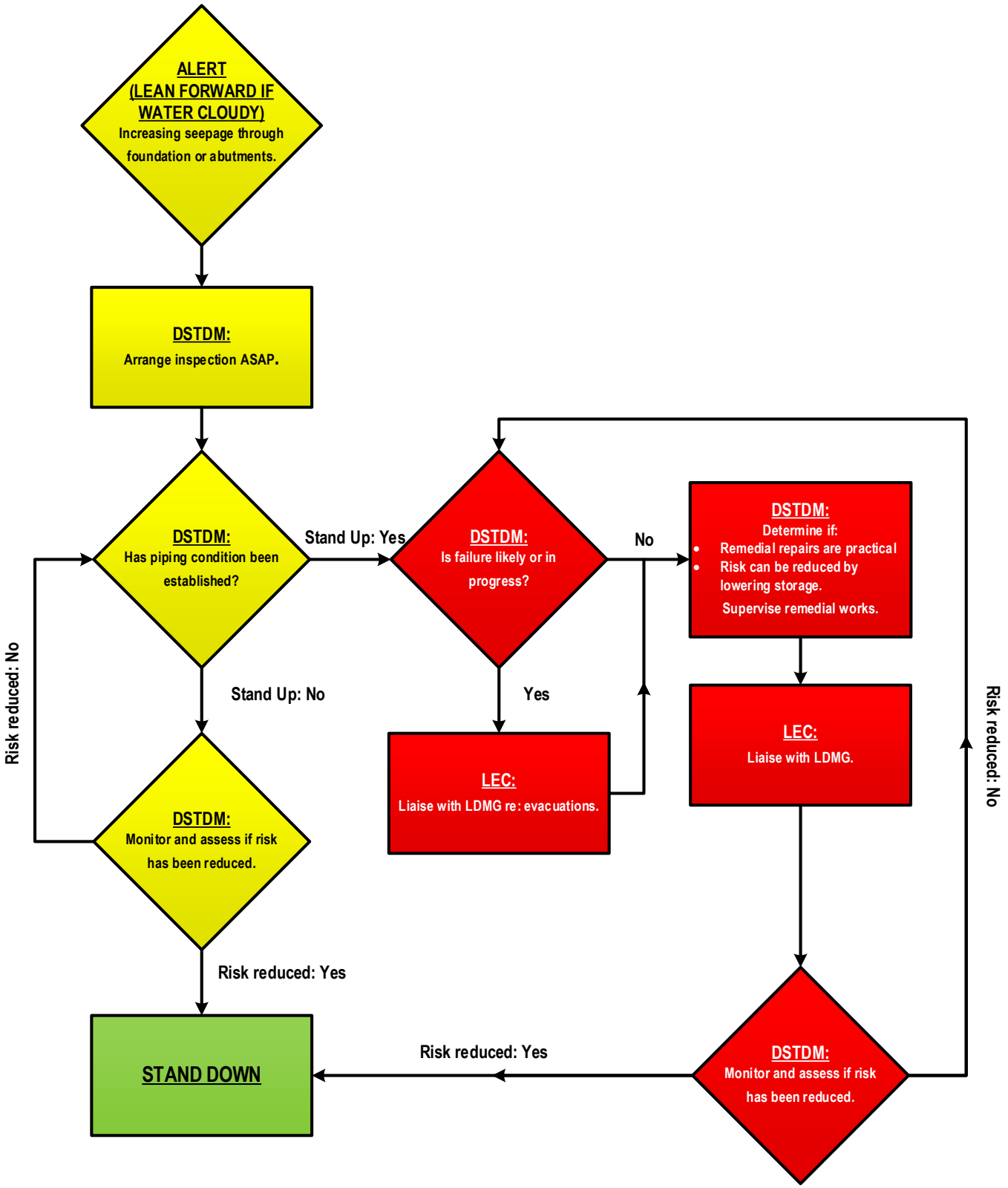


Table 12: Piping: embankment, foundation, or abutments—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing seepage through the embankment, the foundations, or abutments	• Increasing seepage 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 hazard	• Risk assessment has determined that failure risk has reduced
Actions	• Record all communication • Monitor and record 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	• As per previous activation level	• As per previous activation level, AND • Support/supervise remedial works as required • Lower the storage if directed by DSTDM • 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.	• Forward all communication and inspection sheets for EER to: [redacted] • Update Dam Logbook as per SOP 12 • Return to routine activities
Internal notifications	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• Inform all previously notified contacts of stand down
External notifications	• As required	• As required	• As required	• As required	• Inform all previously notified contacts of stand down

Table 13: Piping: embankment, foundation, or abutments—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing seepage through the embankment, the foundations, or abutments	Increasing seepage 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 hazard	• Risk assessment has determined that failure risk has reduced
Actions	• Record all communication • Liaise with DDO and IC	• As per previous activation level, AND • Liaise with LDMG	• As per previous activation level, AND • Liaise with relevant council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward all communication including relevant emails for EER to [redacted] • Return to routine activities
Internal notifications	• DDO • IC	• DDO • IC	• DDO • IC	• DDO • IC	• Inform all previously notified contacts of stand down
External notifications		• LDMG	• LDMG	• LDMG	• Inform all previously notified contacts of stand down

Table 14: Piping: embankment, foundation, or abutments—IC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing seepage through the embankment, the foundations, or abutments	• Increasing seepage 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 hazard	• Risk assessment has determined that failure risk has reduced
Actions	• Record all communication • Liaise with DDO, LEC and DSTDM • Create Incident Report Record • Complete Situation Report, unless otherwise directed. Update Sunwater intranet with dam status. **NOTE**: IC to carry out LEC actions unless LDMG 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 Media on-call and DSTDM to send SMS appropriate messagingMobilise 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	• Complete all internal and external notifications • Forward all communications including relevant emails for EER to [redacted] • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	• DDO • DSTDM • LEC/ORR • SMT • SRT	• DDO • DSTDM • LEC/ORR • SMT • SRT	• DDO • DSTDM • LEC/ORR • SMT • SRT	• DDO • DSTDM • LEC/ORR • SMT • SRT	• Inform all previously notified contacts of stand down
External notifications		• DDMG	• D/S Residents • DDMG • SDCC • ABC	• D/S Residents • DDMG • SDCC • ABC	• D/S Residents • DDMG

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

[redacted]

Table 15: Piping: embankment, foundation, or abutments—LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Increasing seepage through an embankment, the foundations, or abutments			N/A — Internal communications only
Lean Forward	• Increasing seepage through an embankment, the foundations, or abutments WITH cloudy water	• **LDMG** • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Unconfirmed piping—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** • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition). What is the status? (Confirmed piping condition) Advise of current storage level Discuss any potential road/bridge closures Prepare for possible evacuations
		• SDCC Watch desk	• Email & Phone	**Complete Emergency Alert Request Form and email to SDCC Watch Desk to send.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging**
		• ABC	• Phone	**To be determined.**

Table 15 (Continued): Piping: embankment, foundation, or abutments—LEC and IC external 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 hazard	• **LDMG** • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) 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 and email to SDCC Watch Desk to send.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**
	• Dam failure in progress	• **LDMG** • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) 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 (filled copy in Appendix A8) and email to SDCC Watch Desk to send SMS text.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**
Stand Down	• Risk assessment has determined that failure risk has reduced	• **LDMG** • DDMG	• Phone	Describe current situation with Dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Dam hazard Stood Down) Advise risk assessment has determined that failure risk has reduced and EAP has been deactivated
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**

Table 16: Piping: embankment, foundation, or abutments—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing seepage through the embankment, the foundations, or abutments	• Increasing seepage 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 hazard	• Risk assessment has determined that failure risk has reduced
Action	• Record all communication • Liaise with DDO and IC • 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 • Notify DSR	• As per previous activation level	• As per previous activation level, AND • Assess risk and determine if failure likely or in progress • Liaise with the LEC and 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)	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward all communications including relevant emails for EER to [redacted] • Return to routine activities
Internal notifications	• DDO • IC	• DDO • IC	• DDO • IC • LEC/ORR	• DDO • IC • LEC/ORR	• Inform all previously notified contacts of stand down
External notifications	• DSR	• DSR	• DSR	• DSR	• Inform all previously notified contacts of stand down

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

7. Dam hazard—earthquake

7.1 Overview

The emergency action described in this section relates to a potential dam hazard 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 earthquake damage. 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 earthquake damage 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 damage and concurrent flooding or downstream releases are occurring or expected to occur.

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

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 Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM).

Figure 3: Earthquake flowchart

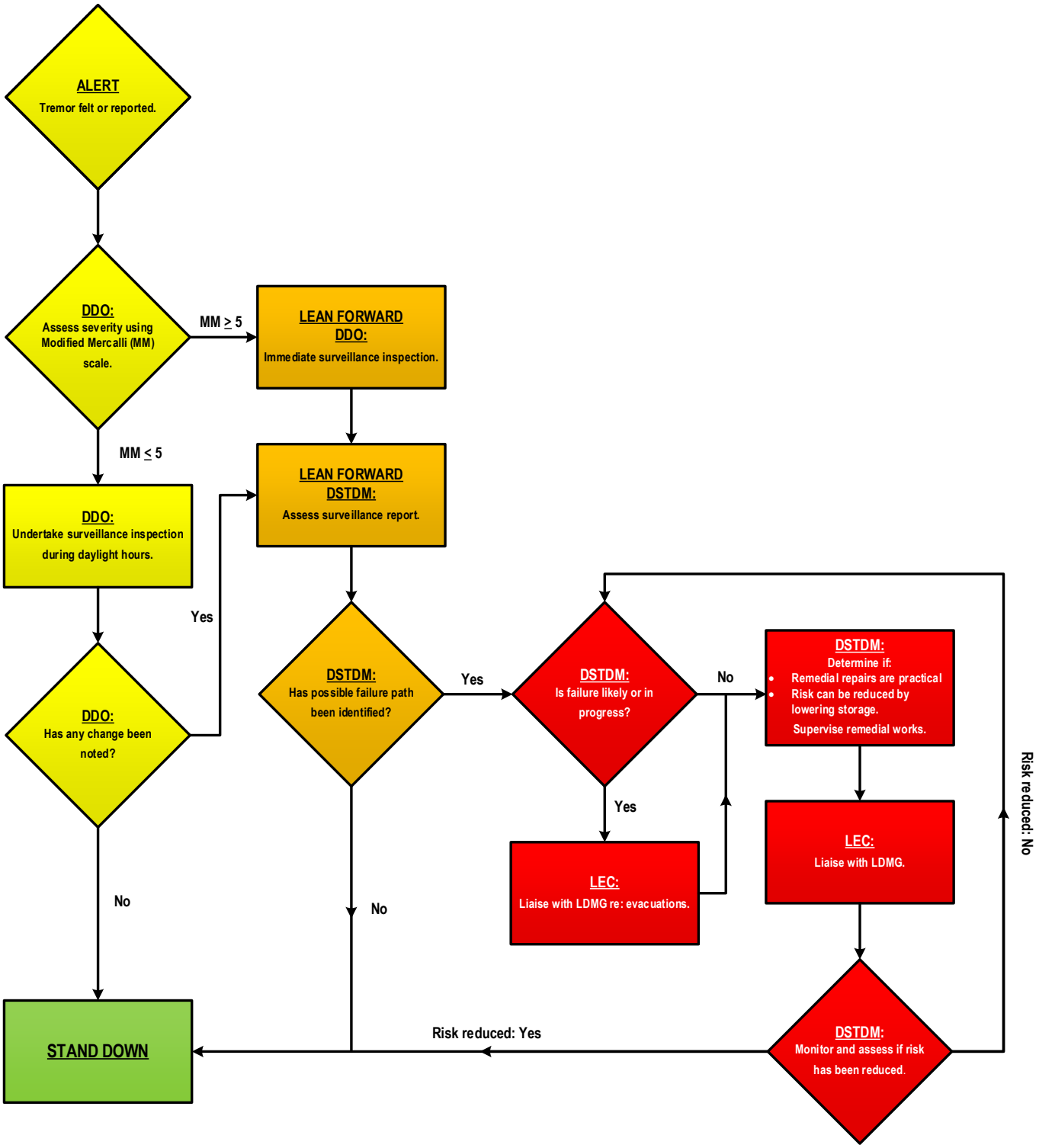


Table 17: Earthquake—DDO emergency action

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 hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Record all communication • Liaise with DSTDM and IC • Inspect all dam infrastructure 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 • Notify SO • Check for leaks, deformation, erosion, and concrete damage • Update Dam Logbook as per SOP 12	• As per previous activation level, AND • 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 personnel have been moved to a safe location • Record/photograph the earthquake damage and/or dam failure from a safe point	• Forward all communication and inspection sheets for EER to [redacted] • Update Dam Logbook as per SOP 12 Return to routine activities
Internal notifications	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• Inform all previously notified contacts of stand down
External notifications	• As required	• As required	• As required	• As required	• Inform all previously notified contacts of stand down

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

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

[redacted]

Table 18: 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 5MM~ **NOTE:** 'Reported' is defined as an alert received from Geoscience Australia or other source that advises an earthquake >4.9ML (Richter Scale) has occurred within a 200km radius of the dam.	• 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 hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Record all communication • Liaise with DDO and IC	• As per previous activation level, AND • Liaise with LDMG	• As per previous activation level, AND • Mobilise resources to undertake remedial works if directed by IC • Liaise with DDO and relevant council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward all communication including relevant emails for EER to [redacted] • Return to routine activities
Internal notifications	• DDO • IC	• DDO • IC	• DDO • IC	• DDO • IC	• Inform all previously notified contacts of stand down
External notifications	• LDMG	• LDMG	• LDMG	• LDMG	• Inform all previously notified contacts of stand down

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

Table 19: 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~ **NOTE:** 'Reported' is defined as an alert received from Geoscience Australia or other source that advises an earthquake >4.9ML (Richter Scale) has occurred within a 200km radius of the dam.	• 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 hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Record all communication • Liaise with DDO, LEC and DSTDM • Create Incident Report Record • **Update Sunwater intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG is *Stood Up*	• As per previous activation, AND • Investigate availability of machinery and materials (if insufficient stockpiles available) • Place machinery operators on standby if directed by DSTDM	• As per previous activation, AND • 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 • Cease remedial works if directed by the DSTDM and plant and personnel to be moved to a safe location • Liaise with DDO and DSTDM re: potential for evacuations.	• Complete all Internal and external notifications • Forward all communications including relevant emails for EER to [redacted] • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	• DDO • LEC/ORR • DSTDM • SMT • SRT	• DDO • LEC/ORR • DSTDM • SMT • SRT	• DDO • LEC/ORR • DSTDM • SMT • SRT	• DDO • LEC/ORR • DSTDM • SMT • SRT	• Inform all previously notified contacts of stand down
External notifications		• DDMG	• D/S Residents • SDCC • ABC • DDMG	• D/S Residents • SDCC • ABC • DDMG	• D/S Residents • DDMG

~ DDO to assess magnitude (MM scale) at dam

Table 20: Earthquake—LEC and IC external 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**	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** • DDMG	• 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** • DDMG	• 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 and email to SDCC Watch Desk to send.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**

Table 20 (Continued): Earthquake—LEC and IC external 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 hazard	• **LDMG** • DDMG	• 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 and email to SDCC Watch Desk to send.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**
	• Dam failure in progress	• **LDMG** • DDMG	• 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 SMS text.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**
Stand Down	• Risk assessment has been determined that failure risk has reduced	• **LDMG** • DDMG	• 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
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**

Table 21: 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~ **NOTE:** 'Reported' is defined as an alert received from Geoscience Australia or other source that advises an earthquake >4.9ML (Richter Scale) has occurred within a 200km radius of the dam.	• 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 hazard	• Risk assessment has been determined that failure risk has reduced
Action	• Record all communication • Monitor situation and assess risks • Liaise with DDO and IC • Notify DSR	• As per previous activation level, AND • Review surveillance inspection of the dam and assess its condition as soon as possible • Determine if there are 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 • 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)	• As per previous activation level	• Forward all communications including relevant emails for EER to [redacted] • Return to routine activities
Internal notifications	• DDO • IC	• DDO • IC	• DDO • IC	• DDO • IC	• Inform all previously notified contacts of stand down
External notifications	• DSR	• DSR	• DSR	• DSR	• Inform all previously notified contacts of stand down

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.

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

[redacted]

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

8.1 Overview

The emergency action described in this section relates to a potential dam hazard 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 Cania 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 a terrorist attack or a 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 a terrorist attack or a 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 a terrorist attack or a 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.

8.1.1 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 an increased likelihood of a terrorist threat. If this were specific enough to name a dam, this circumstance would trigger Stand Up—1 activation level.

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 Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM).

