

EMERGENCY ACTION PLAN — TINAROO FALLS DAM (ID 370)

ISSUE: 10.1 — September 2023

Expiry:

Prepared by Sunwater Limited

Controlled Copy No.

Gated: No

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Type: Mass concrete gravity dam

Project: Tinaroo Falls Dam EAP

File no.: 08-000369/001

Address: Corner Severin Street and Tinaroo Falls Dam Road

Location: Lat. -17.183548° Long. 145.571359°
-17°11'00.77"S 145°34'16.89"E

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

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Emergency activation quick reference – Dam Hazards

The Emergency Action Plan (EAP) for Tinaroo Falls Dam covers dam hazards evaluated within Sunwater’s Dam Safety Management Program. Use the following table to select the relevant section of the EAP that deals with the dam hazard.

NOTE: The Incident Coordinator (IC) is responsible for 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

| Dam Hazards and section numbers | Activation levels for dam hazards | | | |
|--|--|--|--|--|
| | Alert | Lean Forward | Stand Up | Stand Down |
| Flood operations See section 5 | <ul style="list-style-type: none"> Storage at EL 670.32 m and rising (0.1 m below FSL) | <ul style="list-style-type: none"> Storage above FSL 670.42 m | <ul style="list-style-type: none"> Storage above EL 671.92 m (Greater than Moderate Flood Level) | <ul style="list-style-type: none"> Storage EL 671.42 m (Minor Flood Level) and falling with no forecast increase in EL for 48 hours |
| Piping: embankment, foundation, or abutments See section 6 | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations, or abutments | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations, or abutments WITH cloudy water | <ul style="list-style-type: none"> Piping condition has been established | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Earthquake See section 7 | <ul style="list-style-type: none"> Earthquake confirmed (by DSTDm) or felt in the area, AND Intensity less than 5 Modified Mercalli (MM) | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Earthquake confirmed (by DSTDm) or felt in the area, AND A possible failure path has been identified | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Terrorist threat/ activity or high energy impact See section 8 | <ul style="list-style-type: none"> Not applicable | <ul style="list-style-type: none"> Not applicable | <ul style="list-style-type: none"> Possible terrorist activity/suspicious behaviour noticed at the dam, or threat received Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) Failure underway or likely due to impact or explosion, and sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Overturning or sliding of Monoliths See section 9 | <ul style="list-style-type: none"> Indications of movement of monoliths noted such as cracking, increased seepage, spilling | <ul style="list-style-type: none"> Storage level at Flood of Record level of EL 672.74 m | <ul style="list-style-type: none"> Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam | <ul style="list-style-type: none"> Risk Assessment has determined that failure risk has reduced |

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Emergency activation quick reference – Other Emergency Situations

The EAP for Tinaroo Falls Dam covers one other emergency situation evaluated within Sunwater’s Dam Safety Management Program. This emergency situation is communications failure.

NOTE: The IC is responsible for the decision to activate the EAP. Should the IC be unavailable, the LEC or DDO is responsible for the decision.

Table 2: Emergency activation quick reference – Other Emergency Situations

| Other Emergency Situations and section numbers | Activation levels | | |
|--|---|---|--|
| | Communications Failure – Dam Site (DDO) | Communications Failure – Local Area (LEC/ORR) | Communications Failure – Brisbane (IC/DSTDM) |
| | <ul style="list-style-type: none"> Site managed (DDO – becomes LEC) | <ul style="list-style-type: none"> Brisbane managed by IC | <ul style="list-style-type: none"> Locally managed by LEC |
| Activation triggers for other emergency situations | | | |
| Comms Failure See section 10 | <ul style="list-style-type: none"> Unable to communicate to or from Dam site | <ul style="list-style-type: none"> Unable to communicate to or from Local Area | <ul style="list-style-type: none"> Unable to communicate to or from Sunwater Brisbane |

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Document control

Authorisation of document

| Name | Position/role | Signature/date |
|------------|---|-----------------------|
| [Redacted] | EAP Program Lead — Prepared for submission | [Redacted] 29/09/2023 |

Document revision history

| Issue | Date | Prepared by | Reason for change | eDOCS# |
|-------|----------------|-------------|---|---------|
| 2.0 | May 2008 | | Significant changes of Tinaroo Falls Dam Emergency Action Plan to reflect Sunwater Management Structure and other minor changes (Refer HB #616872 Versions 2& 2A for details) | |
| 3 | August 2010 | | Significant changes to all Sections of Tinaroo Falls Dam Emergency Action Plan to reflect current Sunwater Management Structure and other changes | |
| 4 | August 2014 | | New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with relevant disaster management groups | 1619460 |
| 4A | June 2015 | | Improvements and clarifications made following reviews of new EAP by Sunwater staff | 1724339 |
| 5 | Sep 2016 | | Updates to notification & communication lists and Emergency Alert sections. | 2023125 |
| 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). | 2130700 |
| 6A | November 2017 | | Updated Emergency Alert messaging for Cairns area. | 2130700 |
| 7 | December 2017 | | Issue 6 – not approved for use, but changes continue in this issue. Includes updates to notification & communication lists and Emergency Alert sections. Also incorporates non-substantive updates to Sections 1, 2 & 4 and error corrections. | 2230927 |
| 8.0 | December 2018 | | Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes. | 2367506 |
| 8.1 | October 2019 | | Legislated yearly contact updates. Minor error corrections and other non-substantive changes. Updated Downstream Notification map. | 2450051 |
| 9.0 | February 2020 | | Revised and reviewed at expiry of approval. Minor error corrections and other non-substantive changes. Updated Emergency Alert Polygons to new format. | 2489188 |
| 9.1 | September 2020 | | Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes. | 2572832 |
| 9.2 | October 2020 | | Amended Cairns City Emergency Alert due to errors detected by Cairns City Council. | 2576604 |
| 9.3 | September 2021 | | Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes such as removing Comprehensive Risk Assessments description (2.9) and simplifying FODM role in Activation triggers (5.2.1) including removing para 5.2.2. | 2653305 |
| 10.0 | October 2022 | | Revised and reviewed at expiry of approval. Incorporated global non-substantive EAP changes resulting from feedback from previous internal and external reviews. Amended to be consistent with new Sunwater corporate branding. The Chemical Hazard section has been removed as it is not a Dam Safety Hazard and is dealt with in other more relevant documents. Amended contacts and associated sections. Updated hazard triggers and mapping products to reflect CRA 2021. | 2739603 |

| Issue | Date | Prepared by | Reason for change | eDOCS# |
|-------|----------------|-------------|---|----------|
| 10.1 | September 2023 | | Added Fatigue Management as section 2.5. Removed Hazard Management Toolkit from Appendix D. Removed references to chemical spill. Added Annexe and amended messaging in communication tables to comply with AWS requirements. Non-substantive updates as part of Annual Safety Statement. Minor error corrections and readability improvements. | #2813019 |

Controlled document distribution list

| Copy no. | Position | Location |
|----------|---|--|
| 1 | Storage Supervisor | Sunwater, Tinaroo Falls Dam |
| 2 | Operations Manager | Sunwater, Mareeba |
| 3 | Emergency Action Plan Coordinator | Sunwater, Brisbane |
| 4 | Local Disaster Coordinator – Local Disaster Management Group (LDMG 1), Mareeba | Mareeba Shire Council |
| 5 | Local Disaster Coordinator – Local Disaster Management Group (LDMG 2), Tablelands | Tablelands Regional Council |
| 6 | Local Disaster Coordinator – Local Disaster Management Group (LDMG 3), Cairns | Cairns Regional Council |
| 7 | Executive Officer – Cairns District Disaster Management Group (DDMG 2) | Police, Cairns |
| 8 | Emergency Management Coordinator, Far North Region | Queensland Fire and Emergency Services, Cairns |

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

Electronic document distribution list

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| Position | Location |
|---|---------------------------------|
| Executive Officer – Mareeba District Disaster Management Group (DDMG 1) | Police, Mareeba |
| 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 (March 2022) | https://www.legislation.qld.gov.au/view/whole/pdf/inforce/current/act-2008-034 |
| B | Emergency action plan for referable dam guideline (DRDMW 2021) | https://www.resources.qld.gov.au/__data/assets/pdf_file/0018/84015/eap-guideline.pdf |
| C | Queensland State Disaster Management Plan 2018 (Queensland's Disaster Management Committee) | https://www.disaster.qld.gov.au/cdmp/Documents/Queensland-State-Disaster-Management-Plan.pdf |
| D | Queensland Government Communications and systems for public information and warnings | https://www.disaster.qld.gov.au/dmg/Response/Pages/5-6.aspx |
| E | Guidelines for the Development of Communication Education, Awareness and Engagement Programs (2010) | https://knowledge.aidr.org.au/media/1970/manual-45-guidelines-for-the-development-of-communication-education-awareness-and-engagement-programs.pdf |
| F | Queensland Emergency Alert Manual – M.1.174 (February 2022) | https://www.disaster.qld.gov.au/dmg/st/Documents/M1174-Queensland-Emergency-Alert-Manual.pdf |
| G | Sunwater Website — Emergency Action Plans, Flood Maps and Dam Emergency Sirens | https://www.sunwater.com.au/community/preparing-for-weather-events/emergency-management/ |
| H | Sunwater Website — Emergency Notification Service | https://www.sunwater.com.au/community/preparing-for-weather-events/stay-informed/emergency-notification-service/ |
| I | Professional Engineers Act 2002 (RPEQ) (September 2013) | https://www.legislation.qld.gov.au/view/pdf/inforce/2013-09-23/act-2002-054 |
| J | Sunwater (internal) Tinaroo Falls Dam Comprehensive Risk Assessment (2021) | eDOCS# 2720003 |
| K | Sunwater (internal) Tinaroo Falls Dam Spillway Hydraulic Assessment (GHD) | Only available Sunwater internal. |
| L | Sunwater (internal) Strategic Event Procedure | Strategic Event Procedure |
| M | Sunwater (internal) Tinaroo Falls Dam Safety Condition Schedule | eDOCS# 2720258 |
| N | Queensland Disaster Management Act 2003 (April 2022) | https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2003-091 |
| O | Queensland Disaster Management Guidelines | https://www.disaster.qld.gov.au/dmg/Pages/DM-Guideline.aspx |
| P | Guidelines on Selection of Acceptable Flood Capacity for Dams (ANCOLD, 2000) | ANCOLD |
| Q | Queensland Dam Safety Management Guidelines (DNRME October 2020) | https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0007/78838/dam-safety-management.pdf |
| R | Australian Rainfall and Runoff (ARR) 2016 | http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/ |
| S | Sunwater (internal) Tinaroo Falls Dam Operation and Maintenance Manual | Tinaroo Falls Dam Operations and Maintenance (O-M) Manual |
| T | Guidelines on Dam Safety Management (ANCOLD, 2003) | ANCOLD ISBN: 0-731027620 |
| U | Guidelines on Consequence Categories for Dams (ANCOLD, 2012) | ANCOLD ISBN: 978-0-9808192-5-0 |
| V | 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 |
| W | Sunwater (internal) Emergency Alert Protocol | eDOCS# 2156253 |
| X | Water Act 2000 | https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2000-034 |

| | | |
|---|--|---------------------------------|
| Y | Fatigue Management Procedure WHS42 (Sunwater internal) | Fatigue Management Procedure |
| Z | Sunwater (internal) Standing Operating Procedure (SOP) 12 – Dam Log Books | Standard Operating Procedure 12 |

1.2 Abbreviations and acronyms

| | | | |
|---------|--|-------|--|
| AEP | Annual Exceedance Probability | PFRM | Predictive Flood Routing Model |
| AHD | Australian Height Datum | PLL | Probable Loss of Life |
| AMTD | Adopted Mean Thread Distance | PMF | Probable Maximum Flood |
| ANCOLD | Australian National Committee on Large Dams | PMP | Probable Maximum Precipitation |
| BOM | Bureau of Meteorology | PMPDF | Probable Maximum Precipitation Design Flood |
| CED | Chief Engineer Dams | PWRE | Principal Water Resources Engineer |
| CEO | Chief Executive Officer | QDMC | Queensland Disaster Management Committee |
| CRA | Comprehensive Risk Assessment | QFES | Queensland Fire & Emergency Services |
| CTG | Counter Terrorism Group | QPS | Queensland Police Service |
| D/S | Downstream | RB | Right Bank |
| DCF | Dam Crest Flood | RC | Regional Council |
| DCL | Dam Crest Level | RCC | Roller Compacted Concrete |
| DDC | District Disaster Coordinator | RDMW | Department of Regional Development, Manufacturing & Water |
| DDMG | District Disaster Management Group | ROC | Regional Operations Centre |
| DDMP | District Disaster Management Plan | RPEQ | Registered Professional Engineer of Queensland |
| DDO | Dam Duty Officer | RSL | Reduced Supply Level |
| DDS | Director Dam Safety | SCED | Senior Civil Engineer Dams |
| DSR | Dam Safety Regulator | SCTN | Security and Counter Terrorism Network |
| DSSC | Dam Safety Surveillance Coordinator | SDCC | State Disaster Coordination Centre |
| DSTDM | Dam Safety Technical Decision Maker | SDF | Sunny Day Failure |
| EAP | Emergency Action Plan | SDTE | Senior Dam Technical Engineer |
| EA | Emergency Alert | SES | State Emergency Service |
| EER | Emergency Event Report | SMS | Short Message Service |
| EGMO | Executive General Manager Operations | SMT | Sunwater Media Team |
| EGME&WR | Executive General Manager Engineering & Water Resources | SO | Standby Operator |
| EL | Elevation Level | SOP | Standard Operating Procedure |
| ELT | Executive Leadership Team | SRT | Strategic Response Team |
| FCL | Fixed Crest Level | SS | Storage Supervisor |
| FODM | Flood Operations Decision Maker | SWL | Storage Water Level |
| FSL | Full Supply Level | SWRE | Senior Water Resources Engineer |
| GM | General Manager | U/S | Upstream |
| HMT | Hazard Management Toolkit | WHS | Workplace Health & Safety |
| IC | Incident Coordinator | WQ | Water Quality |
| 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 | | |

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 Water Supply (Safety and Reliability) Act 2008 (the Act) (ref A) | |
| Dam hazard | <p>Means a reasonably foreseeable situation or condition that may:</p> <ul style="list-style-type: none"> • 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. • NOTE: Various dam failure modes have been referred to as <i>hazards</i> in this document e.g., piping, instability, and overtopping. |
| Dam hazard event | <p>Means an event arising from a <i>dam hazard</i> if:</p> <ul style="list-style-type: none"> • persons or property may be harmed because of the event, AND • a coordinated response, involving two or more of the following <i>relevant entities</i>, is unlikely to be required; each <i>local group</i> and <i>district group</i> 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 <i>emergency event</i>. |
| Disaster management plan | <p>Of a <i>district group</i> or local government, means the group's District Disaster Management Plan (DDMP) or local government's Local Disaster Management Plan (LDMP).</p> |
| District group | <p>For an EAP, means a district group established under ref O, section 22 whose disaster district under that Act could, under the plan, be affected by a <i>dam hazard</i>.</p> |
| Emergency event | <p>Means an event arising from a <i>dam hazard</i> if:</p> <ul style="list-style-type: none"> • persons or property may be harmed because of the event, AND • any of the following apply: <ul style="list-style-type: none"> ○ a coordinated response, involving two or more of the following <i>relevant entities</i>, is likely to be required; each <i>local group</i> and <i>district group</i> 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 ref O, OR ○ an entity performing functions under the State <i>Disaster Management Plan</i> may, under that plan, require the owner of the dam to give the entity information about the event. |
| Local group | <p>For an EAP, means a local group established under ref O, section 29 whose local government area could, under the plan, be affected by a <i>dam hazard</i>.</p> |
| Notice response | <p>A dam owner's written response to a notice following an assessment of an EAP by a local government or <i>district group</i>.</p> |
| Referable dam | <p>A dam, or a proposed dam after its construction, will be a referable dam if:</p> <ul style="list-style-type: none"> • a failure impact assessment of the dam, or the proposed dam, is carried out under the Act, AND • the assessment states the dam has, or the proposed dam after its construction will have, a category one or category two failure impact rating, AND • the Chief Executive has, under section 349 of the Act, accepted the assessment. <p>Also, a dam is a referable dam if:</p> <ul style="list-style-type: none"> • under section 342B of the Act, the owner of a dam is given a referable dam notice and, before the effective day for the notice, does not give the Chief Executive a failure impact assessment for the dam, AND • the Chief Executive has not, under section 349 of the Act, accepted a failure impact assessment of the dam. |
| Relevant entity | <p>Means each of the following under the EAP for the dam:</p> <ul style="list-style-type: none"> • the persons who may be affected, or whose property may be affected, if a <i>dam hazard event</i> or <i>emergency event</i> 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 <i>dam hazard event</i> or <i>emergency event</i> were to happen • the Chief Executive • another entity the owner of the dam considers appropriate e.g. the Queensland Police Service (QPS). |

| Term | Definition |
|--|--|
| Terms consistent with Queensland Disaster Management Guidelines (ref P) | |
| Activation levels | <p>The four levels of EAP activation are:</p> <ul style="list-style-type: none"> • Alert: A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. • Lean Forward: An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated. • Stand Up: The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the Act. • Stand Down: Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present. <p>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.</p> <p>Triggering one of these levels of activation may not necessarily mean a similar activation of LDMGs or DDMGs.</p> |
| Bureau of Meteorology flood level classifications | <p>The three levels of flooding are:</p> <ul style="list-style-type: none"> • 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 (ref Q) | 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 (ref Q) | 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 | <p>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:</p> <ul style="list-style-type: none"> • settlement, sliding, or overturning of monoliths in the dam wall • initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works. |
| Flood release | A flood release from a dam occurs when catchment inflows raise the storage level above the Full Supply Level (FSL) resulting in a discharge from the spillway of the dam. |
| Piping | Internal scour caused by the water flow and seepage that occurs through earth dams, dam foundations, or dam abutments. The internal scour can lead to the formation of a pipe, which can lead to a failure of the dam. |
| Plane strike or other impact | The impact of a plane, meteorite, or other high energy item on or in close vicinity of a dam that could damage the dam structure or create a wave that could overtop the dam. |
| 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 (ref R) | The flood resulting from the <i>probable maximum precipitation</i> coupled with the worst flood-producing catchment conditions that can be realistically expected in the prevailing meteorological conditions. |
| Probable maximum precipitation (ref R) | The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin. |
| Probable maximum precipitation design flood (ref S) | The flood resulting from the <i>probable maximum precipitation</i> coupled with typical catchment conditions. |

| Term | Definition |
|----------------------------|---|
| 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 | A failure that occurs at the FSL and there is no concurrent rain associated flooding. |
| Terrorist activity | A deliberate attempt to damage, fail or contaminate a dam. |

2. Introduction

2.1 Context

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

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

Summary of legal requirements – Section 352H

Section 352H(1) of the Act requires that the EAP must identify each dam hazard for the dam, and for each of these dam hazard types (e.g., flood operations or piping risk):

- identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard
- identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening
- 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
- 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
- state the actions the owner of the dam plans to take in response to a dam hazard event or emergency event.

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

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

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

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

The local governments whose areas may be affected by a dam hazard for Tinaroo Falls Dam, have been determined as **Mareeba Shire Council (MSC)**, **Tablelands Regional Council (TRC)** and **Cairns Regional Council (CRC)**. Sunwater has provided MSC, TRC and CRC each with a copy of the draft EAP for assessment.

Section 352HC of the Act states that a district group may review the EAP for consistency with its disaster management plan. The district groups for Tinaroo Falls Dam are **Mareeba DDMG** and **Cairns 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 emergency situations. However, there is considerable uncertainty about how any emergency situation might develop and progress. Factors such as the weather, the location, the mechanics, and the rate and size of any actual failure can considerably affect any resulting flood discharges. Therefore, a significant number of assumptions have had to be made in compiling sections of the EAP. Some variation in outcome should be expected where the event differs from the assumed behaviour.

2.2 Purpose

The purpose of this EAP is to:

- enable the dam owner and the LDMG to respond to dam hazard events or dam emergency events in a timely and effective manner
- minimise the risk of harm to persons or property if a dam hazard event or dam emergency event for the dam happens
- identify dam hazards that could occur at Tinaroo Falls Dam and the area likely to be affected for each hazard
- 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 Tinaroo Falls Dam at the one time. In such a circumstance, it may be necessary to act on the procedures within separate sections simultaneously.

The focus of this EAP is the management of dam hazards at Tinaroo Falls Dam by the owner of the dam (Sunwater) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been developed to be consistent with and support the objectives of the Tablelands Regional Council, Mareeba Shire Council and Cairns Regional Council's respective Local Disaster Management Plans (LDMP) and is a sub-plan of the LDMP.

2.3 Scope

The Tinaroo Falls Dam EAP covers:

- dam hazards evaluated within Sunwater's Dam Safety Management Program
- details about the dam that are relevant to a dam hazard
- identification of circumstances that indicates a material increase in the likelihood of a dam hazard event and/or emergency event happening
- 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 (ref D)
- other relevant information that may assist with identifying the area affected by a dam hazard event or emergency event, and the management of such.

2.4 Sunwater 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.

NOTE: All enquiries regarding EAP training should be directed to [REDACTED]

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 (EAs). 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 (ref Y). 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 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 2.7).

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 messages, phone calls and emails 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 Queensland Fire and Emergency Services (QFES) at the SDCC. The process Sunwater follows is documented in Appendix A7.

Some local governments also have their own warning systems that are used in partnership. With respect to this, EAP Tablelands Regional Council and Mareeba Shire Council use EWN whilst Cairns Regional Council uses Whispir.

A copy of all Sunwater approved EAPs are available to the public on the Sunwater website (ref G). These copies are redacted to protect people's personal details.

2.7 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 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.

2.8 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. All year, applicable individuals can register to receive notifications for this EAP and are able to register either through the Sunwater website (ref H) or by calling Sunwater Customer Enquiries on 13 15 89.

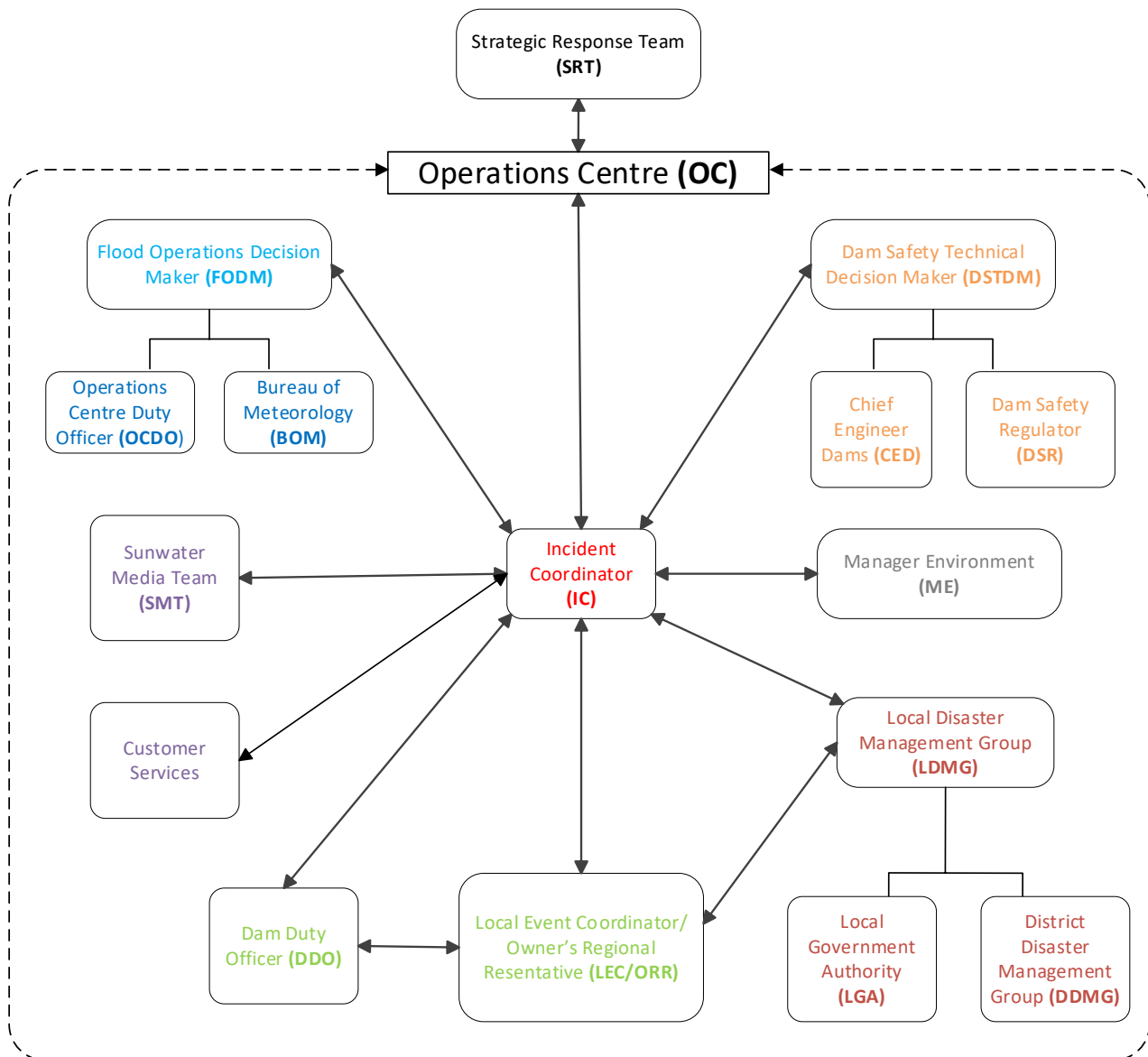
2.9 Dam hazard management within Sunwater

Key aspects of the dam hazard management framework are:

- Central to the framework is the role of IC for any dam hazard at a dam. The IC will maintain overall responsibility for a coordinated response to the dam hazard incident.
- The IC is responsible for activating the EAP when the dam reaches an EAP activation level, unless instructed to activate by the FODM or the DSTDM who have determined that it is reasonably likely that the dam could reach an EAP activation level. Should the IC be unavailable, the LEC followed by the DDO is responsible for the activation. 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 responsibilities of the IC. However, communications failure could result in some communication processes defined in this EAP not being carried out contemporaneously. As this is an identified risk, guidance has been provided to assist with mitigating this risk in Section 10 (Other emergency situation – communications failure).
- Sunwater’s in-house engineering (includes FODM and DSTDM) and technical staff will provide technical advice to the IC, LEC and DDO on an as needs basis. The FODM and DSTDM will also make flood and dam engineering decisions respectively during a dam hazard. These roles are filled by Registered Professional Engineers of Queensland (RPEQs), or by experienced engineers under the direct supervision of an RPEQ and are suitably qualified professionals. Such advice will be provided within an established framework of SOPs, models, standards, and manuals wherever possible.

The Sunwater dam hazard management framework is illustrated in Figure 1 below.

Figure 1: Sunwater dam hazard management framework



3. Roles and responsibilities

| Roles and responsibilities | Position holder |
|---|--|
| <p>Owner (Sunwater)</p> <ul style="list-style-type: none"> • Liaise with the Board and Minister. • Execute Sunwater Strategic Event Procedure (ref M) and Business Continuity Plans, if required. • Ensure necessary resources are available to manage any event. • Maintain an up-to-date list of notifiable D/S residents (Appendix A3 and Appendix A4) of Tinaroo Falls Dam. The downstream limit is indicated in the drawing in Appendix B2 by the zone labelled <i>Limit of downstream notification area</i>. • At all times, aim to provide timely advice and support to the LDMGs in the affected local government areas and the DDMGs in the affected disaster districts. • During a dam hazard emergency event that occurs with little or no warning, undertake the following actions to ensure the community is informed as soon as possible: <ul style="list-style-type: none"> ○ notify the residents listed in Appendix A3 and Appendix A4 via SMS ○ contact SDCC Watch Desk to request an Emergency Alert campaign throughout the Tinaroo Falls Dam Emergency polygons • During a dam hazard event that occurs with adequate warning; notify the residents listed in Appendix A3 and Appendix A4 via SMS, unless otherwise agreed with the LDMGs. • Record communications, notifications and observations as required. | <p>CEO EGMO EGME&WR</p> |
| <p>Strategic Response Team (SRT)</p> <ul style="list-style-type: none"> • Facilitate the assessment, escalation and notification and management of strategic response and recovery for a high or extreme risk, or impact, event. Responsible for the following key activities: <ul style="list-style-type: none"> ○ initial and ongoing assessment of event status and requirements ○ development, and revision of, strategic objectives based on requirements ○ identifying, managing, and monitoring strategic risks ○ monitor media and stakeholder/customer impacts ○ managing/overseeing event communications including media, stakeholder, customer and internal communications. • Record communications, notifications and observations as required. | <p>Various ELT members as per SRT roster</p> |
| <p>Owner's Head Office Representative</p> <ul style="list-style-type: none"> • Authorise the issuing of EAPs, SOPs and O&M Manuals and amendments. • Facilitate Dam Safety Training Courses for Service Managers, Operations Supervisor, Dam Operators, and other staff as appropriate and ensure that all staff required to undertake Dam Safety work are trained and accredited. • Ensure that risks identified in CRAs or other technical reports undertaken in relation to Dam Safety are included in the EAP. • Ensure visual inspections and instrumentation monitoring frequencies conform to ANCOLD Guidelines. • Ensure all Dam Safety work orders, work instructions and lesson learned outcomes are fully implemented. • Ensure requirements of the Dam Condition Schedule (ref N) are met • Ensure the work instructions are correct and the Logbooks, SOPs, Data Books and EAPs are reviewed annually as per ref N. • Undertake and prepare the 5 yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified in ref 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 ref 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 spread sheet for verification for audit and quality control. • Record communications, notifications and observations as required. | <p>SCED PDSE CED MAP</p> |
| <p>Owner's Regional Representative (ORR)</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ○ liaise with the Local Disaster Coordinator (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. | <p>GM North OCO OS</p> |

| Roles and responsibilities | Position holder |
|---|--|
| Technical Advisor <ul style="list-style-type: none"> 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. | ME |
| Dam Safety Technical Decision Maker (DSTDM) <ul style="list-style-type: none"> 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 reduce the risk. Determine response to dam safety incidents and emerging issues. Issue warning on dam failure and advise on potential remedial measures. Liaise with DSR as required. Ensure the EAP is implemented appropriately from a dam safety perspective and carry out the DSTDM role as required. Record communications, notifications and observations as required. | Various personnel as per DSTDM roster |
| Flood Operations Decision Maker (FODM) <ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> Refer to ORR role. | Various personnel as per LEC roster |
| Dam Duty Officer (DDO) <ul style="list-style-type: none"> Complete accreditation to operate and maintain relevant storage. Ensure the EAP is implemented appropriately and carry out the DDO role as required. Take direction from the DSTDM and IC as requested. Arrange immediate site inspection and make informed assessment of the situation. Escalate any issue not covered in the EAP or where actions are not clear. Record communications, notifications and observations as required. | SOM SS OM |
| Councils Councils have legislated local government functions, as per Section 80 of ref O. These include: <ul style="list-style-type: none"> 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 ref O. And as per Section 352HB of the Act: <ul style="list-style-type: none"> <i>Must</i> assess (in consultation with its LDMG) the EAP for consistency with the LDMP. | |

| Roles and responsibilities | Position holder |
|--|--|
| <p>Queensland Police Service (QPS)</p> <p>Manage the initial situation based on local operational procedures; including but not limited to:</p> <ul style="list-style-type: none"> • conduct emergency operations • provide support for Local Disaster Management Groups and Sunwater during a declared emergency at the dam • liaise with relevant organisations • evacuation of persons (if required) in accordance with Roles & Responsibilities contained in the State Disaster Management Plan • control of essential traffic • security of specific area. | Local Police |
| <p>Disaster Management Groups/Personnel – (In addition to requirements outlined in ref O)</p> <ul style="list-style-type: none"> • LDMG <ul style="list-style-type: none"> ○ 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. • QFES <ul style="list-style-type: none"> ○ Work with dam owner and LDMGs to ensure Emergency Alert polygons are prepared, stored, and tested at the State Watch Desk. • DDMG <ul style="list-style-type: none"> ○ May review the EAP for consistency with the DDMP. • SCTN (Security and Counter Terrorism Network) Coordinator <ul style="list-style-type: none"> ○ Identifies Areas of Concern during the preparation of disaster plans and provides advice during counter terrorism emergency events | LDMG QFES DDMG SCTN Coordinator |
| <p>Dam Safety Regulator (DSR)</p> <ul style="list-style-type: none"> • Liaise with relevant Minister on necessary actions. • Approve this document as required under legislation. • Liaise with Chief Executive as required in administering (regulating) the Act. | DDS |

4. Dam details

4.1 General dam information

Location: Tinaroo Falls Dam is situated 14 km northeast of Atherton at AMTD 101.4 km on the Barron River.

Catchment: The dam provides regulated releases for downstream irrigation in the Mareeba Dimbulah Irrigation Area and releases to Kuranda Weir for the Barron Gorge Hydro power station. The catchment is bounded by the Mulgrave to the east, Johnstone and Herbert catchments to the South and Mitchell to the West.

Tributaries: The major tributaries are Barron River and Mazlin Creek.

Construction: Completed in 1958, Tinaroo Falls Dam is a mass concrete gravity dam with a central un-gated ogee spillway. A small saddle dam is located to the southwest of the main dam and incorporates the main access road.