Figure 4: Terrorist threat/activity or high energy impact flowchart

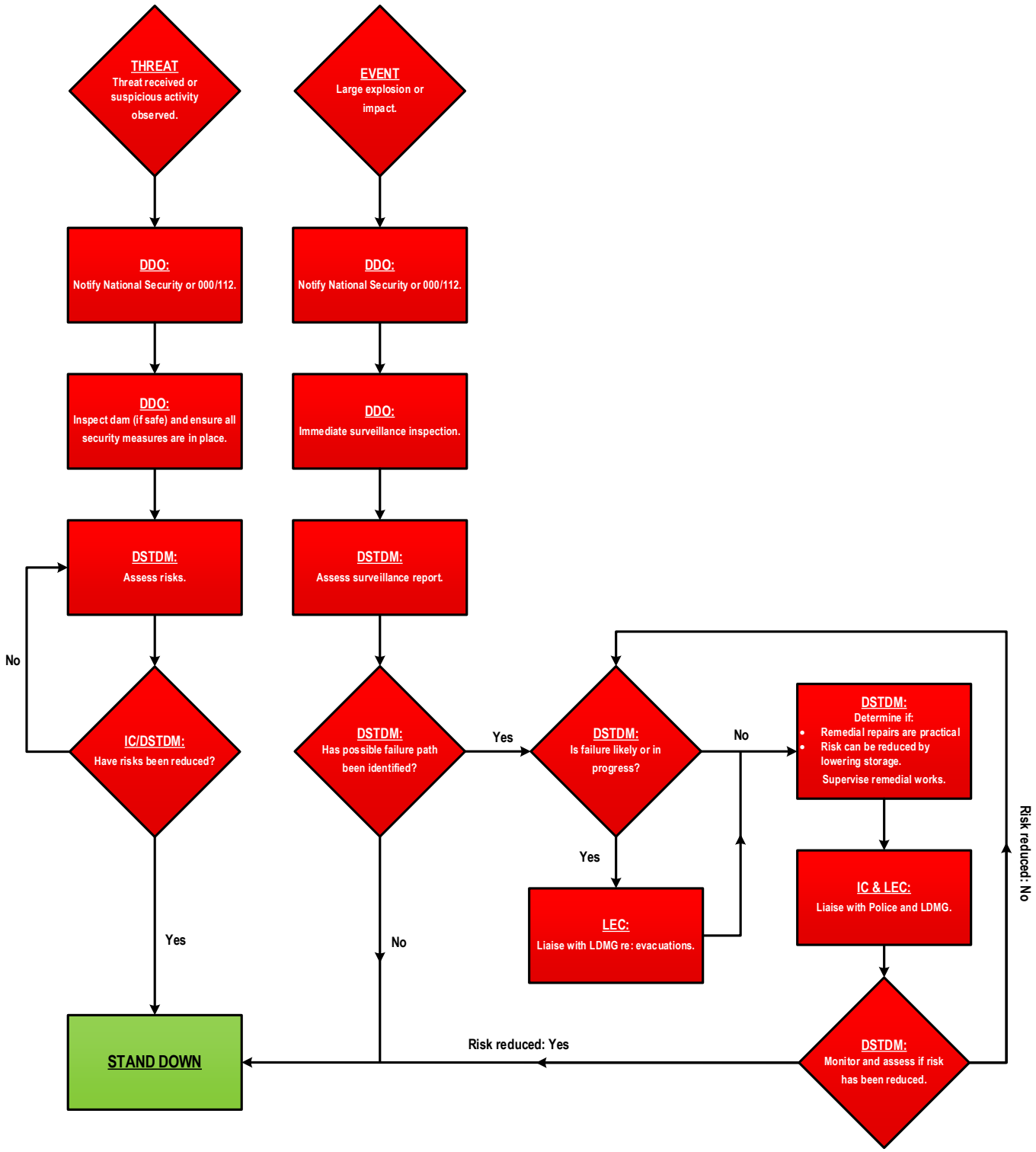


Table 22: Terrorist threat/activity or high energy impact—DDO emergency action

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 hazard	• 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 are 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 • Vacate the immediate vicinity of the affected area	• As per previous activation level, AND • Lower reservoir level, if directed by DSTDM	• Forward all communication and inspection sheets for EER to [redacted] • Update Dam Logbook as per SOP 12 Return to routine activities
Internal notifications	• Not applicable	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• DSTDM • IC • SO • LEC	• Inform all previously notified contacts of stand down
External notifications	• Not applicable	• **#000 Emergency**	• **#000 Emergency**	• **#000 Emergency**	• Inform all previously notified contacts of stand down

Table 23: 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 a dam hazard	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• Record all communication • Liaise with DDO, IC, and LDMG • If Police appoint Incident Manager, support and follow instructions • Monitor situation and assess risks • Liaise with relevant council(s) regarding possible road/bridge closures	• As per previous activation level	• As per previous activation level, AND • Liaise with DDO and LDMG re: potential for evacuations	• Forward all communication and inspection sheets for EER to [redacted] • Return to routine activities
Internal notifications	• Not applicable	• IC • DDO	• IC • DDO	• IC • DDO	• Inform all previously notified contacts of stand down
External notifications	• Not applicable	• LDMG	• LDMG	• LDMG	• Inform all previously notified contacts of stand down

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

[redacted]

Table 24: 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 hazard	• 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 the DSTDM to confirm that dam failure is in progress • Liaise with DDO, DSTDM, and LEC re: potential for evacuations • Mobilise resources to undertake remedial works if directed by DSTDM	• Complete all internal and external notifications • Forward all communications including relevant emails for EER to [redacted] • Close Incident Report Record • **Update Sunwater intranet with dam status** • Return to routine activities
Internal notifications	• Not applicable	• DDO • DSTDM • LEC/ORR • SMT • SRT	• DDO • DSTDM • LEC/ORR • SMT • SRT	• DDO • DSTDM • LEC/ORR • SMT • SRT	• Inform all previously notified contacts of stand down
External notifications	• Not applicable	• CTG • DDMG	• D/S Residents • SDCC Watch Desk • ABC • CTG • DDMG	• D/S Residents • SDCC Watch Desk • ABC • CTG • DDMG	• Inform all previously notified contacts of stand down (SDCC does not need to be notified)

Table 25: 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** • DDMG • 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** • DDMG • 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 Prepare coordinated evacuation
		• SDCC Watch desk	• Email & Phone	**Complete Emergency Alert Request Form and email to SDCC Watch Desk to send.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**

Table 25: Terrorist threat/activity or high energy impact—LEC and IC communication plan (continued)

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 hazard	• **LDMG** • DDMG • CTG	• 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 (filled copy in Appendix A8) and email to SDCC Watch Desk to send.** **Liaise with Sunwater customer support and communications to send appropriate messaging via SMS.**
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**
		• ABC	• Phone	**To be determined.**
Stand Down	• Risk assessment has determined that failure risk has reduced	• **LDMG** • DDMG • CTG	• 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
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Media on-call and DSTDM to send appropriate messaging** **Refer to Annexe for sample message**

Table 26: 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 hazard	• Risk assessment has determined that failure risk has reduced
Action	• Not applicable	• Record all communication • Liaise with IC and DDO • Assess risks • Liaise with SRT • Notify DSR	• 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 LEC • 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 LEC and advise on need to recommend evacuations	• Forward all communications including relevant emails for EER to [redacted] • Return to routine activities
Internal notifications	• Not applicable	• IC • DDO • SRT	• IC • DDO • SRT • LEC/ORR	• IC • DDO • SRT • LEC/ORR	• Inform all previously notified contacts of stand down
External notifications	• Not applicable	• DSR	• DSR	• DSR	• Inform all previously notified contacts of stand down

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

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

9. Other emergency situation—communications failure

9.1 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.

9.2 Emergency actions

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

9.2.1 Activation triggers

Table 27: 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/ORR)
Comms Failure – Brisbane	• Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM & will affect IC)

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

The FODM will assess the weather and flood warnings daily in accordance with the OC SOP. They will escalate to the IC 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.

9.2.3 Emergency action roles

Table 27 to Table 32 specify emergency actions for the following roles:

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

Table 27: Communications failure—DDO emergency action

Activation level	Comms Failure – Local Area	Comms Failure – Brisbane
Activation trigger	• Unable to communicate to local area including LEC	• 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 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 – 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 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 – Social media - e.g. Facebook (Internet may be available via landline) • Record all communication and attempts via Dam Logbook entries as per SOP 12 V and communications log if EAP event is current
Internal Notifications	• IC • SO (if available)	• LEC • SO (if available)
External Notifications	• As required	• As required

Table 28: 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 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 – 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 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 – 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	• IC • DSTDM • SO (if available)	• DDO • DSTDM (if available) • SO
External Notifications	• LDMG	• LDMG • DDMG

Table 29: 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 LECORR
Actions	• Issue Sunwater incident Alert • Every hour, attempt communications 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 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	• LEC • DSTDM • SO (if available)	• DDO (if available) • DSTDM • SO (if available)
External Notifications	• DDMG	• LDMG (if available) • DDMG (if available)

Table 30: 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) • **LDMG** • DDMG	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?
		IC to create Incident Report record		EAP Alert Notification—Cania Dam—Site Communications Failure
Comms Failure – Local Area	• Unable to communicate to or from local area including LEC/ORR	• DDO (if available) • DSTDM • SO (if available) • **LDMG** (if available) • DDMG (if available)	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?
		IC to create Incident Report record		EAP Alert Notification—Cania Dam—Local Area Communications Failure
Comms Failure – Brisbane	• Unable to communicate to or from Sunwater Brisbane	• DSTDM (if available) • **LDMG** • DDMG	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?
		LEC to create Incident Report record		EAP Alert Notification—Sunwater Brisbane Communications Failure

Table 31: 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/ORR
Actions	• Provide technical advice to IC/LEC on a needs 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 needs 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	• IC • LEC • CEO (if time permits)	• IC • DDO (if available) • CEO (if time permits)
External Notifications	• DSR (if applicable)	• DSR (if applicable)

Table 32: 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 ORR
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	• IC • LEC • DSTDM	• IC • DDO (if available) • DSTDM
External notifications	• Not applicable	• Not applicable

APPENDIX A Notification and communication lists

Appendix A1: Sunwater regional notification list

Appendix A2: Sunwater Brisbane notification list

Appendix A3: External notification list

Appendix A4: D/S residents' notification list

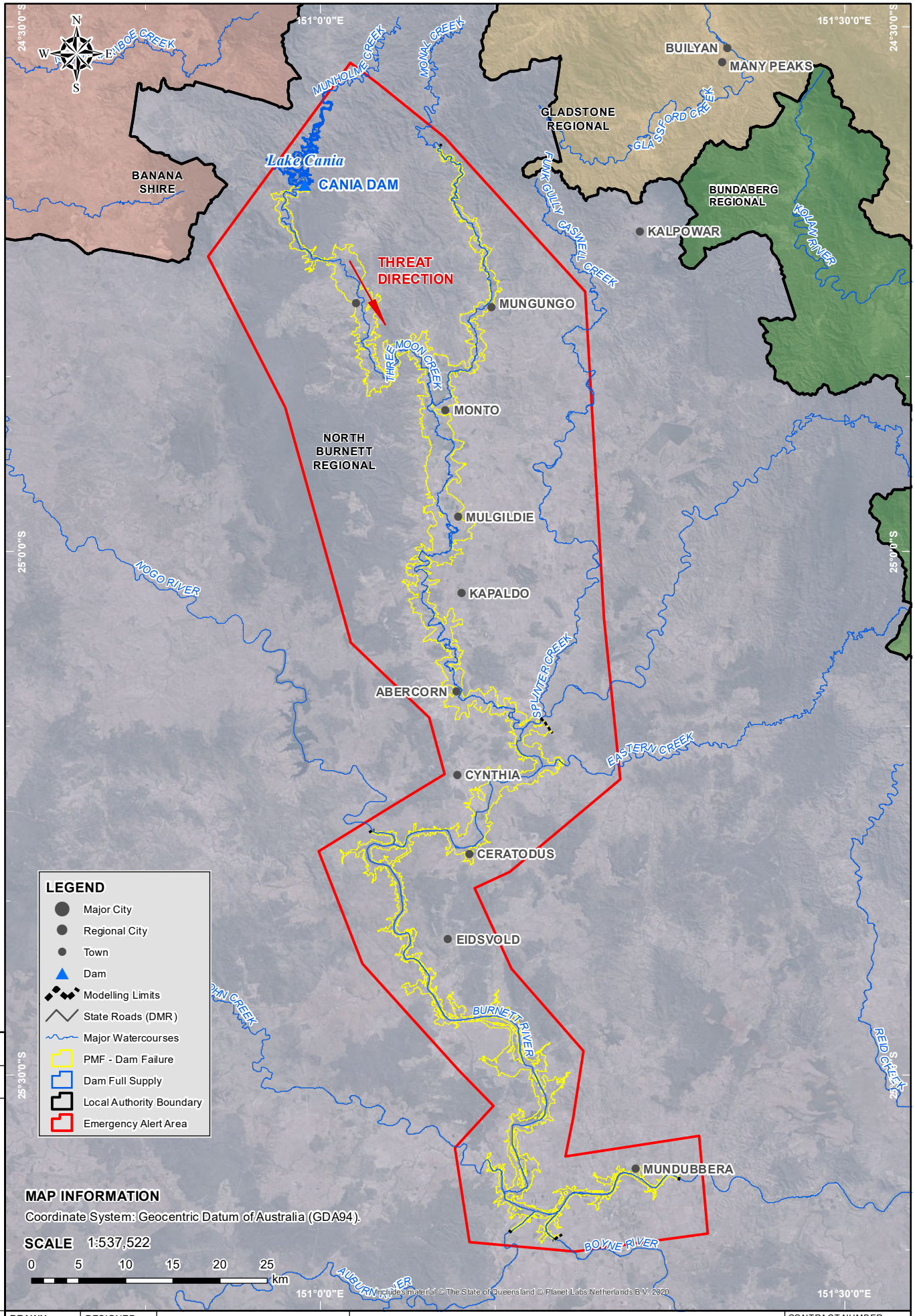
Appendix A5: Other D/S residents' notification list (outside area—requested messaging)

Appendix A6: Other reference contacts

Appendix A7: Emergency alert polygon

Appendix A8: Dam failure emergency alert request

Appendix A1 to 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\249572-C.mxd
Printed: Tuesday, 29/08/2023 12:31:49 PM

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

REVISION	DATE	REMARKS	LH	CKD
C	29/08/23	ALERT AREA AMENDED	MH	PSD
B	03/09/18	ALERT AREA AMENDED	MB	

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

sunwater

CANIA DAM
EMERGENCY ACTION PLAN
EMERGENCY ALERT AREA

CONTRACT NUMBER	
DRAWING NUMBER	REV.
249572	C
SHEET 1 OF 1	
DATE JANUARY 2018	

Appendix A8: Dam failure emergency alert request

Queensland emergency alert request guidelines

An Emergency Alert (EA) Request form should be completed, if required (see dam hazard sections for actions) and sent to the SDCC Watch Desk to activate the Cania Dam Emergency Polygon.

Instructions

1. EA Request forms are not to be used for flood UNLESS a flood has triggered an Emergency Event.
2. Obtain appropriate MS Word format form from either the Sunwater SharePoint site or the SDCC Disaster Management Portal.
3. Telephone the [redacted] and tell them your intention to use the EA for an Emergency Event for Cania Dam.
    a. A Polygon for this dam is stored on the Disaster Management Portal. Ask the SDCC operative to locate the polygon. It will be a KML file called [redacted]
    b. Give them your phone number, confirm their name, and end the call after advising the form/s will be sent shortly.
4. IC and DSTDM will work together to craft a message relevant to the hazard and discuss with the LDMG if there is time. If time does not permit use approved pre-filled form/s.
5. Send filled out EA form/s and the Cania Threat Direction polygon to SDCC watch desk email: [redacted] The form/s MUST be sent from a Sunwater email address and come from the IC, DSTDM, or member of the Sunwater Executive.
6. Phone back SDCC to check that the message has been sent and ask for email confirmation.
7. Create an Incident Report Record to advise of completion of EA campaign.

The following text is a copy of that contained in the prefilled EA request/s:

Filename:	Voice Message:	SMS:
[redacted]	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Cania Dam including Moonford and Monto must LEAVE IMMEDIATELY. Cania 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. Central Monto and bill oh eel ah are safe. More information available at North Burnett Regional Council emergency dot north burnett dot que el dee dot guv dot ay you.	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Cania Dam including Moonford and Monto must LEAVE IMMEDIATELY. Cania 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. Central Monto and Biloela are safe. More information here: North Burnett Regional Council http://emergency.northburnett.qld.gov.au.

The next two pages contain a copy of the Cania Dam Emergency Alert Request form and instructions.

Queensland Government

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

EMERGENCY ALERT REQUEST

Location of Alert: Cania 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 Sunwater: People downstream of Cania Dam including Moonford and Monto must LEAVE IMMEDIATELY. Cania 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. Central Monto and bill oh eel ah are safe. More information available at North Burnett Regional Council emergency dot north burnett dot que el dee dot guv dot ay you.

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 downstream of Cania Dam including Moonford and Monto must LEAVE IMMEDIATELY. Cania 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. Central Monto and Biloela are safe. More information here: North Burnett Regional Council http://emergency.northburnett.qld.gov.au

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 and Maps

Appendix B1: General Arrangement and Instrumentation drawings

Appendix B2: Downstream Notification area

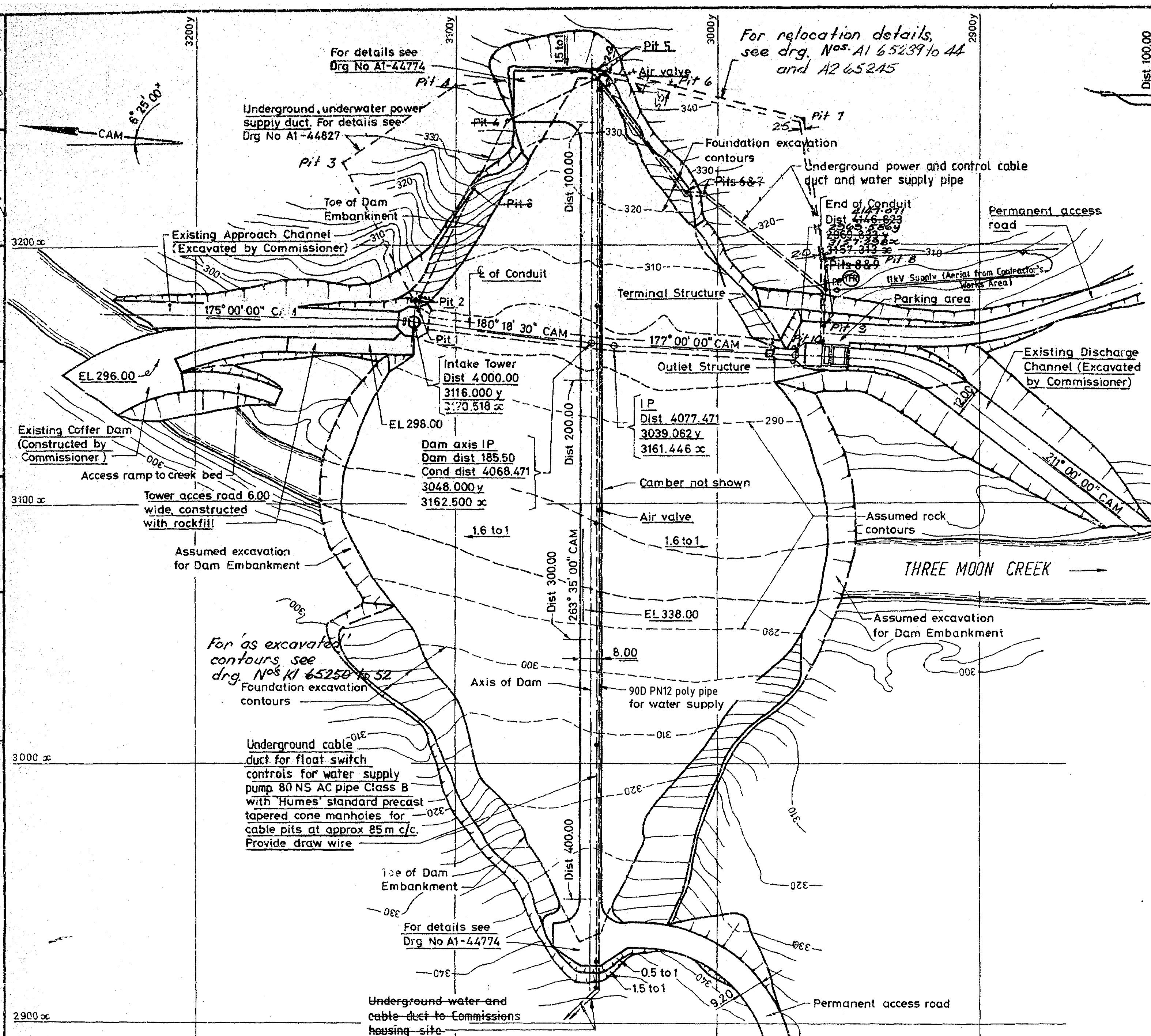
Appendix B3: Inundation maps

Appendix B4: Access routes during fair and adverse weather conditions

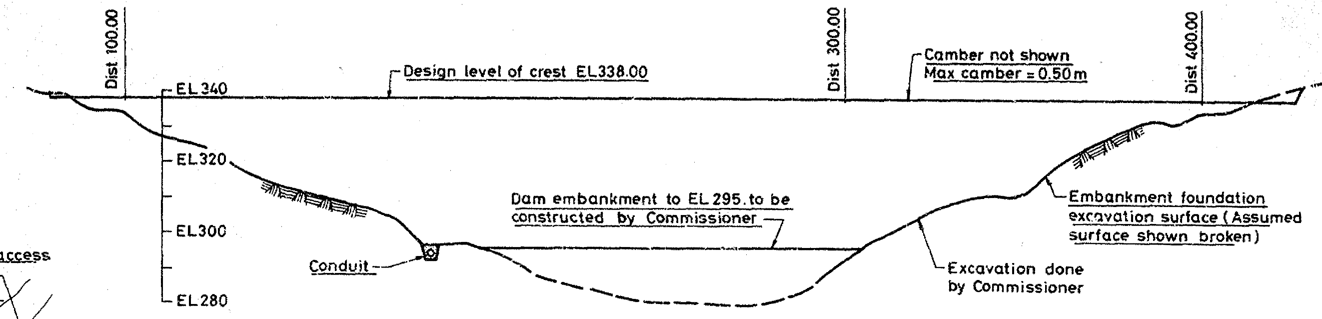
Appendix B5: Cania Dam Locality Plan

Appendix B6: Cania Dam Catchment Area Map

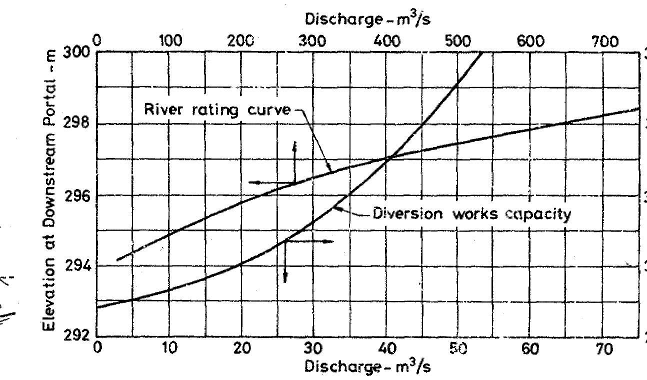
NOTE: Actual levels may differ from those shown in flood inundation maps due to variations in assumptions made in the models to actual flood events.



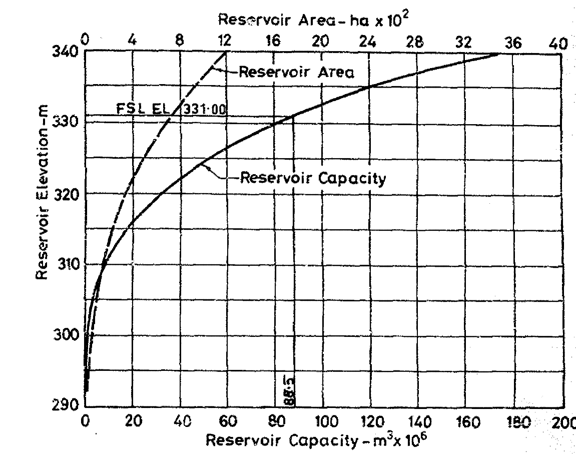
PLAN



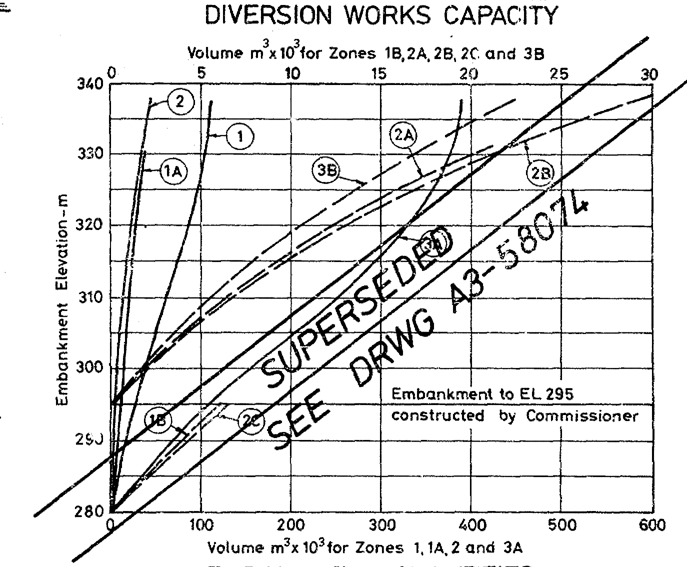
PROFILE ON AXIS OF DAM



RIVER RATING CURVE AND DIVERSION WORKS CAPACITY



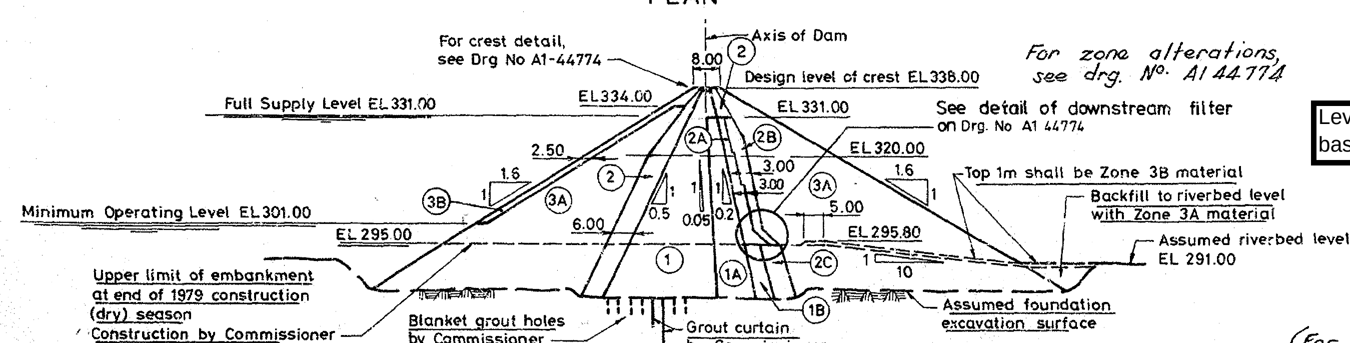
RESERVOIR AREA AND CAPACITY CURVES



EMBANKMENT QUANTITIES

EMBANKMENT MATERIALS

Zones 1 and 1A	Selected impervious earthfill from required excavation and borrow areas placed at a specified moisture content in layers thinner than 150 mm after compaction
Zones 2A and 2B	Selected filter material processed from river gravel from borrow areas placed in layers thinner than 300 mm after compaction
Zone 3A	Selected slightly weathered to fresh rock from required excavation and quarry, compacted after sluicing in layers thinner than 1 m except as specified
Zone 3B	Selected coarse slightly weathered to fresh rock from required excavation and quarry
Zone 1B	Selected semi-impervious material from borrow areas
Zones 2 and 2C	Selected filter material from river gravel borrow areas with selected finer material placed directly against Zones 1 and 1B as appropriate



MAXIMUM SECTION OF DAM

Levels on this drawing are in metres
based on PM 190406 = EL 338.433 (AHD Registered)

REFERENCE DRAWINGS

Three Moon Creek - Cania Dam -

Works and Disposal Areas	A1-44772
Dam Embankment - Details	A1-44774
Dam Embankment - Embankment to EL 295	A1-51324
Dam Embankment - Foundation Grouting	A1-44868 and A1-44869
Dam Embankment - Instrumentation	A1-44777
Dam Embankment - Grading Limits for Zones 2, 2A, 2B and 2C	A1-44778
Diversion and Outlet Works - General Arrangement	A1-44784

NOTES

1. Co-ordinates shown x, y refer to the local working grid and are in metres. Bearings shown are measured from the County Adjusted Meridian (CAM). Elevations are in metres and are based on the Australian Height Datum (AHD)
2. Distances measured horizontally along axis of dam and centreline of conduit
3. Where assumed excavation lines are shown, actual excavation may vary from such assumed lines

AS BUILT
By J.M. Allen
Class'n
Date 15-4-82

Rev	Date		Remarks	Ckd	Psd
F	16-5-6	F	Pipe type across emb chd	RRM	LEK
E	1-7-82	E	As Built		
D	9-10-81	D	Embankment zoning		
C	18-12-79	C	Embankment Changes		
B	1-11-79	B	Outlet Works 11kV Supply ind		

Drawing Schedule

0 10 50 100 m (1:1000 before reduction)

CONTRACT No 2200

SNOWY MOUNTAINS ENGINEERING CORPORATION
CHIEF ENGINEER CIVIL DESIGN AND FEAS 18.7.79
ASSISTANT DIRECTOR

QUEENSLAND WATER - RESOURCES COMMISSION
A/CHIEF DESIGNING ENGINEER
COMMISSIONER 14.9.79

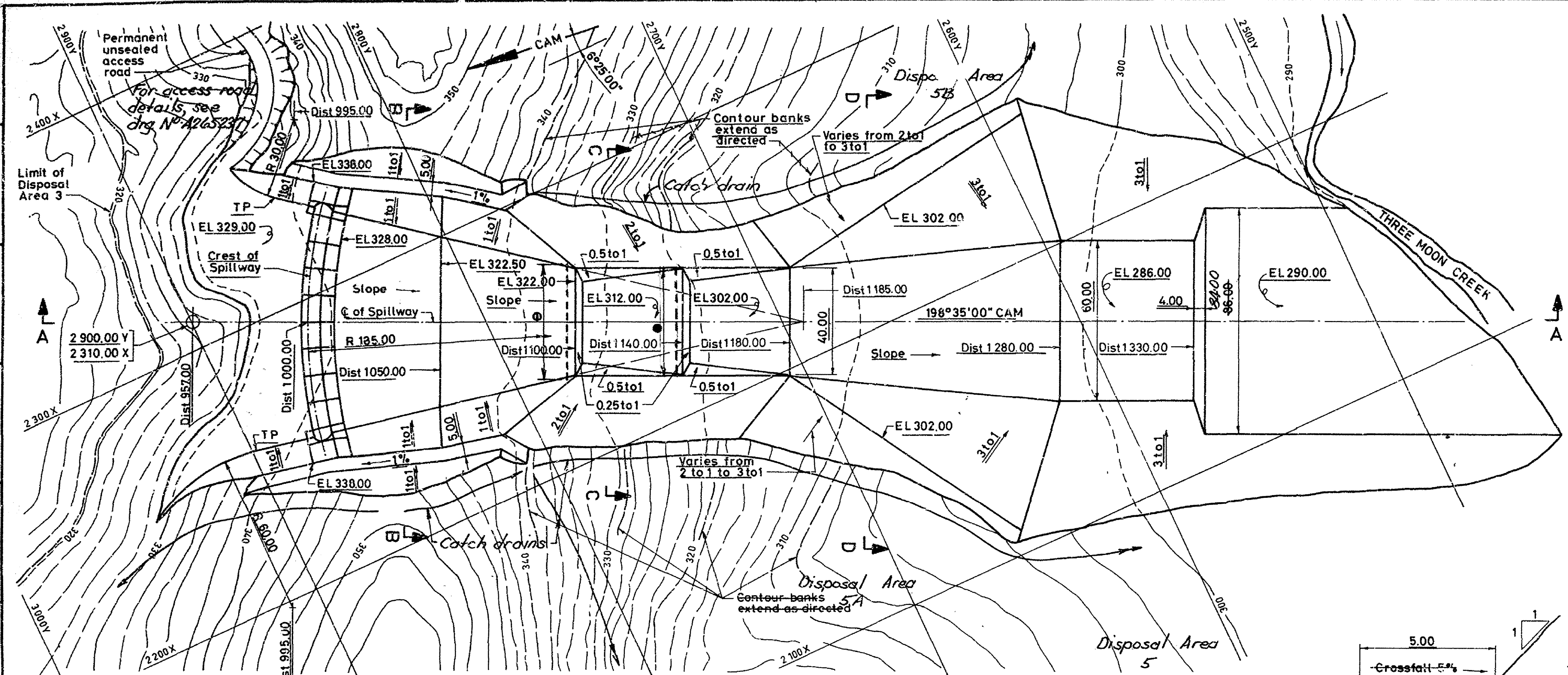
QUEENSLAND WATER RESOURCES COMMISSION

THREE MOON CREEK — CANIA DAM

DAM EMBANKMENT
GENERAL ARRANGEMENT

JULY 1979 A1-44773 A B C E F

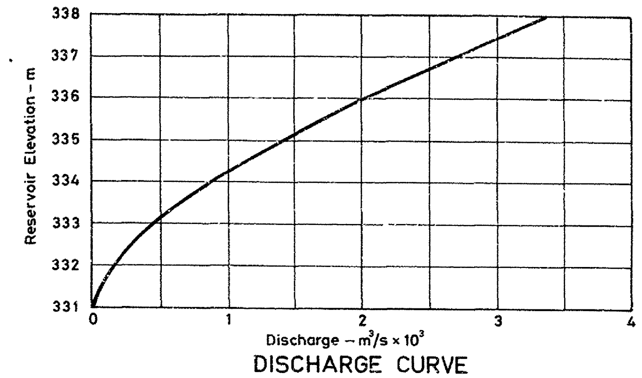
A1–44780



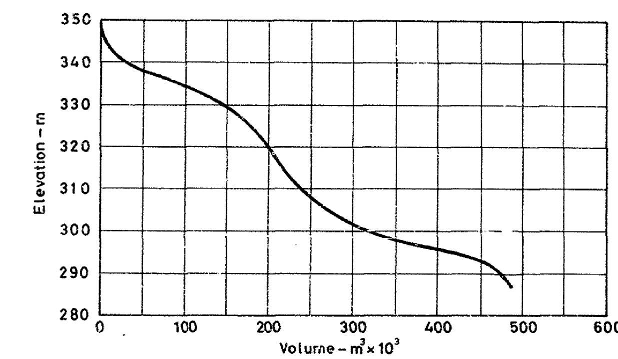
PLAN
Scale A

⊕ One row of 30 grouted anchor bars @ 1·5 crs.

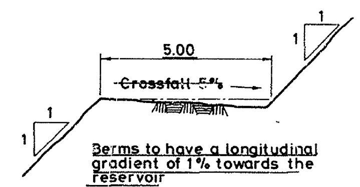
● One row of 28 grouted anchor bars @ 1·5 crs.