An upgrade of the dam was completed in 2011. The main dam structure was strengthened by installing stressed anchors and an erosion protection slab was added along the toe of the non-spillway monoliths. The saddle dam was raised by 600 mm by the addition of a concrete wall along the upstream side of the crest.

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

Table 3:Tinaroo Falls Dam specifications

| Description | Specification |
|--------------------------|--|
| Main Dam | Mass concrete gravity dam |
| Full Supply Level (FSL) | EL 670.42 m |
| Dam Crest Level (DCL) | EL 674.11 m (Top of Kerb EL 674.31 m) |
| Storage capacity at FSL | 438,920 ML |
| Catchment area | 561 km ² |
| Dam height | 41.48 m above downstream toe |
| Dam length | 533.5 m |
| Spillway | Central uncontrolled ogee crest with baffle wall type dissipator |
| Spillway crest level | EL 670.42 m |
| Spillway capacity | 1188 m ³ /s (102,643 ML/d) |
| Spillway crest length | 76.2 m |
| Outlet Works | |
| Irrigation outlet | One 1500 mm mild steel pipe with guard valve and radial gate regulator at downstream end. |
| Hydropower | One 1500 mm mild steel pipe feeding the Hydropower generator |
| Barron River outlet | One 1500 mm mild steel pipe with guard valve and fixed cone dispersion valve at the downstream end. |
| Outlet capacity (at FSL) | Irrigation outlet – 7 m ³ /s (605 ML/d) per gate River outlet – 21 m ³ /s (1814 ML/d) |
| Saddle Dam | Rolled earth fill with an upstream filter and concrete parapet wall |
| Embankment crest level | EL 677.0 m |
| Top of crest wall | EL 677.7 m (min.) |
| Length | 240 m |
| Embankment max height | 6.6 m |

All levels are to Australian Height Datum, AHD.

Conversion for Dam is AHD = ((State Datum in feet x 0.348) + 0.303) m.

The rating and storage curves for Tinaroo Falls Dam can be found in Appendix C2 and Appendix C3.

4.2 Population at risk

The Population at Risk (PAR) from failure of Tinaroo Falls Dam in either flood events or in a Sunny Day scenario was assessed to feed into the 2021 Comprehensive Risk Assessment (CRA), (ref J). The CRA and detailed Consequence Assessment Report are available upon request and contain additional information on PAR, Potential Life Loss, and hydraulics.

The PAR is typically located downstream of the dam in Mareeba but extend through the Barron River Catchment through to Cairns.

PAR is divided into two definitions; total PAR which includes all population at risk from natural catchment flooding and dam break flooding and incremental PAR which is only population at risk due to the increase in flood extent driven by dam failure.

The Sunny Day Failure (SDF) results in a PAR of 15,220. The Probable Maximum Flood (PMF) results in a total PAR of 31,454 and an incremental PAR of 25,500.

4.3 Cascade Dam Failure

Lake Mitchell, impounded by Southedge Dam, lies approximately 50 km downstream of Tinaroo Falls Dam, between Bibohra and Mount Molloy. The dam discharges into the Mitchell River towards the Gulf of Carpentaria.

In extreme flooding, the Barron River Floodplain connects to the headwaters of the Lake Mitchell Catchment. For flood failure cases rarer than 1 in 100-year (1% AEP), modelling shows that there are inflows into Lake Mitchell (refer to maps in Appendix B3).

In extreme events with flood failure (PMF), there is a risk of cascade failure of Southedge Dam. This is strongly dependent on the initial level in the lake. Downstream of Southedge Dam there are very few PAR (<5 in PMF). Notification to the Incident Coordinator for Southedge Dam has been included for all dam failure scenarios.

4.4 Spillway adequacy

A Spillway Hydraulic Assessment (ref K) was carried out in 2021 as part of the Comprehensive Risk Assessment (ref J). Additional information on the spillway capacity is available upon request.

The spillway was assessed to pass the 1 in 200-year event, a flow rate of 1,188 m³/s.

A Spillway Rating Curve is contained in Appendix C.

4.5 General arrangement

The general arrangement drawings are in Appendix B1.

4.6 Comprehensive Risk Assessments

Comprehensive Risk Assessments (CRAs) are carried out on all Sunwater Dams. These are technical reports that are utilised to ascertain risks for each dam as the basis for emergency triggers. The CRA can be made available to disaster management personnel who require further assurance around the findings. To obtain a copy of a relevant CRA a request should be made to Sunwater's Executive General Manager Engineering and Water Resources (EGME&WR)

4.7 Emergency inspections and monitoring

To maintain the dam and comply with regulatory requirements, the following is applicable to Tinaroo Falls Dam.

4.7.1 Inspections

- Routine Visual Inspection: Conducted as per routine surveillance Work Order or as directed by the DSTDM
- Detailed Inspection: Conducted annually
- Comprehensive Inspection: Conducted 5-yearly

4.7.2 Instrumentation and monitoring

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

- Main Dam
- Settlement/movement measurement
 - 52 operational surface deformation points
 - 5 Spillway settlement points
 - 6 Survey control stations
- Seepage measurement
 - 5 V notch weirs: located along the lower gallery
 - Crack gauges in upper and lower galleries
- Saddle Dam
 - 3 Surface settlement points

NOTE: The location of instrumentation and monitoring equipment is detailed in the drawings in Appendix B1.

If telemetry is not operating, the receipt of local intelligence and monitoring of the Bureau of Meteorology website (www.bom.gov.au) on predicted rainfall and weather conditions will provide updates to any situation until telemetry and communications resume.

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 Tinaroo Falls Dam to Full Supply Level (FSL) 670.42 m, and the rate of inflow exceeds the capacity of the outlet works. The primary spillway will then discharge water downstream into the Barron River. These flood flows can create a dam hazard event. 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 Action 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 the Barron River and other infrastructure in the river such as pump sites.
- When the storage height exceeds moderate flood level (1.5 m over the spillway) EL 671.92 m, flows will begin to break out of the riverbanks and inundate low lying areas.
- When the storage height exceeds major flood level (2.0 m over the spillway) EL 672.42 m, flows will impact on urban areas.

Detailed information on downstream flood impacts, including tables and maps, is presented in Appendix B.

Table 4: Flood classification triggers

| | Flood Classification Level | Depth over Spillway (m) | Storage Elevation (m AHD) |
|---|----------------------------|-------------------------|---------------------------|
| <p>Example of Flood Level Classification</p> | Major | 2.0 | 672.42 |
| | Moderate | 1.5 | 671.92 |
| | Minor | 1.0 | 671.42 |

Source: Bureau of Meteorology — <http://www.bom.gov.au/qld/flood/brochures/leichhardt/leichhardt.shtml>

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

Table 5: Historical floods experienced at Tinaroo Falls Dam

| Flood rank | Date | Peak height EL (AHD) | Peak height (m over crest) |
|------------|---------------|-------------------------|-------------------------------|
| 1 | February 1999 | 672.74 m | 2.32 |
| 2 | March 1977 | 672.70 m | 2.28 |
| 3 | March 1974 | 672.37 m | 1.95 |
| 4 | February 2000 | 672.30 m | 1.88 |
| 5 | March 2008 | 671.95 m | 1.53 |

5.1.1 Activation triggers

Table 6: Flood emergency activation trigger summary

| | |
|---------------------|---|
| Alert | <ul style="list-style-type: none"> EL 670.32 m and rising (0.1 m below FSL) |
| Lean Forward | <ul style="list-style-type: none"> Storage Level above FSL 670.42 m |
| Stand Up — 1 | <ul style="list-style-type: none"> Storage above EL 671.92 m (Greater than Moderate Flood Level) |
| Stand Up — 2 | <ul style="list-style-type: none"> Storage above EL 672.74 m (Greater than Flood of Record) |
| Stand Up — 3 | <ul style="list-style-type: none"> Storage above EL 674.31 m (Non-overflow section level) |
| Stand Down | <ul style="list-style-type: none"> Storage EL 671.42 m (Minor Flood Level) and falling, with no forecast increase in EL for 48 hours |

While this EAP is not triggered until Tinaroo Falls Dam reaches the Alert Trigger, Sunwater and the Tablelands Regional Council, Mareeba Shire Council and Cairns Regional Council LDMGs will work cooperatively and will endeavour to share intelligence of any rainfall event when whichever 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.


5.1.2 Emergency action roles

Table 7 to Table 12 specify emergency actions for the following roles.

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

Table 7: Flood operations – DDO emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 (Greater than Moderate Flood Level) | Stand Up — 2 (Greater than Flood of Record) | Stand Up — 3 (Non-overflow section) | Stand Down |
|---------------------------|---|--|---|---|---|--|
| Activation trigger | <ul style="list-style-type: none"> EL 670.32 m and rising (0.1 m below FSL) | <ul style="list-style-type: none"> Storage above FSL 670.42 m | <ul style="list-style-type: none"> Storage above EL 671.92 m | <ul style="list-style-type: none"> Storage above EL 672.74 m | <ul style="list-style-type: none"> Storage above EL 674.31 m | <ul style="list-style-type: none"> Storage EL 671.42 m and falling with no forecast increase in EL for 48 hours |
| Actions | <ul style="list-style-type: none"> Record all communication Inspect the dam daily (or as instructed by the DSTDM) and photograph/video and record using approved forms in ref L O and send to DSTDM, IC & Hydrographers Undertake site preparations including but not limited to checking (if not already): <ul style="list-style-type: none"> fuel and operation of backup generator operations of sump pump Seal of outlet building and hydro power station communication systems (including backup radio, satellite, phones and internet) Continued Notify the SO (Record the Storage Level daily (or as instructed by the DSTDM) using gauge boards and confirm accuracy of gauging station Record rainfall — daily Update Dam Logbook as per SOP 12 (ref Z) | <ul style="list-style-type: none"> As per previous activation level, AND Continue to inspect the dam daily (or as instructed by the DSTDM) with attention to: <ul style="list-style-type: none"> visual inspection of flow patterns over spillway and dissipator for evidence of scouring inspect embankment for leaks, deformation, and slumping obvious signs of seepage, in particular on the Saddle Dam downstream slopes Read dam instrumentation daily (or as instructed by the DSTDM) Report any unusual readings or observations to the DSTDM and IC as soon as practical Confirm that any personnel on-site are aware that areas may be cut off and isolated | <ul style="list-style-type: none"> As per previous activation level, AND Record the storage level at 4-hourly intervals (or as instructed by the DSTDM) Inspect the dam twice daily (or as instructed by the DSTDM) and photograph/video and record using the approved forms in ref L and send to DSTDM and IC Inspections to include saddle dam from the time water level reaches the u/s toe Read dam instrumentation daily (or as instructed by the DSTDM), as per section 3.5.2. | <ul style="list-style-type: none"> As per previous activation level, AND Evacuate any plant and/or vehicles to higher ground Monitor and record the Storage Level at 4-hourly intervals (or as instructed by the DSTDM) Inspect the dam 6-hourly (or as instructed by the DSTDM) and photograph/video and record using the approved forms in ref L and send to DSTDM and IC <div style="border: 1px solid red; padding: 5px; margin-top: 10px;"> <p>NOTE: Flood levels above EL 672.74 m trigger Lean Forward for Overturning/sliding – see Section 8</p> </div> | <ul style="list-style-type: none"> As per previous activation level, AND View the embankment (with binoculars) Photograph spillway discharge area and email to DSTDM | <ul style="list-style-type: none"> Inspect the dam for any damage and photograph any damage identified during the event If required, forward all relevant communication including emails, and inspection sheets for EER to:  Update Dam Logbook as per SOP 12 (ref Z) Return to routine surveillance activities and frequencies |
| Notifications | IC SO LEC | IC SO DSTDM (as required) | IC SO DSTDM (as required) | IC SO DSTDM (as required) | IC SO DSTDM (as required) | <ul style="list-style-type: none"> 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





Table 8: Flood operations – LEC emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 (Greater than moderate flood level) | Stand Up — 2 (Greater than Flood of Record) | Stand Up — 3 (Non-overflow section) | Stand Down |
|---------------------------|--|---|--|--|--|--|
| Activation trigger | <ul style="list-style-type: none"> EL 670.32 m and rising (0.1 m below FSL) | <ul style="list-style-type: none"> Storage above FSL 670.42 m | <ul style="list-style-type: none"> Storage above EL 671.92 m | <ul style="list-style-type: none"> Storage above EL 672.74 m | <ul style="list-style-type: none"> Storage above EL 674.31 m | <ul style="list-style-type: none"> Storage EL 671.42 m and falling with no forecast increase in EL for 48 hours |
| Actions | <ul style="list-style-type: none"> Record all communication Develop/implement staff roster and check site preparations <p><i>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</i></p> | <ul style="list-style-type: none"> As per previous activation level, AND Ensure all abnormal observations or damage has been reported to DSTDM and IC | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level <p>NOTE: Flood levels above EL 672.74 m trigger Lean Forward for Overturning/sliding – see Section 8</p> | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| Notifications | DDO IC LDMG 1* LDMG 2* | DDO IC LDMG 1* LDMG 2* | DDO IC LDMG 1* LDMG 2* | DDO IC LDMG 1* LDMG 2* LDMG 3* | DDO IC LDMG 1* LDMG 2* LDMG 3* | <ul style="list-style-type: none"> 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

Table 9: Flood operations – IC emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 (Greater than moderate flood level) | Stand Up — 2 (Greater than Flood of Record) | Stand Up — 3 (Non-overflow section) | Stand Down |
|---------------------------|--|--|--|--|---|---|
| Activation trigger | <ul style="list-style-type: none"> EL 670.32 m and rising (0.1 m below FSL) | <ul style="list-style-type: none"> Storage above FSL 670.42 m | <ul style="list-style-type: none"> Storage above EL 671.92 m | <ul style="list-style-type: none"> Storage above EL 672.74 m | <ul style="list-style-type: none"> Storage above EL 674.31 m | <ul style="list-style-type: none"> Storage EL 671.42 m and falling with no forecast increase in EL for 48 hours |
| Actions | <ul style="list-style-type: none"> Record all communication Liaise with Sunwater Customer Support to send SMS and email to D/S residents and phone those without mobiles Create Incident Report Record Update intranet with EAP Status <p><i>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</i></p> | <ul style="list-style-type: none"> As per previous activation level, AND Ensure all abnormal observations or damage has been reported to DSTDM | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level <p>NOTE: Flood levels above EL 672.74 m trigger Lean Forward for Overturning/sliding – see Section 8</p> | <ul style="list-style-type: none"> As per previous activation level Liaise with the DSTDM to confirm that dam failure is in progress Liaise with the Company Representative for Southedge re Lake Mitchell Dam (Appendix A5) | <ul style="list-style-type: none"> Deactivate EAP Complete all internal and external notifications Forward all relevant communication, including emails for EER to:  Close out Incident Report Record Update intranet with EAP Status Return to routine activities |
| Notifications | FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1* LDMG 2* DDMG 1 SRT | FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1* LDMG 2* DDMG 1 SRT | FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1* LDMG 2* DDMG 1 SRT | FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | <ul style="list-style-type: none"> 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



Table 10: Flood operations – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|---|---|--|--|--|
| Alert | <ul style="list-style-type: none"> EL 670.32 m and rising (0.1m below FSL) | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? What is the status? Advise of current storage level |
| Lean Forward | <ul style="list-style-type: none"> Storage above FSL 670.42 m | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Not Spilling - Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS Spilling - Liaise with Sunwater Customer Support and Communications to send SMS and email. |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? What is the status? Advise of current storage level and whether any flood releases are due to commence Discuss any potential road/bridge closures |
| Stand Up — 1 (Greater than moderate flood level) | <ul style="list-style-type: none"> Storage above EL 671.92 m | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? What is the status (Storage is greater than moderate flood level) Advise of current storage level and whether any flood releases are due to commence Check with LDMG’s re road closures etc. Advise of any forecasts you are aware of |


Table 10: Flood operations – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|--|----------------------------|---|--|--|
| Stand Up — 2 (Greater than Flood of Record) | Storage above EL 672.74 m | D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send SMS and email |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> 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 |
| Stand Up — 3 (Non-overflow section) | Storage above EL 674.31 m | D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? What is the status (storage has had major increase to spilling) Advise of current storage level Advise of any forecasts you are aware of |

Table 10: Flood operations – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|------------------|--|---|--|---|
| Stand Down | <ul style="list-style-type: none"> Storage EL 671.42 m and falling with no forecast increase in EL for 48 hours | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | <p>Not Spilling – Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS</p> <p>Still Spilling – Liaise with Sunwater Customer Support and Communications to send SMS and email</p> |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | |

Table 11: Flood operations – DSTDM emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 (Greater than moderate flood level) | Stand Up — 2 (Greater than Flood of Record) | Stand Up — 3 (Non-overflow section) | Stand Down |
|---------------------------|--|--|--|--|--|---|
| Activation trigger | <ul style="list-style-type: none"> EL 670.32 m and rising (0.1 m below FSL) | <ul style="list-style-type: none"> Storage above FSL 670.42 m | <ul style="list-style-type: none"> Storage above EL 671.92 m | <ul style="list-style-type: none"> Storage above EL 672.74 m | <ul style="list-style-type: none"> Storage above EL 674.31 m | <ul style="list-style-type: none"> Storage EL 671.42 m and falling with no forecast increase in EL for 48 hours |
| Action | <ul style="list-style-type: none"> Record all communication Provide technical advice to DDO and IC on a need's basis Review surveillance reports and determine if any additional responses are required Review instrumentation data and determine if any additional responses are required Advise DSR of EAP activation | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level <div style="border: 1px solid red; padding: 5px; margin-top: 10px;"> <p>NOTE: Flood levels above EL 672.74 m trigger Lean Forward for Overturning/sliding – see Section 8</p> </div> | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to:  Return to routine activities |
| Notifications | IC DDO DSR | IC DDO DSR | IC DDO DSR | IC DDO DSR | IC DDO DSR | <ul style="list-style-type: none"> 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



Table 12: Flood operations – FODM emergency action

| Activation level | Alert | Lean Forward | Stand Up — greater than moderate flood level | Stand Up — greater than Flood of Record | Stand Up — 3 (Non-overflow section) | Stand Down |
|---------------------------|---|--|--|---|--|--|
| Activation trigger | <ul style="list-style-type: none"> • EL 670.32 m and rising (0.1 m below FSL) | <ul style="list-style-type: none"> • Storage above FSL 670.42 m | <ul style="list-style-type: none"> • Storage above EL 671.92 m | <ul style="list-style-type: none"> • Storage above EL 672.74 m | <ul style="list-style-type: none"> • Storage above EL 674.31 m | <ul style="list-style-type: none"> • Storage EL 671.42 m and falling with no forecast increase in EL for 48 hours |
| Action | <ul style="list-style-type: none"> • Record all communication • Extract relevant data from available sources • Update Flood models as per SOP of OC • Update and issue flood operations report • Liaise with BOM • Update DSTDM and IC re: current flood situation and PFRM results | <ul style="list-style-type: none"> • As per previous activation level | <ul style="list-style-type: none"> • As per previous activation level | <ul style="list-style-type: none"> • As per previous activation level <div style="border: 1px solid red; padding: 5px; color: red; font-weight: bold;"> NOTE: Flood levels above EL 672.74 m trigger Lean Forward for Overturning/sliding – see Section 8 </div> | <ul style="list-style-type: none"> • As per previous activation level | <ul style="list-style-type: none"> • If required, forward all relevant communication, including emails for EER to: [REDACTED] • Return to routine activities |
| Notifications | IC DSTDM BOM | IC DSTDM BOM | IC DSTDM BOM | IC DSTDM BOM | IC DSTDM BOM | <ul style="list-style-type: none"> • 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

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 B3 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.

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

6.1.1 Assessment of circumstances that indicate an increase in the likelihood of piping

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

Cloudy seepage water is a circumstance that could indicate an increase likelihood of piping. This circumstance is the trigger for the lean forward status for piping.

6.2 Emergency action roles

Table 13 to Table 17 specify emergency actions for the following roles.

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

Definitions can be found in 1.3.

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

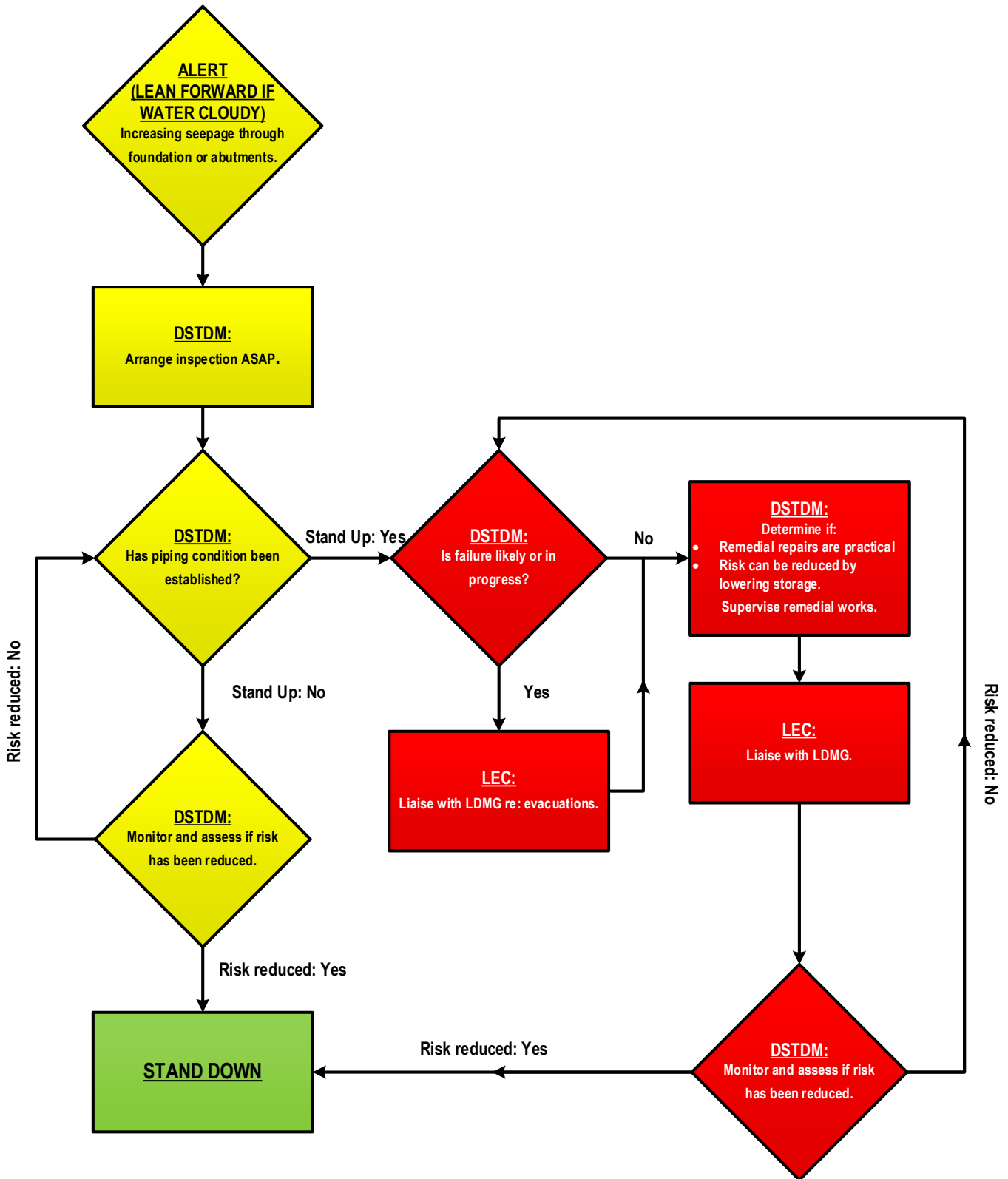


Table 13: Piping: embankment, foundation or abutments- DDO emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|---|--|---|--|---|
| Activation trigger | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations or abutments | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations or abutments WITH cloudy water | <ul style="list-style-type: none"> Piping condition has been established | <ul style="list-style-type: none"> Failure underway or likely due to piping, and Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Record all communication Monitor dam every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable Photograph/video the damage from a safe point and record using the approved forms in ref L and send to DSTDM, IC & Hydrographers Notify SO Update Dam Logbook as per SOP 12 (ref Z) | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level, AND Support/supervise remedial works as required Lower the storage if directed by DSTDM Close road access to dam 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 | <ul style="list-style-type: none"> As per previous activation level, AND Vacate the immediate vicinity of the embankment Ensure remedial works cease and plant and personnel have been moved to a safe location | <ul style="list-style-type: none"> Inspect the dam for any damage and photograph any damage identified during the event If required, forward all relevant communication including emails, and inspection sheets for EER to: [REDACTED] Update Dam Logbook as per SOP 12 (ref Z) Return to routine surveillance activities and frequencies |
| Notifications | DSTDM IC SO LEC | DSTDM IC SO | DSTDM IC SO | DSTDM IC SO | <ul style="list-style-type: none"> 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

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

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|--|--|---|--|--|
| Activation trigger | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations or abutments | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations or abutments WITH cloudy water | <ul style="list-style-type: none"> Piping condition has been established | <ul style="list-style-type: none"> Failure underway or likely due to piping, and Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Record all communication Liaise with DDO and IC <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>NOTE: IC to contact LDMGs unless LDMG1 is <i>Stood Up</i></p> </div> | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with relevant Council(s) regarding potential road/bridge closures | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with DDO, IC, and LDMG re: potential for evacuations | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| Notifications | DDO IC LDMG 1* LDMG 2* | DDO IC LDMG 1* LDMG 2* | DDO IC LDMG 1* LDMG 2* LDMG 3* | DDO IC LDMG 1* LDMG 2* LDMG 3* | <ul style="list-style-type: none"> 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

Table 15 Piping: embankment, foundation or abutments — IC emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|---|---|--|--|--|
| Activation trigger | <ul style="list-style-type: none"> Increasing leakage through the embankment, the foundations, or abutments | <ul style="list-style-type: none"> Increasing leakage through the embankment, the foundations, or abutments WITH cloudy water | <ul style="list-style-type: none"> Piping condition has been established | <ul style="list-style-type: none"> Failure underway or likely due to piping, and Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Record all communication Create Incident Report Record Update Intranet with EAP Status <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</p> </div> | <ul style="list-style-type: none"> 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. Confirm EAs and other messages are prepared in advance – if required | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with Sunwater Customer Support to send SMS to D/S residents and phone those without mobiles Mobilise resources to undertake remedial works if directed by DSTDM Liaise with the company representative for Southedge Dam (Appendix A5) | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with the DSTDM to confirm that dam failure is in progress Direct remedial works to cease 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 | <ul style="list-style-type: none"> Deactivate EAP Complete all Internal and External notifications Forward all relevant communication, including emails for EER to: [REDACTED] Close out Incident Report Record Update Intranet with EAP Status Return to routine activities |
| Notifications | DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* DDMG 1 SRT | DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* LDMG 3* DDMG 1 SRT | DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | <ul style="list-style-type: none"> 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

Table 16: Piping: embankment, foundation or abutments — LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|------------------|--|---|--|---|
| Alert | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations, or abutments | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk — Unconfirmed piping) What is the status? (Unconfirmed instability of dam — Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advice |
| Lean Forward | <ul style="list-style-type: none"> Increasing leakage through an embankment, the Foundations or abutments WITH cloudy water | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk — Unconfirmed piping) What is the status? (Unconfirmed instability of dam — Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advice |
| Stand Up — 1 | <ul style="list-style-type: none"> Piping condition has been established | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS: |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Complete Emergency Alert Request Form (as per instructions in Appendix A7 using pre-populated wording and send to SDCC Watch Desk to propagate to Polygons) |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition). What is the status? (Confirmed instability of dam) Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures Prepare for possible evacuations |

Table 16: 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) | <ul style="list-style-type: none"> Failure likely due to piping; AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS: |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Dam failure likely) Advise of current storage level Prepare coordinated evacuations |
| Stand Up — 3 (Failure underway) | <ul style="list-style-type: none"> Dam Failure underway | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS: |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Dam Failure underway) Advise of current storage level Coordinate evacuations of affected Downstream Residents and move people to higher ground |

Table 16: Piping: embankment, foundation or abutments — LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|------------------|--|---|--|---|
| Stand Down | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | <p>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 piping risk has reduced, and EAP has been deactivated</p> |
| | | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | <p>Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS</p> |

Table 17: Piping: embankment, foundation, or abutments— DSTDM emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|--|---|--|---|--|
| Activation trigger | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations, or abutments | <ul style="list-style-type: none"> Increasing leakage through an embankment, the foundations, or abutments WITH cloudy water | <ul style="list-style-type: none"> Piping condition has been established | <ul style="list-style-type: none"> Failure underway or likely due to piping, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Action | <ul style="list-style-type: none"> Record all communication Arrange an inspection of the dam to assess its condition as soon as possible, when safe to do so Determine if piping condition has been established Monitor situation and assess risks Advise DSR of EAP activation | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level, AND 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) | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with the IC and advise on need to recommend evacuations <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>* Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.</p> </div> | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: eer_eap@sunwater.com.au Return to routine activities |
| Notifications | DDO IC DSR | DDO IC DSR | DDO IC LEC/ORR DSR | IC LEC/ORR DSR | <ul style="list-style-type: none"> 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

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 B3 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 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 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 1.3.

7.2 Emergency action roles

Table 18 to Table 22 to specify emergency actions for the following roles.