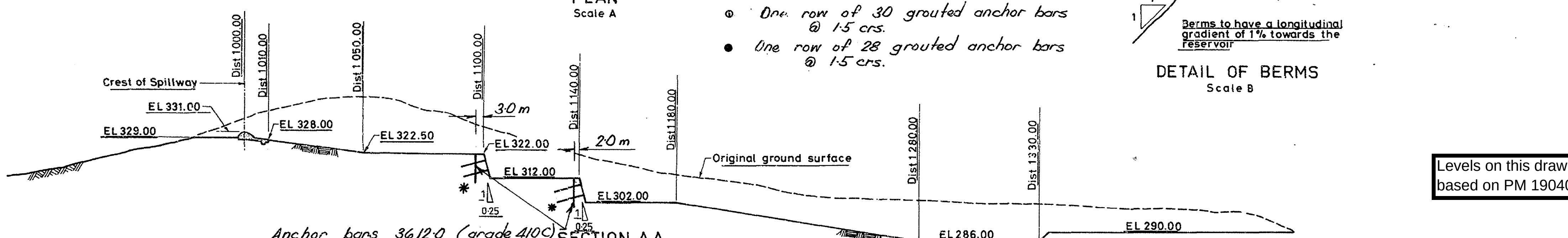
DISCHARGE CURVE



EXCAVATION VOLUME CURVE

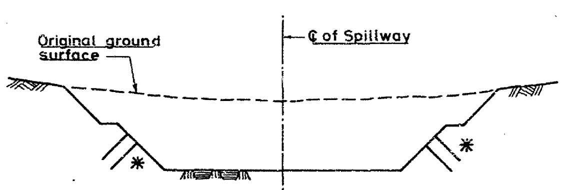


DETAIL OF BERMS
Scale B



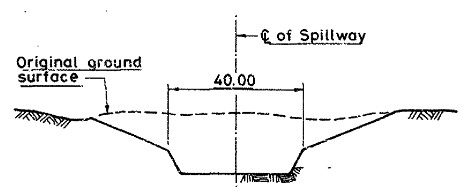
SECTION AA
Scale A

Levels on this drawing are in metres
based on PM 190406 = EL 338.433 (AHD Registered)

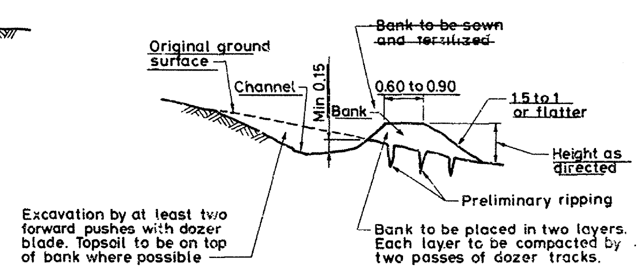


SECTION BB
Scale A

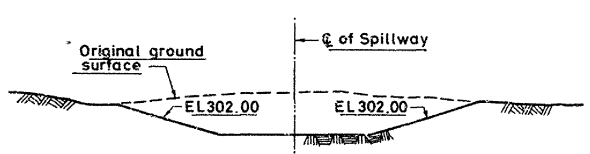
~~✱ Rockbolts as directed.~~



SECTION CC
Scale A



CONTOUR BANKS



SECTION DD
Scale A

REFERENCE DRAWINGS

Three Moon Creek – Cania Dam –
Works and Disposal Areas A1–44772
Spillway – Control Crest Details A1–44781

NOTES

1. Co-ordinates shown x,y refer to the local working grid and are in metres. Bearings shown are measured from the County Adjusted Meridian (CAM). Elevations are in metres and are based on the Australian Height Datum (AHD).
2. The contours of the existing ground surface are based on Drg No AO – 42698.
3. Spillway distances are measured horizontally along spillway centreline.
4. Final excavation surfaces may vary from assumed excavation surfaces shown.
5. Where directed, batter slopes in other than rock excavation shall be covered with top soil and seeded.

AS BUILT
By G. M. ...
Class'n 9/E
Date 15-9-82

(For topographic survey of spillway excavation, see Level book Nº CAN-82-01)

Revision				
1·7·82	B	As Built		
25·6·77	A	Chainage altered to distance		
Date		Remarks	Ckd	Psd

Drawing Schedule

Scale A 0 10 50 100 m (1 : 1000 before reduction)

Scale B 0 1 5 10 m (1 : 100 before reduction)

CONTRACT Nº 2200.

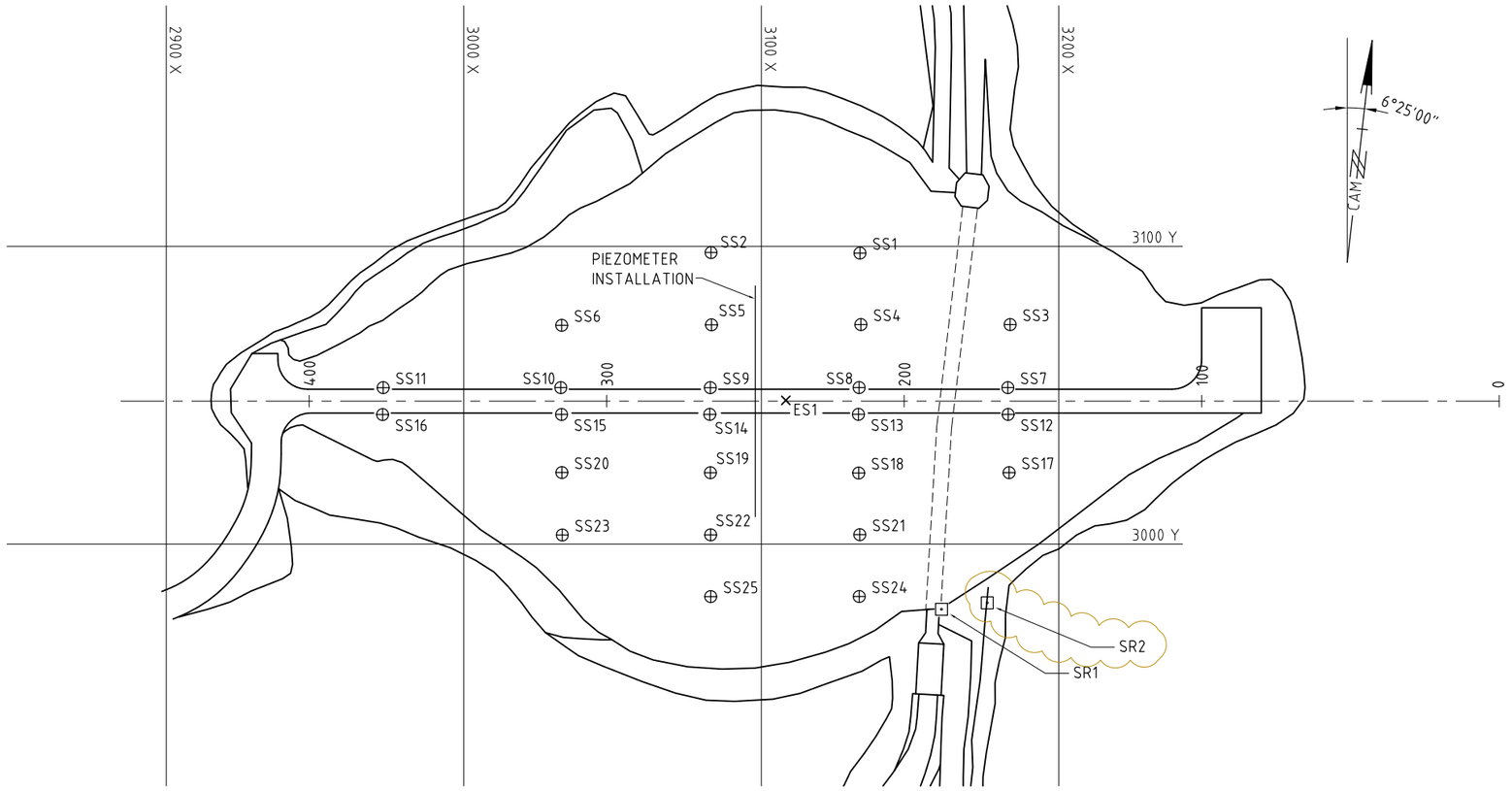
SNOWY MOUNTAINS ENGINEERING CORPORATION
CHIEF ENGINEER, CIVIL DESIGN 19.9.77
ASSISTANT DIRECTOR 19.8.77

QUEENSLAND WATER RESOURCES COMMISSION
ACT CHEIF DESIGNING ENGINEER
COMMISSIONER 2.11.77

QUEENSLAND WATER RESOURCES COMMISSION
THREE MOON CREEK — CANIA DAM
SPILLWAY
GENERAL ARRANGEMENT
JUNE 77 A1–44780 B

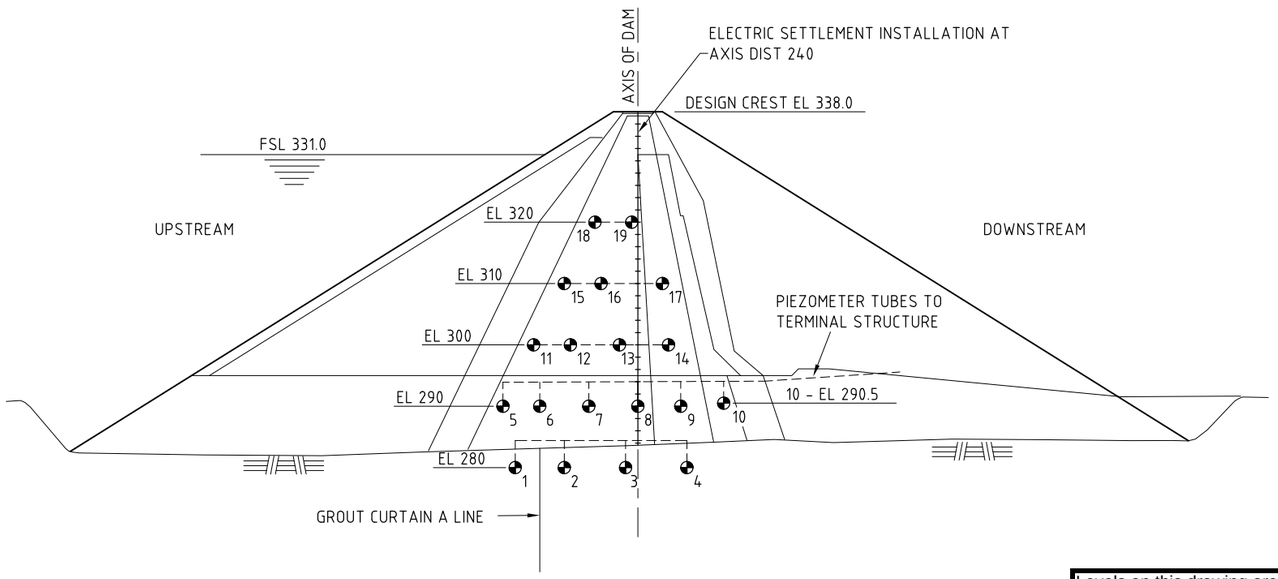
SUBMITTED / DRG C'KD L.J... / DRAWN L.J./S.D. / ENG C'K'D / CALC FILE No

1401–D 2300



PLAN

SCALE A



DAM EMBANKMENT SECTION AT DIST 250m

SCALE B

SURFACE MOVEMENT STATIONS (ORIGINAL SURVEY)

NO	X	Y	ELEVATION	REMARKS	
SS1	3133.157	3097.747	310.119		
SS2	3083.097	3097.921	310.110		
SS3	3183.635	3073.732	324.967		
SS4	3133.463	3073.732	324.963		
SS5	3083.255	3073.643	325.116		
SS6	3032.898	3073.479	324.908		
SS7	3182.865	3052.544	339.072		
SS8	3132.871	3052.565	339.112		
SS9	3082.861	3052.538	339.179		
SS10	3032.590	3052.545	339.221		
SS11	2972.897	3052.534	339.196		
SS12	3182.969	3043.546	339.149		
SS13	3132.641	3043.577	339.255		
SS14	3082.676	3043.569	339.312		
SS15	3032.851	3043.535	339.319		
SS16	2972.707	3043.498	339.290		
SS17	3183.286	3023.991	326.064		
SS18	3132.724	3023.860	325.762		
SS19	3082.892	3023.971	325.844		
SS20	3032.963	3024.028	325.966		
SS21	3133.098	3003.154	313.159		
SS22	3082.964	3003.089	313.060		
SS23	3033.098	3003.044	313.152		
SS24	3132.913	2982.377	300.104		
SS25	3082.994	2982.353	300.054		
BM01	3257.683	2918.574	331.971		
BM02	2953.974	2844.312	333.469		
BM03	2880.000	3048.000	350.638		

HYDRAULIC PIEZOMETER INSTALLATION AT AXIS DIST 250m

TIP NO	OFFSET FROM AXIS	ELEVATION	REMARKS
1	20.0 U/S	280.0	
2	12.0 U/S	280.0	
3	2.0 U/S	280.0	
4	8.0 D/S	280.0	
5	22.0 U/S	290.0	
6	16.0 U/S	290.0	
7	8.0 U/S	290.0	
8	0 U/S	290.0	
9	7.0 D/S	290.0	
10	14.0 D/S	290.0	
11	17.0 U/S	300.0	
12	11.0 U/S	300.0	
13	3.0 U/S	300.0	
14	5.0 D/S	300.0	
15	12.0 U/S	310.0	
16	6.0 U/S	310.0	
17	4.0 D/S	310.0	
18	7.0 U/S	320.0	
19	1.0 U/S	320.0	

ELECTRIC SETTLEMENT INSTALLATION AT AXIS DIST 240

NO	OFFSET FROM AXIS	REMARKS
1	0.0	

SEEPAGE MEASURING STATION

NO	LOCATION
SR1	PIEZOMETER HUT
SR2	VALVE HOUSE

LEGEND

- SURVEY CONTROL STATION
- SURFACE SETTLEMENT STATION
- HYDRAULIC PIEZOMETER INSTALLATION
- ELECTRIC SETTLEMENT INSTALLATION
- SEEPAGE MEASURING STATION

Levels on this drawing are in metres
based on PM 190406 = EL 338.433 (AHD Registered)

NOTES:

1. CO-ORDINATE DATUM: LOCAL WORKING GRID.
2. AZIMUTH DATUM: MEASURED FROM COUNTY ADJUSTED MERIDAIN.
3. LEVELS DATUM: BASED ON AHD.

REVISION					
20.11.15	B	SR2 ADDED	KP	K. EHM	
15.5.01	A	ORIGINAL SURVEY ADDED.		DS	
		TIP 4, 9, 10, 14, 17 WERE U/S.			
DATE		REMARKS	CKD	PASSED	

REFERENCE DRAWINGS	
A144773	DAM EMBANKMENT GENERAL ARRANGEMENT
A144777	DAM EMBANKMENT INSTRUMENTATION

SCALES (A3 SIZE)

A 0 50 100 METRES 1:2000

B 0 10 20 30 40 50 METRES 1:1000

DRAWN	DESIGNED
LMD	D.C.S
CHECKED	CHECKED
APPROVED	
K.EHM	
15.5.01	

SunWater

DAM SAFETY INVESTIGATIONS
CANIA DAM
INSTRUMENTATION LAYOUT

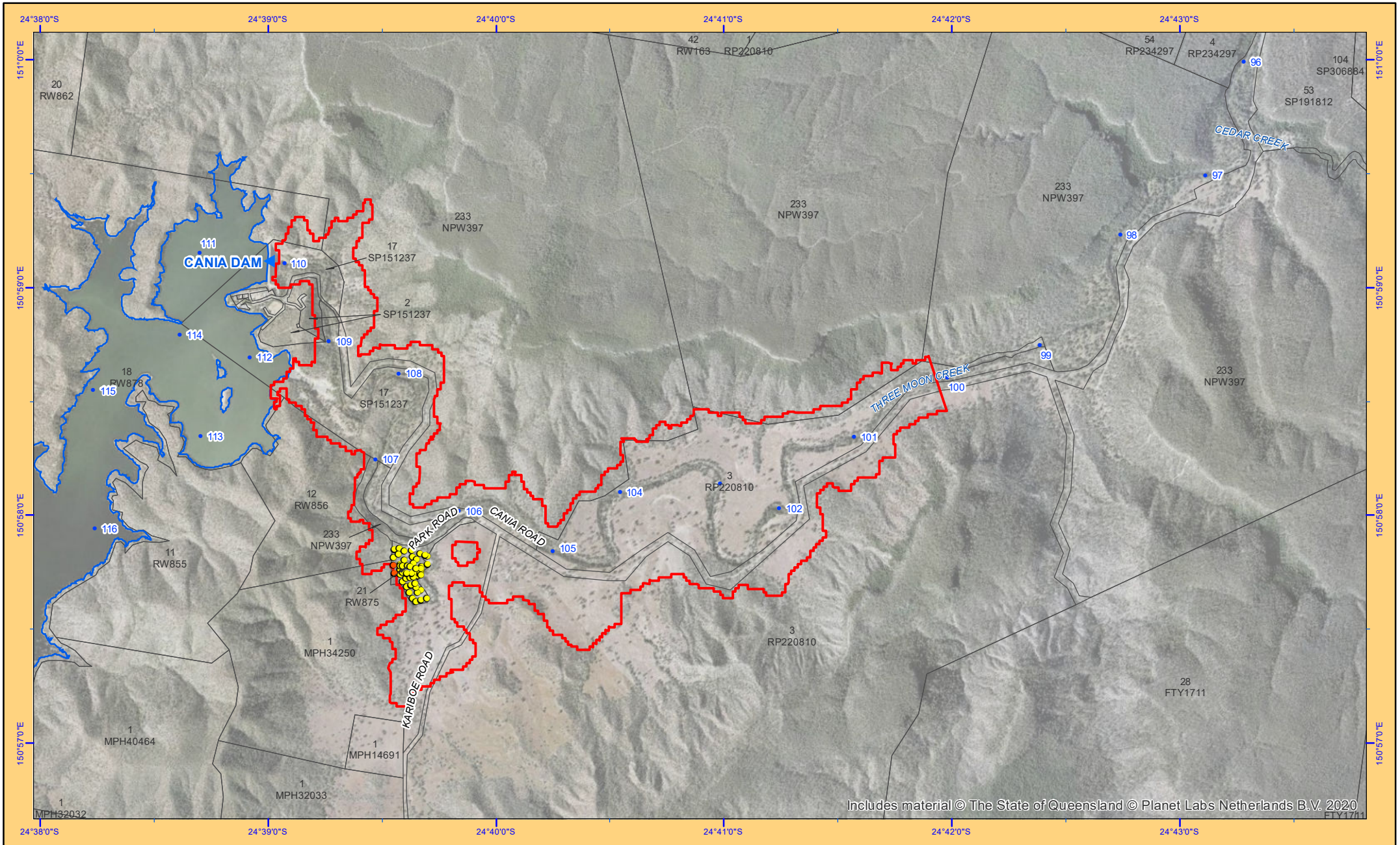
CONTRACT NUMBER

DRAWING NUMBER
A3-102273

DATE MAY 2001

A B

S:\BW Asset Delivery\SW-Three Moon Creek WSS\Cania Dam Instrumentation\Drawings\AutoCAD\W102273-B.dwg
18 Nov 2015 8:27 AM



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

SCALE (A4 SIZE)
0 400 800 1,200 1,600 2,000 m 1:40,000

LEGEND
- Dam Full Supply Level
- Limit of Downstream Notification Area
- AMTD (Markers)
- PAR - No Dam Failure
- PAR- Dam Failure

CANIA 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. 250709 D

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-WSRW-38-01-05-01 EAP Mapping\Drawings\ArcMap\DS Notification Area\250709-D.mxd
Printed: Tuesday, 29/08/2023 01:15:59 PM

Appendix B3: Inundation maps

Drawings:

- Keymap
- PMF
- SDF

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.