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

Figure 3: Earthquake flowchart

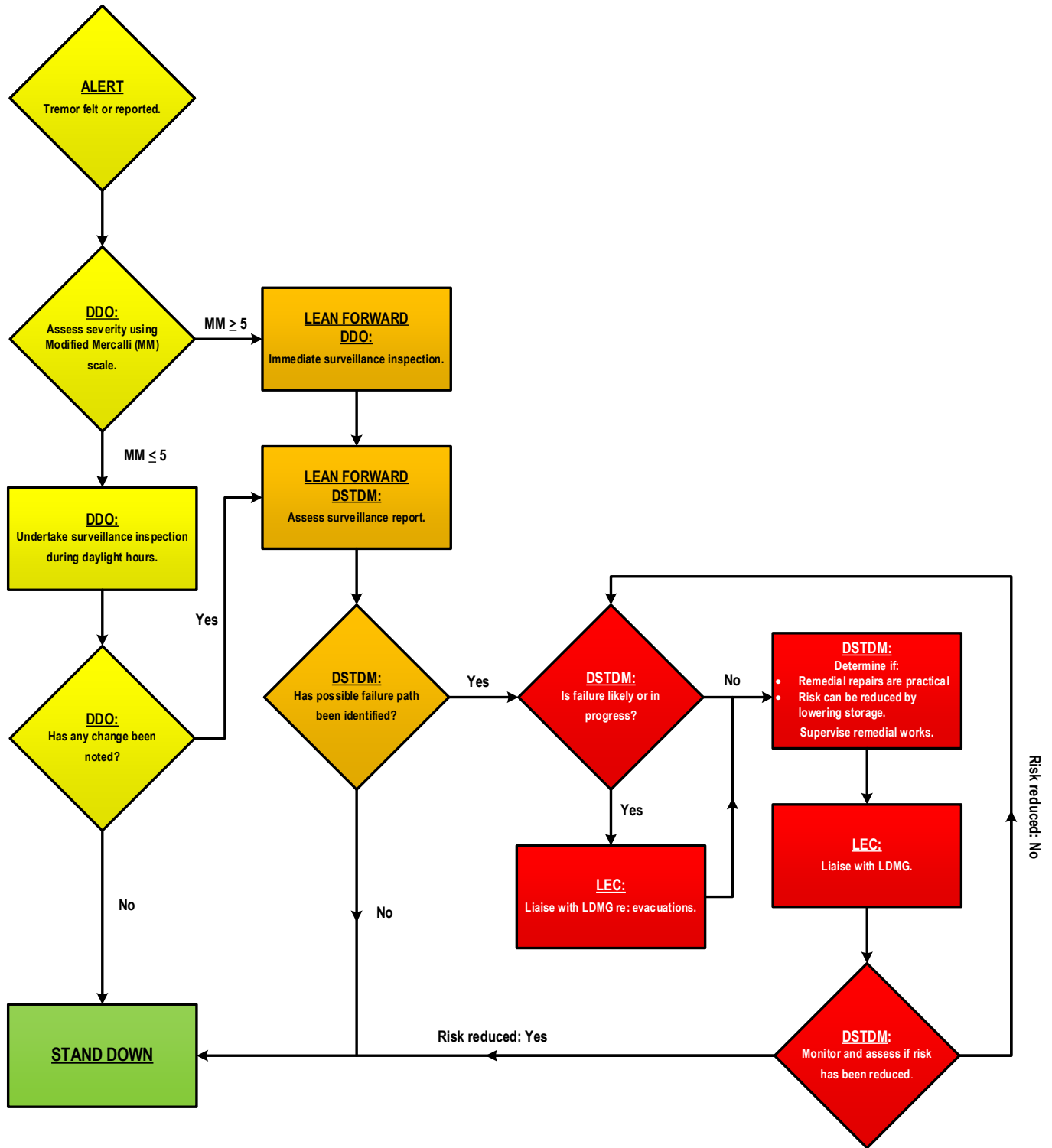


Table 18: Earthquake – DDO emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|--|--|--|---|---|---|
| <p>Activation trigger</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>*'Confirmed' 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.</p> </div> | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM~ <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>~DDO to assess magnitude, Modified Mercalli (MM) Scale, at dam location. The MM Scale is in ref L.</p> </div> | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified | <ul style="list-style-type: none"> Failure underway or likely due to earthquake, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has been determined that failure risk has reduced |
| <p>Actions</p> | <ul style="list-style-type: none"> Record all communication Inspect the dam wall, spillway structure and abutments in daylight hours (if safe to do so). Photograph/video and record using approved forms and send to DSTDM, IC & Hydrographers Check for leaks, deformation, erosion, and concrete damage Notify SO Update Dam Logbook as per SOP 12 (ref Z) | <ul style="list-style-type: none"> As per previous activation level, AND <u>Immediately</u> inspect for leakage and evidence of initiation of piping of embankment slips on both upstream and downstream slopes and in the abutments and report to the IC & DSTDM Repeat the inspection as directed | <ul style="list-style-type: none"> 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 or Saddle Dam (if safe to do so) and move on any members of the public Photograph the damage from a safe point Vacate the immediate vicinity of the embankment | <ul style="list-style-type: none"> As per previous activation level, AND Ensure remedial works cease and plant and personnel have been moved to a safe location | <ul style="list-style-type: none"> Inspect the dam for any damage and photograph any damage identified during the event If required, forward all relevant communication including emails, and inspection sheets for EER to: [REDACTED] Update Dam Logbook as per SOP 12 (ref Z) Return to routine surveillance activities and frequencies |
| <p>Notifications</p> | <p>DSTDM IC SO LEC</p> | <p>DSTDM IC SO</p> | <p>DSTDM IC SO</p> | <p>DSTDM IC SO</p> | <ul style="list-style-type: none"> 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



Table 19: Earthquake LEC emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|--|---|--|---|---|--|
| <p>Activation trigger</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>*'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 200 km radius of the dam.</p> </div> | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM~ <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>~DDO to assess magnitude, Modified Mercalli (MM) Scale, at dam location. The MM Scale is in ref L.</p> </div> | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified | <ul style="list-style-type: none"> Failure underway or likely due to earthquake, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has been determined that failure risk has reduced |
| <p>Actions</p> | <ul style="list-style-type: none"> Record all communication <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>*NOTE: IC to contact LDMGs unless LDMG1 is <i>Stood Up</i></p> </div> | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| <p>Notifications</p> | <ol style="list-style-type: none"> DDO IC LDMG 1* LDMG 2* | <ol style="list-style-type: none"> DDO IC LDMG 1* LDMG 2* | <ol style="list-style-type: none"> DDO IC LDMG 1* LDMG 2* LDMG 3* | <ol style="list-style-type: none"> DDO IC LDMG 1* LDMG 2* LDMG 3* | <ul style="list-style-type: none"> 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

Table 20: Earthquake – IC emergency action

| Activation level | Alert | Lean Forward | Stand Up – 1 | Stand Up – 2 | Stand Down |
|---|--|--|--|---|--|
| <p>Activation trigger</p> <p>~DDO to assess magnitude, Modified Mercalli (MM) Scale, at dam location. The MM Scale is in ref L.</p> | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM~ | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified | <ul style="list-style-type: none"> Failure underway or likely due to earthquake, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has been determined that failure risk has reduced |
| <p>Actions</p> <p>*'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 200 km radius of the dam.</p> | <ul style="list-style-type: none"> Record all communication Create Incident Report Record Update Intranet with EAP Status <p>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</p> | <ul style="list-style-type: none"> As per previous activation level, AND Investigate availability of machinery and materials 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. Confirm EAs and other messages are prepared in advance – if required | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with Sunwater Customer Support to send SMS and email to D/S residents and phone those without mobiles Mobilise resources to undertake remedial works if directed by DSTDM Liaise with the company representative for Southedge Dam (Appendix A5) | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Deactivate EAP Complete all Internal and External notifications Forward all relevant communication, including emails for EER to: [REDACTED] Close out Incident Report Record Update Intranet with EAP Status Return to routine activities |
| <p>Notifications</p> | <p>DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* DDMG 1 SRT</p> | <p>DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* DDMG 1 SRT</p> | <p>DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT</p> | <p>DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT</p> | <ul style="list-style-type: none"> 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 

Table 21: Earthquake – LEC and IC external communication plan


| Activation level | Trigger for communications | Group to contact | Method | Message text |
|------------------|---|---|--|--|
| Alert | <ul style="list-style-type: none"> Earthquake confirmed or felt in the area, AND Intensity less than 5MM | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 | <ul style="list-style-type: none"> 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 Advise EAP has been activated Stand by for further information |
| Lean Forward | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 | <ul style="list-style-type: none"> 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 – change detected during inspection) Advise of current storage level Advise EAP has been activated Stand by for further information |
| Stand Up — 1 | <ul style="list-style-type: none"> Earthquake confirmed or felt in the area, AND A possible failure path has been identified | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Phone & Email | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Develop messages in consultation with DSTDM — and LDMG if time permits If time does not permit: Complete Emergency Alert Request Form (as per instructions in Appendix A7 and 0 using pre-populated wording – Tablelands/Mareeba Instability 1 and Cairns Instability 1) and send to SDCC Watch Desk to propagate to Polygons |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Possible earthquake damage to dam) Advise current storage level. Discuss any potential road/ bridge closures Activate emergency response |

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



Table 21: Earthquake – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|--------------------------|---|---|--|--|
| Stand Up — 2 (Likely) | <ul style="list-style-type: none"> Failure likely due to earthquake, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. If time does not permit: Complete Emergency Alert Request Form (as per instructions in Appendix A7 and 0 using pre-populated wording – Tablelands/Mareeba Instability 2 and Cairns Instability 2) and send to SDCC Watch Desk to propagate to Polygons |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> 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 |



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




Table 21: Earthquake – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|----------------------------|---|---|--|--|
| Stand Up — 2 (Underway) | <ul style="list-style-type: none"> Dam Failure underway | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. If time does not permit: Complete Emergency Alert Request Form (as per instructions in Appendix A7 and 0 using pre-populated wording – Tablelands/Mareeba Failure and Cairns Failure) and send to SDCC Watch Desk to propagate to Polygons |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Dam Failure underway) Advise of current storage level Coordinate evacuation of Downstream Residents and move people to higher ground |
| Stand down | <ul style="list-style-type: none"> Risk assessment has been determined that failure risk has reduced | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> 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 |


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



Table 22: Earthquake – DSTDM emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|--|---|--|---|--|
| Activation trigger | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM~ <p>~DDO to assess magnitude, Modified Mercalli (MM) Scale, at dam location. The MM Scale is in ref L.</p> | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified | <ul style="list-style-type: none"> Failure underway or likely due to earthquake, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has been determined that failure risk has reduced |
| Action | <p>*'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 200 km radius of the dam.</p> <ul style="list-style-type: none"> Record all communication Review surveillance inspection of the dam and assess its condition as soon as possible Review instrumentation data and determine if any additional responses are required Monitor situation and assess risks Advise DSR of EAP activation | <ul style="list-style-type: none"> As per previous activation level, AND Review surveillance inspection of the dam and assess its condition as soon as possible Determine if there are any possible failure paths from reported damage | <ul style="list-style-type: none"> As per previous activation level, AND 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) | <ul style="list-style-type: none"> As per previous activation level <p>^Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.</p> | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| Notifications | <ol style="list-style-type: none"> DDO IC DSR | <ol style="list-style-type: none"> DDO IC DSR | <ol style="list-style-type: none"> DDO IC LEC/ORR DSR | <ol style="list-style-type: none"> DDO IC LEC/ORR DSR | <ul style="list-style-type: none"> 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

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 Tinaroo Falls Dam to a terrorist attack is low.

The flood outlines in Appendix B3 are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by a terrorist attack. The use of these flood outlines is prescribed below:

- Use the SDF outline when a dam failure is in progress or likely due to a terrorist attack and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to a terrorist attack and concurrent flooding or downstream releases are occurring or expected to occur.

NOTE: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in 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 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 23 to Table 27 specify emergency actions for the following roles. Definitions can be found in 0:

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

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

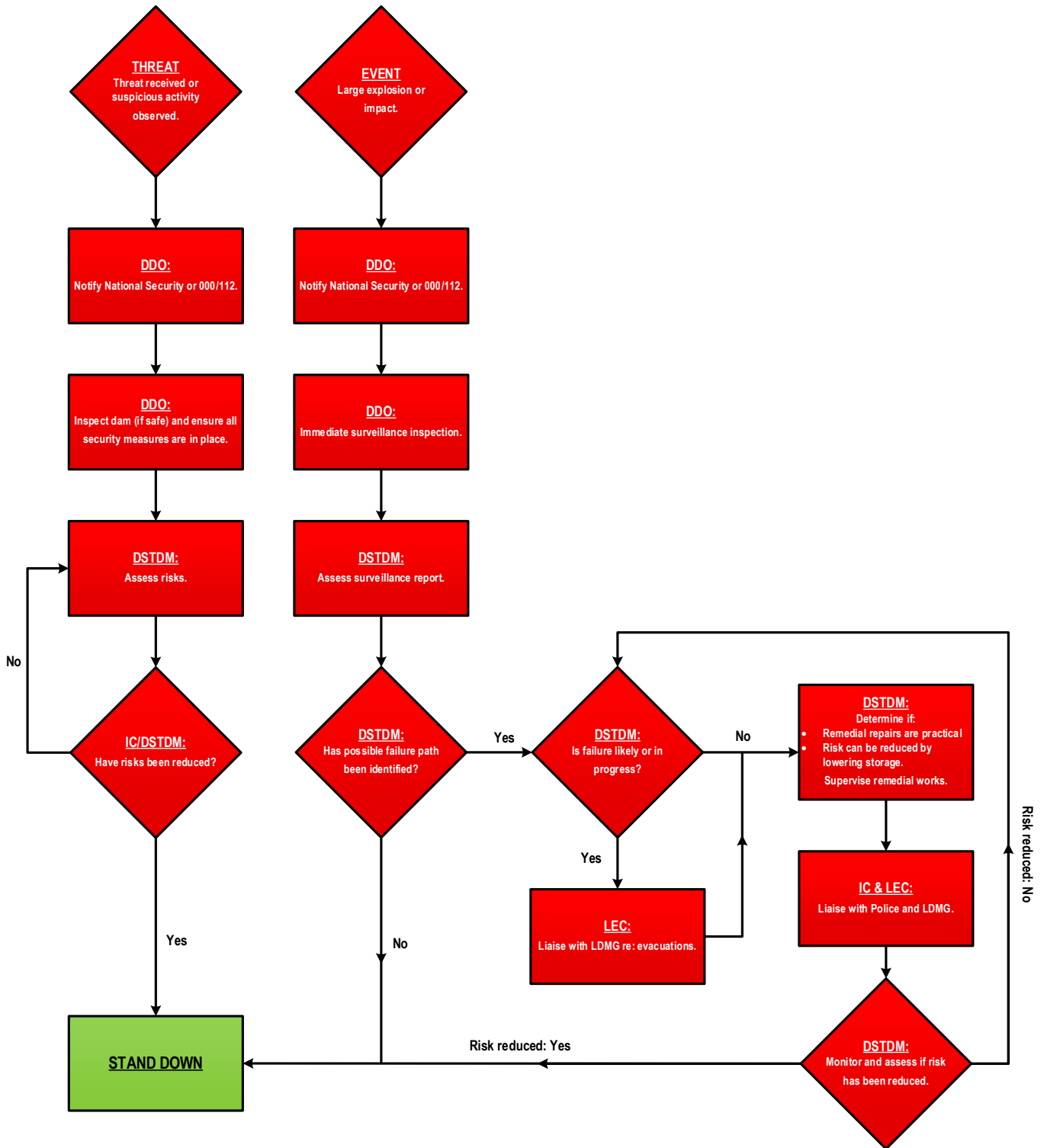


Table 23: Terrorist threat/activity or high energy impact – DDO emergency action

| Activation level | Alert/Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Up — 3 | Stand Down |
|---------------------------|--|---|---|---|--|
| Activation trigger | <ul style="list-style-type: none"> Not applicable | <p>THREAT</p> <ul style="list-style-type: none"> Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received | <p>EVENT</p> <ul style="list-style-type: none"> Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) | <p>RESPONSE</p> <ul style="list-style-type: none"> Failure underway or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Not applicable | <ul style="list-style-type: none"> In an emergency call 000. Record all communication If any suspicious behaviour noticed, contact DSTDM for advice and if instructed or if threat received, complete the following: <ul style="list-style-type: none"> 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 DSTDM, IC & Hydrographers If Police appoint incident manager support and follow instructions Close any affected roads as directed Notify SO Update Dam Logbook as per SOP 12 (ref Z) | <ul style="list-style-type: none"> As per previous activation level, AND Vacate the immediate vicinity of the affected area | <ul style="list-style-type: none"> As per previous activation level, AND Lower reservoir level, if directed by DSTDM | <ul style="list-style-type: none"> Inspect the dam for any damage and photograph any damage identified during the event If required, forward all relevant communication including emails, and inspection sheets for EER to: <div style="background-color: #cccccc; width: 100px; height: 15px; margin-top: 5px;"></div> Update Dam Logbook as per SOP 12 ref Z) Return to routine surveillance activities and frequencies |
| Notifications | Not applicable | #000 Emergency DSTDM IC SO LEC | #000 Emergency DSTDM IC SO | #000 Emergency DSTDM IC SO | <ul style="list-style-type: none"> 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

Table 24: 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 | <ul style="list-style-type: none"> Not applicable | <p>THREAT</p> <ul style="list-style-type: none"> Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received | <p>EVENT</p> <ul style="list-style-type: none"> Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) | <p>RESPONSE</p> <ul style="list-style-type: none"> Failure underway or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Not applicable | <ul style="list-style-type: none"> Record all communication If Police appoint incident manager support and follow instructions Monitor situation and assess risks Liaise with relevant Council(s) regarding possible road/bridge closures <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</i></p> </div> | <ul style="list-style-type: none"> As per previous activation level | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with DDO, DSTDM, and LDMG re: potential for evacuations | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| Notifications | Not applicable | DDO IC LDMG 1* LDMG 2* | DDO IC LDMG 1* LDMG 2* LDMG 3* | DDO IC LDMG 1* LDMG 2* LDMG 3* | <ul style="list-style-type: none"> 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

Table 25: 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 | <ul style="list-style-type: none"> Not applicable | <p>THREAT</p> <ul style="list-style-type: none"> Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received | <p>EVENT</p> <ul style="list-style-type: none"> Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) | <p>RESPONSE</p> <ul style="list-style-type: none"> Failure underway or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Not applicable <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</p> </div> | <ul style="list-style-type: none"> Record all communication Contact National Security If Police appoint incident manager support and follow instructions Create Incident Report Record Update Intranet with EAP Status 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. Confirm EAs and other messages are prepared in advance – if required | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with Sunwater Customer Support to send SMS and email to D/S residents and phone those without mobiles Liaise with the company representative for Southedge Dam (Appendix A5) | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Deactivate EAP Complete all Internal and External notifications If required, forward all relevant communication, including emails for EER to: [REDACTED] Close out Incident Report Record Update Intranet with EAP Status Return to routine activities |
| Notifications | Not applicable | CTG (if required) DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* DDMG 1 SRT | CTG (if required) DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | CTG (if required) DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | <ul style="list-style-type: none"> 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

Table 26: Terrorist threat/activity or high energy impact – LEC and IC external 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 <ul style="list-style-type: none"> Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received | <ul style="list-style-type: none"> LDMG 1 LDMG 2 DDMG 1 CTG | <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS. |
| | | <ul style="list-style-type: none"> SDCC Watch desk | <ul style="list-style-type: none"> Phone & Email | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Appendix A70 |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 CTG Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk — Security threat/ impact/explosion, etc.) What is the status? (Under Investigation) Discuss any potential road/bridge closures (if not discussed at Stand Up — 1) Prepare coordinated evacuation |

Table 26: Terrorist threat/activity or high energy impact – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|------------------|--|--|--|--|
| Stand Up — 3 | RESPONSE <ul style="list-style-type: none"> Failure underway or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | <p>Failure Likely – Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS.</p> <p>Failure Underway – Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS.</p> |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | <p>Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Appendix A70</p> |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 CTG Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | <p>Describe current situation with dam — What is the event? (Dam Safety Risk — Security threat/ impact/ explosion, etc.)</p> <p>What is the status? (Dam Failure Likely/In Progress)</p> <p>Initiate evacuations</p> |
| Stand Down | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | <p>Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS.</p> |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 CTG Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | <p>Describe current situation with dam:</p> <p>What is the event? (Dam Safety Risk — Security threat/ impact/explosion, etc.)</p> <p>What is the status? (Dam hazard Stood Down)</p> <p>Advise that failure risk has been reduced and EAP has been deactivated</p> |

Table 27: 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 | <ul style="list-style-type: none"> Not applicable | <p>THREAT</p> <ul style="list-style-type: none"> Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received | <p>EVENT</p> <ul style="list-style-type: none"> Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) | <p>RESPONSE</p> <ul style="list-style-type: none"> Failure underway or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Action | <ul style="list-style-type: none"> Not applicable | <ul style="list-style-type: none"> Record all communication Assess Risks Advise DSR of EAP activation | <ul style="list-style-type: none"> 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 Monitor situation, assess risks, 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) | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with the IC and LEC and advise on need to recommend evacuations <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>[^]Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.</p> </div> | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| Notifications | <ul style="list-style-type: none"> Not applicable | IC DDO DSR | IC DDO LEC/ORR DSR | IC DDO LEC/ORR DSR | <ul style="list-style-type: none"> 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



9. Dam hazard—overturning or sliding of monoliths

9.1 Overview

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

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

The stability of the dam in its current configuration has been fully evaluated. Overturning or sliding of a monolith should not occur for any loading. However, if a change were to be introduced it is possible that an unstable situation could be created that would lead to a dam failure. The most likely cause of a change that could lead to an unstable situation would be scouring at or near the toe of a monolith during a large flood event.

The flood outlines in Appendix B3 are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by overturning or sliding of monoliths. The use of these flood outlines is prescribed below:

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

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

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

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

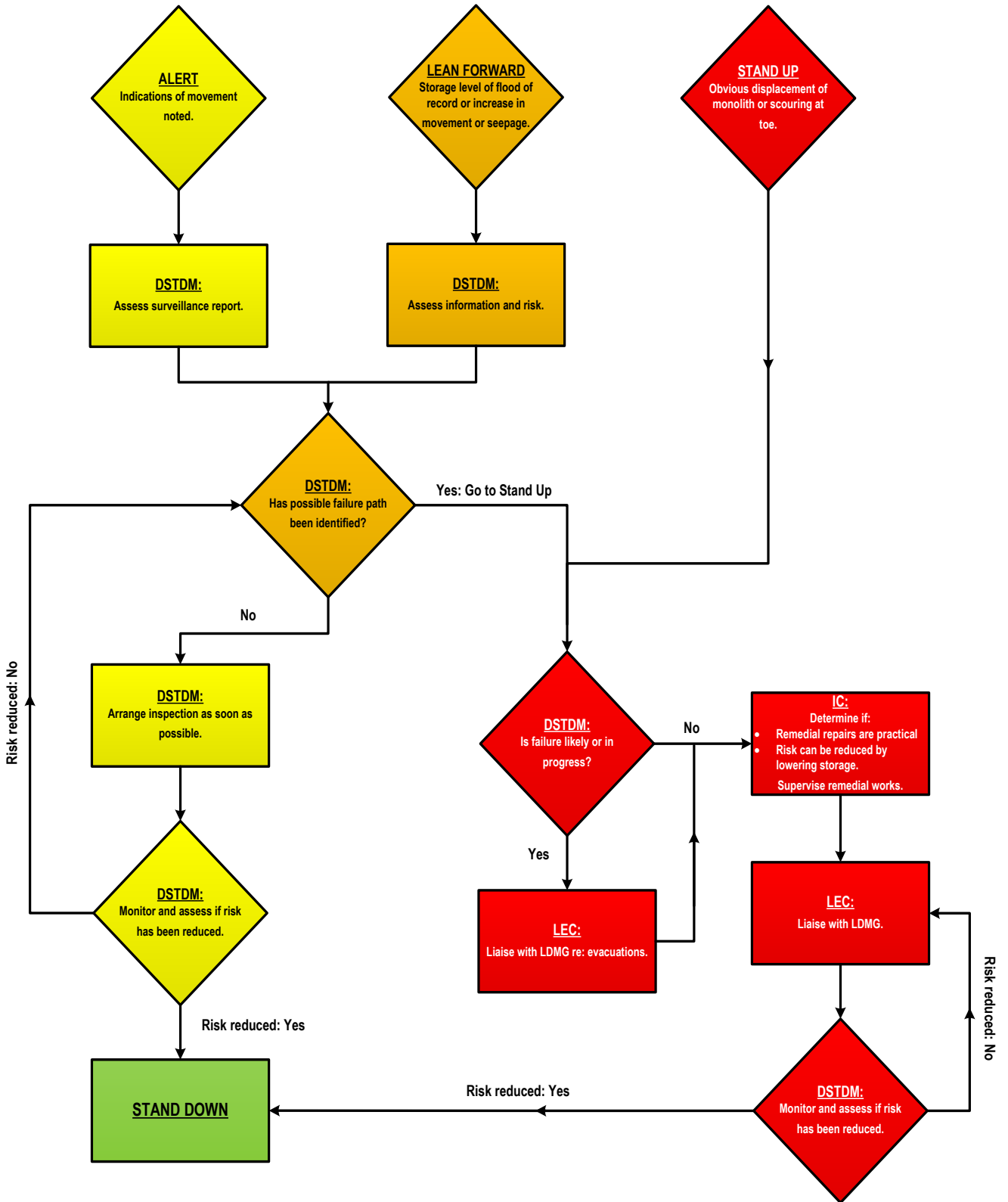
An earthquake is a circumstance that could indicate an increased likelihood of overturning. Inspections following an earthquake would identify if any movement had taken place which is the alert status for overturning. An increase in lake level beyond 672.74 m is a circumstance that could indicate an increase likelihood of overturning. This circumstance is the trigger for the lean forward status for overturning. An increase in seepage is a circumstance that could indicate an increased likelihood of overturning. This circumstance is the alert status for overturning.

9.2 Emergency Actions

Table 28 to Table 32 specify emergency actions for the following roles:

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

Figure 5: Overturning or sliding of monoliths flowchart



| Table 28: Overturning or sliding of monoliths – DDO emergency action | | | | | |
|--|---|---|--|--|---|
| Activation level | Alert | Lean Forward | Stand Up – 1 | Stand Up – 2 | Stand Down |
| Activation trigger | <ul style="list-style-type: none"> • Indications of movement of monoliths noted such as cracking, increased seepage, spilling | <ul style="list-style-type: none"> • Storage level at Flood of Record level of EL 672.74 m | <ul style="list-style-type: none"> • Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam | <ul style="list-style-type: none"> • Failure underway or likely due to sliding or overturning | <ul style="list-style-type: none"> • Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> • Record all communication • Monitor dam every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable or as directed by the IC • Photograph/video the indications from a safe point and record using the approved forms in Appendix D and send to IC & DSTDM • Notify SO • Update Dam Logbook as per SOP 12 (ref Z) | <ul style="list-style-type: none"> • As per previous activation level | <ul style="list-style-type: none"> • As per previous activation level, AND • Support/supervise remedial works as required • Lower the storage if directed by DSTDM • Close road access to dam if not already closed by others • Maintain surveillance of area immediately downstream of dam or saddle dam and ‘move on’ any members of the public | <ul style="list-style-type: none"> • As per previous activation level, AND • Vacate the immediate vicinity of the embankment • Ensure remedial works cease and plant and personnel have been moved to a safe location | <ul style="list-style-type: none"> • Inspect the dam for any damage and photograph any damage identified during the event • If required, forward all relevant communication including emails, and inspection sheets for EER to: [REDACTED] • Update Dam Logbook as per SOP 12 (ref Z) • Return to routine surveillance activities and frequencies |
| Notifications | <ol style="list-style-type: none"> 1. DSTDM 2. IC 3. SO 5. LEC | <ol style="list-style-type: none"> 1. DSTDM 2. IC 3. SO | <ol style="list-style-type: none"> 1. DSTDM 2. IC 3. SO | <ol style="list-style-type: none"> 1. DSTDM 2. IC 3. SO | <ul style="list-style-type: none"> • 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

Table 29: Overturning or sliding of monoliths – LEC emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|--|--|---|--|--|
| Activation trigger | <ul style="list-style-type: none"> Indications of movement of monoliths noted such as cracking, increased seepage, spilling | <ul style="list-style-type: none"> Storage level at Flood of Record level of EL 672.74 m | <ul style="list-style-type: none"> Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam | <ul style="list-style-type: none"> Failure underway or likely due to sliding or overturning | <ul style="list-style-type: none"> Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> Record all communication <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>*NOTE: IC to contact LDMGs unless LDMG1 is Stood Up</p> </div> | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with LDMGs re: situation | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with DDO and relevant Council(s) regarding potential road/bridge closures | <ul style="list-style-type: none"> As per previous activation level, AND Liaise with DDO, IC, and LDMG re: potential for evacuations | <ul style="list-style-type: none"> If required, forward all relevant communication, including emails for EER to: [REDACTED] Return to routine activities |
| Notifications | DDO IC LDMG 1* LDMG 2* LDMG 3* | DDO IC LDMG 1* LDMG 2* LDMG 3* | DDO IC LDMG 1* LDMG 2* LDMG 3* | DDO IC LDMG 1* LDMG 2* LDMG 3* | <ul style="list-style-type: none"> 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

Table 30: Overturning or sliding of monoliths – IC emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|---|---|--|--|--|
| Activation trigger | <ul style="list-style-type: none"> • Indications of movement of monoliths noted such as cracking, increased seepage, spilling | <ul style="list-style-type: none"> • Storage level at Flood of Record level of EL 672.74 m | <ul style="list-style-type: none"> • Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam | <ul style="list-style-type: none"> • Failure underway or likely due to sliding or overturning | <ul style="list-style-type: none"> • Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> • Record all communication • Create Incident Report Record • Update Sunwater Intranet with dam status | <ul style="list-style-type: none"> • As per previous activation level, AND • Place machinery operators on standby if directed by DSTDM • Consider the need to appoint a Sunwater recovery coordinator. The Sunwater 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. • Confirm EAs and other messages are prepared in advance – if required | <ul style="list-style-type: none"> • As per previous activation level, AND • Mobilise resources to undertake remedial works if directed by DSTDM • Liaise with the company representative for Southedge Dam (Appendix A5) | <ul style="list-style-type: none"> • As per previous activation level, AND • Liaise with the DSTDM to confirm that dam failure is in progress • Direct remedial works to cease if directed by the DSTDM and plant and personnel to be moved to a safe location • Liaise with DDO, DSTDM, and LDMGs re: potential for evacuations | <ul style="list-style-type: none"> • 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 |
| Notifications | DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* LDMG 3* DDMG 1 SRT | DDO LEC/ORR DSTDM SMT LDMG 1* LDMG 2* LDMG 3* DDMG 1 SRT | DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | DDO LEC/ORR DSTDM SMT D/S Residents SDCC Watch Desk LDMG 1* LDMG 2* LDMG 3* DDMG 1 DDMG 2 Southedge rep SRT | <ul style="list-style-type: none"> • 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

Table 31: Overturning or sliding of monoliths – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|--|---|---|--|---|
| Alert | <ul style="list-style-type: none"> Indications of movement of monoliths noted such as cracking, increased seepage, spilling | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk—unconfirmed instability of dam) What is the status? (<i>Under Investigation</i>) Advise of current storage level Advise any issues you are aware of Standby for further advice |
| Lean Forward | <ul style="list-style-type: none"> Storage level at Flood of Record level of EL 672.74 m | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Dam Safety Risk— unconfirmed instability of dam) What is the status? (<i>Under Investigation</i>) Advise of current storage level Advise any issues you are aware of Standby for further advice |
| Stand Up — 1 | <ul style="list-style-type: none"> Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS. |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Appendix A70 |
| | | <ul style="list-style-type: none"> LDMG 1 LDMG 2 LDMG 3 DDMG 1 DDMG 2 Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> Phone | Describe current situation with dam: What is the event? (Confirmed instability of the dam). What is the status? (Prepare for possible evacuations) Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures Prepare for possible evacuations |
| Stand Up — 2 (Failure likely) | <ul style="list-style-type: none"> Failure likely due to piping; AND Sufficient water in storage to create a dam hazard | <ul style="list-style-type: none"> D/S Residents | <ul style="list-style-type: none"> SMS Email Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS. |
| | | <ul style="list-style-type: none"> SDCC Watch Desk | <ul style="list-style-type: none"> Phone & Email | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Appendix A70 |

Table 31: Overturning or sliding of monoliths – LEC and IC external communication plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|------------------------------------|--|---|--|--|
| | | <ul style="list-style-type: none"> • LDMG 1 • LDMG 2 • LDMG 3 • DDMG 1 • DDMG 2 • Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> • Phone | Describe current situation with dam: What is the event? (Dam Safety Risk—sliding/overturning of monoliths) What is the status? (Dam failure likely) Advise of current storage level Prepare coordinated evacuations |
| Stand Up — 2 (Failure underway) | <ul style="list-style-type: none"> • Dam Failure underway | <ul style="list-style-type: none"> • D/S Residents | <ul style="list-style-type: none"> • SMS • Email • Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS. |
| | | <ul style="list-style-type: none"> • SDCC Watch Desk | <ul style="list-style-type: none"> • Email & Phone | Complete Emergency Alert Request Form in ref L and send to SDCC Watch Desk to propagate to Polygon. Appendix A70 |
| | | <ul style="list-style-type: none"> • LDMG 1 • LDMG 2 • LDMG 3 • DDMG 1 • DDMG 2 • Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> • Phone | Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Dam Failure underway) Advise of current storage level Coordinate evacuations of affected Downstream Residents and move people to higher ground |
| Stand Down | <ul style="list-style-type: none"> • Risk assessment has determined that failure risk has reduced | <ul style="list-style-type: none"> • D/S Residents | <ul style="list-style-type: none"> • SMS • Email • Phone (for those <u>without</u> mobiles) | Liaise with Sunwater Customer Support and Communications to send appropriate messaging via SMS. |
| | | <ul style="list-style-type: none"> • LDMG 1 • LDMG 2 • LDMG 3 • DDMG 1 • DDMG 2 • Southedge Daintree Pastoral Company representative (Mitchell Dam owner) | <ul style="list-style-type: none"> • 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 piping risk has reduced, and EAP has been deactivated |

Table 32: Overturning or sliding of monoliths – DSTDM emergency action

| Activation level | Alert | Lean Forward | Stand Up — 1 | Stand Up — 2 | Stand Down |
|---------------------------|--|---|---|---|--|
| Activation trigger | <ul style="list-style-type: none"> • Indications of movement of monoliths noted such as cracking, increased seepage, spilling | <ul style="list-style-type: none"> • Storage level at Flood of Record level of EL 672.74 m | <ul style="list-style-type: none"> • Obvious displacement of one or more monoliths, OR • Evidence of scouring at or near toe of dam | <ul style="list-style-type: none"> • Failure underway or likely due to sliding or overturning | <ul style="list-style-type: none"> • Risk assessment has determined that failure risk has reduced |
| Actions | <ul style="list-style-type: none"> • Record all communication • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Determine if there are possible failure paths from reported damage • Monitor situation and undertake risk assessment • Notify DSR | <ul style="list-style-type: none"> • As per previous activation level | <ul style="list-style-type: none"> • As per previous activation level, AND • 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) | <ul style="list-style-type: none"> • As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>* Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.</p> </div> | <ul style="list-style-type: none"> • Forward all communications including relevant emails for EER to [REDACTED] • Return to routine activities |
| Notifications | DDO DSTDM DSR | DDO DSTDM DSR | DDO IC LEC/ORR DSR | DDO DSTDM LEC/ORR DSR | <ul style="list-style-type: none"> • 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

10. Other emergency situations — communications failure

10.1 Overview

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

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

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

10.2 Emergency actions

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

10.2.1 Activation triggers

Table 33: Communications failure emergency action trigger summary

| | |
|-----------------------------------|--|
| Comms Failure – Site | <ul style="list-style-type: none"> • Unable to communicate to or from Dam site (usually affects DDO) |
| Comms Failure – Local area | <ul style="list-style-type: none"> • Unable to communicate to or from Local Area (likely to affect LEC/ORR) |
| Comms Failure – Brisbane | <ul style="list-style-type: none"> • Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM & will affect IC) |

10.2.2 Emergency action roles

Table 34 to Table 39 specify emergency actions for the following roles. Definitions can be found in 0:

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

Table 34: Communications failure – DDO emergency action

| Activation level | Comms Failure – Local Area | Comms Failure – Brisbane |
|---------------------------|--|---|
| Activation trigger | <ul style="list-style-type: none"> • Unable to communicate to Local Area including LEC/ORR | <ul style="list-style-type: none"> • Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM |
| Actions | <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 (ref Z) and communications log if EAP event is current | <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 (ref Z) and communications log if EAP event is current |
| Notifications | IC SO – if available | LEC SO – if available |



Table 35: Communications failure – LEC emergency action

| Activation level | Comms Failure – Dam Site | Comms Failure – Brisbane |
|---------------------------|---|--|
| Activation trigger | <ul style="list-style-type: none"> • Unable to communicate to Dam site | <ul style="list-style-type: none"> • Unable to communicate to Sunwater Brisbane including IC, DSTDM or FODM |
| Actions | <ul style="list-style-type: none"> • Every hour attempt communications noting the following: <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Create Incident Report Record • Every hour attempt communications noting the following: <ul style="list-style-type: none"> • 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 |
| Notifications | IC DSTDM SO – if available LDMG | DDO DSTDM – if available SO LDMG DDMG |



Table 36: Communication failure – IC emergency action

| Activation level | Comms Failure – Dam Site | Comms Failure – Local Area |
|---------------------------|--|---|
| Activation trigger | <ul style="list-style-type: none"> • Unable to communicate to Dam site | <ul style="list-style-type: none"> • Unable to communicate to Local Area including LEC/ORR |
| Actions | <ul style="list-style-type: none"> • Issue Sunwater Incident Alert • Every hour attempt communications noting the following: <ul style="list-style-type: none"> • 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 LEC • Liaise with DSTDM • As much as is practicable continue other tasks associated with the role in accordance with any other current Emergency Action | <ul style="list-style-type: none"> • Issue Sunwater Incident Alert • Every hour attempt communications noting the following: <ul style="list-style-type: none"> • 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 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 |
| Notifications | LEC/ORR DSTDM SO – if available DDMG | DDO – if available DSTDM SO – if available LDMG – if available DDMG – if available |



Table 37: Communications failure – LEC and IC external communications plan

| Activation level | Trigger for communications | Group to contact | Method | Message text |
|----------------------------|--|--|---|---|
| Comms Failure – Site | <ul style="list-style-type: none"> Unable to communicate to or from Dam site, AND DDO is at Dam site | <ul style="list-style-type: none"> IC/LEC DSTDM SO – if available LDMG DDMG | <ul style="list-style-type: none"> 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 — Tinaroo Falls Dam — Site Communications Failure |
| Comms Failure – Local Area | <ul style="list-style-type: none"> Unable to communicate to or from Local Area including LEC and ORR | <ul style="list-style-type: none"> DDO – if available DSTDM SO – if available LDMG – if available DDMG – if available | <ul style="list-style-type: none"> 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 — Tinaroo Falls Dam — Local Area Communications Failure |
| Comms Failure – Brisbane | <ul style="list-style-type: none"> Unable to communicate to or from Sunwater Brisbane | <ul style="list-style-type: none"> DSTDM – if available LDMG DDMG | <ul style="list-style-type: none"> 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 38: Communications failure – DSTDM emergency action

| Activation level | Comms Failure – Site | Comms Failure – Local Area |
|---------------------------|---|--|
| Activation trigger | <ul style="list-style-type: none"> • Unable to communicate to Dam site | <ul style="list-style-type: none"> • Unable to communicate to Local Area including LEC and ORR |
| Actions | <ul style="list-style-type: none"> • Provide technical advice to IC/LEC on a need’s basis • Record all communication • As much as is practicable continue other tasks associated with the role in accordance with any other current Emergency Action | <ul style="list-style-type: none"> • Provide technical advice to IC on a need’s basis • Record all communication • Assume that the DDO is assisting IC with LEC role • As much as is practicable continue other tasks associated with the role in accordance with any other current Emergency Action |
| Notifications | IC LEC SRT DSR – if applicable | IC DDO – if available SRT DSR – if applicable |



Table 39: Communications failure – FODM emergency action

| Activation level | Comms Failure – Site | Comms Failure – Local Area |
|-------------------------------|---|--|
| Activation trigger | <ul style="list-style-type: none"> • Unable to communicate to Dam site, | <ul style="list-style-type: none"> • Unable to communicate to Local Area including LEC and ORR |
| Actions | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 |

Notes:

Tablelands Regional Council (TRC) has invested in redundant communication networks to provide back-up communication modalities which is imperative in emergency response and recovery. Past experience demonstrates that emergency agencies cannot depend on just one or two means for communication. Some examples of TRC redundant communications include utilising Queensland Parks and Wildlife Service VHF radio repeater network with three new UHF-CB repeaters installed in Atherton, Mount Garnet and Millaa Millaa with base stations installed in the TRC Local Disaster Coordination Centre. Additionally, Community Disaster Coordinators have access to seven portable radio handsets and there are numerous Amateur Radio Operators available to support operations. The Kairi State School also has an Amateur Radio Club program and base station. These back-up communication systems enhance interoperability and capacity for wider coverage, disaster-proofness and broadcast capability. If communication networks fail during an EAP activation event, TRC will work closely with Sunwater and where able provide contingency to sustain communication with key stakeholders and reduce downtime.