Document: S:\BW Asset Delivery\SWBW Service Delivery\RA-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260278-A.mxd
Printed: Tuesday, 29/08/2023 02:27:38 PM

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

BUNDABERG REGIONAL
GLADSTONE REGIONAL
NORTH BURNETT REGIONAL
BANANA SHIRE

BUILYAN
MANY PEAKS
KALPOWAR
MUNGUNGO
MONTO
MOONFORD
KAPALDO
ABERCORN
CERATODUS
CYNTHIA
EIDSVOLD
MUNDUBBERA

BONE RIVER
KOLAN RIVER
KALPOWAR ROAD
WEST BURNETT RIVER
MONTO - MOUNT PERRY ROAD
GLADSTONE - MONTO ROAD
CANIA DAM ROAD
BURNETT HIGHWAY
WURUMA DAM ROAD
EIDSVOLD - THEODORE ROAD
MUNDUBBERA - DURONG ROAD
BURNETT RIVER
AUBURN RIVER
NOGO RIVER

Bazley Weir
Avis Weir
Monto Weir
Youlambie Weir
Mulgildie Weir
John Goleby Weir

CANIA DAM
Lake Cania
WURUMA DAM

SHEET 1 OF 7
SHEET 2 OF 7
SHEET 3 OF 7
SHEET 4 OF 7
SHEET 5 OF 7
SHEET 6 OF 7
SHEET 7 OF 7

LEGEND
- Settlements
- Major Roads
- Qld Rail Network
- Maximum Flood Event
- Local Authority Boundary

SunWater Storages
- Dam
- Weir
- Anabranch Weir
- Dam Full Supply Level

REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260276 - Sunny Day Failure
260277 - Probable Maximum Flood

SCALES (A3 SIZE)
0 3.5 7 10.5 14 17.5 km
1:350,000

DRAWN FMT | DESIGNED
CHECKED | CHECKED MGH
APPROVED M.G. HUGHES 13/09/2023
RPEQ: 18351

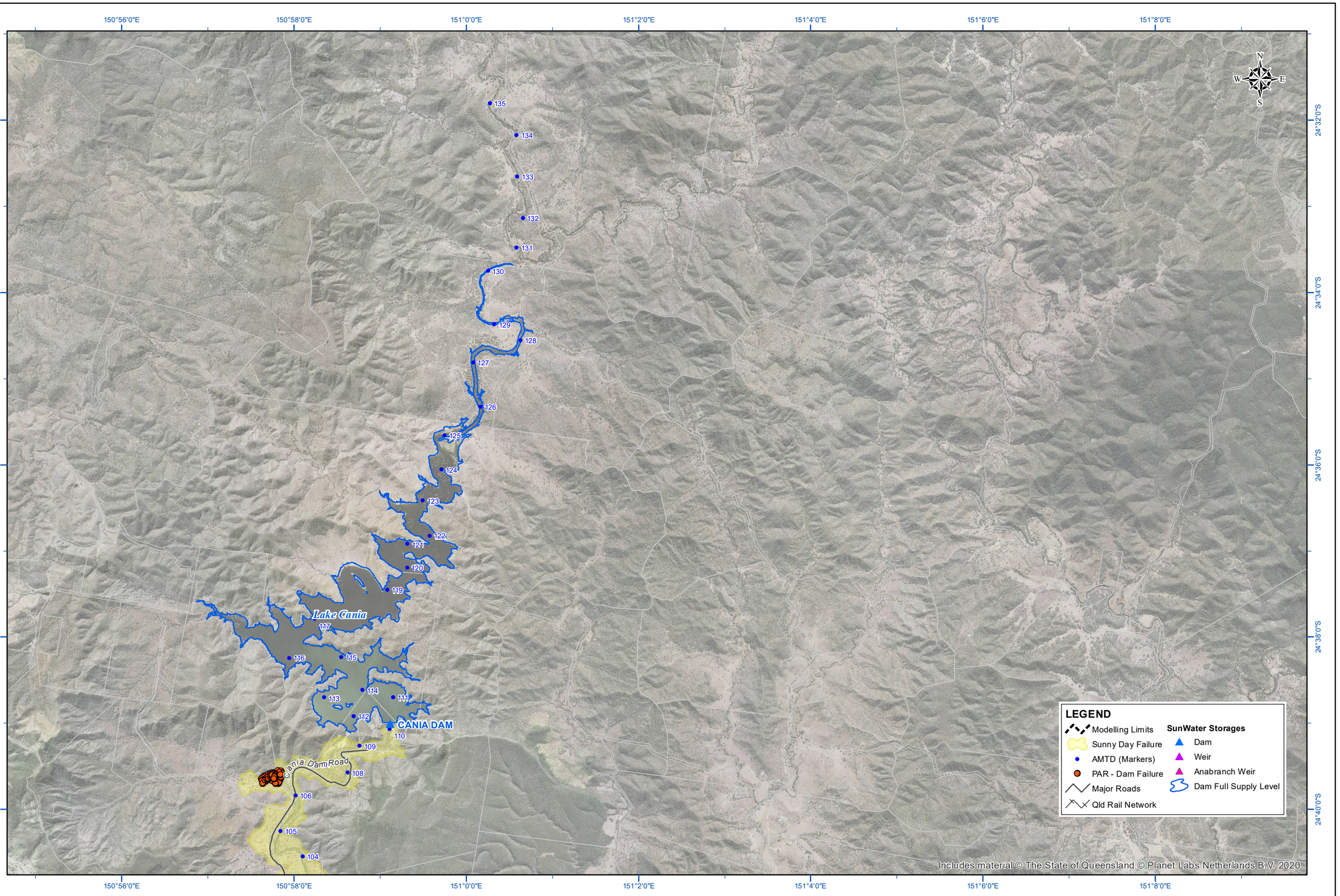
sunwater

ACN 131 034 985

CANIA DAM
DAM BREAK ANALYSIS
INUNDATION PLAN - 2022
KEYMAP

CONTRACT NUMBER
DRAWING NUMBER 260278 | REV. A
SHEET 1 OF 1
DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP\Flood Inundation Mapping\Drawings\ArcMap\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

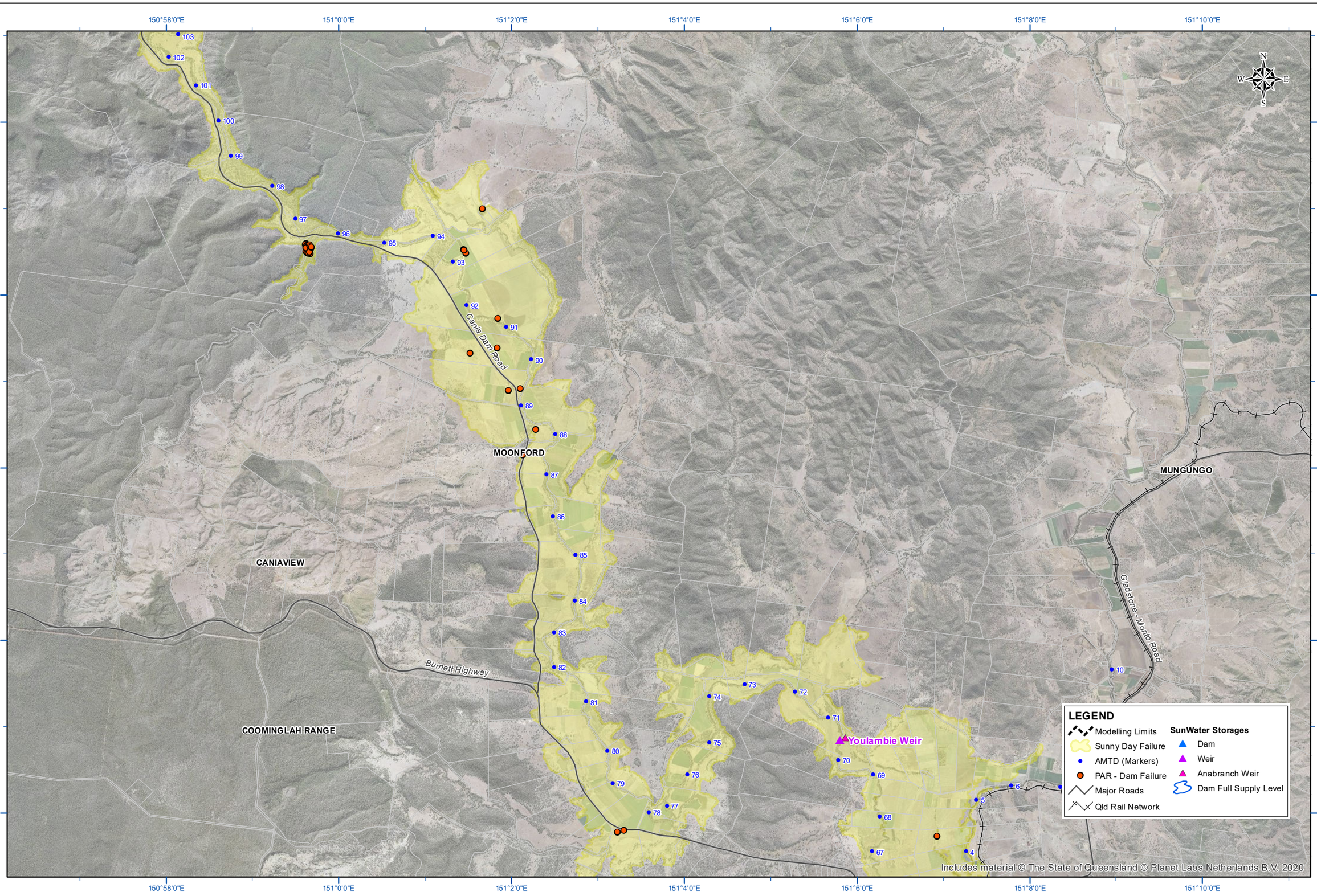
CONTRACT NUMBER

DRAWING NUMBER	REV.
260276	A

SHEET 1 OF 7
DATE SEPTEMBER 2023

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

Document: S:\BW Asset Delivery\SW\BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\Arc Map\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER	REV.
260276	A

SHEET 2 OF 7

DATE SEPTEMBER 2023

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

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM

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

150°58'0"E 151°0'0"E 151°2'0"E 151°4'0"E 151°6'0"E 151°8'0"E 151°10'0"E

24°52'0"S 24°54'0"S 24°56'0"S 24°58'0"S 25°0'0"S

66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 3 2 1

Monto Weir
Bazley Weir
Avis Weir

MONTO
THREE MOON
MULGILDIE
SELENE

Gladstone - Monto Road
Burnett Highway

N W E S

LEGEND

- Modelling Limits
- Sunny Day Failure
- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
- Qld Rail Network

SunWater Storages

- Dam
- Weir
- Anabranch Weir
- Dam Full Supply Level

REVISION				
13/09/23	A	ISSUED FOR USE	LH	MGH
DATE		REMARKS	CKD	PSD

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER	REV.
260276	A

SHEET 3 OF 7
DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM

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

151°0'0"E 151°2'0"E 151°4'0"E 151°6'0"E 151°8'0"E 151°10'0"E 151°12'0"E 151°14'0"E

25°2'0"S 25°4'0"S 25°6'0"S 25°8'0"S 25°10'0"S

TUTURI
KAPALDO
LANGLEY FLAT
ABERCORN
Mulgildie Weir
Wuruma Dam Road
Burnett Highway
BURNETT RIVER

38 37 34 33 32 31 30 29 28 26 27 25 24 23 22 21 20 19 18 17 16 15 14 13 12 10 9 11 8 7 6 5 4 3 2 1 349 348 347 346 345 3440 342 343

N W E S

LEGEND

- Modelling Limits
- Sunny Day Failure
- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
- Qld Rail Network

SunWater Storages

- Dam
- Weir
- Anabranch Weir
- Dam Full Supply Level

REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES 13/09/2023	
RPEQ: 18351	

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER 260276 | REV. A

SHEET 4 OF 7

DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP\Flood Inundation Mapping\Drawings\ArcMap\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM

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

151°0'0"E 151°2'0"E 151°4'0"E 151°6'0"E 151°8'0"E 151°10'0"E 151°12'0"E 151°14'0"E

25°12'0"S 25°14'0"S 25°16'0"S 25°18'0"S 25°20'0"S

Lake Wuruma
Wuruma Dam Road
WURUMA DAM
CYNTHIA
Wuruma Dam Road
Burnett Highway
CERATODUS
NOGO RIVER
BURNETT RIVER
John Goleby Weir

N W E S

22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 309 308 307 306 305 304 303 302

LEGEND

- Modelling Limits
- Sunny Day Failure
- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
- Qld Rail Network

SunWater Storages

- Dam
- Weir
- Anabranch Weir
- Dam Full Supply Level

REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN FMT | DESIGNED
CHECKED | CHECKED MGH
APPROVED M.G. HUGHES 13/09/2023 RPEQ: 18351

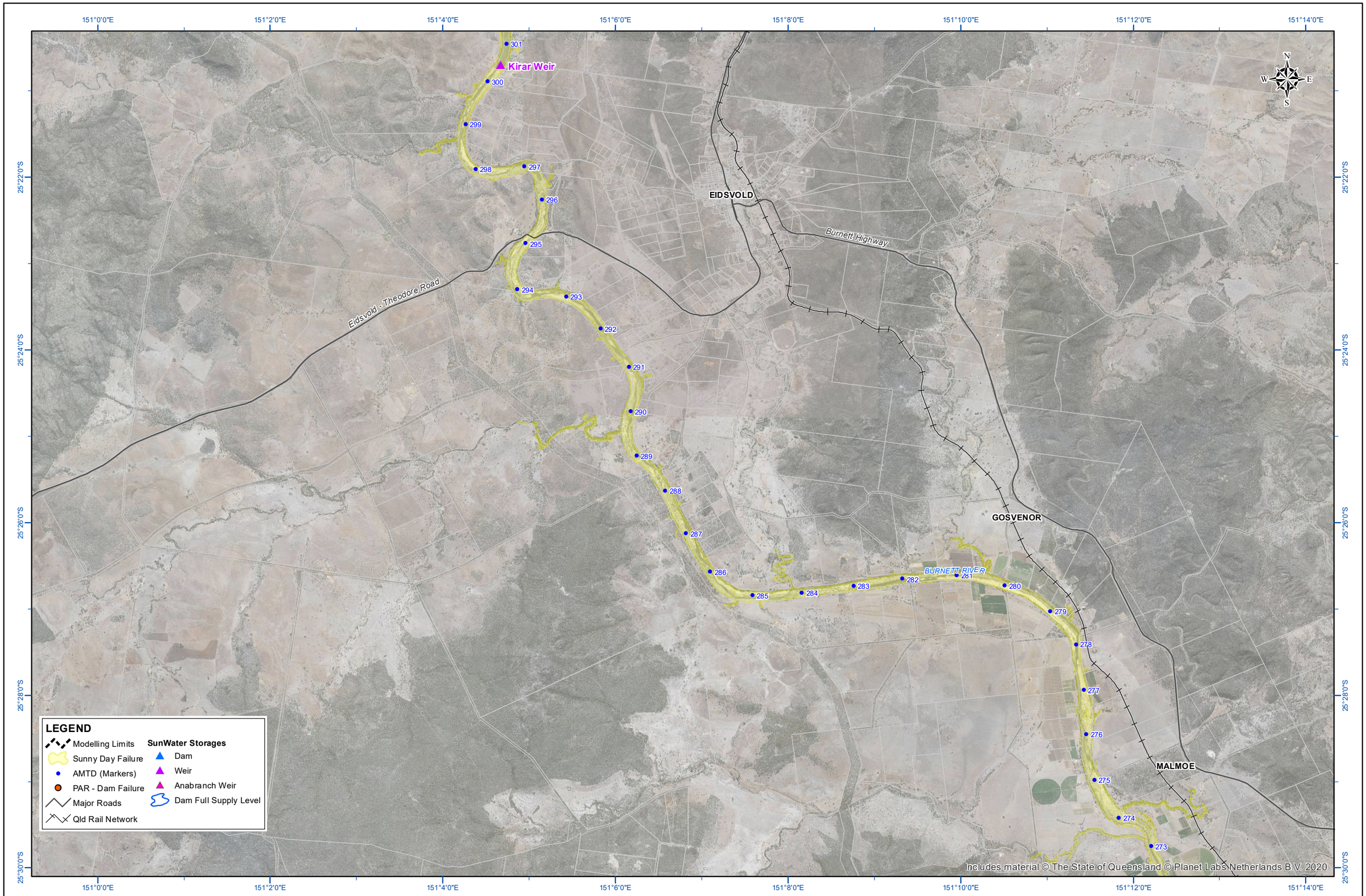
sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

CONTRACT NUMBER
DRAWING NUMBER 260276 | REV. A
SHEET 5 OF 7
DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM

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



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

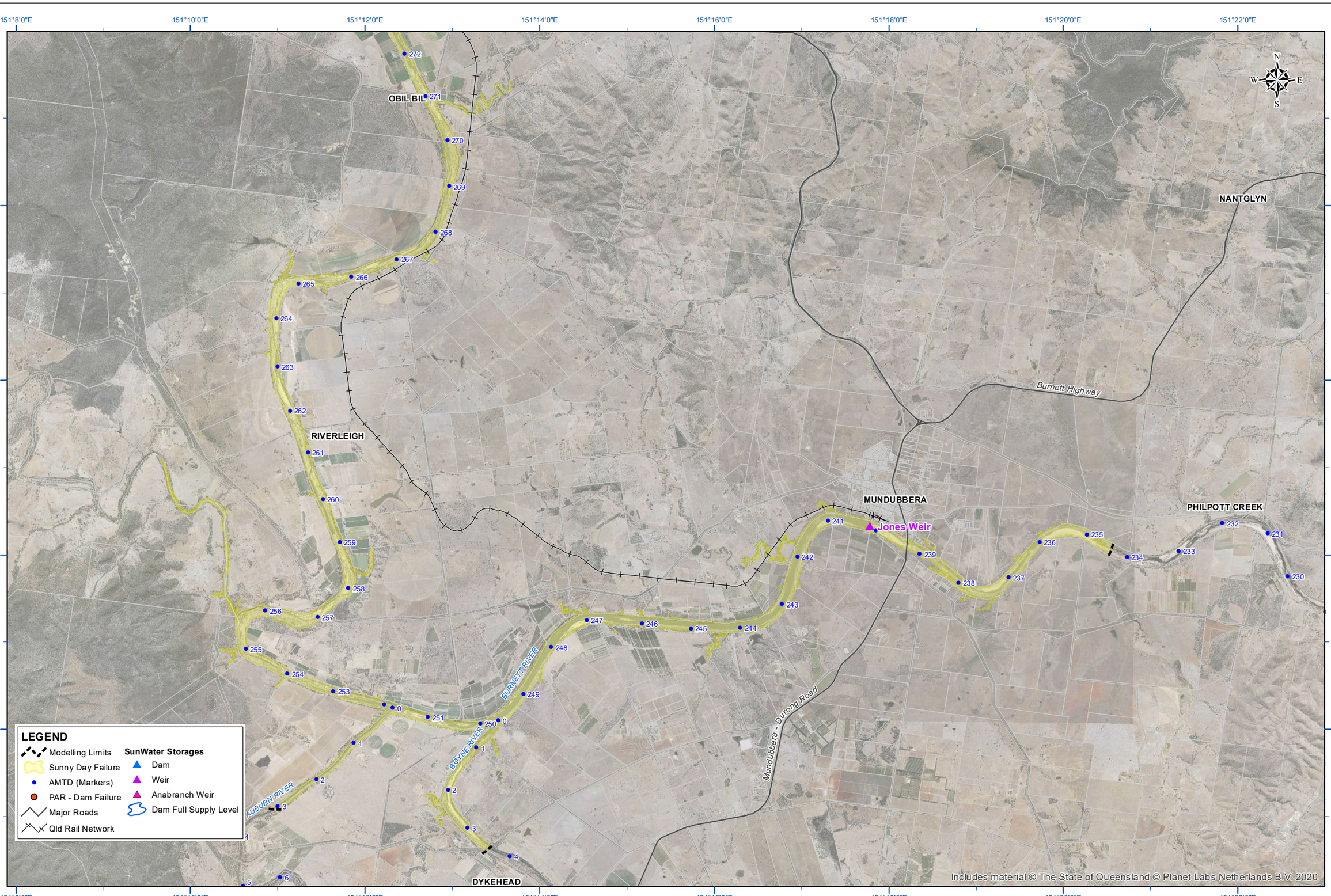
CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER	REV.
260276	A

SHEET 6 OF 7
DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260276-A.mxd
Printed: Monday, 11/09/2023 12:10:23 PM



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

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

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater
©SUNWATER LIMITED
ACN 131 034 985

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
SUNNY DAY FAILURE
MAIN EMBANKMENT

CONTRACT NUMBER

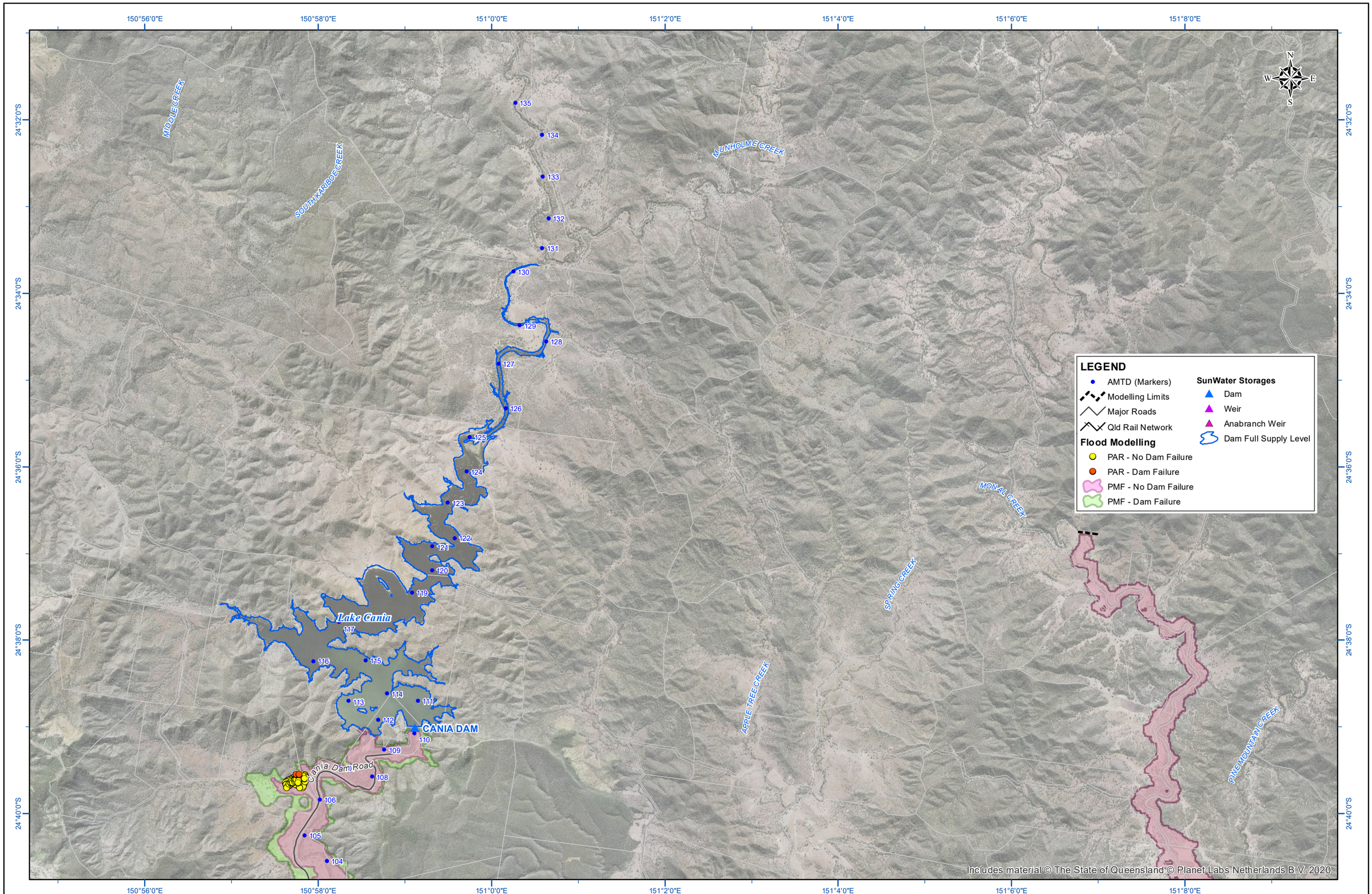
DRAWING NUMBER	REV.
260276	A

SHEET 7 OF 7
DATE SEPTEMBER 2023

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

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM

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



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION

- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS

260278 - Keymap

SCALES (A3 SIZE)

0 750 1,500 2,250 3,000 3,750 m

1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

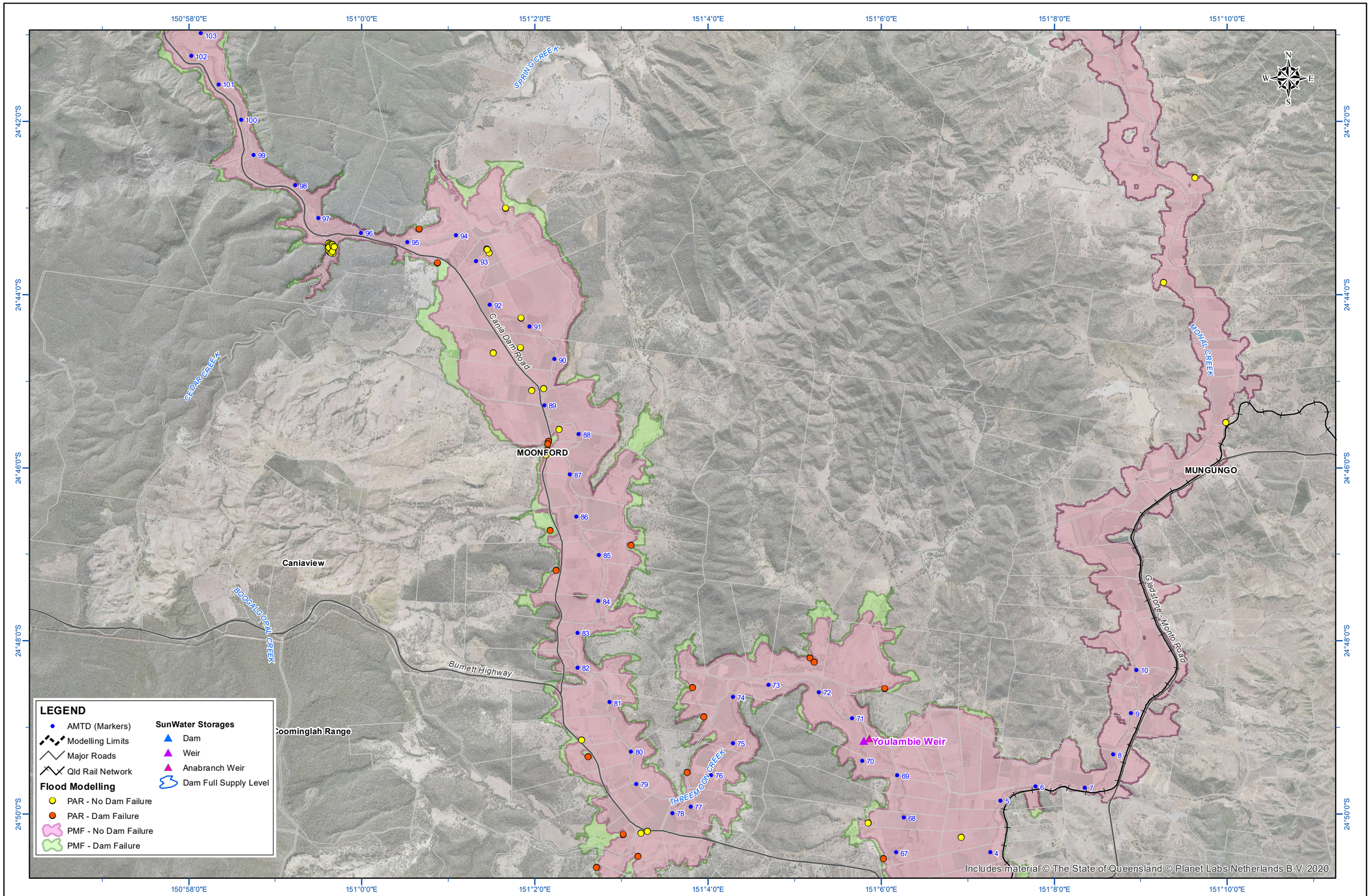
CONTRACT NUMBER

DRAWING NUMBER	REV.
260277	A

SHEET 1 OF 7

DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

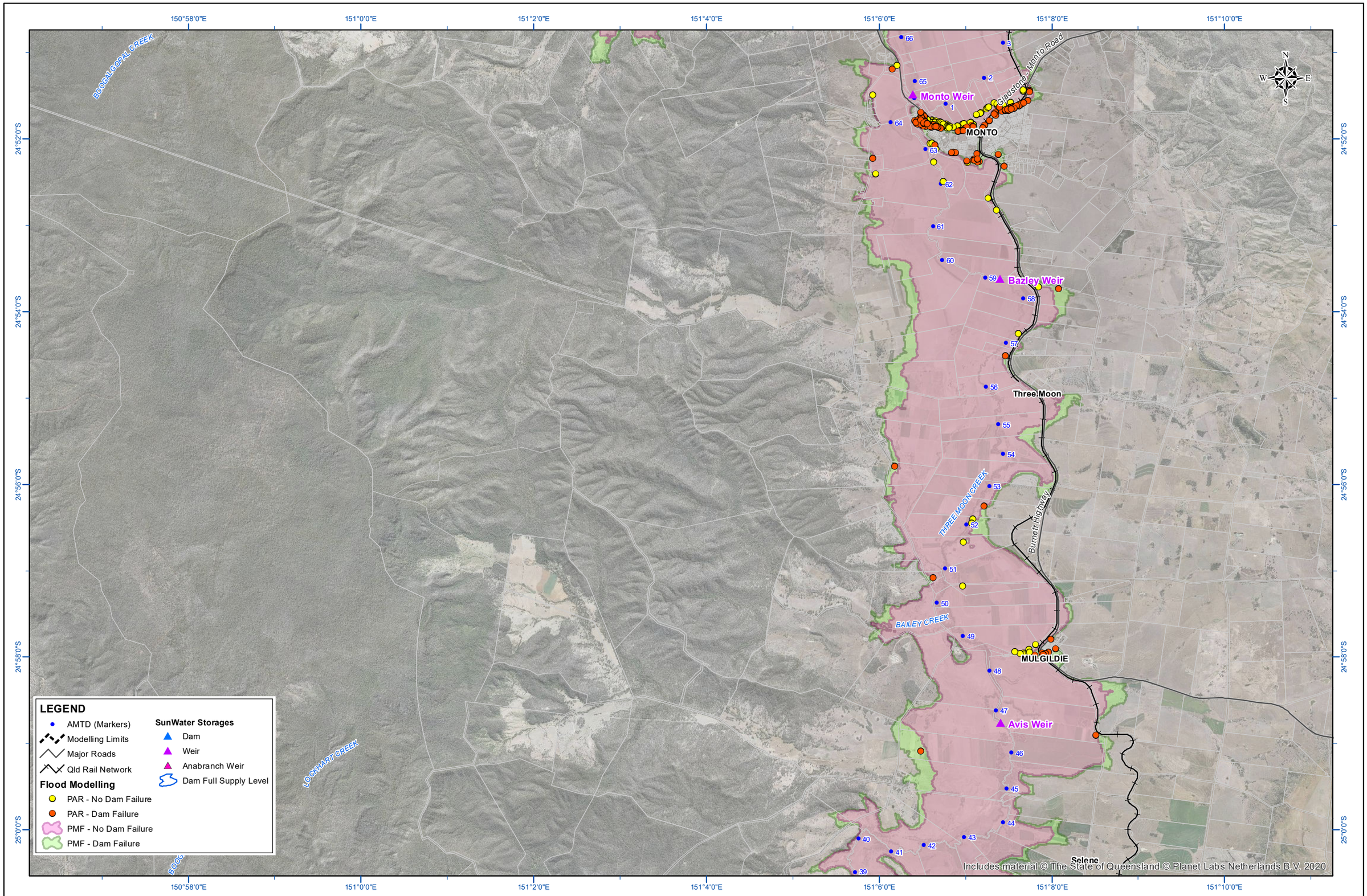
CONTRACT NUMBER

DRAWING NUMBER	REV.
260277	A

SHEET 2 OF 7
DATE SEPTEMBER 2023

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

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater
©SUNWATER LIMITED
ACN 131 034 985

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

CONTRACT NUMBER

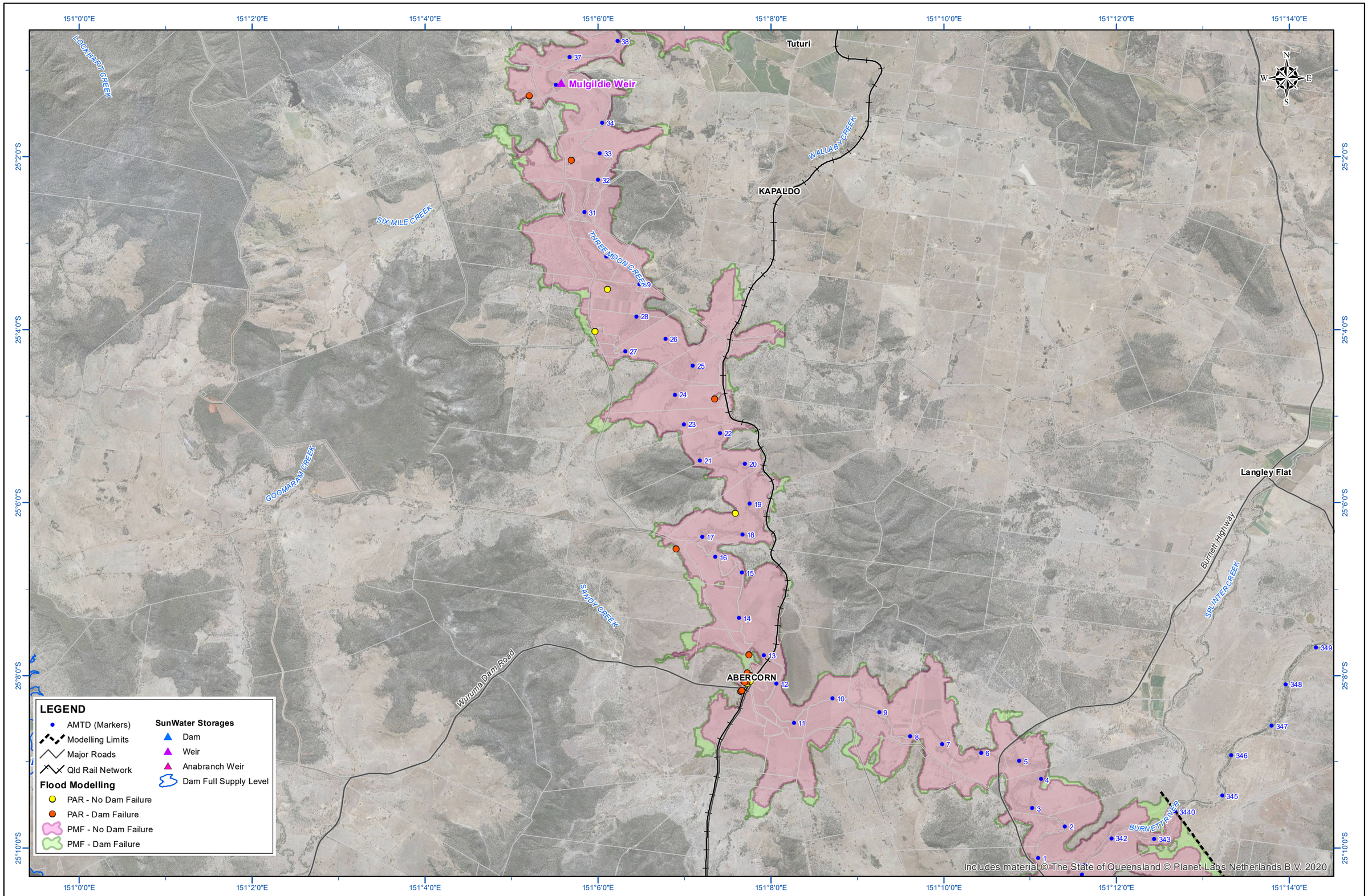
DRAWING NUMBER	REV.
260277	A

SHEET 3 OF 7
DATE SEPTEMBER 2023

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

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM

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



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER	REV.
260277	A

SHEET 4 OF 7

DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM

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

151°0'0"E 151°2'0"E 151°4'0"E 151°6'0"E 151°8'0"E 151°10'0"E 151°12'0"E 151°14'0"E
25°12'0"S 25°14'0"S 25°16'0"S 25°18'0"S 25°20'0"S