Cairns Regional Council also has redundant communication options including amateur radio operators (Cairns Amateur Radio Club – VK4CNS). The Club's 2.0 m repeater is located at the Royal Flying Doctor Service Site Mt Haren, and the frequency is 146.950 MHz with a negative offset of 600 kHz.



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 A4: Non-D/S residents' notification list (outside area—requested messaging)

Appendix A5: Other reference contacts

Appendix A6: Emergency alert polygon – Mareeba

Appendix A7: Dam failure emergency alert request

Appendix A8: Emergency alert polygon – Cairns

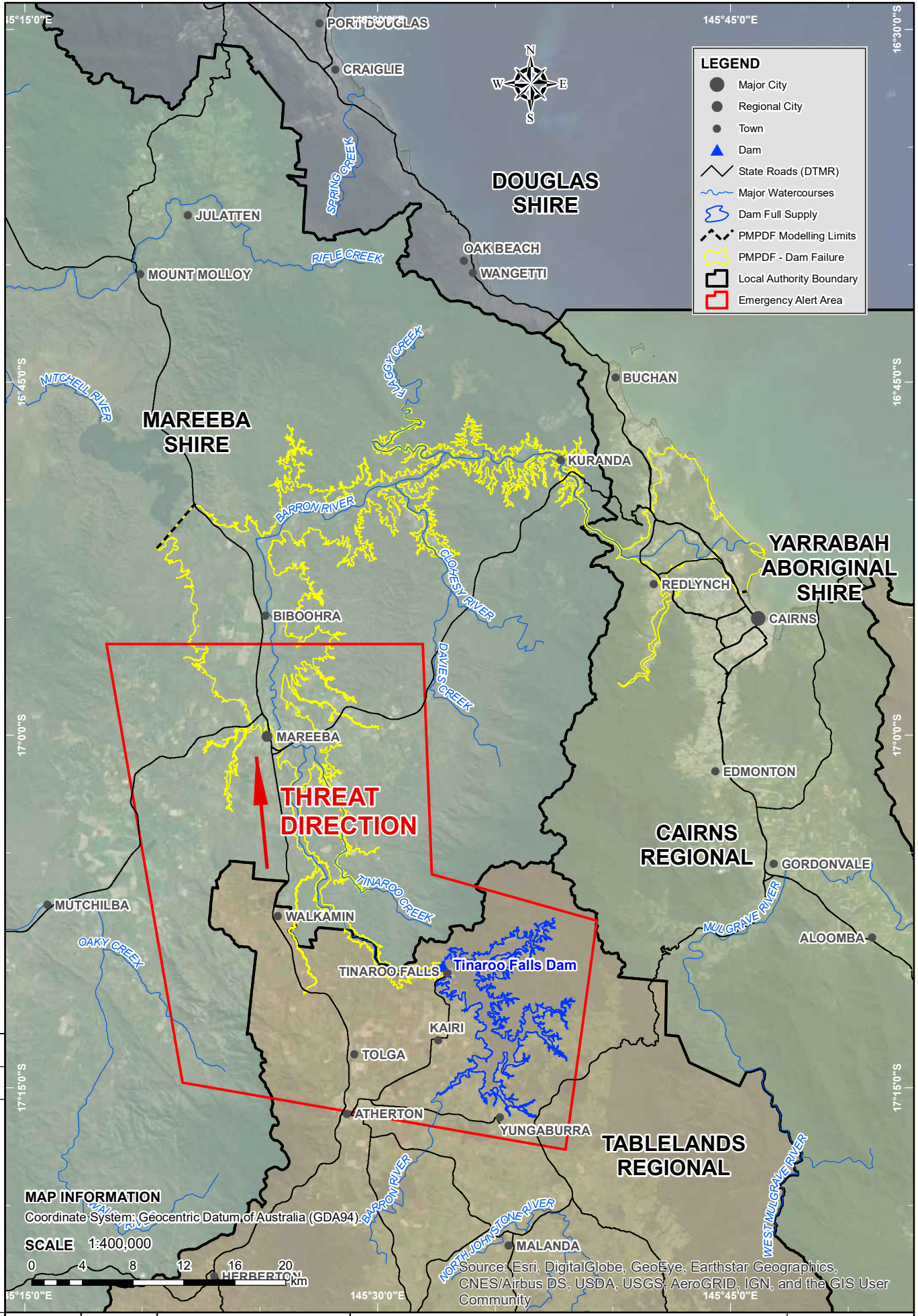
Appendix A1 to Appendix A5 have been redacted

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MAP PRODUCED BY:
 ASSET DELIVERY
 TEL. (07)3120 0000

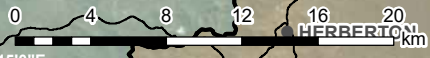
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| | MB | OKD |
| ISSUED FOR USE | | |
| REVISION | DATE | REMARKS |



MAP INFORMATION

Coordinate System: Geocentric Datum of Australia (GDA94)

SCALE 1:400,000



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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| B | A | DRAWN <i>IDH</i> | DESIGNED |
| 28/10/19 | 23/01/18 | CHECKED <i>MB</i> | CHECKED |
| REVISION | DATE | APPROVED M. HUGHES | |
| | | 23/1/2018 | |

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**TINAROO FALLS DAM - MAREEBA
 EMERGENCY ACTION PLAN
 EMERGENCY ALERT AREA**

| | |
|--------------------------|----------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 249587 | B |
| SHEET 1 OF 1 | |
| DATE JANUARY 2018 | |

Appendix A7: TINAROO DAM EMERGENCY ALERT REQUEST – TABLELANDS/MAREEBA

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 Tinaroo Falls Dam Emergency Polygon – Tablelands_Mareeba.

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 SDCC Watch Desk on 07 3635 2387 or 0408 190 872 and tell them your intention to use the EA for an Emergency Event for Tinaroo Dam.
 - a. Polygons for this dam are stored on the Disaster Management Portal. Ask the SDCC operative to locate this polygon. It will be a KML file called Tinaroo Falls Dam_Emergency_Polygon_Mareeba.
 - 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 Tinaroo Falls Threat Direction Polygon - Mareeba to SDCC watch desk email: sdcc@qfes.qld.gov.au. 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: |
|-------------------------------------|--|---|
| Tinaroo Falls_Dam_Emergency_Polygon | FLOOD EMERGENCY WARNING from Sunwater: People downstream of Tinaroo Dam must LEAVE IMMEDIATELY. Tinaroo 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. Mareeba Racecourse is a safe location. More information is available at Mareeba Emergency Management Dashboard emergency dot em s c dot que el dee dot gov dot ay you and at Tablelands Regional Council dashboard dot tee are see dot que el dee lot dot gov dot ay you . | FLOOD EMERGENCY WARNING from Sunwater: People downstream of Tinaroo Dam must LEAVE IMMEDIATELY. Tinaroo 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. Mareeba Racecourse is a safe location. More information at Mareeba Emergency Management Dashboard emergency.msc.qld.gov.au and at Tablelands Regional Council https://dashboard.trc.qld.gov.au/ |

The next pages contains pre-prepared copy of the Tinaroo Falls Dam EA Request form for Tablelands and Mareeba with instructions:



PHONE THE SDCC WATCH DESK (07) 3635 2387 – ADVISE EA IS BEING DEVELOPED

EMERGENCY ALERT REQUEST

Location of Alert: Tinaroo 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? YES N/A Threat location indicated on map? YES N/A
(e.g. Fire, Chemical Spill, Dam Spill) Only For Emergency Warning Voice & Service Address SMS

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 handwriting, max 4000 characters incl spaces. (Ideally message should be < 450 characters)

FLOOD EMERGENCY WARNING from Sunwater: People downstream of Tinaroo Dam must LEAVE IMMEDIATELY. Tinaroo 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. Mareeba Racecourse is a safe location. More information is available at Mareeba Emergency Management Dashboard emergency dot em s c dot que el dee dot gov dot ay you and at Tablelands Regional Council dashboard dot tee are see dot que el dee lot dot gov dot ay you.

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

FLOOD EMERGENCY WARNING from Sunwater: People downstream of Tinaroo Dam must LEAVE IMMEDIATELY. Tinaroo 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. Mareeba Racecourse is a safe location. More information at Mareeba Emergency Management Dashboard emergency.msc.qld.gov.au and at Tablelands Regional Council https://dashboard.trc.qld.gov.au/

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

Requesting Officer: Signature: Date: / /

Send to sdcc@qfes.qld.gov.au and telephone (07) 3635 2387 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: / /
Authorising Officer Name: Signature: Date: / /
Emergency Alert No:
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. | <i>Sunwater Polygons are all in *.kml format.</i> Check applicable box. |
| STEP 4. | <i>Sunwater Messaging/spatial data is always supplied via DMportal.</i> 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 & Biloeila are safe.

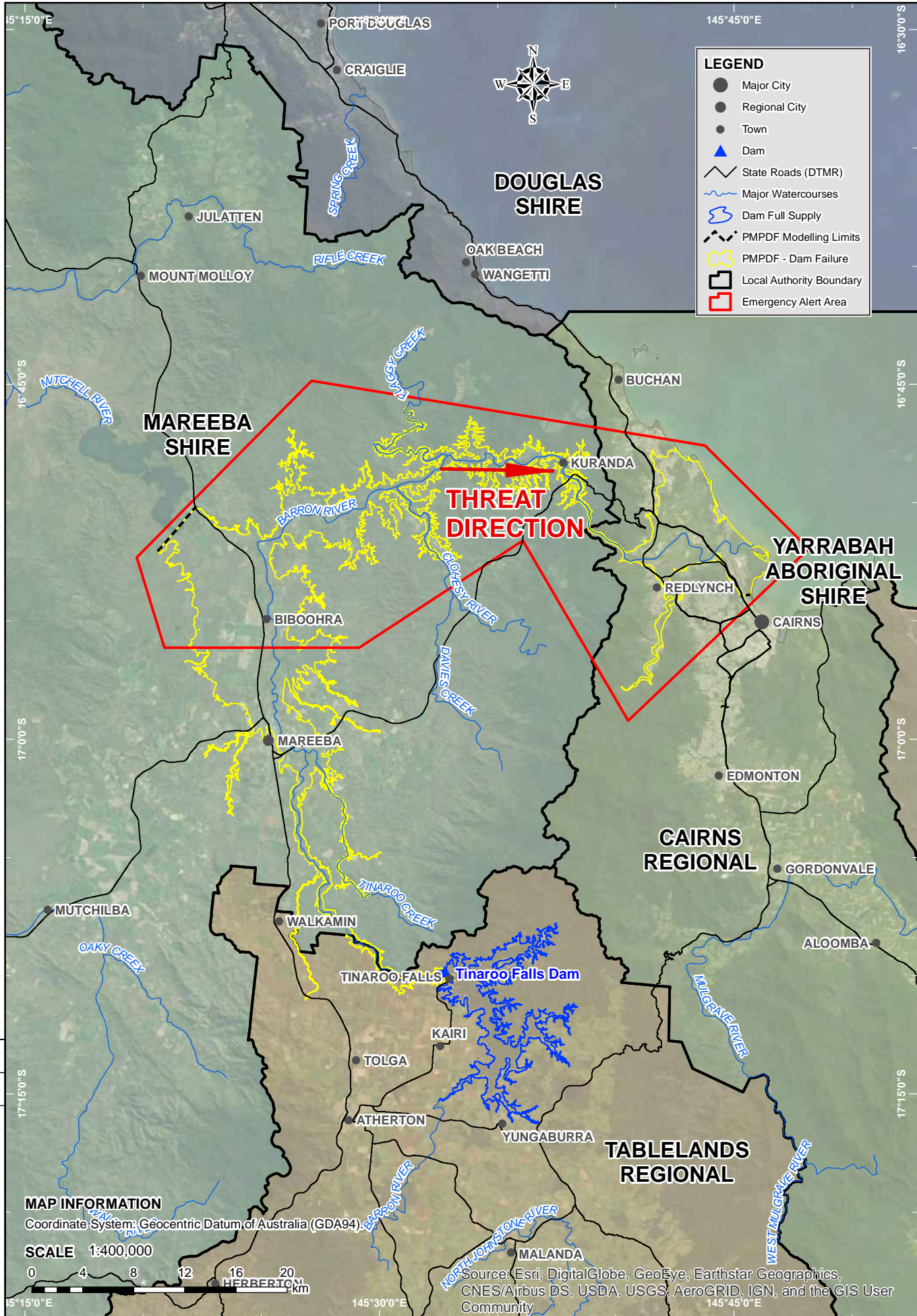
If using template EA messages, please provide the appropriate variables that are in the template message guides. Refer to the Queensland EA Manual for copies of the template message guides.

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MAP PRODUCED BY:
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MAP INFORMATION

Coordinate System: Geocentric Datum of Australia (GDA94)
 SCALE 1:400,000
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 HERBERTON

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

| | | | | | |
|----------|----------|----------|-----------|----------|--|
| DATE | 25/02/20 | DRAWN | IDH | DESIGNED | |
| REVISION | | CHECKED | MS | CHECKED | |
| | | APPROVED | M. BANKS | | |
| | | | 25/2/2020 | | |

sunwater
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 ACN 131 034 985

**TINAROO FALLS DAM - (CAIRNS)
 EMERGENCY ACTION PLAN
 EMERGENCY ALERT AREA**

| | |
|--------------------------|----------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 251969 | A |
| SHEET 1 OF 1 | |
| DATE OCTOBER 2019 | |

APPENDIX B DRAWINGS AND MAPS

Appendix B1: General Arrangement and Instrumentation drawings

Appendix B2: Downstream Notification area

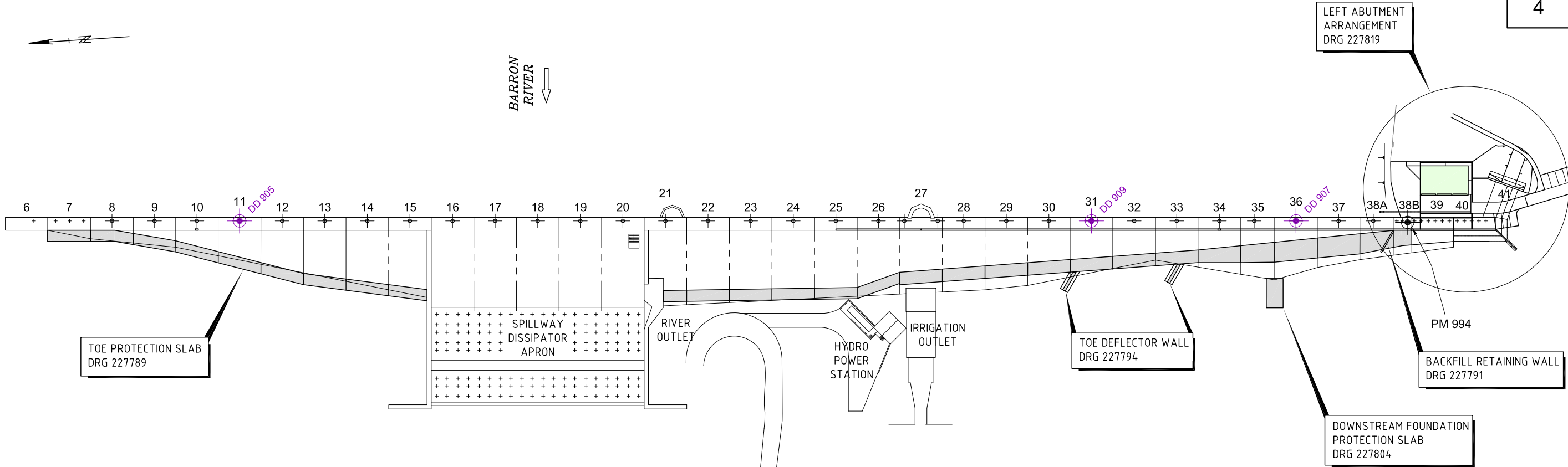
Appendix B3: Inundation maps

Appendix B4: Access routes during fair and adverse weather conditions

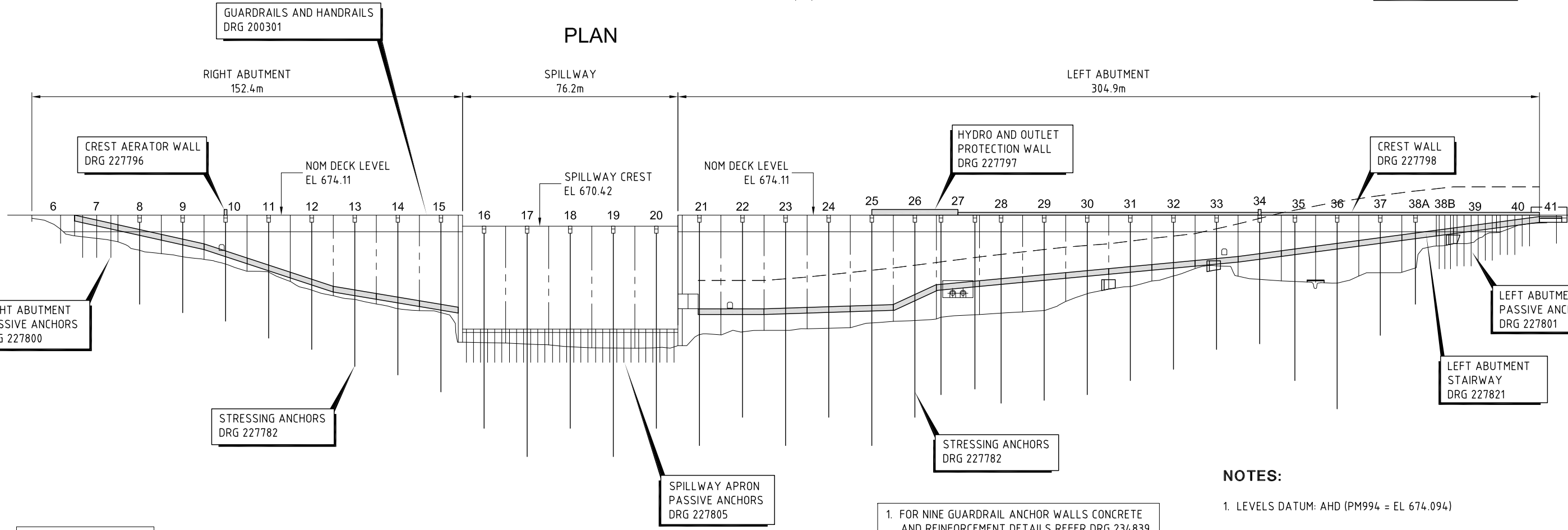
Appendix B5: Locality plan

Appendix B6: Catchment area

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



PLAN



ELEVATION

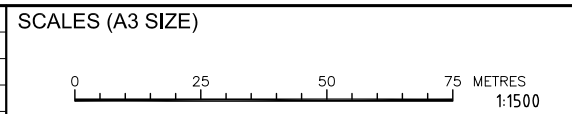
NOTES:

1. FOR NINE GUARDRAIL ANCHOR WALLS CONCRETE AND REINFORCEMENT DETAILS REFER DRG 234839. (NOT SHOWN ON THIS DRAWING)
 2. FOR GUARDRAIL, HANDRAIL AND SECURITY FENCE REFER DRG 200301.
1. LEVELS DATUM: AHD (PM994 = EL 674.094)
 2. COORDINATE SYSTEM: PLANE DERIVED FROM TRUNCATED AMG PM994 E345256.561 N8101272.946 AMG = E 5256.561 N 1272.946 PLANE

DRAWING PRODUCED BY:
 SUNWATER
 LEVEL 9, 179 TURBOT ST
 BRISBANE QLD 4000
 TEL: (07) 3120 0000
 T:\Asset Solutions\Sw-Mareeba Dimbulah MSS\Tinaroo Falls Spillway Upgrade Drawings\AutoCAD\227781.dwg
 20 Jun 2012 10:51 AM

| REVISION | DATE | REMARKS | CKD | PSD |
|----------|------|----------------------------------|-----|-----|
| 30.06.11 | D | AS BUILT | LD | PGW |
| 6.08.10 | C | GUARDRAIL ANCHORS. LEFT ABUTMENT | LD | JKR |
| 11.11.09 | B | VARIOUS | AN | JKR |
| 22.05.09 | A | DRILL HOLES, ANCHOR LENGTHS | AN | JKR |

| REFERENCE DRAWINGS |
|--------------------|
| |
| |
| |
| |

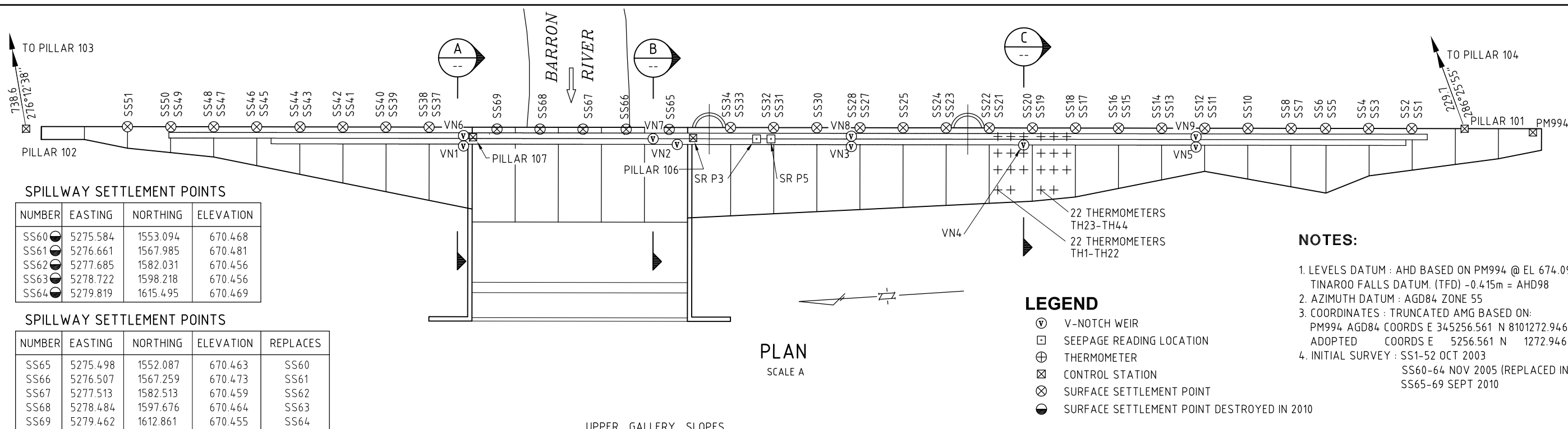


| | |
|---|-----------------|
| DRAWN AJN | DESIGNED JKR |
| CHECKED KFP | CHECKED |
| APPROVED P G RICHARDSON CHIEF DESIGN ENGINEER | |



TINAROO FALLS DAM
 SPILLWAY CAPACITY UPGRADE 2009
 GENERAL ARRANGEMENT

| |
|--------------------------|
| CONTRACT NUMBER |
| DRAWING NUMBER 227781 |
| DATE MAY 2009 |
| A B C D |



SPILLWAY SETTLEMENT POINTS

| NUMBER | EASTING | NORTHING | ELEVATION |
|--------|----------|----------|-----------|
| SS60 | 5275.584 | 1553.094 | 670.468 |
| SS61 | 5276.661 | 1567.985 | 670.481 |
| SS62 | 5277.685 | 1582.031 | 670.456 |
| SS63 | 5278.722 | 1598.218 | 670.456 |
| SS64 | 5279.819 | 1615.495 | 670.469 |

SPILLWAY SETTLEMENT POINTS

| NUMBER | EASTING | NORTHING | ELEVATION | REPLACES |
|--------|----------|----------|-----------|----------|
| SS65 | 5275.498 | 1552.087 | 670.463 | SS60 |
| SS66 | 5276.507 | 1567.259 | 670.473 | SS61 |
| SS67 | 5277.513 | 1582.513 | 670.459 | SS62 |
| SS68 | 5278.484 | 1597.676 | 670.464 | SS63 |
| SS69 | 5279.462 | 1612.861 | 670.455 | SS64 |

LEGEND

- ⊖ V-NOTCH WEIR
- SEEPAGE READING LOCATION
- ⊕ THERMOMETER
- ⊗ CONTROL STATION
- ⊗ SURFACE SETTLEMENT POINT
- SURFACE SETTLEMENT POINT DESTROYED IN 2010

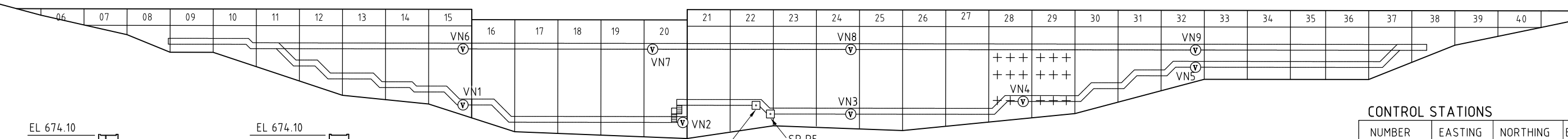
NOTES:

- LEVELS DATUM : AHD BASED ON PM994 @ EL 674.094m AHD
TINAROO FALLS DATUM. (TFD) -0.415m = AHD98
- AZIMUTH DATUM : AGD84 ZONE 55
- COORDINATES : TRUNCATED AMG BASED ON:
PM994 AGD84 COORDS E 345256.561 N 8101272.946
ADOPTED COORDS E 5256.561 N 1272.946
- INITIAL SURVEY : SS1-52 OCT 2003
SS60-64 NOV 2005 (REPLACED IN SEPT 2010)
SS65-69 SEPT 2010

PLAN

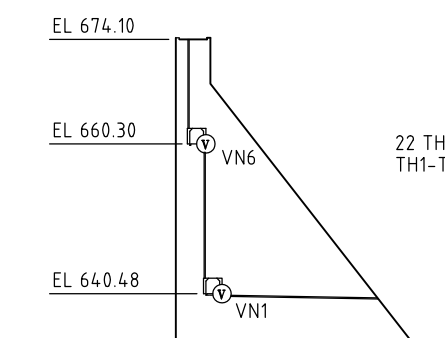
SCALE A

UPPER GALLERY SLOPES



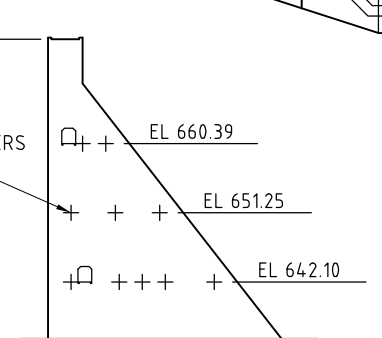
ELEVATION

SCALE A



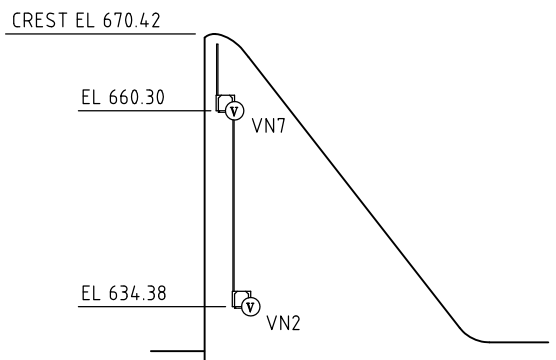
SECTION A

SCALE B



SECTION C

SCALE B



SECTION B

SCALE B

V-NOTCH WEIRS

| No | LOCATION | |
|------|----------|---------|
| | MONO | GALLERY |
| VN 1 | 15 | LOWER |
| VN 2 | 20 | LOWER |
| VN 3 | 24 | LOWER |
| VN 4 | 28 | LOWER |
| VN 5 | 32 | LOWER |
| VN 6 | 15 | UPPER |
| VN 7 | 20 | UPPER |
| VN 8 | 24 | UPPER |
| VN 9 | 32 | UPPER |

SEEPAGE READINGS LOCATIONS

| No | LOCATION | |
|-------|----------|---------|
| | MONO | GALLERY |
| SR P3 | 22 | LOWER |
| SR P5 | 22 | LOWER |

THERMOMETERS MONOLITH 28

| No | OFFSET D/S OF AXIS | DISTANCE FROM 27/28 CJ | ELEVATION |
|-------|--------------------|------------------------|-----------|
| TH 1 | 7.62 | 3.05 | 642.10 |
| TH 2 | 7.62 | 9.43 | 642.10 |
| TH 3 | 7.62 | 15.53 | 642.10 |
| TH 4 | 7.62 | 21.92 | 642.10 |
| TH 5 | 3.05 | 21.92 | 642.10 |
| TH 6 | 3.05 | 12.48 | 642.10 |
| TH 7 | 3.05 | 3.05 | 642.10 |
| TH 8 | 10.67 | 3.05 | 651.25 |
| TH 9 | 10.67 | 8.92 | 651.25 |
| TH 10 | 10.67 | 14.78 | 651.25 |
| TH 11 | 7.62 | 14.78 | 651.25 |
| TH 12 | 7.62 | 8.92 | 651.25 |
| TH 13 | 7.62 | 3.05 | 651.25 |
| TH 14 | 3.05 | 3.05 | 651.25 |
| TH 15 | 3.05 | 8.92 | 651.25 |
| TH 16 | 3.05 | 14.78 | 651.25 |
| TH 17 | 10.67 | 4.57 | 660.39 |
| TH 18 | 10.67 | 7.65 | 660.39 |
| TH 19 | 7.62 | 7.65 | 660.39 |
| TH 20 | 7.62 | 4.57 | 660.39 |
| TH 21 | 3.05 | 4.57 | 660.39 |
| TH 22 | 3.05 | 7.65 | 660.39 |

THERMOMETERS MONOLITH 29

| No | OFFSET D/S OF AXIS | DISTANCE FROM 28/29 CJ | ELEVATION |
|-------|--------------------|------------------------|-----------|
| TH 23 | 7.62 | 3.05 | 642.10 |
| TH 24 | 7.62 | 9.43 | 642.10 |
| TH 25 | 7.62 | 15.53 | 642.10 |
| TH 26 | 7.62 | 21.92 | 642.10 |
| TH 27 | 3.05 | 21.92 | 642.10 |
| TH 28 | 3.05 | 12.48 | 642.10 |
| TH 29 | 3.05 | 3.05 | 642.10 |
| TH 30 | 10.67 | 3.05 | 651.25 |
| TH 31 | 10.67 | 8.92 | 651.25 |
| TH 32 | 10.67 | 14.78 | 651.25 |
| TH 33 | 7.62 | 14.78 | 651.25 |
| TH 34 | 7.62 | 8.92 | 651.25 |
| TH 35 | 7.62 | 3.05 | 651.25 |
| TH 36 | 3.05 | 3.05 | 651.25 |
| TH 37 | 3.05 | 8.92 | 651.25 |
| TH 38 | 3.05 | 14.78 | 651.25 |
| TH 39 | 10.67 | 4.57 | 660.39 |
| TH 40 | 10.67 | 7.65 | 660.39 |
| TH 41 | 7.62 | 7.65 | 660.39 |
| TH 42 | 7.62 | 4.57 | 660.39 |
| TH 43 | 3.05 | 4.57 | 660.39 |
| TH 44 | 3.05 | 7.65 | 660.39 |

SURFACE SETTLEMENT POINTS

| NUMBER | EASTING | NORTHING | ELEVATION |
|--------|----------|----------|-----------|
| SS1 | 5259.140 | 1289.693 | 674.308 |
| SS2 | 5259.168 | 1290.077 | 674.308 |
| SS3 | 5260.151 | 1304.892 | 674.309 |
| SS4 | 5260.177 | 1305.286 | 674.311 |
| SS5 | 5261.124 | 1320.093 | 674.304 |
| SS6 | 5261.143 | 1320.496 | 674.312 |
| SS7 | 5261.923 | 1332.248 | 674.310 |
| SS8 | 5261.943 | 1332.648 | 674.306 |
| SS9 | 5262.904 | 1347.498 | 674.311 |
| SS10 | 5262.940 | 1347.905 | 674.312 |
| SS11 | 5263.890 | 1362.708 | 674.309 |
| SS12 | 5263.916 | 1363.120 | 674.305 |
| SS13 | 5264.876 | 1377.946 | 674.312 |
| SS14 | 5264.906 | 1378.356 | 674.317 |
| SS15 | 5265.876 | 1393.180 | 674.301 |
| SS16 | 5265.900 | 1393.575 | 674.308 |
| SS17 | 5266.843 | 1408.343 | 674.315 |
| SS18 | 5266.887 | 1408.753 | 674.310 |
| SS19 | 5267.843 | 1423.570 | 674.313 |
| SS20 | 5267.865 | 1423.976 | 674.312 |
| SS21 | 5268.830 | 1438.815 | 674.314 |
| SS22 | 5268.850 | 1439.213 | 674.320 |
| SS23 | 5269.822 | 1454.054 | 674.318 |
| SS24 | 5269.844 | 1454.450 | 674.318 |
| SS25 | 5270.804 | 1469.242 | 674.313 |
| SS26 | 5270.831 | 1469.643 | 674.316 |
| SS27 | 5271.788 | 1484.455 | 674.310 |
| SS28 | 5271.804 | 1484.857 | 674.309 |
| SS29 | 5272.783 | 1499.672 | 674.321 |

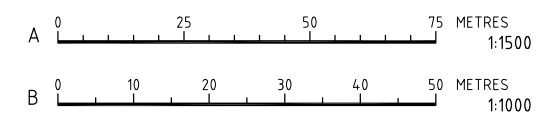
CONTROL STATIONS

| NUMBER | EASTING | NORTHING | ELEVATION |
|------------|----------|----------|-----------|
| PILLAR 101 | 5257.965 | 1271.290 | 675.747 |
| PILLAR 102 | 5290.083 | 1779.077 | 677.614 |
| PILLAR 103 | 6024.318 | 1858.977 | 672.893 |
| PILLAR 104 | 5478.262 | 1336.260 | 672.876 |
| PILLAR 106 | 5272.257 | 1544.748 | 675.252 |
| PILLAR 107 | 5277.316 | 1622.937 | 675.521 |

SURFACE SETTLEMENT POINTS (CONT'D)

| NUMBER | EASTING | NORTHING | ELEVATION |
|--------|----------|----------|-----------|
| SS30 | 5272.806 | 1500.064 | 674.316 |
| SS31 | 5273.761 | 1514.919 | 674.318 |
| SS32 | 5273.779 | 1515.322 | 674.312 |
| SS33 | 5274.757 | 1530.129 | 674.321 |
| SS34 | 5274.767 | 1530.527 | 674.314 |
| SS35 | 5275.592 | 1544.498 | 674.312 |
| SS36 | 5280.637 | 1622.436 | 674.311 |
| SS37 | 5281.657 | 1636.567 | 674.319 |
| SS38 | 5281.675 | 1636.972 | 674.315 |
| SS39 | 5282.649 | 1651.791 | 674.317 |
| SS40 | 5282.681 | 1652.188 | 674.318 |
| SS41 | 5283.633 | 1667.001 | 674.313 |
| SS42 | 5283.657 | 1667.395 | 674.313 |
| SS43 | 5284.602 | 1682.183 | 674.320 |
| SS44 | 5284.637 | 1682.583 | 674.314 |
| SS45 | 5285.598 | 1697.419 | 674.314 |
| SS46 | 5285.636 | 1697.809 | 674.311 |
| SS47 | 5286.598 | 1712.602 | 674.308 |
| SS48 | 5286.622 | 1712.999 | 674.311 |
| SS49 | 5287.551 | 1727.701 | 674.311 |
| SS50 | 5287.593 | 1728.093 | 674.312 |
| SS51 | 5288.562 | 1743.016 | 674.312 |
| SS52 | 5288.587 | 1743.415 | 674.315 |

SCALES (A3 SIZE)



DRAWN

AJN
CHECKED WRH
APPROVED

DESIGNED

CHECKED



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**DAM SAFETY INVESTIGATION
TINAROO FALLS DAM
INSTRUMENTATION LAYOUT**

CONTRACT NUMBER

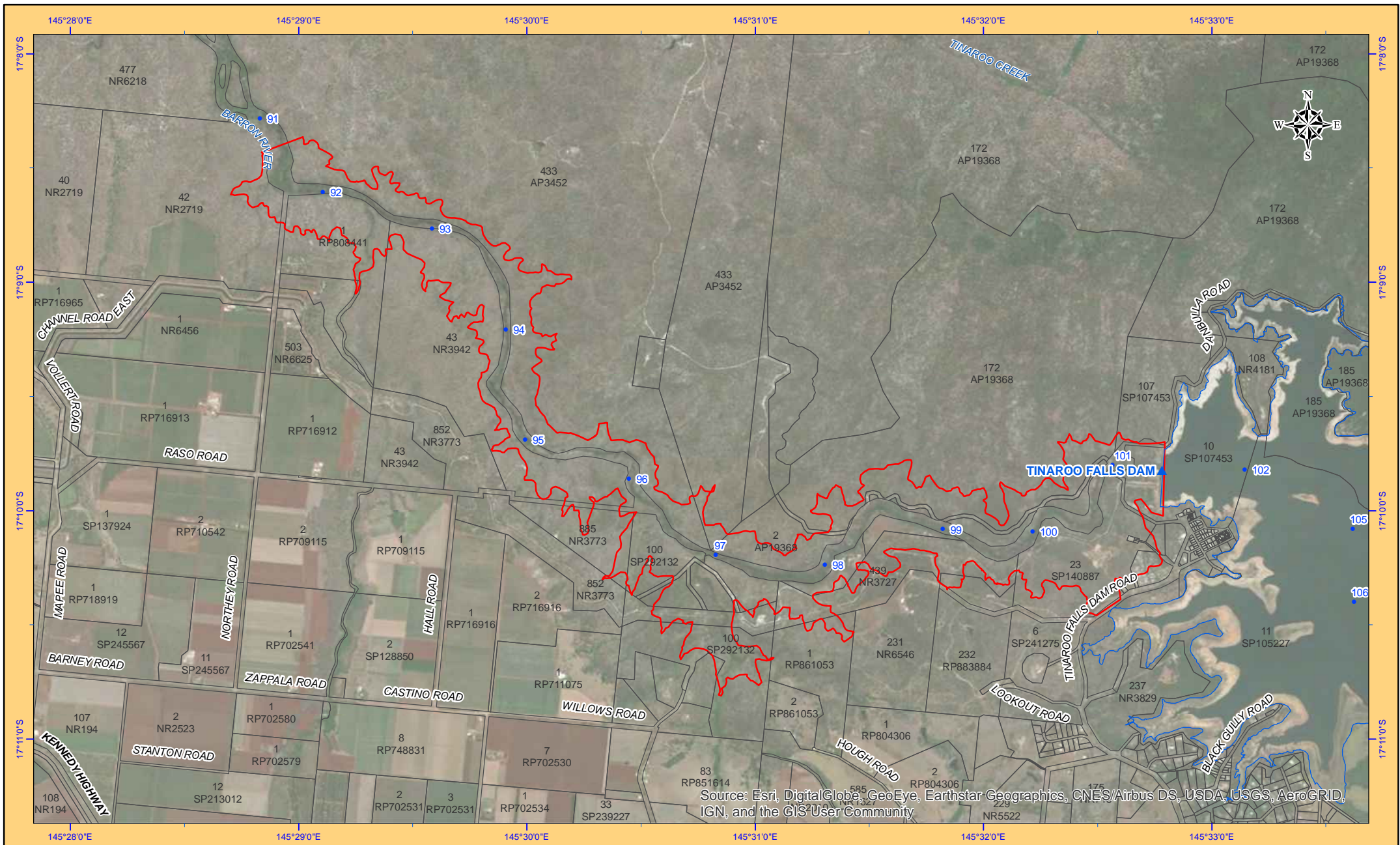
102274

| DATE | APR 97 |
|------|--------|
| A | B C D |

DRAWING PRODUCED BY:
 SUNWATER LIMITED
 179 TURBOT ST.
 BRISBANE QLD 4000
 TEL: (07) 3120 0000
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 03 Oct 2011 9:21 AM

| REVISION | DATE | REMARKS | CKD | PSD |
|----------|------|--------------------------------------|-----|-----|
| 30.06.11 | D | NEW SETTLEMENT PTS & PILLARS IN 2010 | LD | WRH |
| 16.01.09 | C | SCREW 105 | WH | KE |
| 09.02.06 | B | SPILLWAY SETTLEMENT POINTS ADDED | | DH |
| 12/03 | A | SURFACE SETTLEMENT POINTS ADDED | AJS | CM |

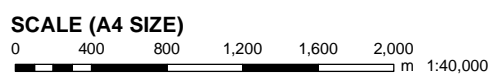
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|--------------------|--------|----------------------------|
| | 239863 | SADDLE DAM INSTRUMENTATION |



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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While every care is taken to ensure the accuracy of this product, SunWater makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose.

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



- LEGEND**
- AMTD (Markers)
 - ◌ Dam Full Supply Level
 - ◌ Limit of Downstream Notification Area

**TINAROO FALLS DAM
DOWNSTREAM NOTIFICATION AREA**

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



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DRAWING No. 250722 B

Appendix B3: DAM BREAK ANALYSIS INUNDATION PLANS

The following is a complete list of the Inundation maps for Tinaroo Falls Dam (source, 2021 CRA, ref J)

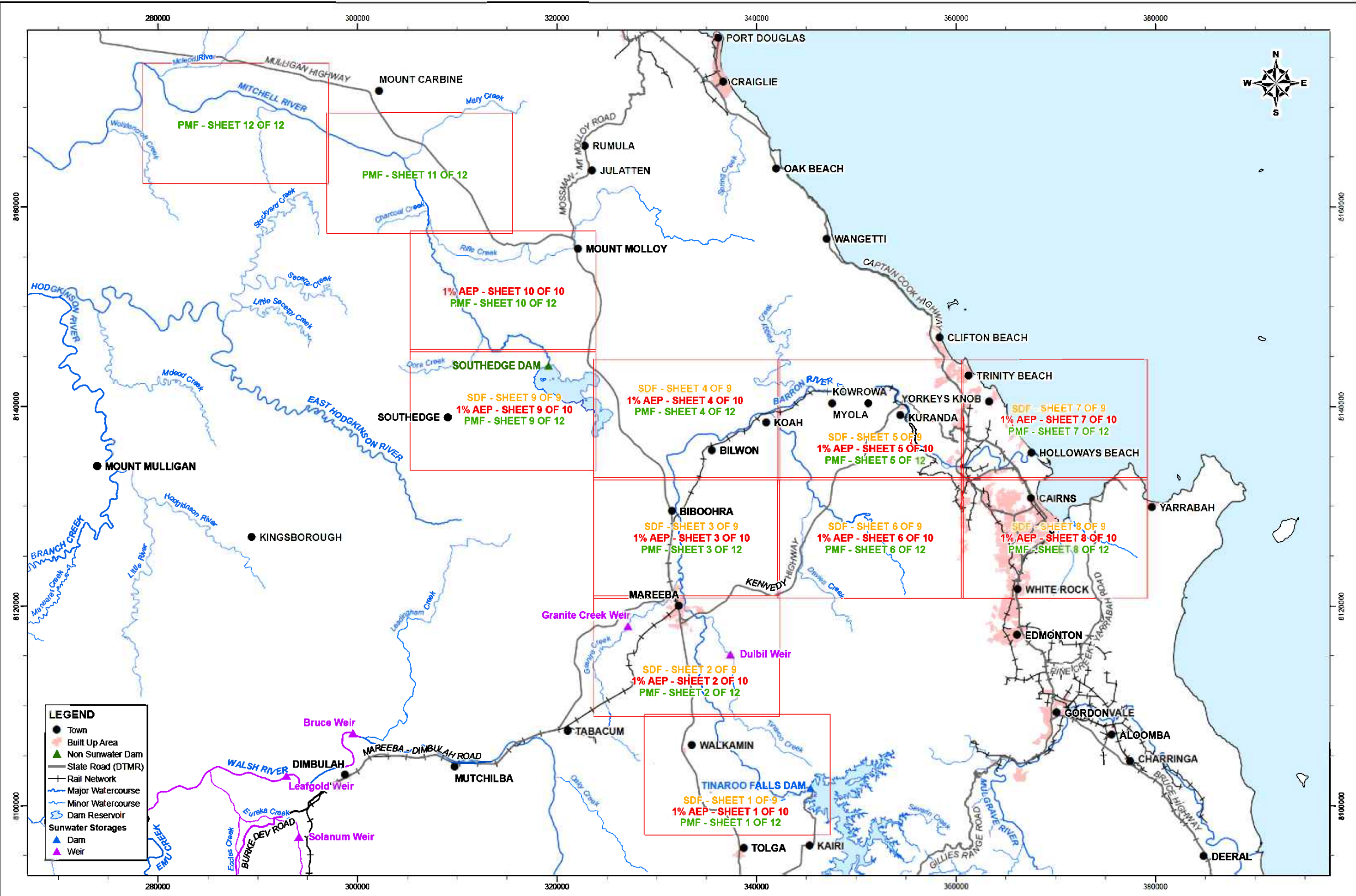
Drawings:

- Keymap
- SDF – Sunny Day Failure
- 1 in 100 AEP Flood
- PMF – Probable Maximum Flood

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.

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Document: SUBW_WaterResource\GIS_Data\SW_Mareeba_Dimbulah_Vess\Transof\allDam_CRA2022\Drawing\ArchMap\256189-A.mxd
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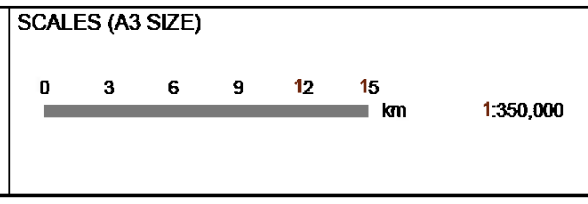


| LEGEND | |
|-------------------|-------------------|
| ● | Town |
| ■ | Built Up Area |
| ▲ | Non Sunwater Dam |
| — | State Road (DTMR) |
| + | Rail Network |
| — | Major Watercourse |
| — | Minor Watercourse |
| ○ | Dam Reservoir |
| Sunwater Storages | |
| ▲ | Dam |
| ▲ | Weir |

MAP PRODUCED BY:
 SUNWATER LTD
 TEL: (07) 3420 0000

| REVISION | DATE | BY | REMARKS |
|----------|------|----|----------------|
| 29/06/22 | A | JJ | ISSUED FOR USE |

| MAP INFORMATION | |
|--|------------------------|
| Projected Coordinate System: Mapping Grid of Australia (MGA2020), Zone 55. | |
| DRAWING REFERENCE | |
| 256190 | Sunny Day Failure |
| 256191 | 1% AEP Flood |
| 256192 | Probable Maximum Flood |



| | | | |
|----------|-----------|-------------|----|
| DRAWN | IDH | DESIGNED | |
| CHECKED | | CHECKED | JJ |
| APPROVED | R. JENSEN | | |
| | 29/6/2022 | RPEQ: 23733 | |

sunwater

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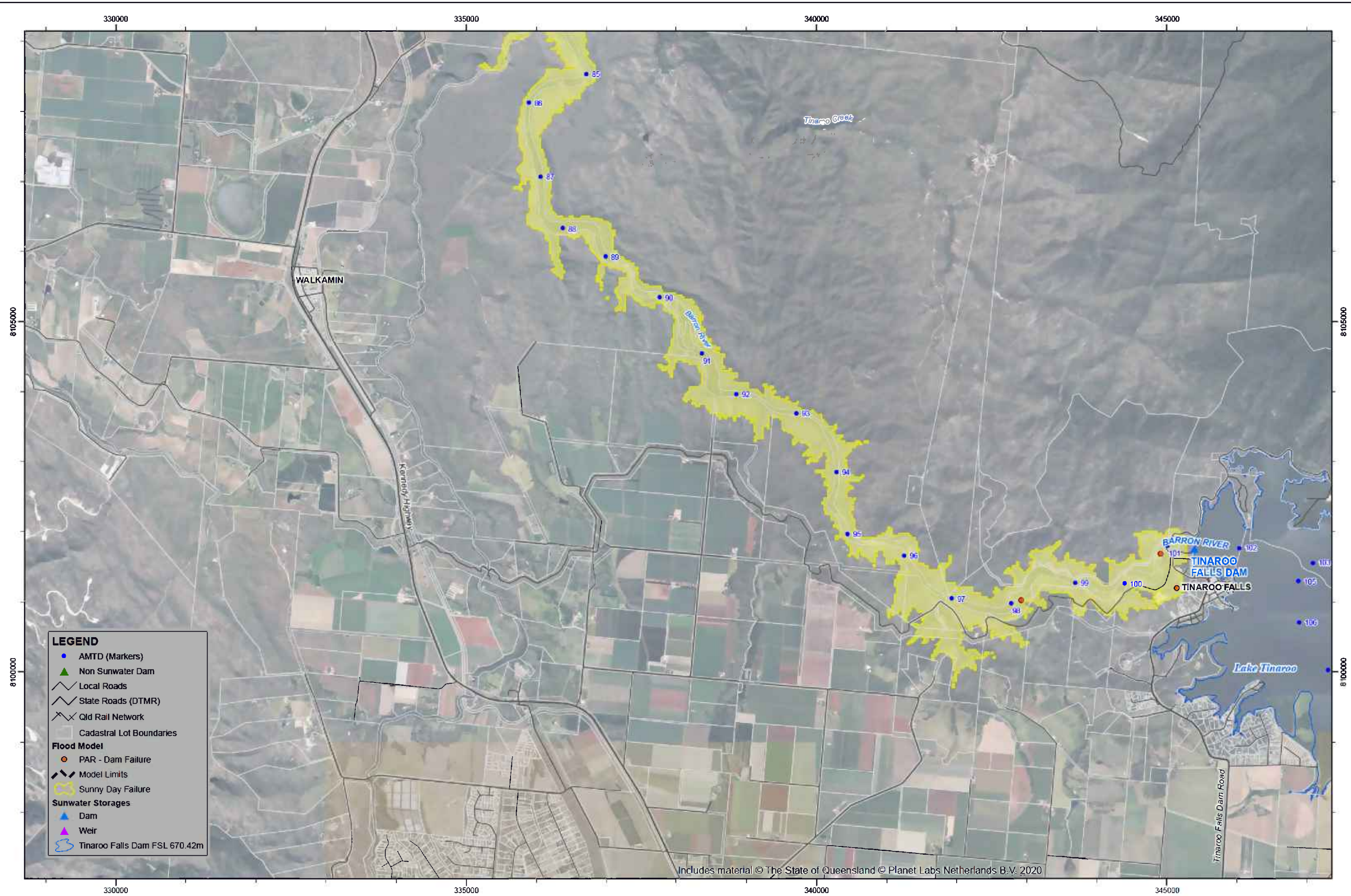
| TINAROO FALLS DAM DAM BREAK ANALYSIS 2022 INUNDATION PLANS KEYMAP | |
|--|-----------|
| DRAWING NUMBER | 256189 |
| REV. | A |
| SHEET 1 OF 1 | |
| DATE | JUNE 2022 |

| CONTRACT NUMBER | |
|-----------------|-----------|
| DRAWING NUMBER | 256189 |
| REV. | A |
| SHEET 1 OF 1 | |
| DATE | JUNE 2022 |

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Document: SUBW_WaterResources\GIS_Data\SW_Mareeba Umbulah WSS\Tinaroo\abDam_CPA2022\Drawings\Arch\Map_256189-A.mxd
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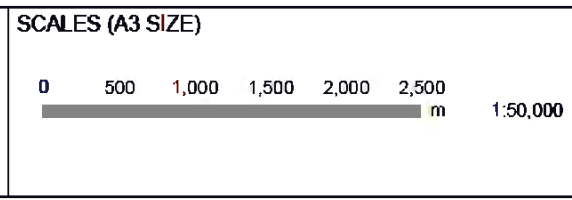
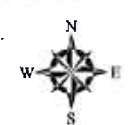
MAP PRODUCED BY:
 WATER RESOURCES & DAM SAFETY
 TEL: (07) 3120 0000



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| REVISION | DATE | BY | CHKD | REMARKS |
|----------|------|-----|------|----------------|
| 29/06/22 | A | JJ | RJ | ISSUED FOR USE |
| | | CKD | PSD | |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap



| | |
|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

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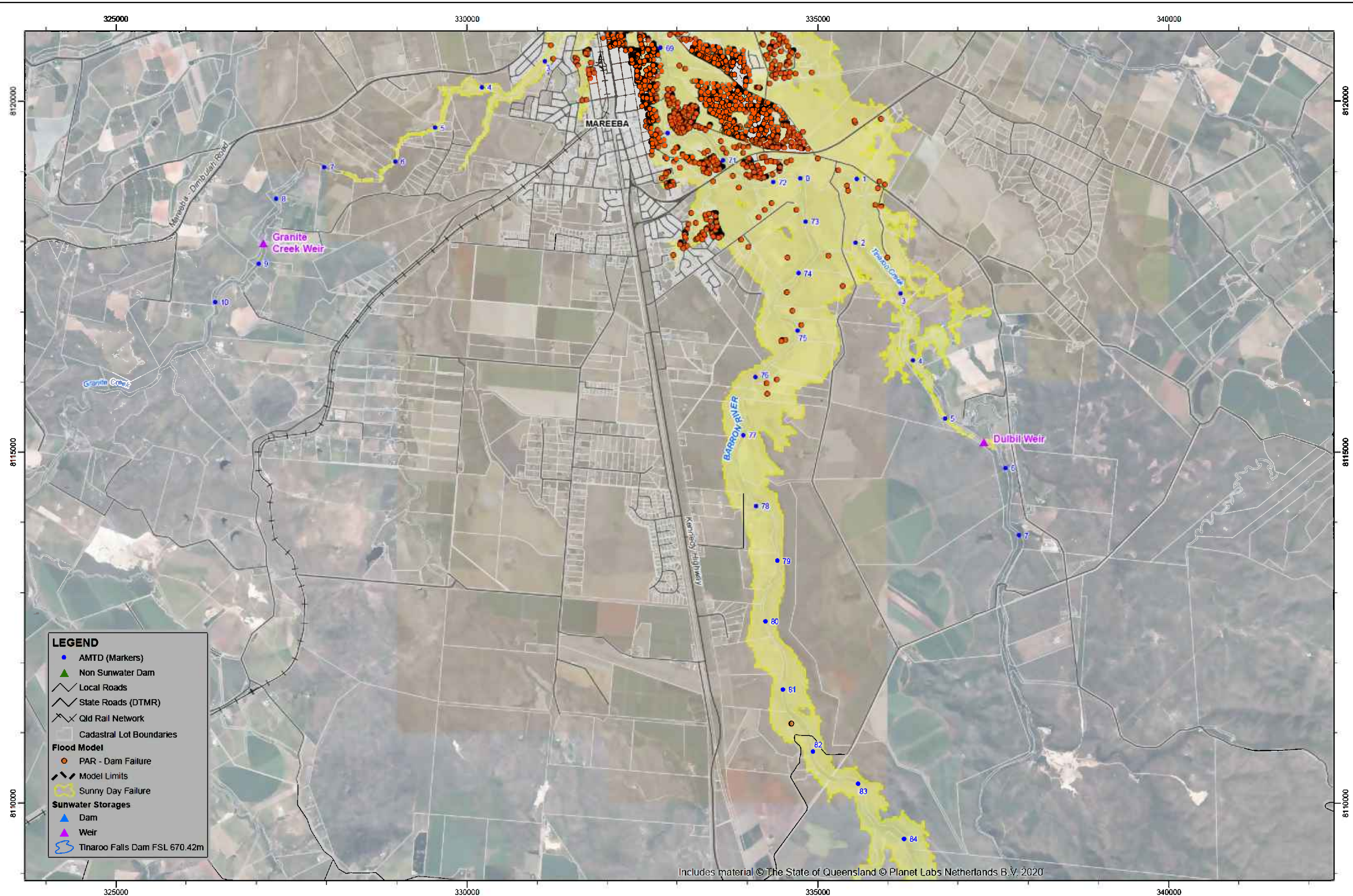
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
| SHEET 1 OF 9 | |
| DATE JUNE 2022 | |

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Document: S:\B\W\WaterResources\GIS_Data\SW_Mareeba_Dimbulah\WSS\TinarooFallsDam_CRA2022\Drawings\ArchMap\256190-A.mxd
 Printed: Wednesday, 29/06/2022 01:38:46 PM

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



LEGEND

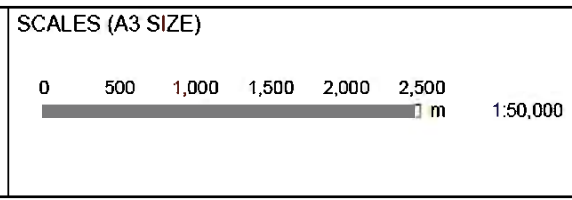
- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Qld Rail Network
- ▭ Cadastral Lot Boundaries
- Flood Model**
- PAR - Dam Failure
- Model Limits
- Sunny Day Failure
- Sunwater Storages**
- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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| REVISION | DATE | BY | REMARKS | CHKD | PSD |
|----------|------|----|----------------|------|-----|
| 29/06/22 | A | JJ | ISSUED FOR USE | RJ | |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55.
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



| | |
|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | |
| CHECKED | CHECKED |
| | JJ |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | |
| | RPEQ: 23733 |

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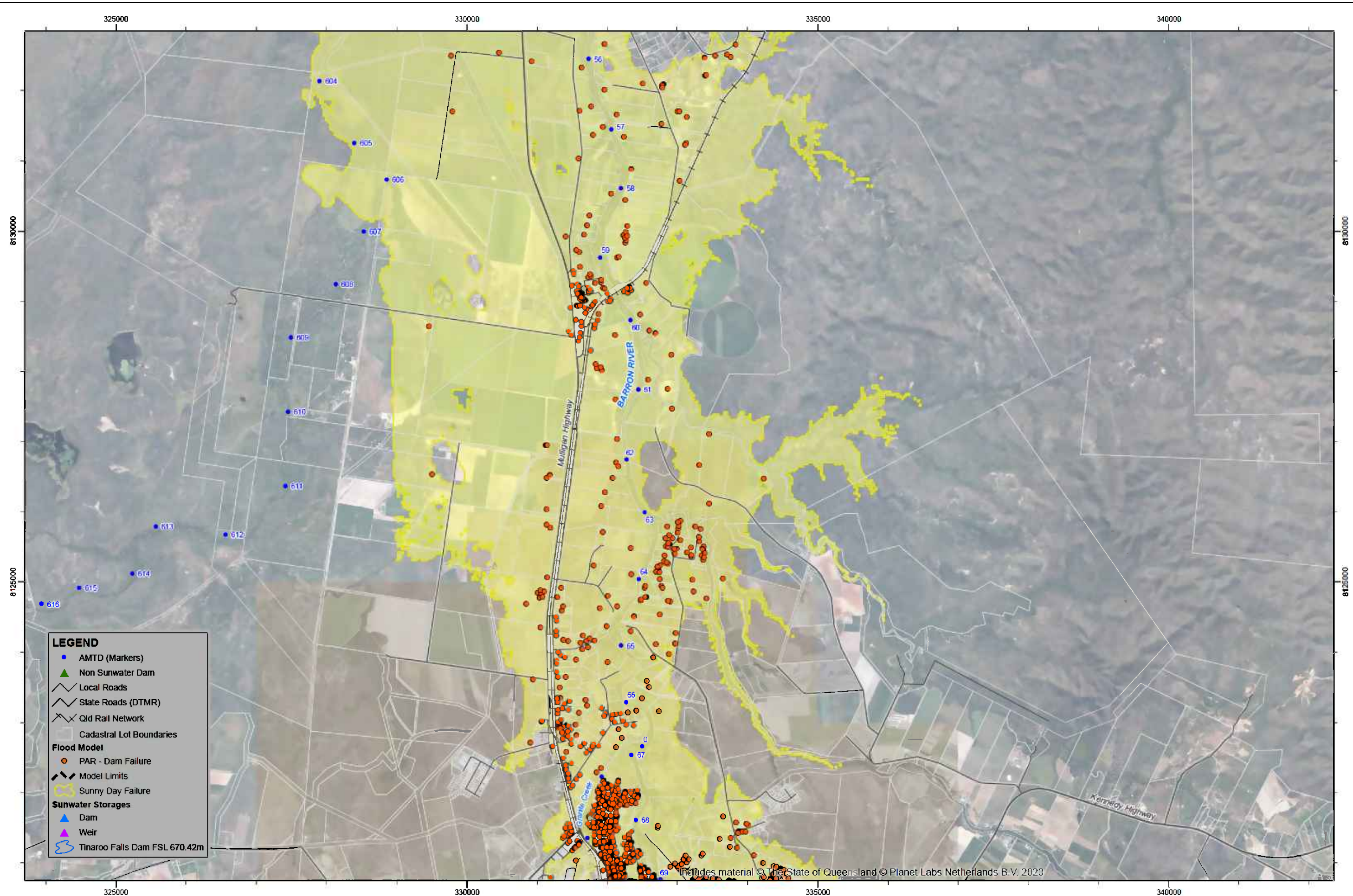
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
| SHEET 2 OF 9 | |
| DATE JUNE 2022 | |

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MAP PRODUCED BY:
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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Qld Rail Network
- ▭ Cadastral Lot Boundaries
- Flood Model**
- PAR - Dam Failure
- Model Limits
- Sunny Day Failure
- Sunwater Storages**
- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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| REVISION | DATE | REMARKS | CKD | PSD |
|----------|------|----------------|-----|-----|
| 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap

SCALES (A3 SIZE)