Lake Wuruma
Wuruma Dam Road
WURUMA DAM
CYNTHIA
CERATODUS
Burnett Highway
John Goleby Weir
EASTERN CREEK
DEAD BULLOCK CREEK
BURNETT RIVER
HORSE CREEK
NO GO RIVER
JACKASS CREEK
YELLOW CREEK
5 MILE CREEK
EIGHT MILE CREEK

22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 340 339 338 337 336 335 334 333 332 331 330 329 328 327 326 325 324 323 322 321 320 319 318 317 316 315 314 313 312 311 310 309 308 307 306 305 304 303 302

N W E S

LEGEND

- AMTD (Markers)
- Modelling Limits
- Major Roads
- Qld Rail Network

Flood Modelling

- PAR - No Dam Failure
- PAR - Dam Failure
- PMF - No Dam Failure
- PMF - Dam Failure

SunWater Storages

- Dam
- Weir
- Anabranch Weir
- Dam Full Supply Level

REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION

- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS

260278 - Keymap

SCALES (A3 SIZE)

0 750 1,500 2,250 3,000 3,750 m

1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH
APPROVED	
M.G. HUGHES 13/09/2023	RPEQ: 18351

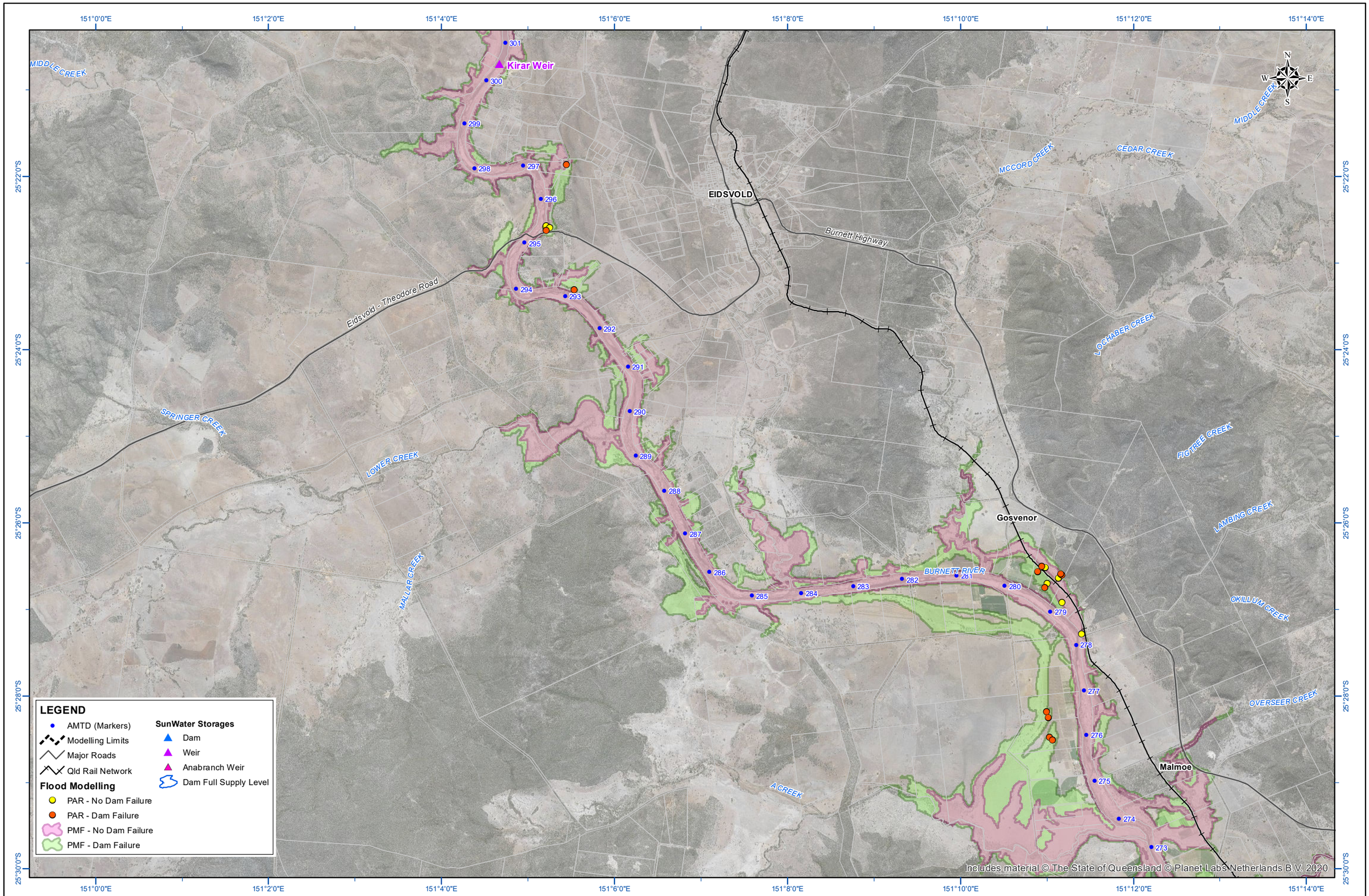
sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

CONTRACT NUMBER	
DRAWING NUMBER	REV.
260277	A
SHEET 5 OF 7	
DATE SEPTEMBER 2023	

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM

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



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

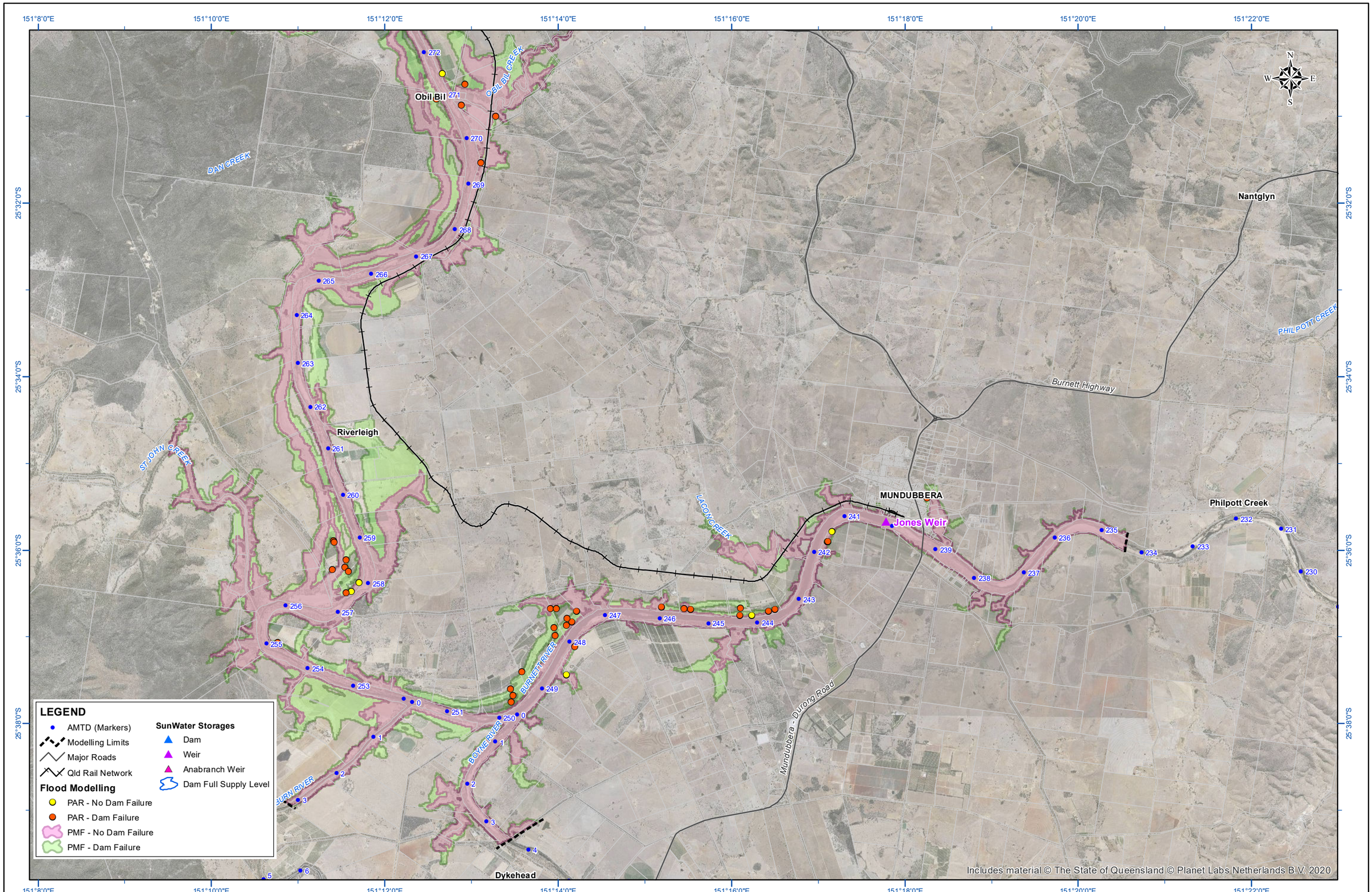
CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER	REV.
260277	A

SHEET 6 OF 7
DATE SEPTEMBER 2023

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Cania\260277-A.mxd
Printed: Monday, 11/09/2023 10:55:52 AM



REVISION					
13/09/23	A	ISSUED FOR USE	LH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
- Coordinate System: Geocentric Datum of Australia (GDA94).
- The 'Dam Failure' flood extent also includes the 'No Dam Failure' flood extent.

REFERENCE DRAWINGS
260278 - Keymap

SCALES (A3 SIZE)
0 750 1,500 2,250 3,000 3,750 m
1:75,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
13/09/2023
RPEQ: 18351

sunwater

CANIA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLAN
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT

CONTRACT NUMBER

DRAWING NUMBER	REV.
260277	A

SHEET 7 OF 7

DATE SEPTEMBER 2023

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

Appendix B4: Access Routes during fair and adverse weather conditions

Emergency access route information from Biloela Depot:

Details	Cania Dam access route
Distance	Approx. 38 km north of Monto on the Burnett Highway/A3 and Cania Rd Approx. 25 km from Highway turnoff north along Cania Dam road passing through Moonford.
Travel Time	Approx. 40 minutes on Burnett Highway/Approx. 20 minutes along Cania Dam road
Road type	Bitumen
Speed limit	80–100 km/h (drive to suit conditions)

Note1: Should Cania Dam be spilling greater than 500ML/d, the road crossing at Cania Dam will be cut.

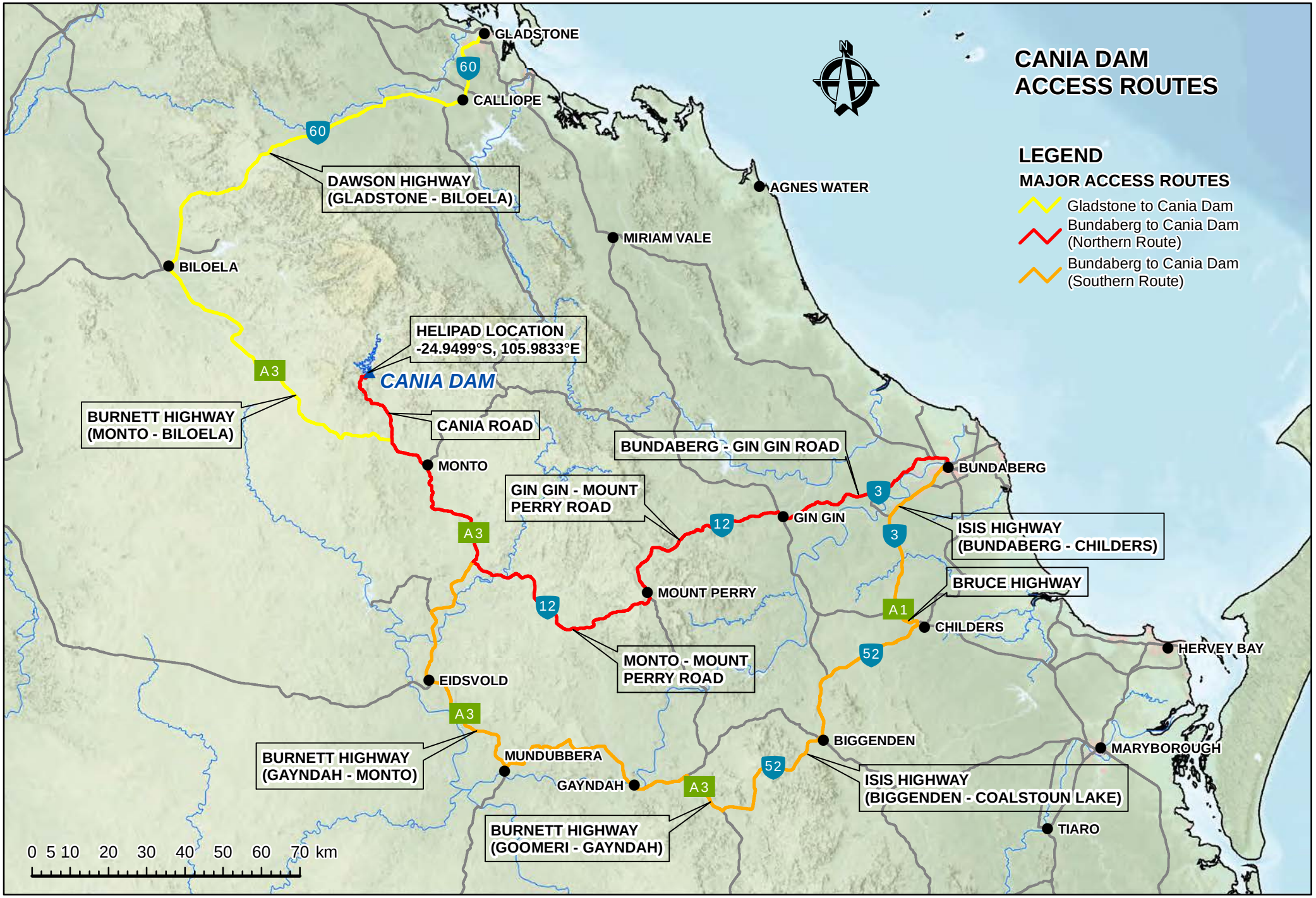
Note2: When the downstream flood waters have inundated access routes, then access to the dam shall be by helicopter.

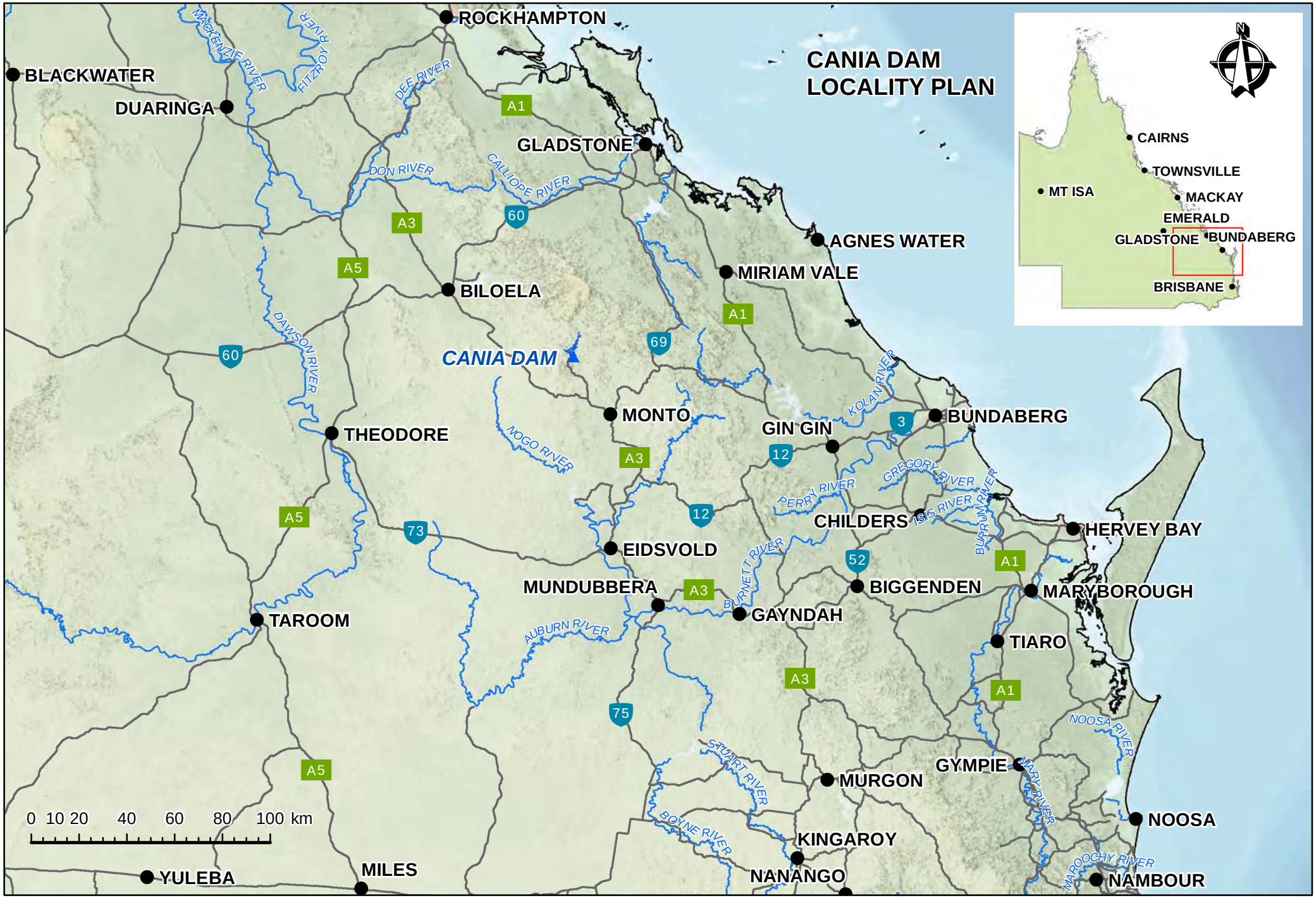
Helipad coordinates:

Latitude. -24.64990 Longitude. 150.98330

Helipad location description:

Approximately 20 m west of the Main Embankment.