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

| | |
|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

sunwater

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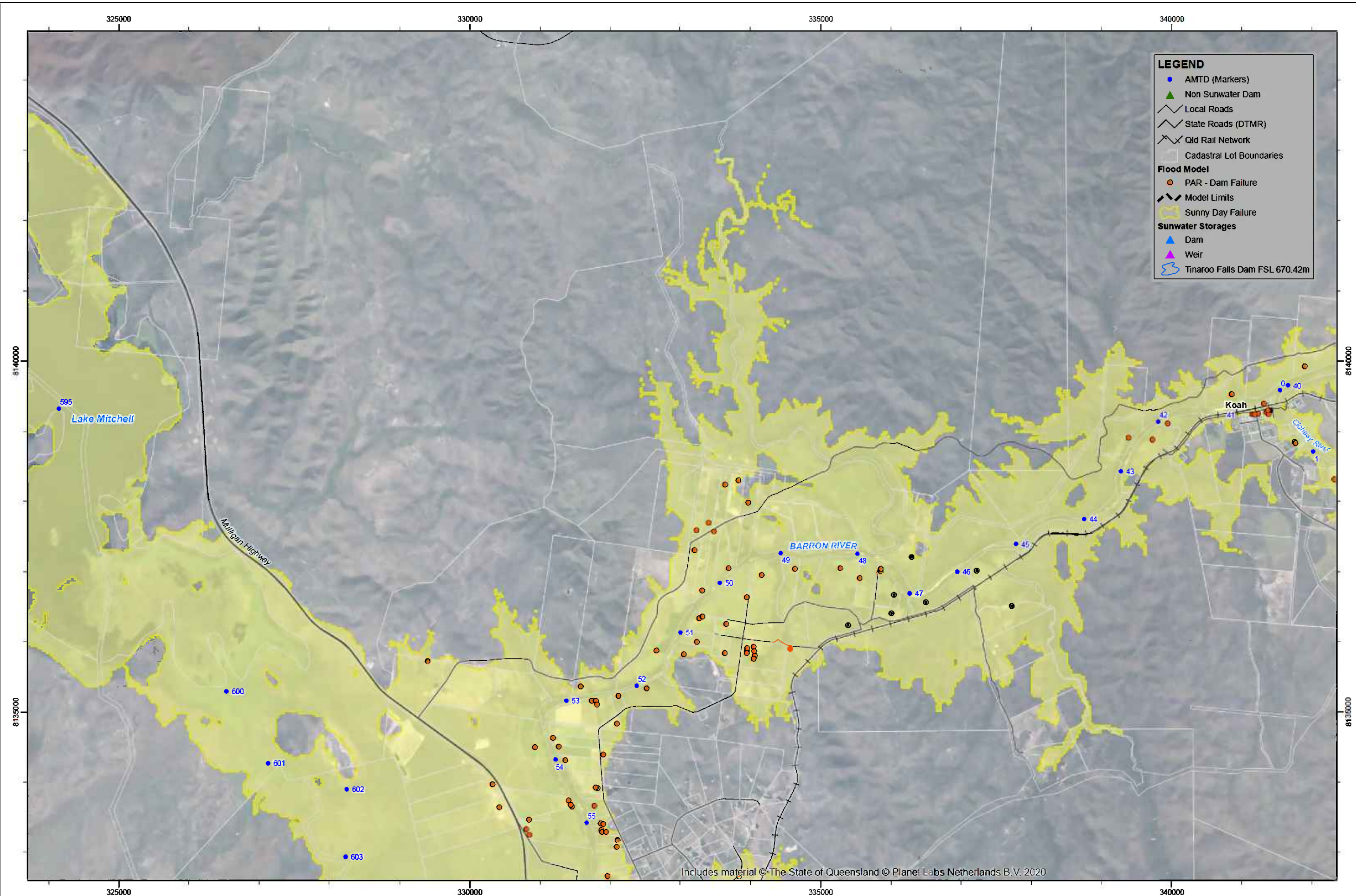
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
| SHEET 3 OF 9 | |
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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Old Rail Network
- ▭ Cadastral Lot Boundaries

Flood Model

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

Sunwater Storages

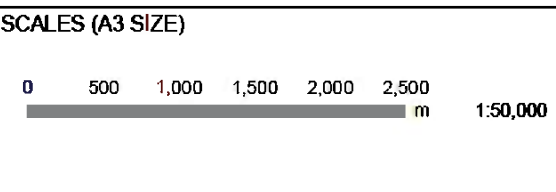
- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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| REVISION | DATE | BY | CHKD | REMARKS |
|----------|------|----|------|----------------|
| 29/06/22 | A | JJ | RJ | ISSUED FOR USE |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



DRAWN IDH
DESIGNED JJ
CHECKED JJ
APPROVED R. JENSEN
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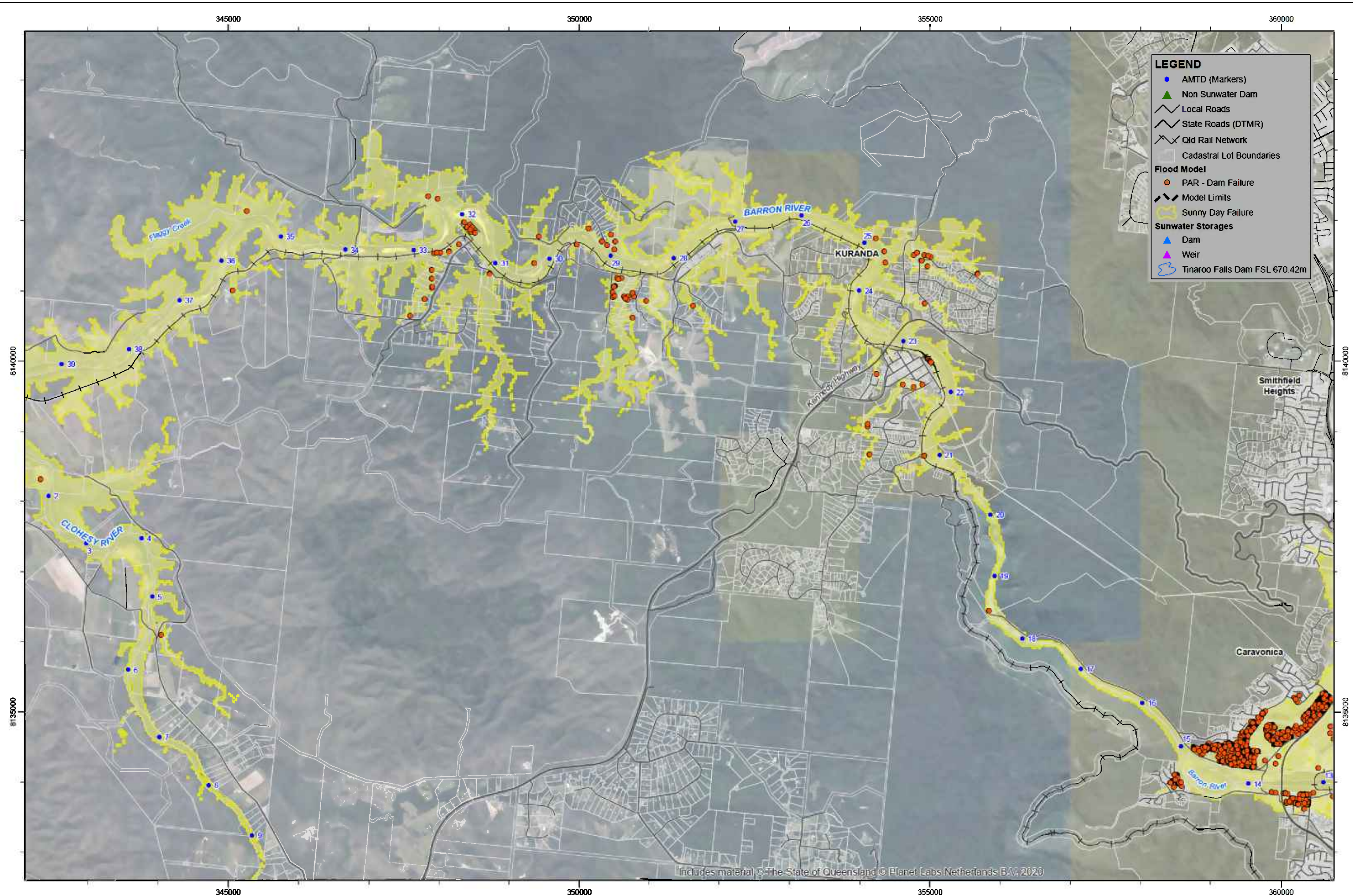
TINAROO FALLS DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
PRIMARY SPILLWAY FAILURE
INUNDATION PLAN

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|------------------------|-------------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
| SHEET 4 OF 9 | |
| DATE JUNE 2022 | |

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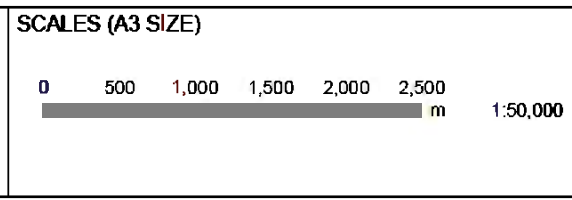


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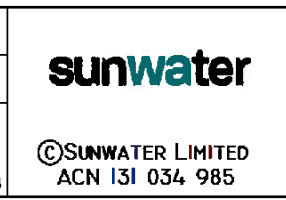
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| 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
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 Levels Datum: Australian Height Datum (AHD).

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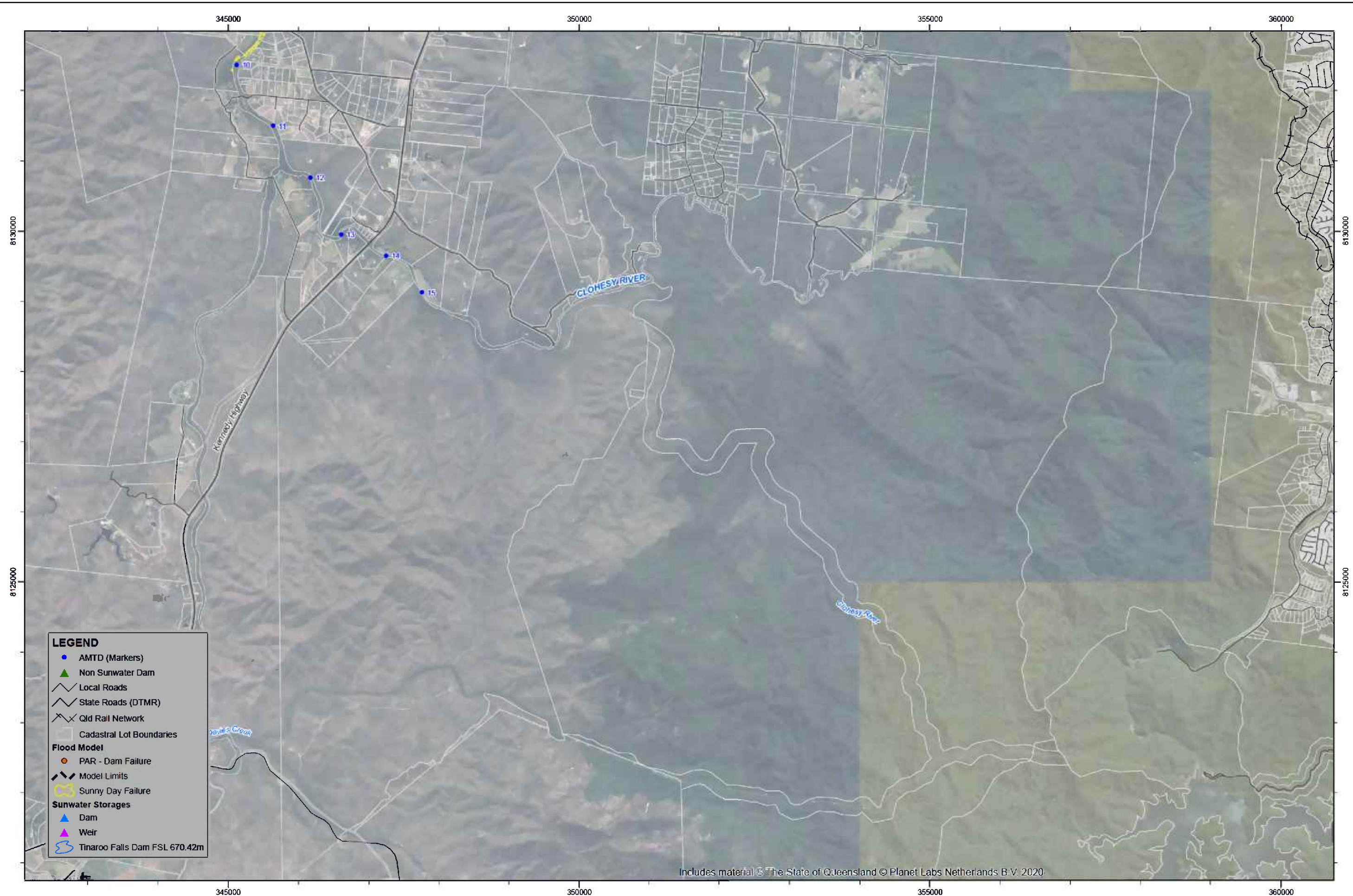
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| CONTRACT NUMBER | |
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| DRAWING NUMBER | REV. |
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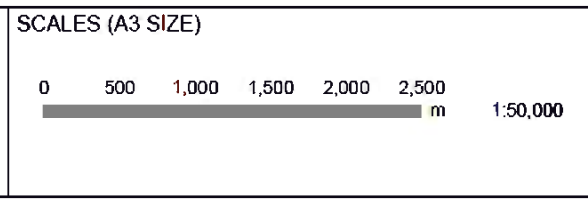
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 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
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| DRAWN | DESIGNED |
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| APPROVED | |
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| 29/6/2022 | |
| RPEQ: 23733 | |

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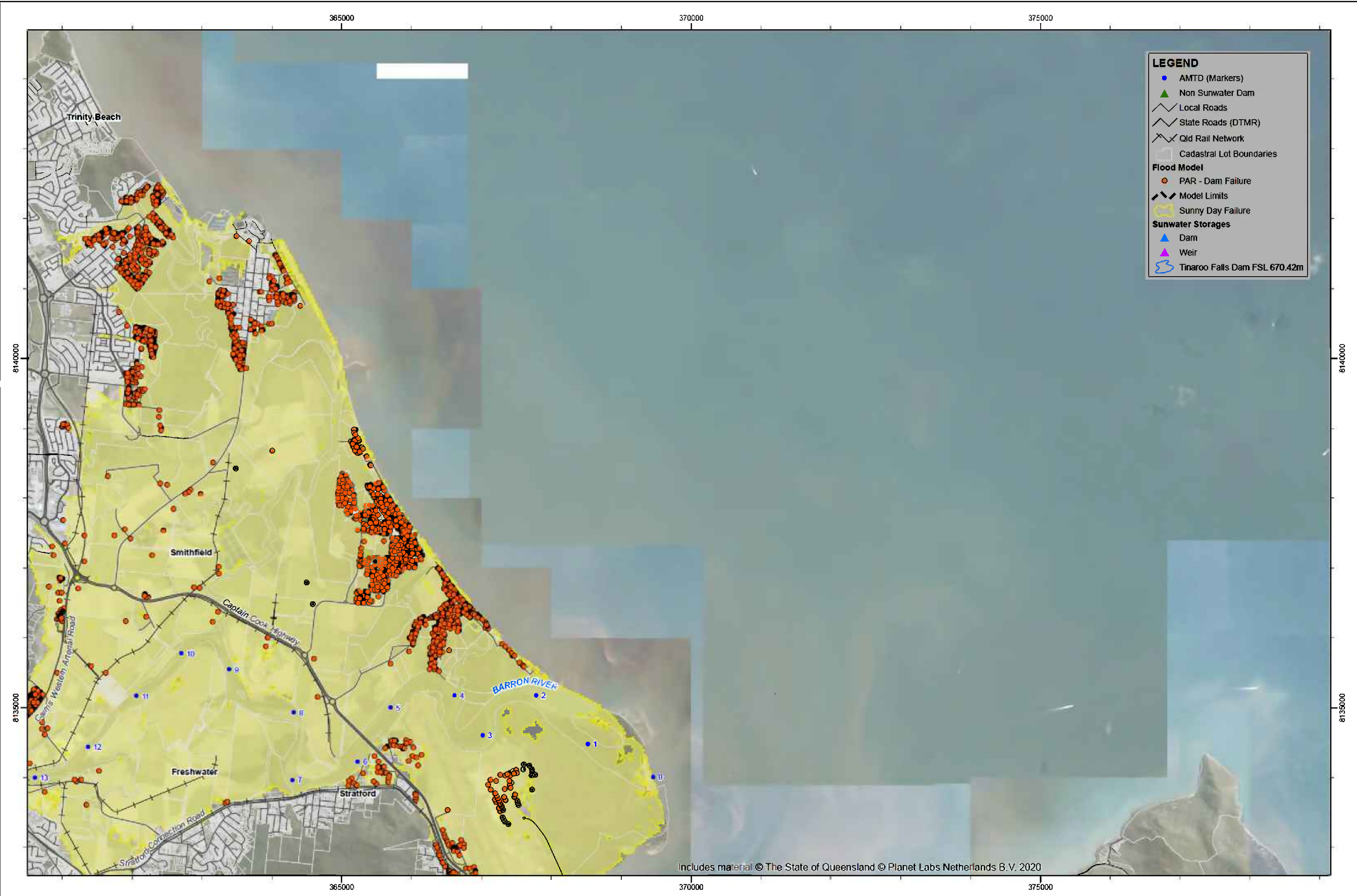
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
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| DATE JUNE 2022 | |

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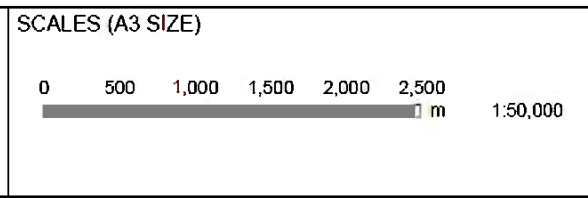


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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55.
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
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| DRAWN | DESIGNED |
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| CHECKED | CHECKED |
| | JJ |
| APPROVED | |
| R. JENSEN | |
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| RPEQ: 23733 | |



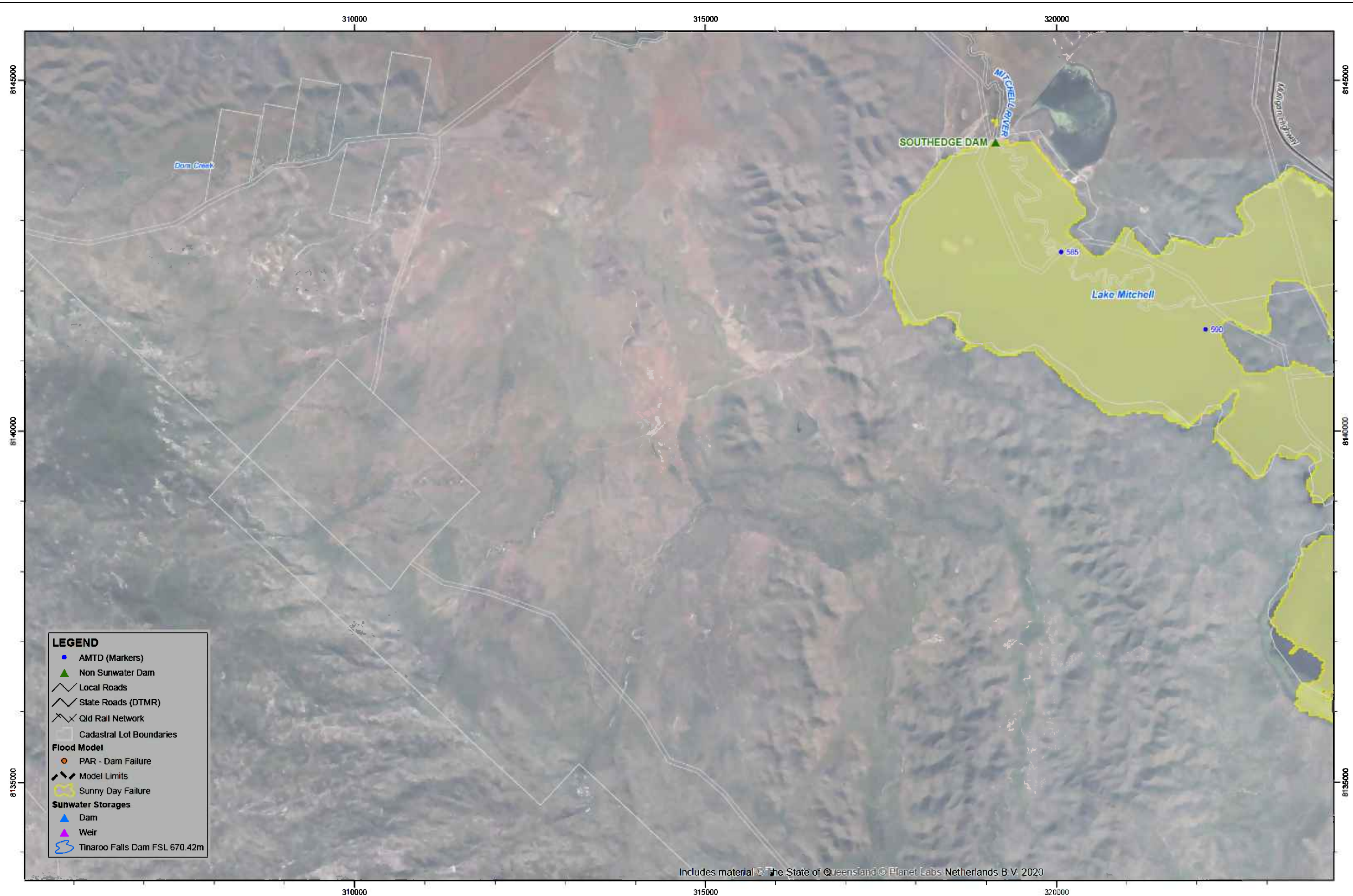
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
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| DATE JUNE 2022 | |

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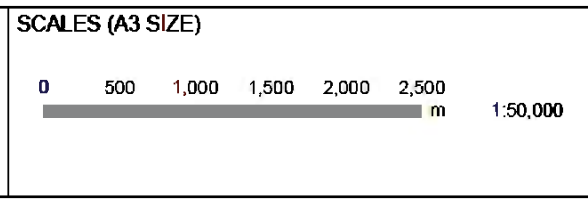
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap



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| RPEQ: 23733 | |

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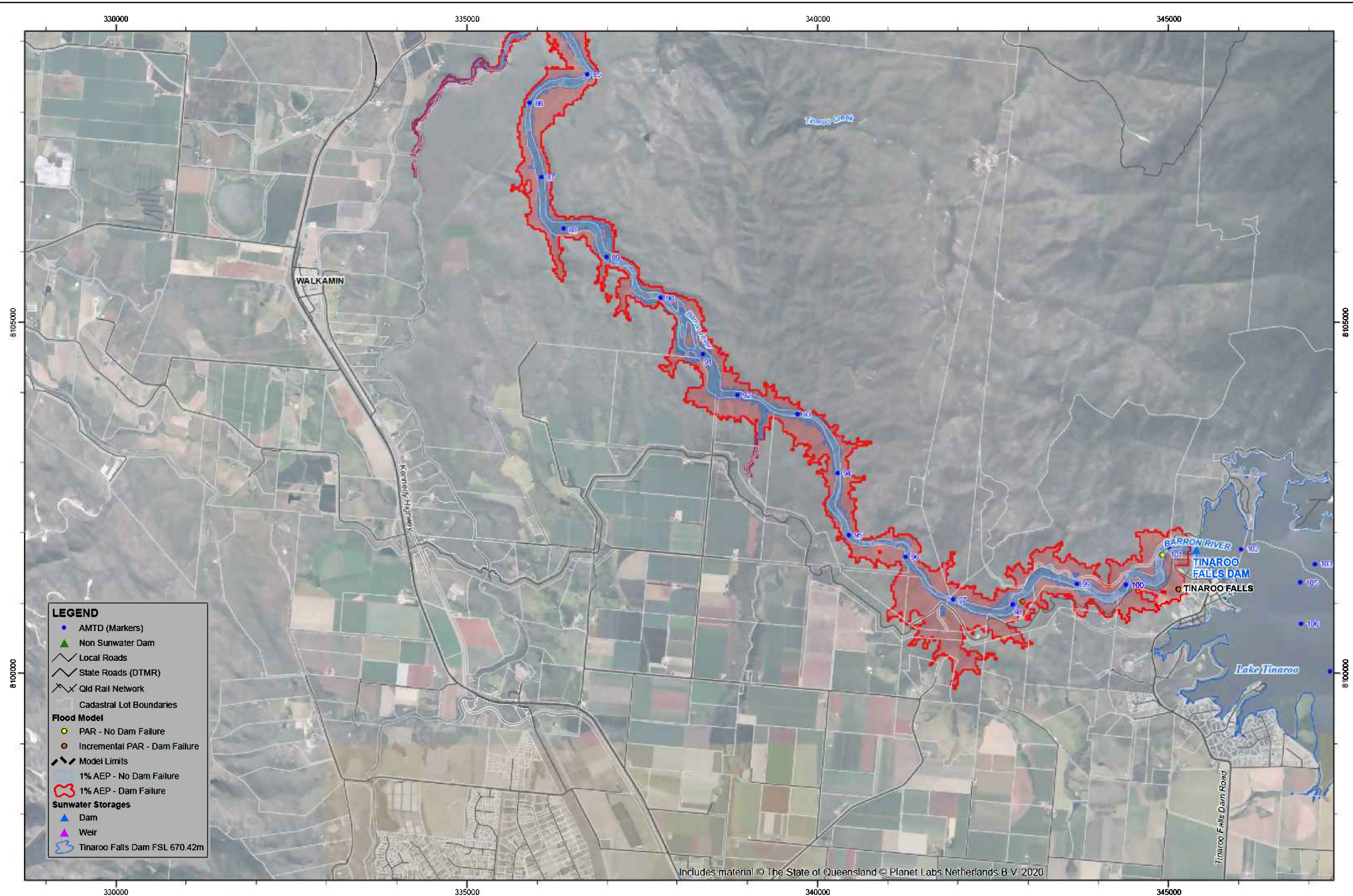
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 SUNNY DAY FAILURE
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256190 | A |
| SHEET 9 OF 9 | |
| DATE JUNE 2022 | |

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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Qld Rail Network
- Cadastral Lot Boundaries
- Flood Model**
- PAR - No Dam Failure
- Incremental PAR - Dam Failure
- Model Limits
- 1% AEP - No Dam Failure
- 1% AEP - Dam Failure
- Sunwater Storages**
- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap

SCALES (A3 SIZE)

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

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| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

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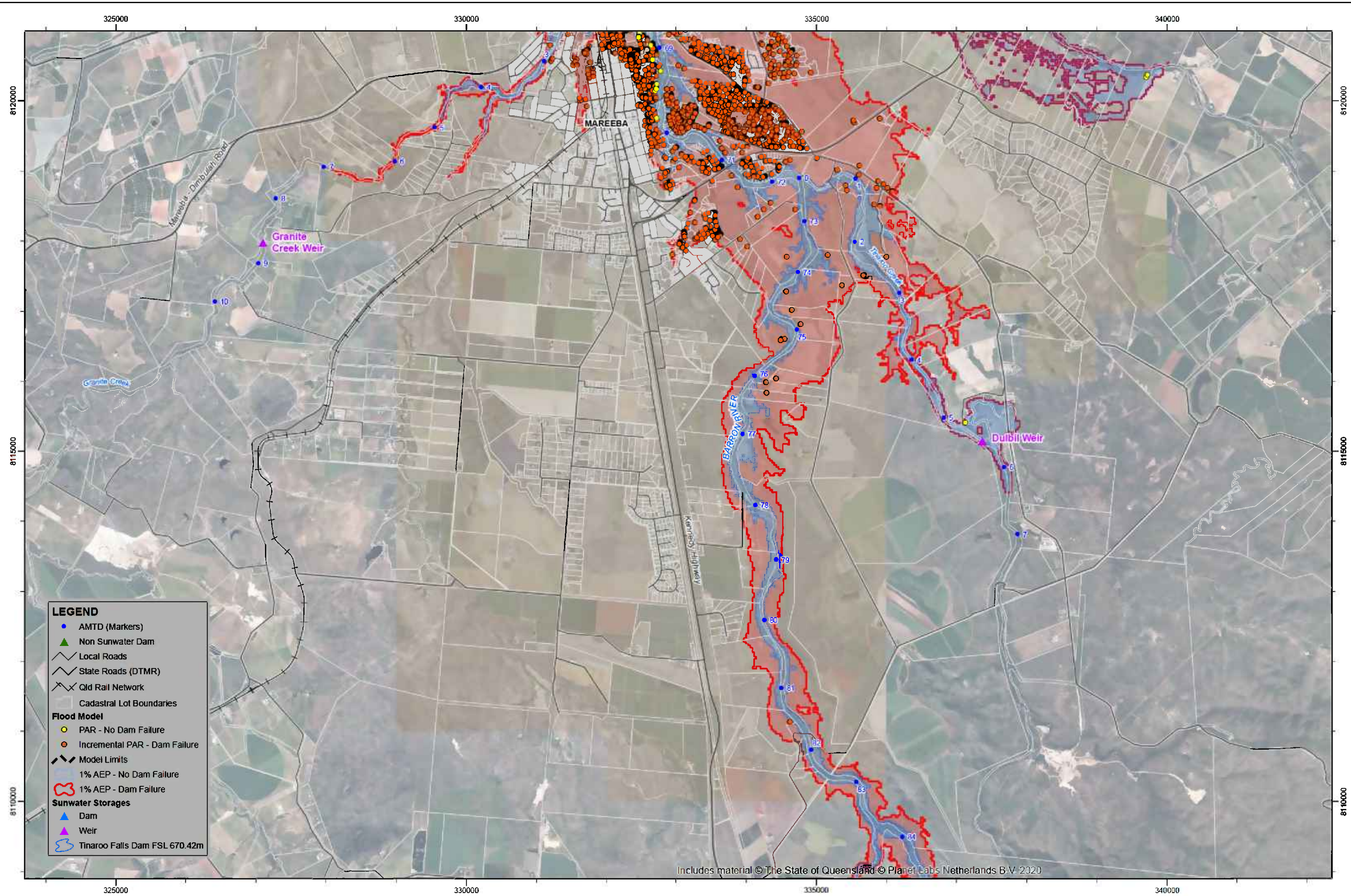
TINAROO FALLS DAM
DAM BREAK ANALYSIS 2022
1% AEP FLOOD (1 IN 100 YEAR)
PRIMARY SPILLWAY FAILURE
INUNDATION PLAN

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256191 | A |
| SHEET 1 OF 10 | |
| DATE JUNE 2022 | |

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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Qld Rail Network
- Cadastral Lot Boundaries

Flood Model

- PAR - No Dam Failure
- Incremental PAR - Dam Failure
- Model Limits
- 1% AEP - No Dam Failure
- 1% AEP - Dam Failure

Sunwater Storages

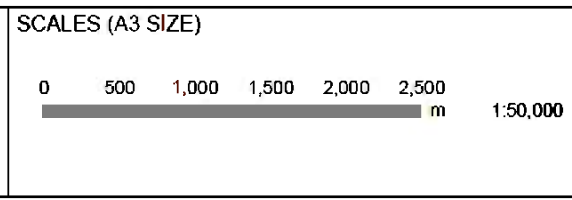
- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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| REVISION | DATE | REMARKS | CKO | PSD |
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
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REFERENCE DRAWINGS
 256189 - Keymap



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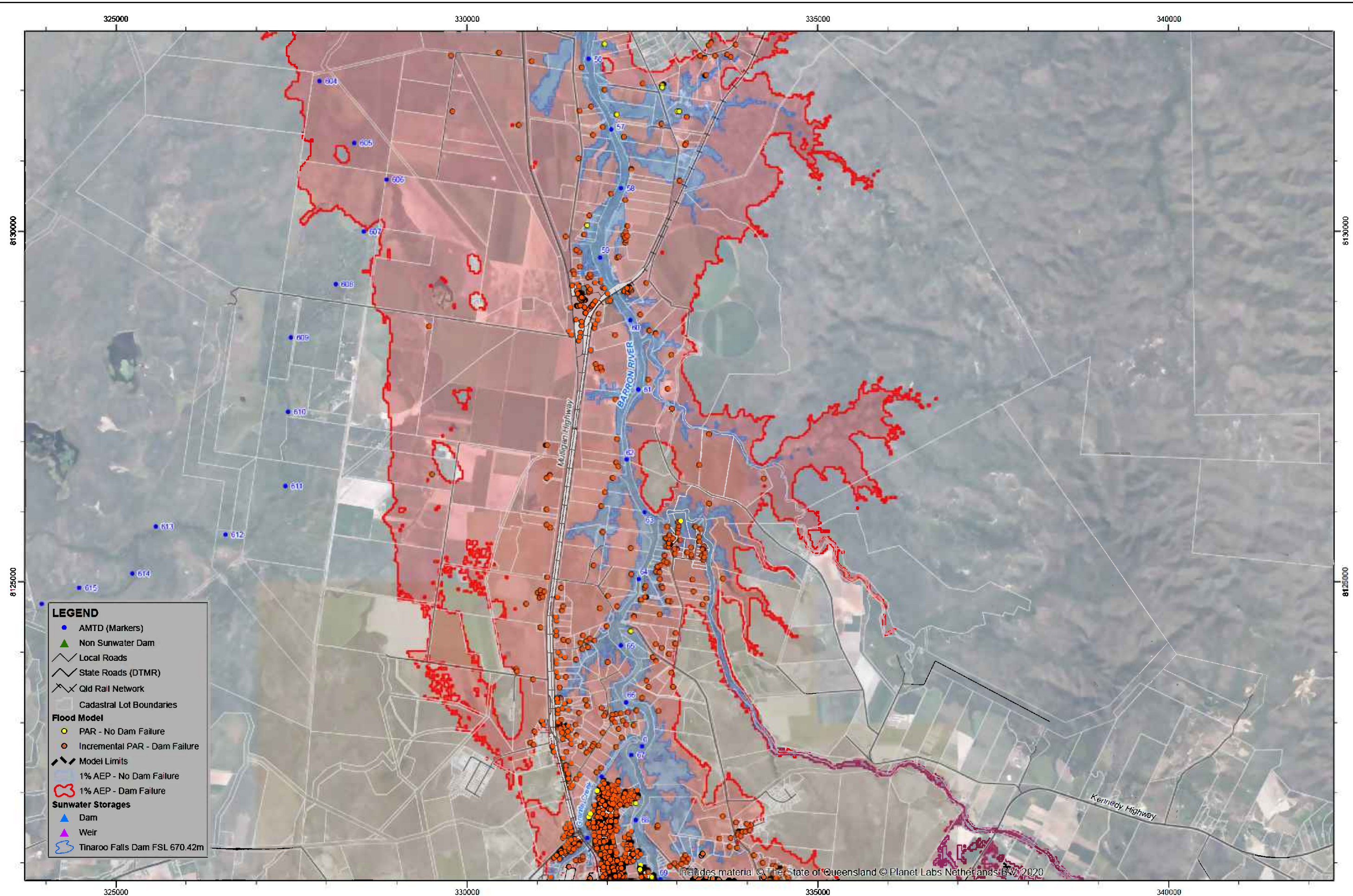
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 1% AEP FLOOD (1 IN 100 YEAR)
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
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| 256191 | A |
| SHEET 2 OF 10 | |
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 TEL: (07) 3120 0000



LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Qld Rail Network
- Cadastral Lot Boundaries
- Flood Model**
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- ▲ Dam
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| REVISION | DATE | REMARKS | CKO | PSD |
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap

SCALES (A3 SIZE)

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| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

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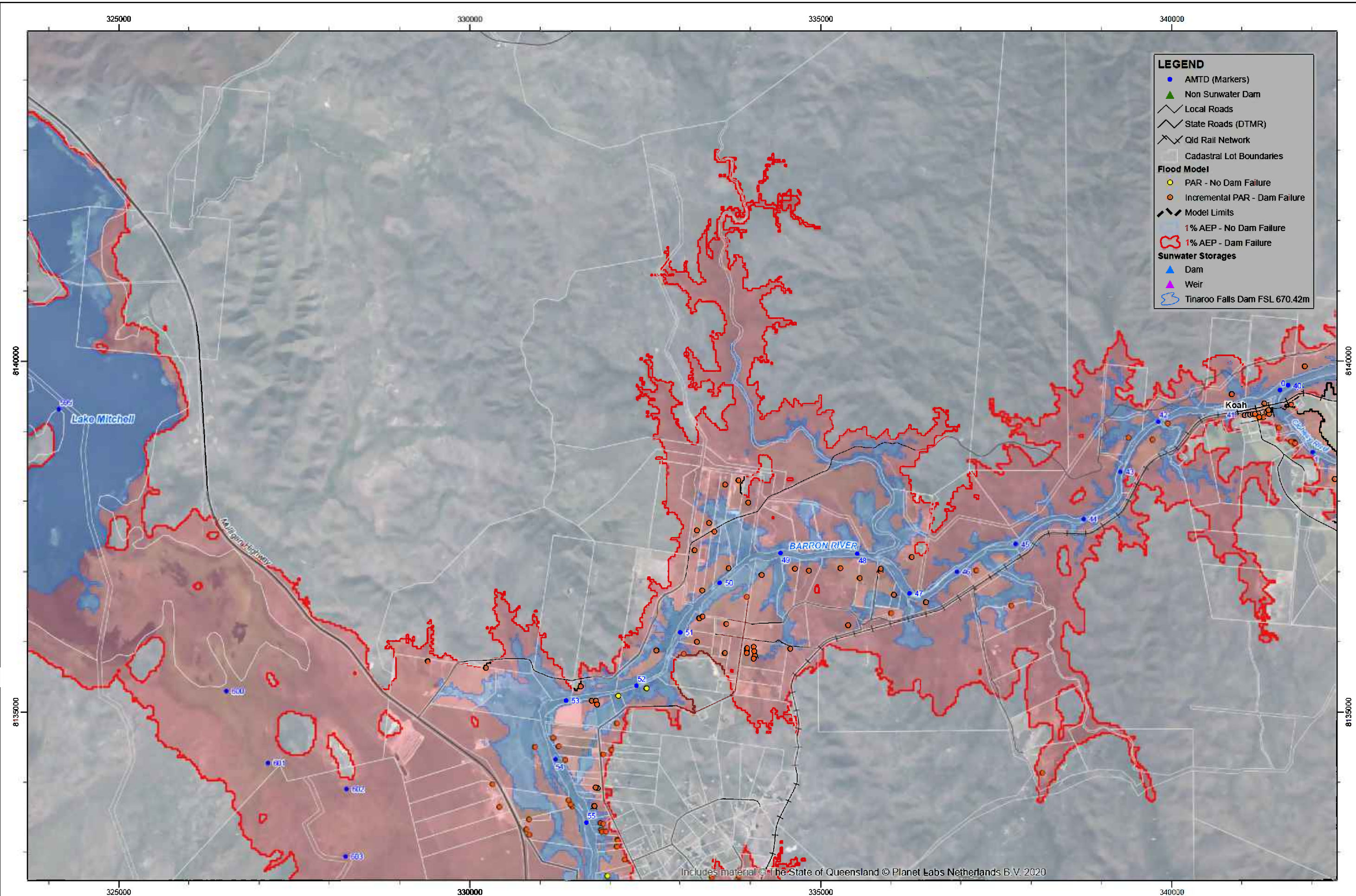
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 1% AEP FLOOD (1 IN 100 YEAR)
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
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- Old Rail Network
- ▭ Cadastral Lot Boundaries

Flood Model

- PAR - No Dam Failure
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- Model Limits
- 1% AEP - No Dam Failure
- 1% AEP - Dam Failure

Sunwater Storages

- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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SCALES (A3 SIZE)

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| IDH | JJ |
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| 29/6/2022 | RPEQ: 23733 |

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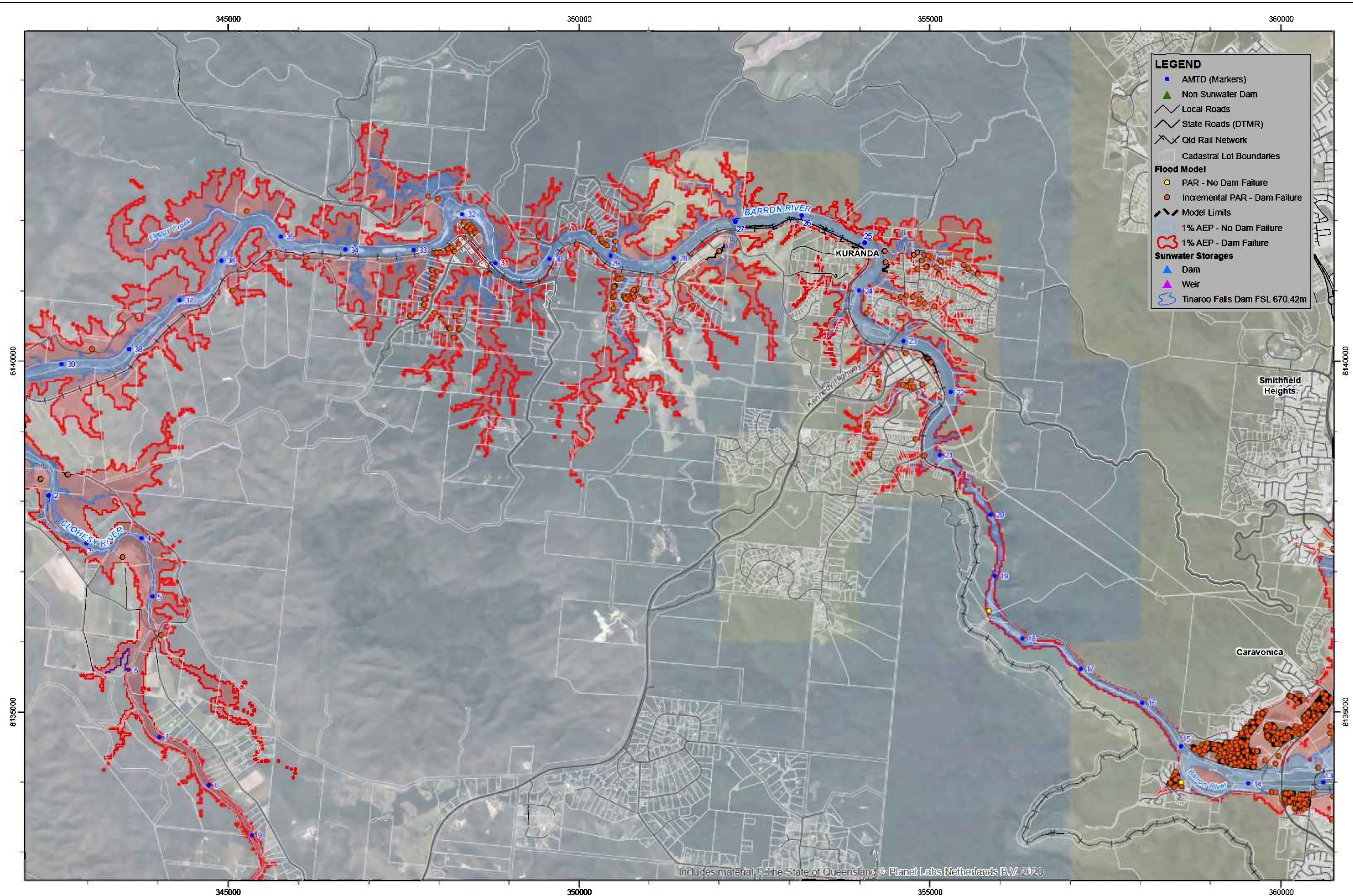
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 1% AEP FLOOD (1 IN 100 YEAR)
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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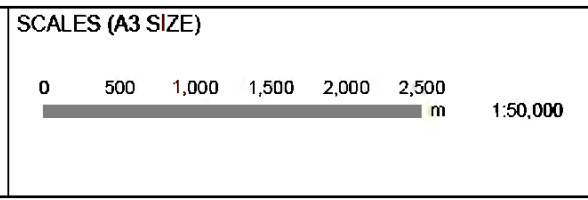


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| 29/06/22 | A | JJ | RJ | ISSUED FOR USE |
| | | CKO | PSD | |

MAP INFORMATION
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| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

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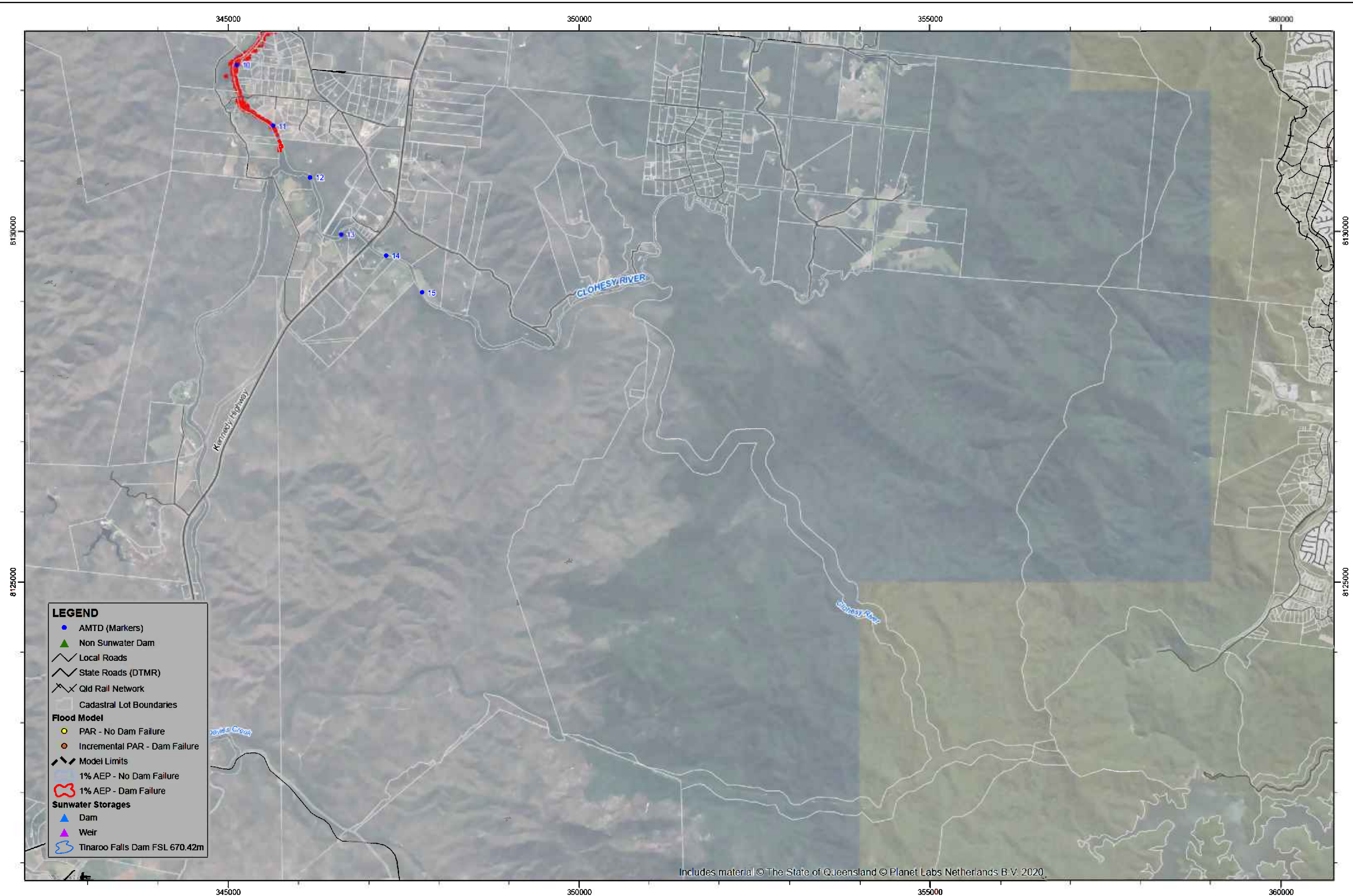
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 1% AEP FLOOD (1 IN 100 YEAR)
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256191 | A |
| SHEET 5 OF 10 | |
| DATE JUNE 2022 | |

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Document: SUBW_WaterResources\GIS_Data\SW_Mareeba\Tributary\WSS1\Tributary\allDam_CPA2022\Drawings\ArchMap\256191-A.mxd
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MAP PRODUCED BY:
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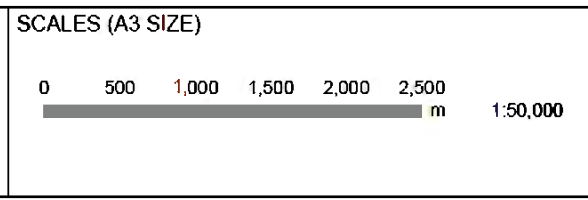


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| REVISION | DATE | BY | REMARKS | CHKD | PSD |
|----------|----------|----|----------------|------|-----|
| | 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



| | |
|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

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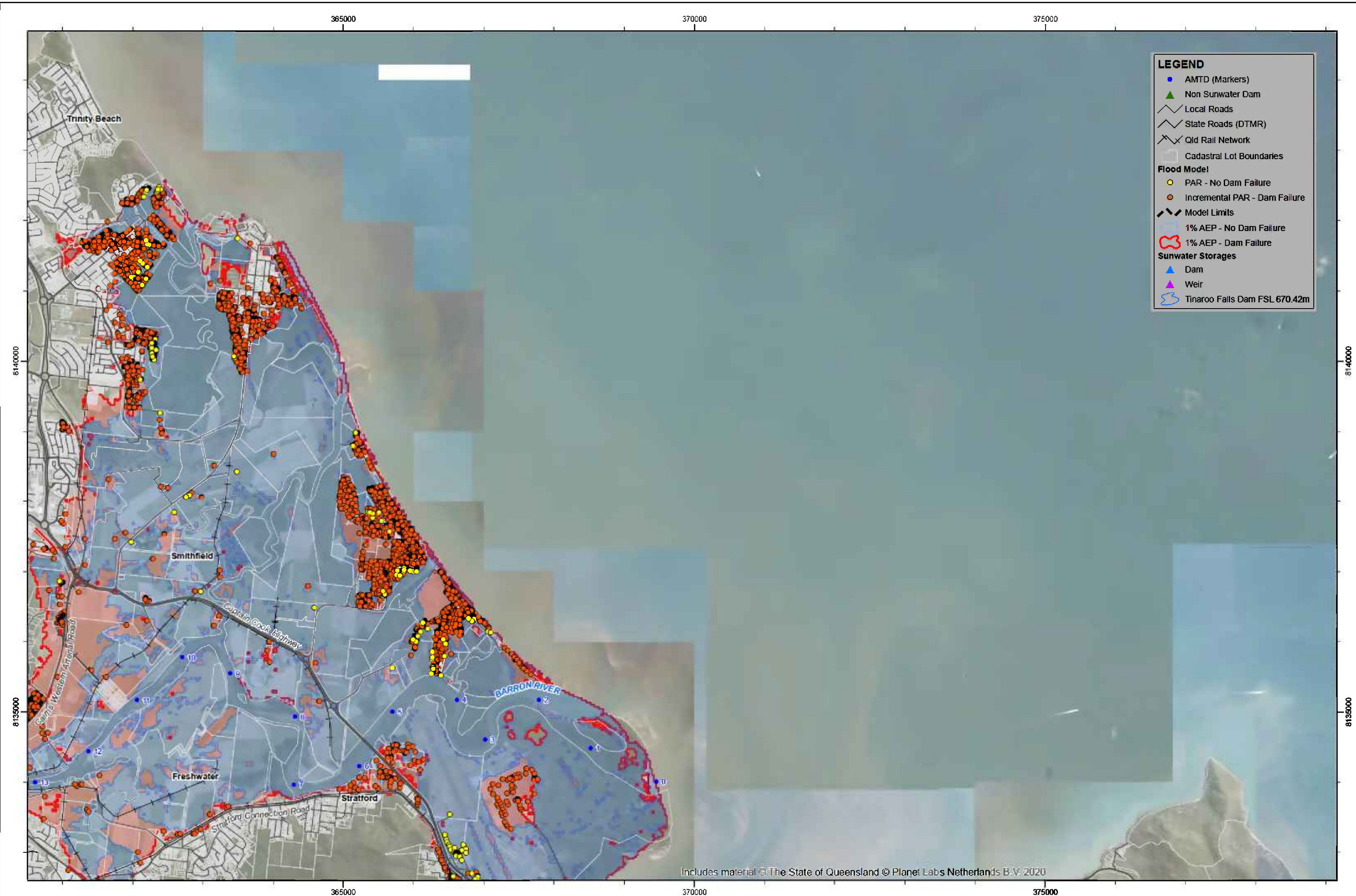
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 1% AEP FLOOD (1 IN 100 YEAR)
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256191 | A |
| SHEET 6 OF 10 | |
| DATE JUNE 2022 | |

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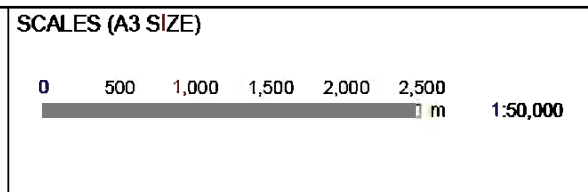


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| REVISION | DATE | REMARKS | CKO | PSD |
|----------|------|----------------|-----|-----|
| 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



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| DRAWN | DESIGNED |
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| APPROVED | |

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 R. JENSEN
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 RPEQ: 23733



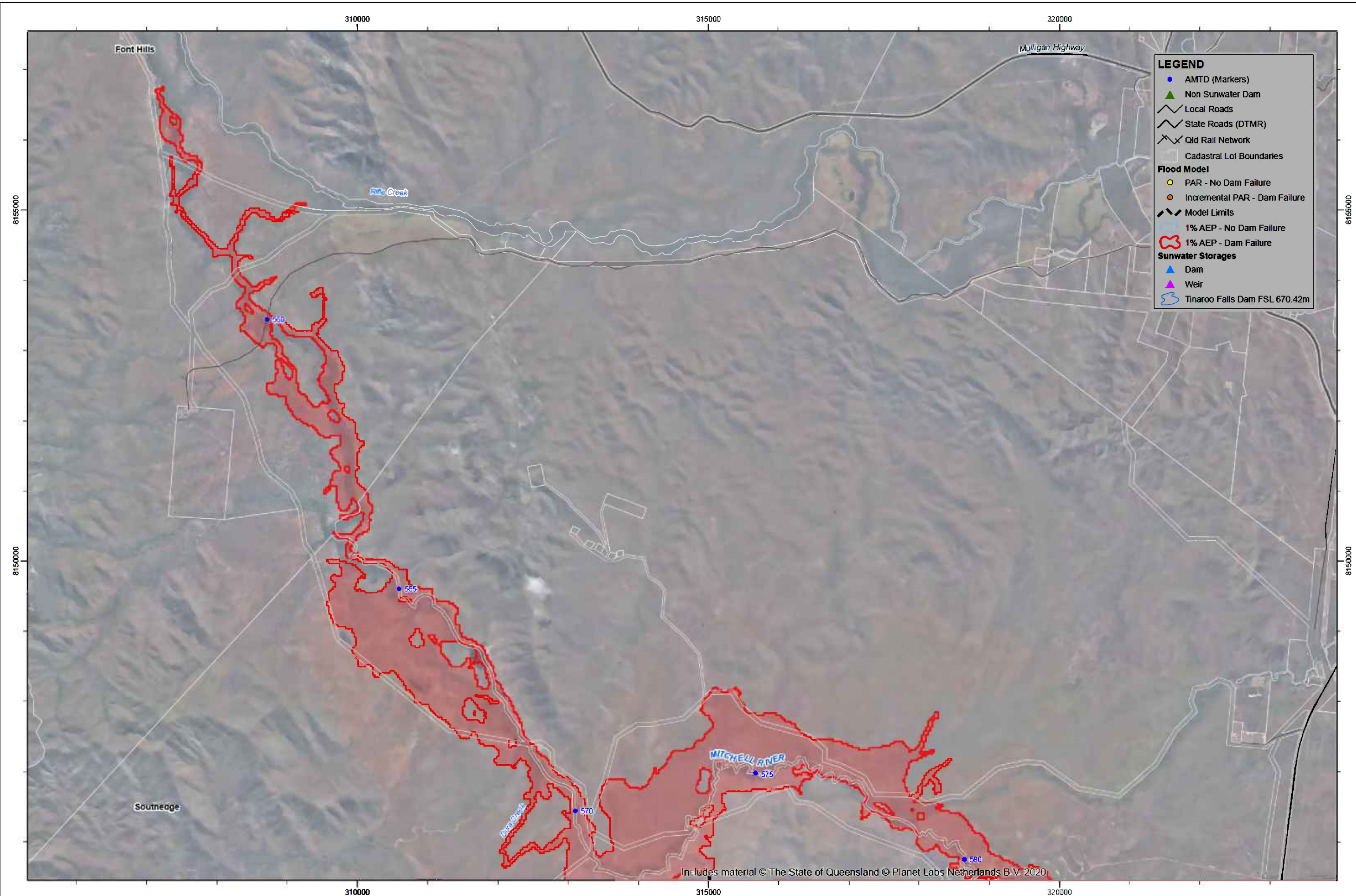
TINAROO FALLS DAM
DAM BREAK ANALYSIS 2022
1% AEP FLOOD (1 IN 100 YEAR)
PRIMARY SPILLWAY FAILURE
INUNDATION PLAN

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256191 | A |
| SHEET 7 OF 10 | |
| DATE JUNE 2022 | |

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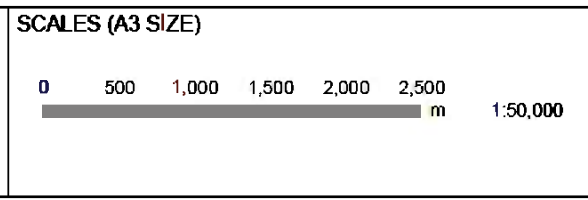
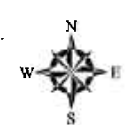
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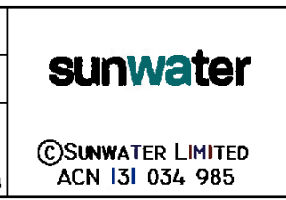
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MAP INFORMATION
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 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap



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 29/6/2022
 RPEQ: 23733



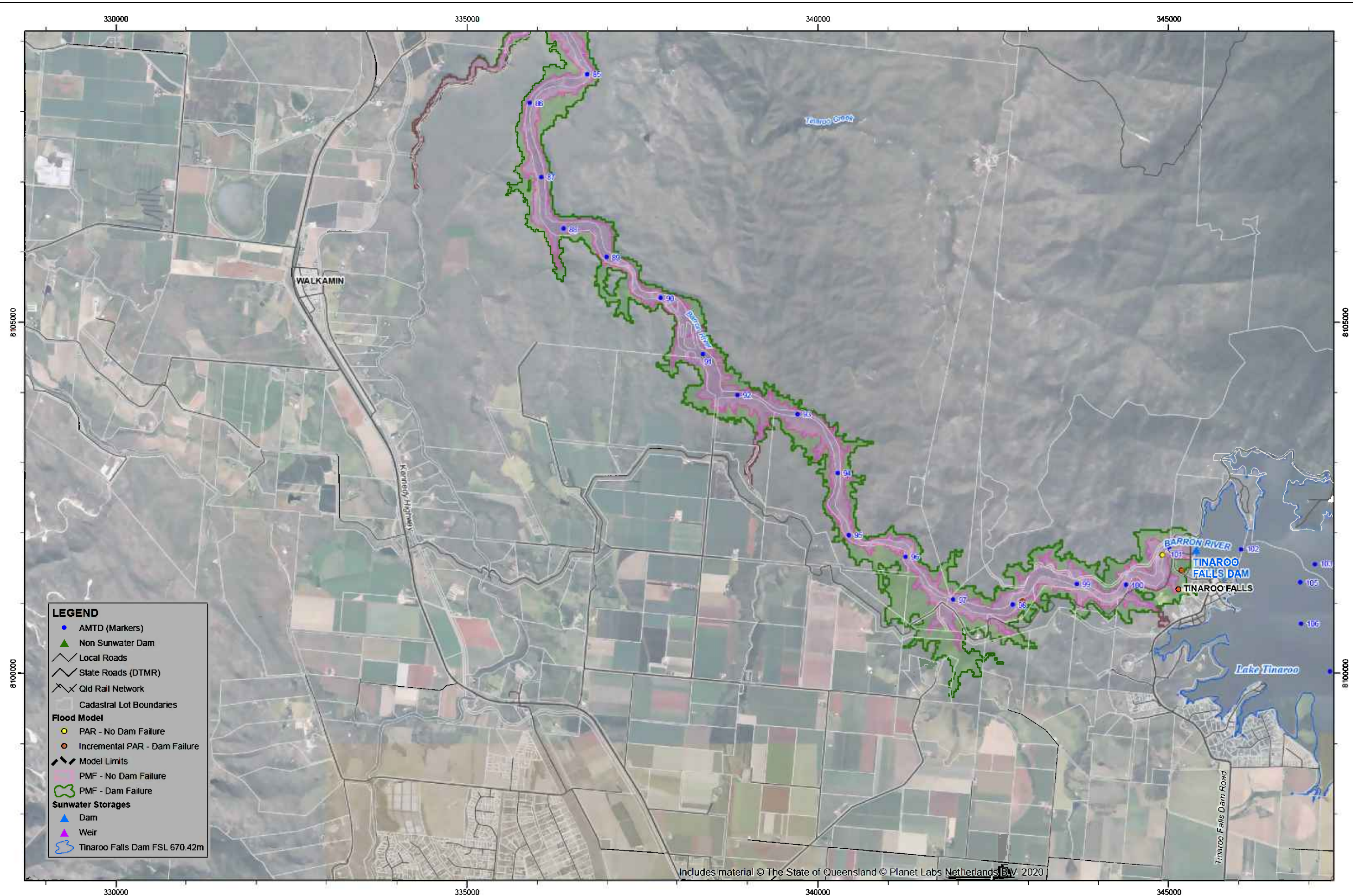
TINAROO FALLS DAM
DAM BREAK ANALYSIS 2022
1% AEP FLOOD (1 IN 100 YEAR)
PRIMARY SPILLWAY FAILURE
INUNDATION PLAN

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| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256191 | A |
| SHEET 10 OF 10 | |
| DATE JUNE 2022 | |

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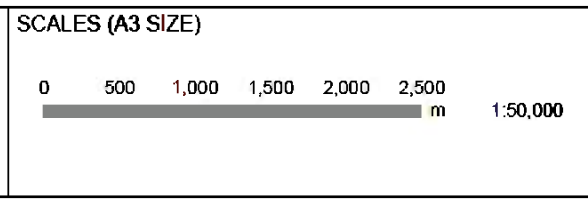


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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

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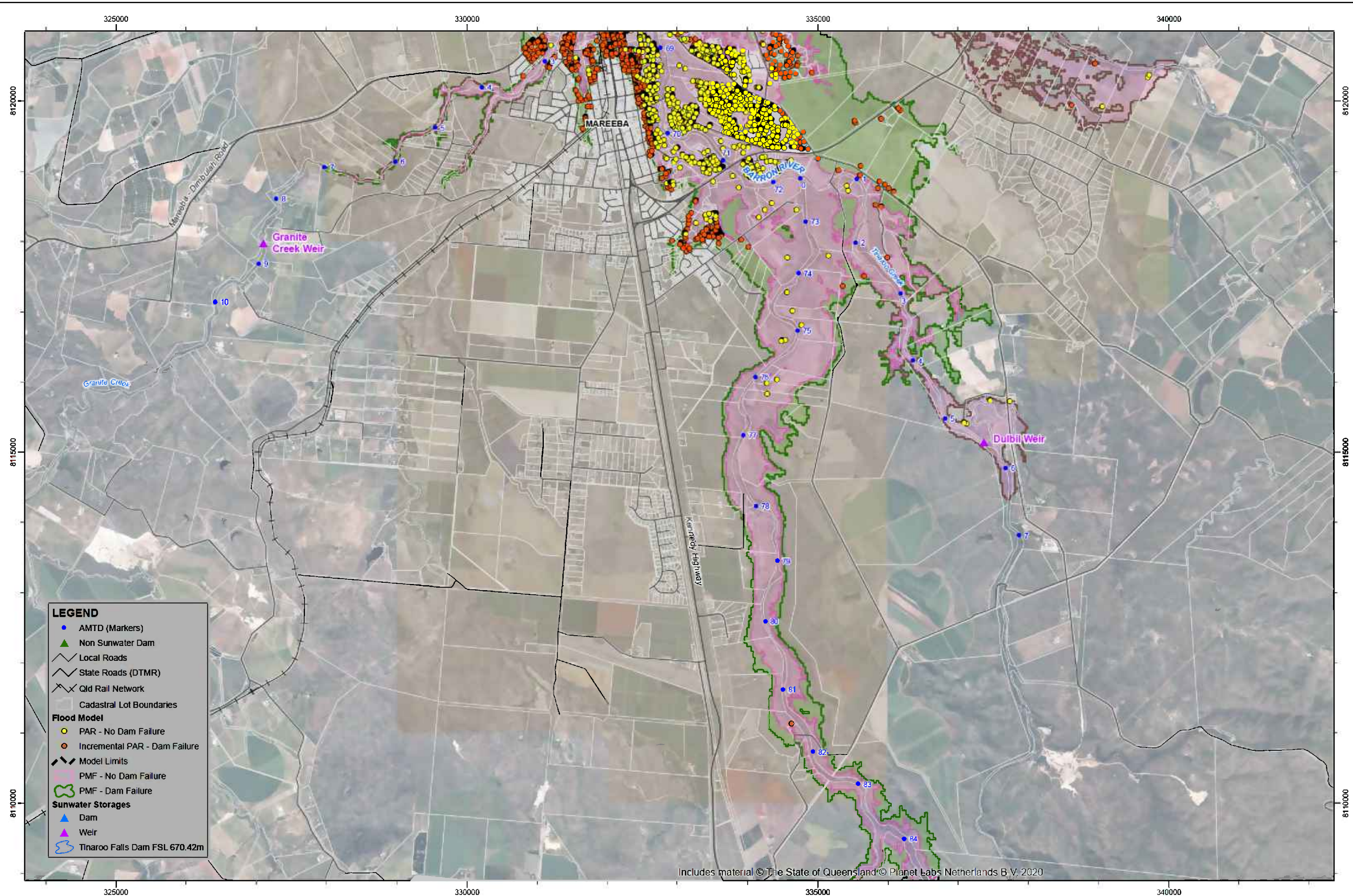
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 1 OF 12 | |
| DATE JUNE 2022 | |

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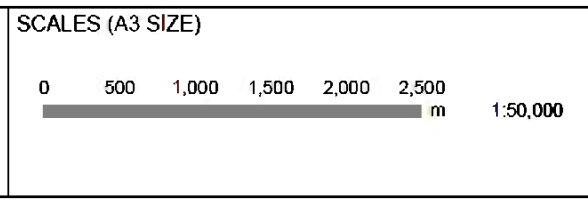
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap