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

Document: S:\BW Asset Delivery\GIS_Data\Enterprise_GIS\Water_Supply_Schemes\Three Moon Creek\Drawings\ArcMap\252276-A.mxd
Printed: Tuesday, 25/02/2020 09:21:45 AM

150°55'0"E 151°0'0"E 151°5'0"E

24°25'0"S 24°30'0"S 24°35'0"S 24°40'0"S

N W E S

BOOLAROO TOPS TM

THREE MOON CREEK
CLIFF CREEK
MUNHOLME CREEK
SHEEP STATION CREEK
STIRRUP IRON CREEK
PATCHY CREEK
BACK CREEK
OAKY CREEK
STONY CREEK

BLUE HILLS

THREE MOON CREEK AT BIEGOGO

DODGER CREEK
KROOMBIT OAKY CREEK

FOUR MILE CREEK
BEATTY CREEK
LANGTRY CREEK
WELL CREEK
EIGHT MILE CK
BOOLGAL CREEK

CANIA DAM HW TM
CANIA DAM HW AL
CANIA DAM
CANIA DAM TW TM

THREE MOON CREEK
CANIA DAM ROAD

LEGEND

- Rainfall Station
- Rainfall & River Station
- River Station
- Sunwater Gauging Station
- Sunwater Dam
- Town
- Major Watercourse
- Creek
- State Road (DTMR)

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

SCALES (A3 SIZE)
0 1 2 3 4 5 km 1:100,000

sunwater

CANIA DAM
THREE MOON CREEK CATCHMENT
CATCHMENT MAP

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

DRAWING No. 252276 A

APPENDIX C Equipment and technical information

Appendix C1: List of equipment available during an emergency

Appendix C2: Cania Dam discharge curve

Appendix C3: Cania Dam storage curve

Appendix C1 has been redacted

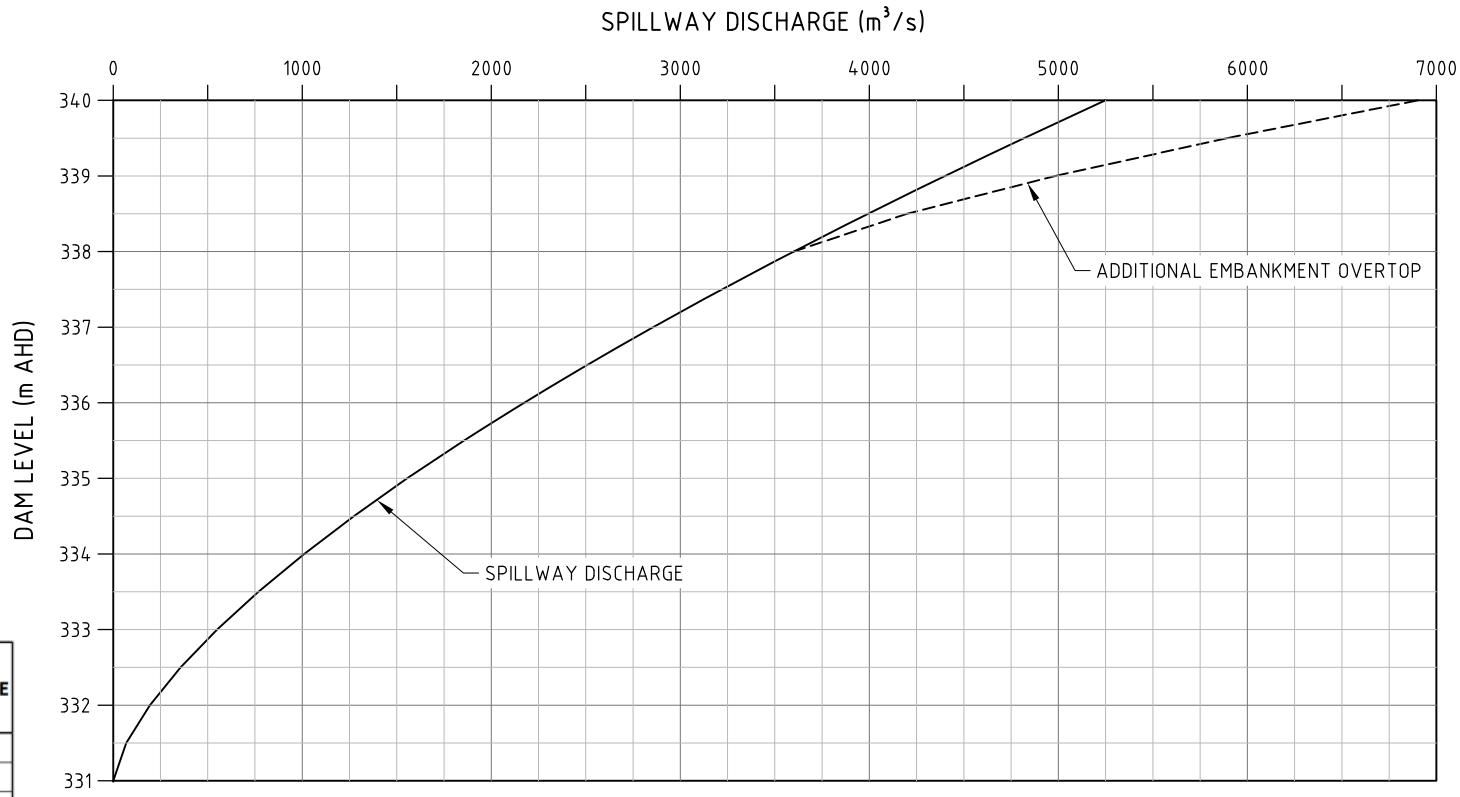
REVISION	DATE		REMARKS		
	21/04/2021	A	ISSUED FOR USE	LH	MGH
	DATE		REMARKS	CKD	PSD

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

S:\BW_WaterResources\projects\SW_Three Moon Creek WSS\Cania Dam - Spillway Rating Curve\Drawings\AutoCAD\253767-A.dwg
21 Apr 2021 2:29 PM

DRAWN
DESIGNED
CHECKED
CHECKED LH
APPROVED M.G. HUGHES 21/4/2021 RPEQ: 18351

SCALES (A4 SIZE)
NOT TO SCALE



DAM LEVEL (m)	SPILLWAY DISCHARGE (m3/s)	EMBANKMENT OVERTOP (m3/s)	TOTAL DISCHARGE (m3/s)
331.0	0.0		0.0
331.5	69.0		69.0
332.0	194.0		194.0
332.5	357.0		357.0
333.0	550.0		550.0
333.5	768.0		768.0
334.0	1010.0		1010.0
334.5	1273.0		1273.0
335.0	1555.0		1555.0
335.5	1856.0		1856.0
336.0	2173.0		2173.0
336.5	2507.0		2507.0
337.0	2857.0		2857.0
337.5	3222.0		3222.0
338.0	3600.0	0.0	3600.0
338.5	3993.0	206.7	4199.7
339.0	4399.0	584.5	4983.5
339.5	4818.0	1073.8	5891.8
340.0	5249.0	1653.2	6902.2

NOTE:

- DAM OVERTOPPING FLOW ASSUMES DESIGN CREST LEVEL 338.00m MINIMUM CREST LEVEL 338.27m SURVEYED 8/4/2014 (REFER DRAWING 246485).
- SOURCE REFERENCE - STANTEC CFD MODEL REPORT 2020 (HB DOC #2547888).

sunwater

CANIA DAM SPILLWAY DISCHARGE RATING CURVE

CONTRACT NUMBER

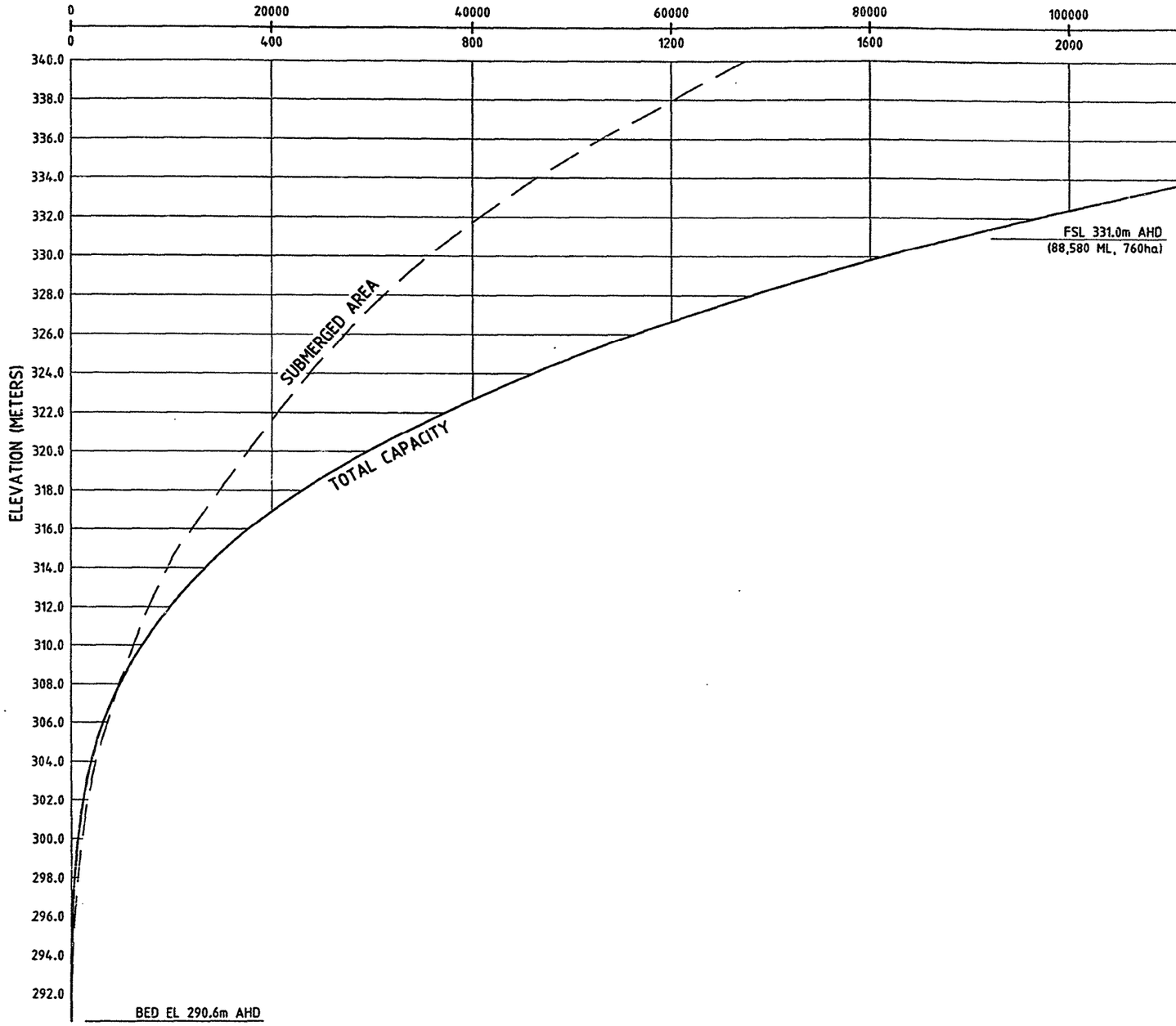
DRAWING NUMBER 253767

REV. A

SHEET 1 OF 1

DATE MARCH 2021

MASTER



EL (m)	AREA (HA)	VOLUME (ML) TOTAL
340.00	1346.39	181929.03
339.50	1311.93	175287.06
339.00	1274.03	168817.33
338.50	1238.22	162543.09
338.00	1204.90	156432.63
337.50	1170.69	150498.03
337.00	1133.57	144731.34
336.50	1096.25	139162.69
336.00	1059.69	133769.88
335.50	1025.70	128562.20
335.00	994.13	123510.89
334.50	963.16	118621.38
334.00	930.63	113883.74
333.50	899.56	109313.37
333.00	871.78	104883.31
332.50	843.08	100599.53
332.00	814.83	96452.91
331.50	787.77	92450.23
331.00	760.00	88580.00
330.50	735.78	84838.42
330.00	711.58	81218.55
329.50	687.41	77723.80
329.00	665.36	74341.92
328.50	645.18	71068.00
328.00	623.93	67892.95
327.50	602.68	64830.28
327.00	583.36	61863.73
326.50	564.43	58996.88
326.00	545.95	56220.43
325.50	528.51	53536.82
325.00	510.80	50936.72
324.50	492.76	48430.32
324.00	475.68	46008.57
323.50	459.32	43673.67
323.00	443.18	41415.89
322.50	427.20	39242.41
322.00	411.50	37144.53
321.50	396.14	35127.94
321.00	381.79	33182.46
320.50	367.71	31310.56
320.00	353.23	29507.53
319.50	339.10	27778.75
319.00	325.21	26116.87
318.50	310.48	24529.12
318.00	296.42	23011.92
317.50	282.42	21566.06
317.00	268.21	20188.40
316.50	253.76	18886.30
316.00	240.99	17648.90
315.50	227.00	16479.70

EL (m)	AREA (HA)	VOLUME (ML) TOTAL
315.00	213.60	15378.82
314.50	202.15	14342.36
314.00	192.16	13355.93
313.50	182.65	12420.74
313.00	173.20	11530.39
312.50	163.69	10689.34
312.00	154.73	9893.37
311.50	146.65	9141.20
311.00	139.42	8426.00
310.50	132.19	7747.96
310.00	125.05	7104.73
309.50	118.33	6497.25
309.00	111.17	5922.67
308.50	103.44	5387.00
308.00	95.67	4889.56
307.50	89.58	4428.25
307.00	84.43	3992.85
306.50	78.85	3585.44
306.00	73.09	3205.26
305.50	67.06	2855.58
305.00	60.45	2536.07
304.50	54.13	2250.74
304.00	48.53	1994.47
303.50	44.28	1763.22
303.00	40.67	1550.94
302.50	36.93	1357.58
302.00	32.90	1182.52
301.50	29.60	1027.46
301.00	26.92	886.04
300.50	24.20	758.82
300.00	21.43	644.67
299.50	18.93	544.23
299.00	16.51	455.69
298.50	14.56	378.64
298.00	12.82	310.05
297.50	10.88	251.00
297.00	9.20	201.10
296.50	8.04	158.29
296.00	6.90	121.01
295.50	5.83	89.50
295.00	4.74	63.10
294.50	3.59	42.57
294.00	2.49	27.34
293.50	1.77	17.03
293.00	1.23	9.59
292.50	0.81	4.68
292.00	0.44	1.49
291.50	0.11	0.27
291.00	0.01	0.01

Level Datum: Australian Height Datum
Derived from PM41301 at EL 255.155m AHD
PM50086 on Valve house @ EL 295.744 m AHD
Computed from DTM produced from 1978 photography
Digital data & volumes computed to EL 340m AHD
Catchment Area: 280 sq km
Latitude: 24°39'05" Longitude: 150°59'00"

THIS DRAWING SUPERSEDES S42518

10 Sep 1998 3:12 PM

REVISION	DATE	REMARKS	CKD	PSD

REFERENCE DRAWINGS

210592 TO 210604	CONTOUR PLANS

SCALES

DRAFTING IMP
DRAFTING CHK AN
DESIGN
DESIGN CHK

RECOMMENDED
APPROVED
PRINCIPAL SURVEYOR

Engineering Services
NATURAL RESOURCES

THREE MOON CREEK - BASIN 136
CANIA DAM - AMTD 110.1km
TOTAL VOLUME
STORAGE CURVE

CONTRACT NUMBER
DRAWING NUMBER A3-202490
DATE SEP 1998

A3-202490 (FIF)

Appendix D Interaction with local government and district groups

To be populated when EAP next completes a substantive review

Annexe — Cania 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. Cania Dam is spilling excess water into Three Moon Creek. People downstream of Cania Dam should STAY INFORMED and MONITOR CONDITIONS. Water flows from Cania 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 Cania Dam into Three Moon Creek has increased significantly. Water flows from Cania Dam may contribute to dangerous / widespread flooding downstream. Expect increased river flows in 6-12 hours / later today / overnight / tomorrow. People downstream of Cania 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 downstream of Cania Dam including Moonford and Monto must LEAVE IMMEDIATELY. Cania 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. Central Monto and Biloela are safe. More information here: North Burnett Regional Council http://emergency.northburnett.qld.gov.au