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| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |

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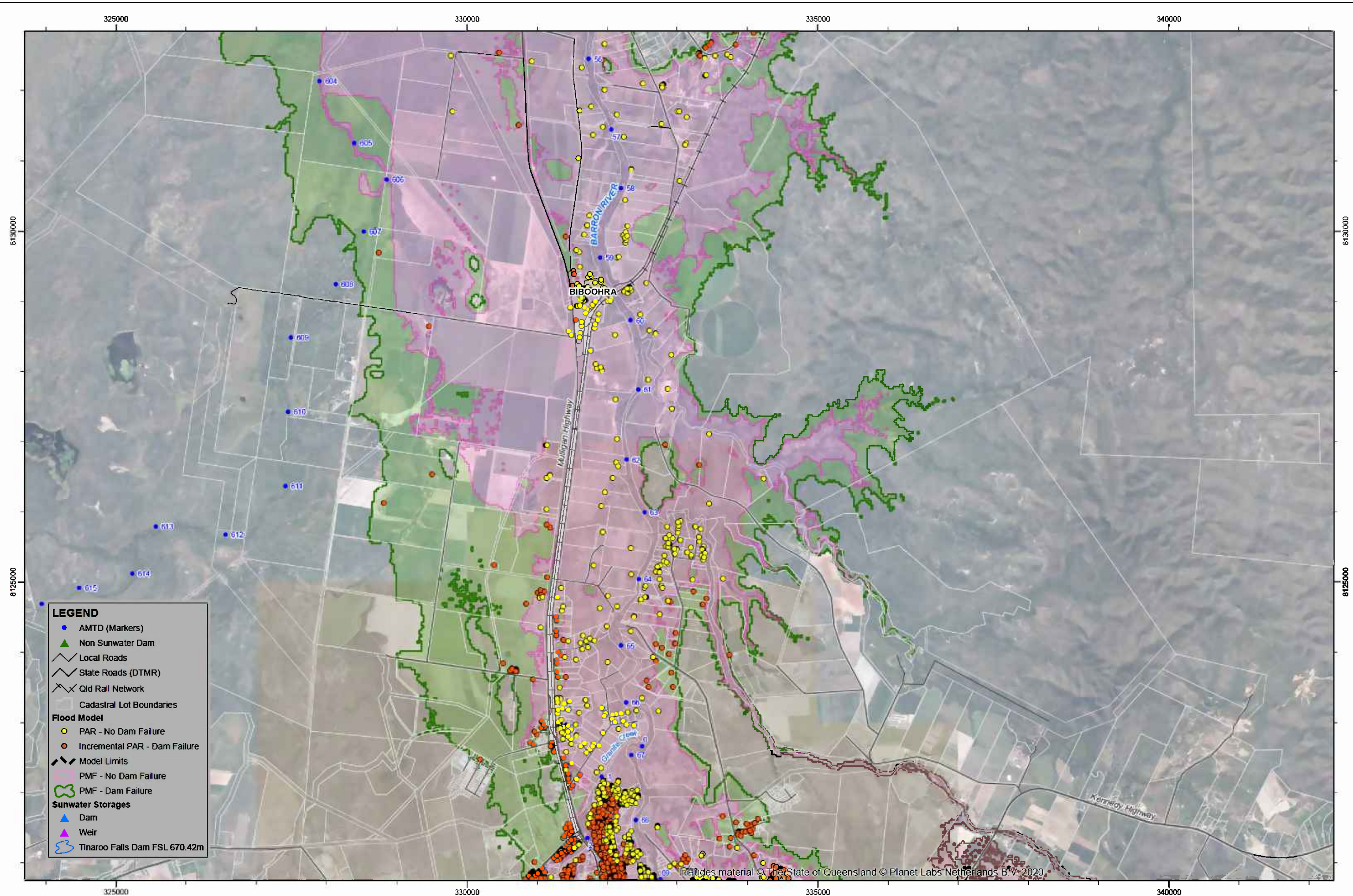
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 2 OF 12 | |
| DATE JUNE 2022 | |

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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Qld Rail Network
- Cadastral Lot Boundaries
- Flood Model**
- PAR - No Dam Failure
- Incremental PAR - Dam Failure
- Model Limits
- PMF - No Dam Failure
- PMF - Dam Failure
- Sunwater Storages**
- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

| REVISION | DATE | REMARKS | CKO | PSD |
|----------|------|----------------|-----|-----|
| 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap

SCALES (A3 SIZE)

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

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|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
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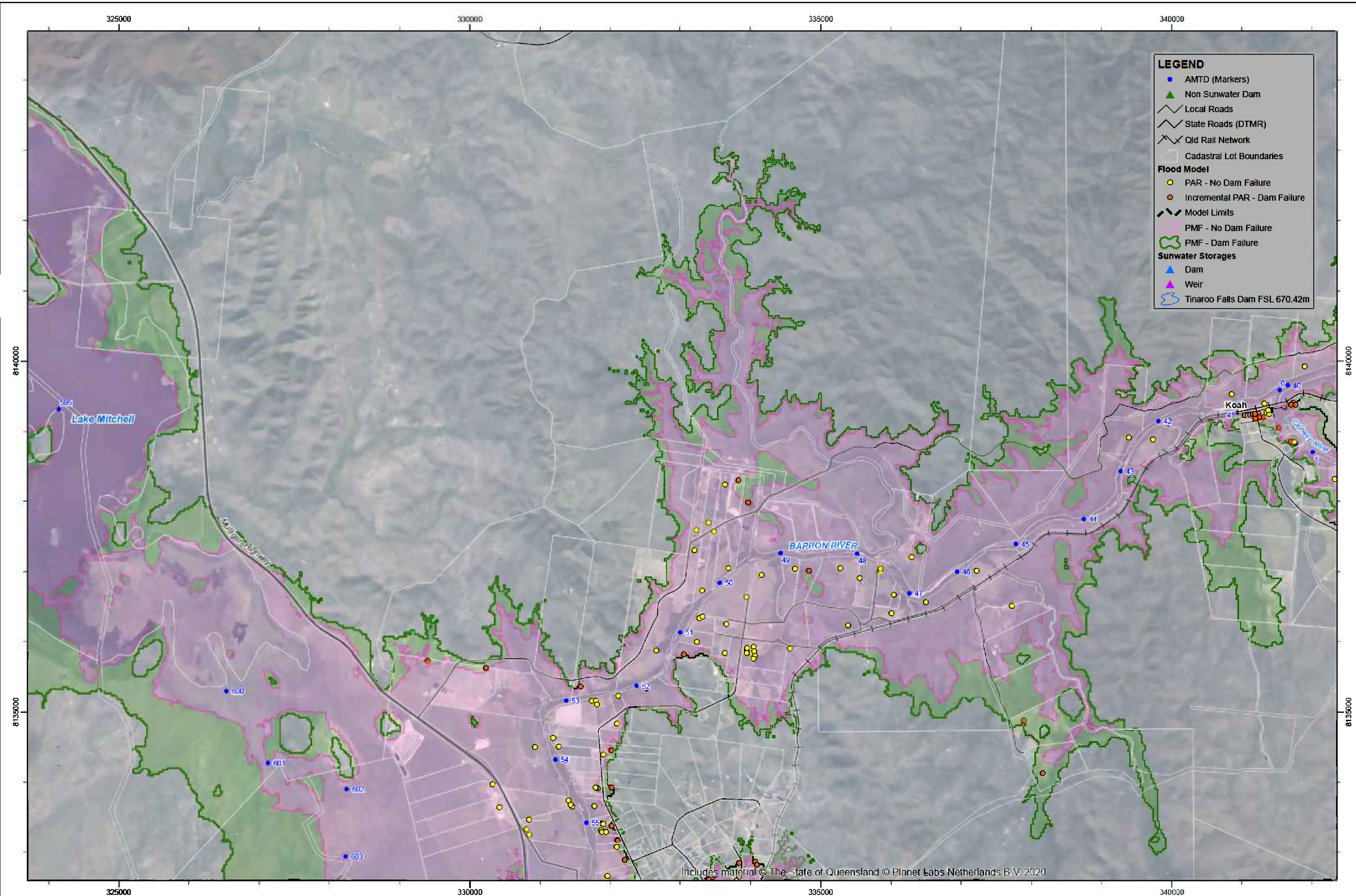
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
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| 256192 | A |
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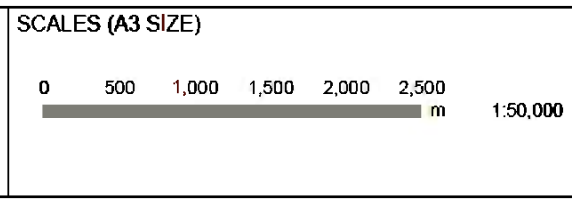
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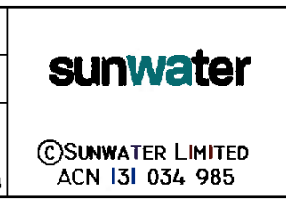
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap



DRAWN IDH
DESIGNED JJ
CHECKED JJ
APPROVED R. JENSEN
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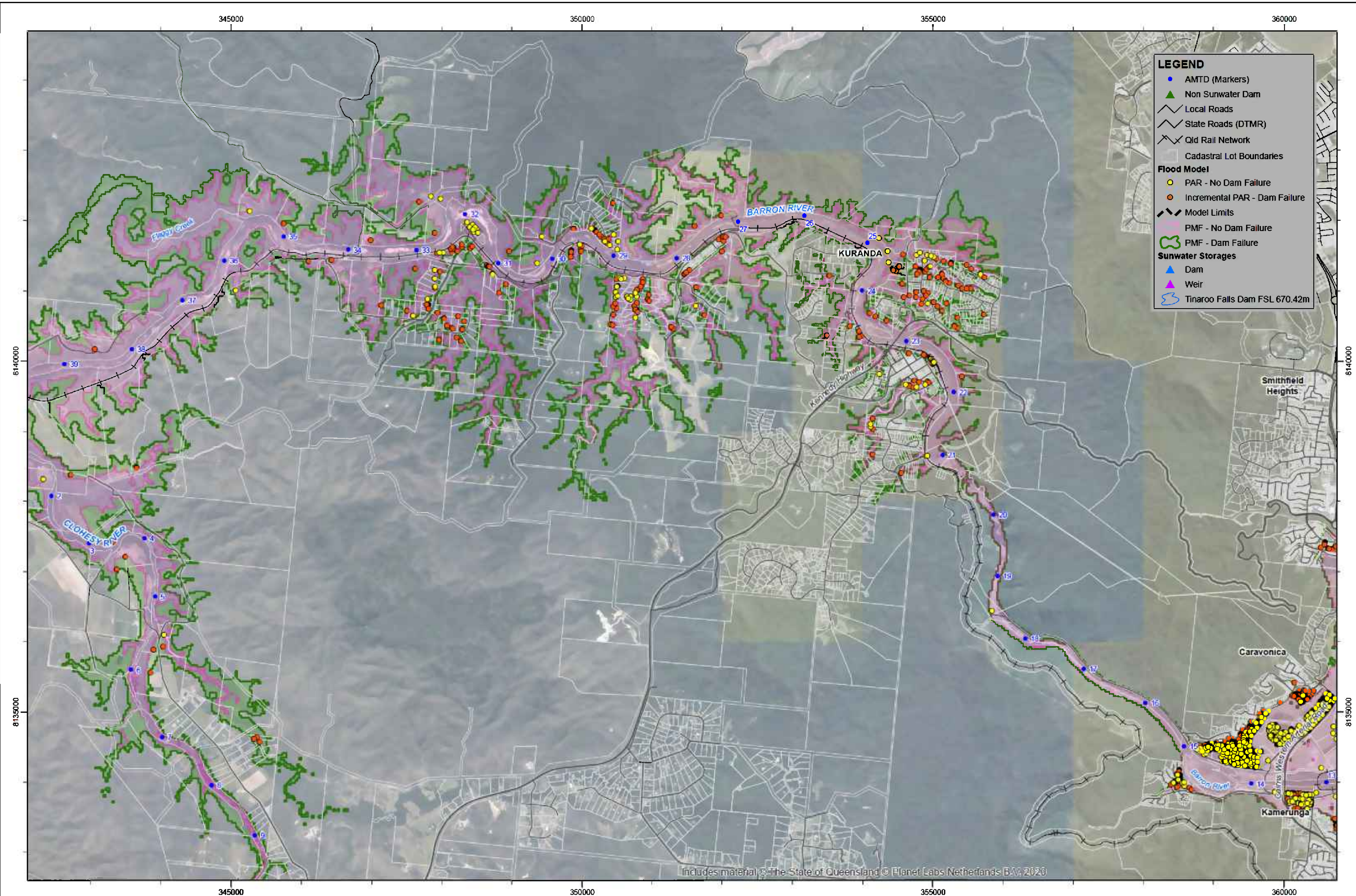
TINAROO FALLS DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
PRIMARY SPILLWAY FAILURE
INUNDATION PLAN

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|------------------------|-------------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
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LEGEND

- AMTD (Markers)
- ▲ Non Sunwater Dam
- Local Roads
- State Roads (DTMR)
- Old Rail Network
- ▭ Cadastral Lot Boundaries

Flood Model

- PAR - No Dam Failure
- Incremental PAR - Dam Failure
- Model Limits
- PMF - No Dam Failure
- PMF - Dam Failure

Sunwater Storages

- ▲ Dam
- ▲ Weir
- Tinaroo Falls Dam FSL 670.42m

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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap

SCALES (A3 SIZE)

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

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|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | JJ |
| CHECKED | CHECKED |
| APPROVED | |
| R. JENSEN | |
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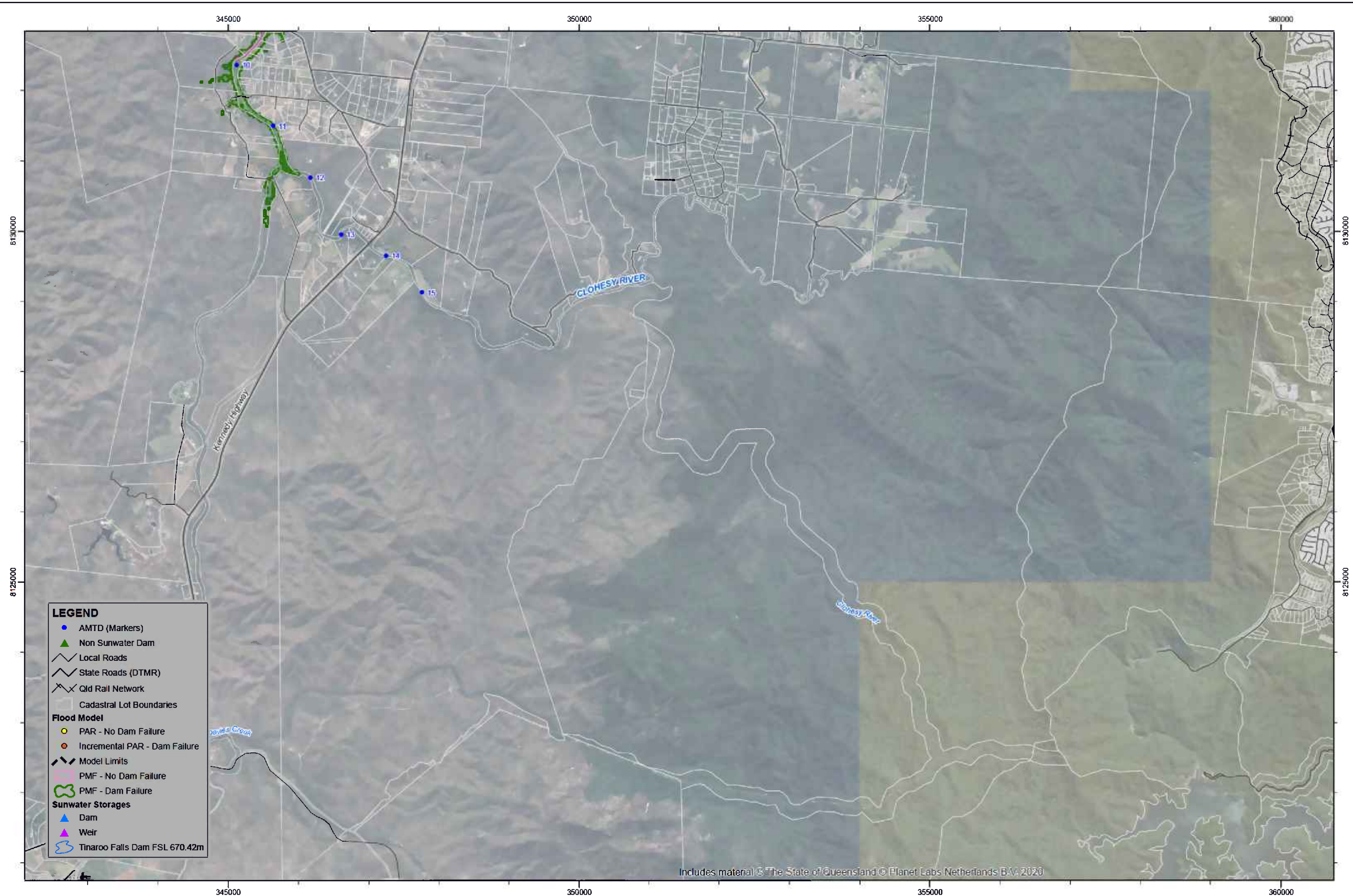
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 5 OF 12 | |
| DATE JUNE 2022 | |

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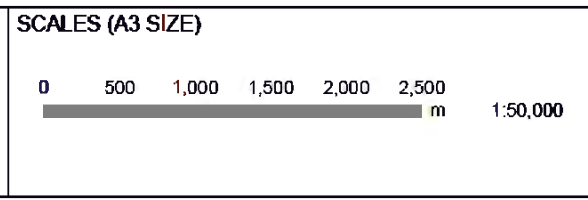
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



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| DRAWN IDH | DESIGNED JJ |
| CHECKED | CHECKED |
| APPROVED R. JENSEN 29/6/2022 RPEQ: 23733 | |



**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|---------------------------------|------------------|
| CONTRACT NUMBER | |
| DRAWING NUMBER 256192 | REV. A |
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Document: SUBW_WaterResourcesGIS_DataSW_Mareeba Umbulah WSS1 (name of all Dam_CRA2022) Drawings ArchMap_256192_A.mxd
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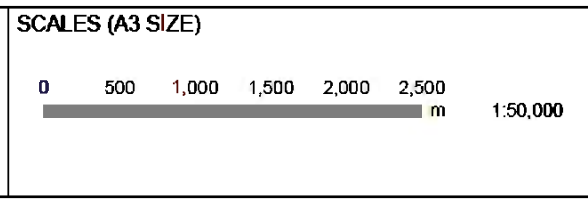
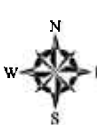
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
REFERENCE DRAWINGS
 256189 - Keymap



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| DRAWN | DESIGNED |
| IDH | |
| CHECKED | CHECKED |
| | JJ |
| APPROVED | |
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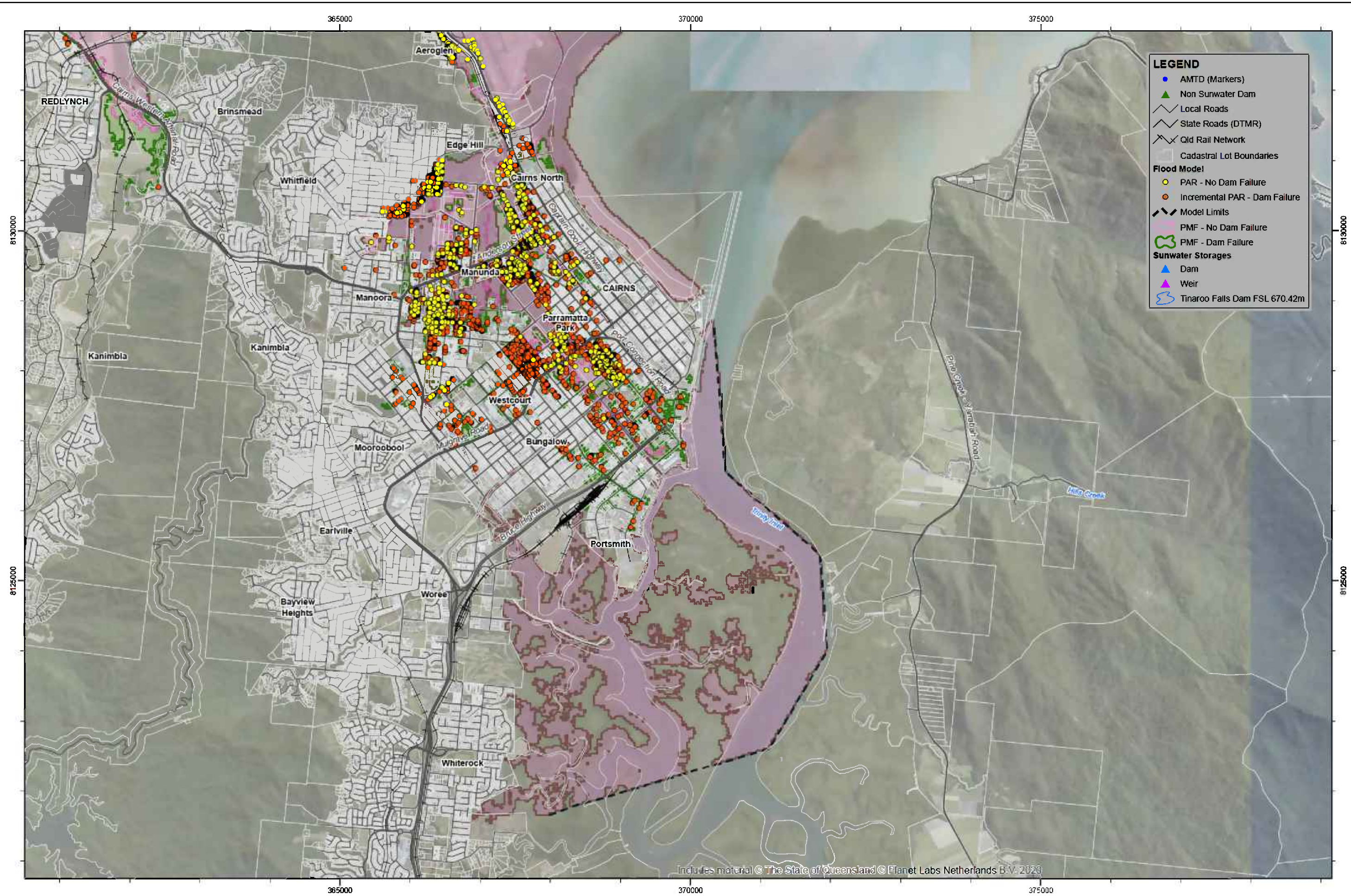
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 7 OF 12 | |
| DATE JUNE 2022 | |

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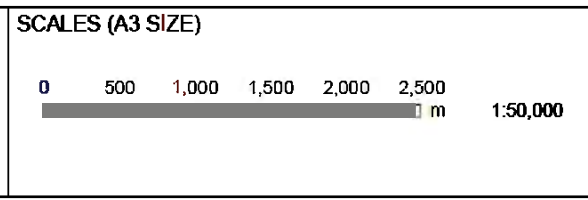
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MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).
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| DRAWN | DESIGNED |
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| CHECKED | CHECKED |
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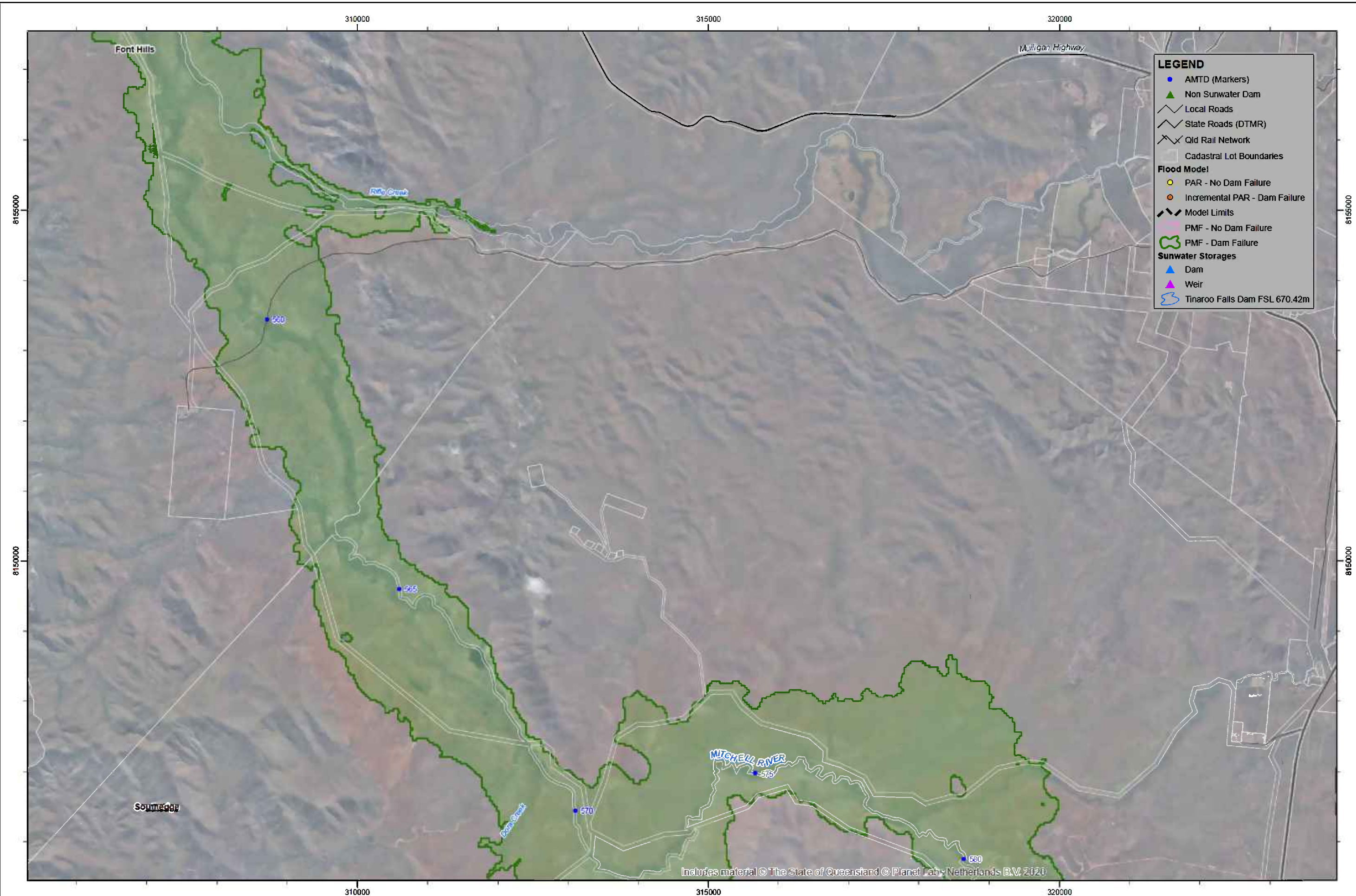
TINAROO FALLS DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
PRIMARY SPILLWAY FAILURE
INUNDATION PLAN

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 8 OF 12 | |
| DATE JUNE 2022 | |

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Document: SWW_WaterResourcesGIS_DataSW_Mareeba Umbulah WSS\TinarooFallsDam_CRA2022\Drawings\Arch\Map\256192-A.mxd
 Printed: Wednesday, 29/06/2022 03:03:02 PM

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

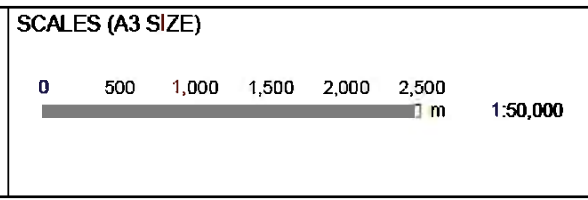


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| REVISION | DATE | REMARKS | CKO | PSD |
|----------|------|----------------|-----|-----|
| 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



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|-----------|-------------|
| DRAWN | DESIGNED |
| IDH | |
| CHECKED | CHECKED |
| | JJ |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | RPEQ: 23733 |



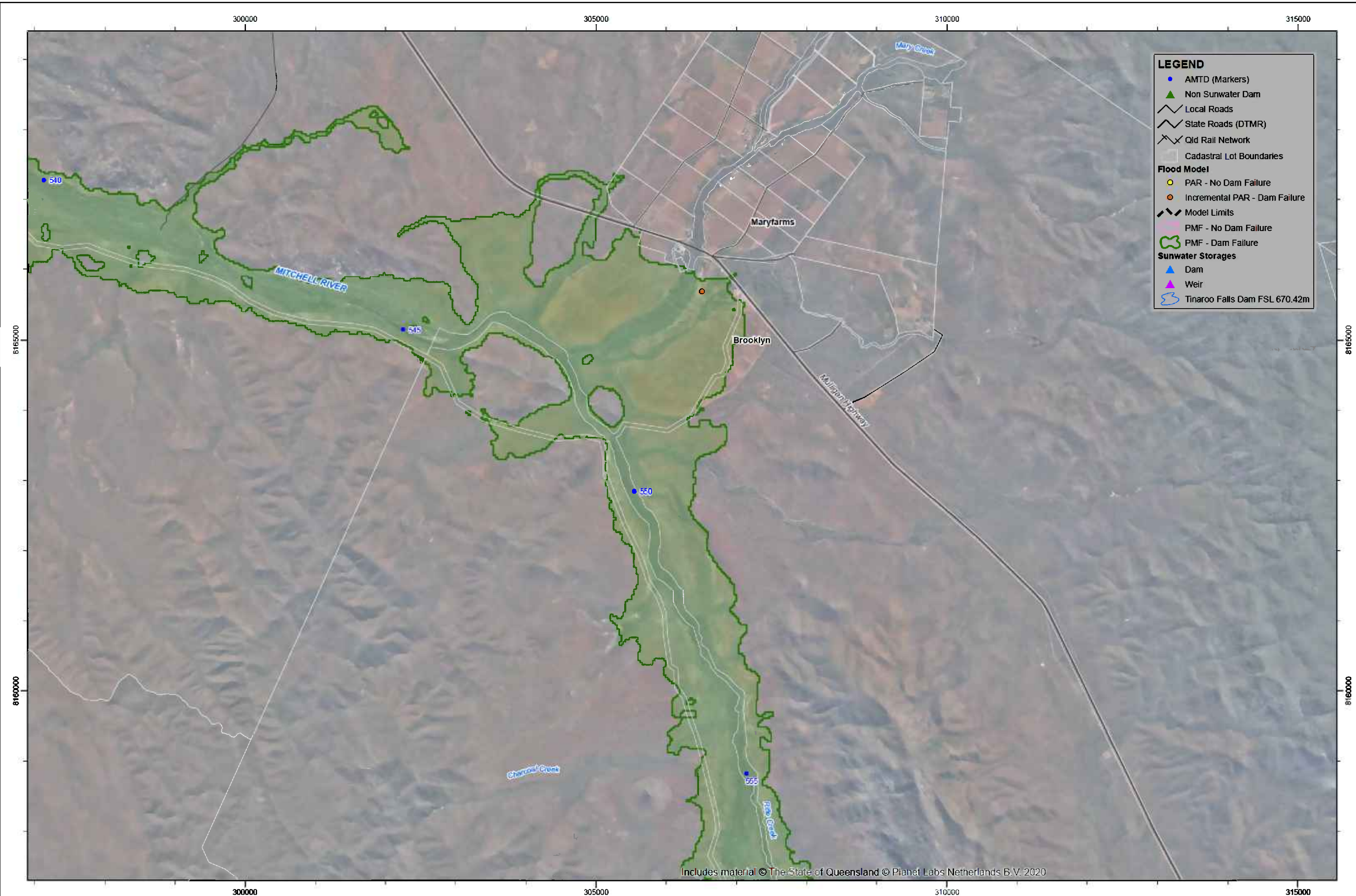
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 10 OF 12 | |
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Document: SUBW_WaterResourcesGIS_DataSW_Mareeba Umbulah WGS1983Tinasof:abDam_CPA2022DrawingsArchMap_256192-A.mxd
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MAP PRODUCED BY:
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 TEL: (07) 3120 0000

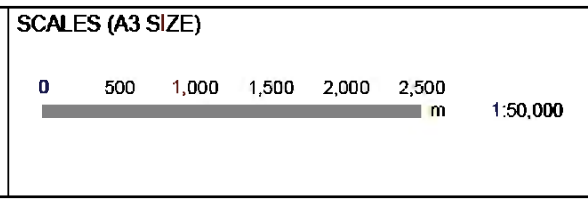
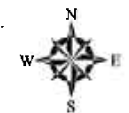


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| REVISION | DATE | REMARKS | CKD | PSD |
|----------|------|----------------|-----|-----|
| 29/06/22 | A | ISSUED FOR USE | JJ | RJ |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



| | |
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| DRAWN | DESIGNED |
| <i>IDH</i> | |
| CHECKED | CHECKED |
| | <i>JJ</i> |
| APPROVED | |
| <i>R. JENSEN</i> | |
| 29/6/2022 | |
| RPEQ: 23733 | |

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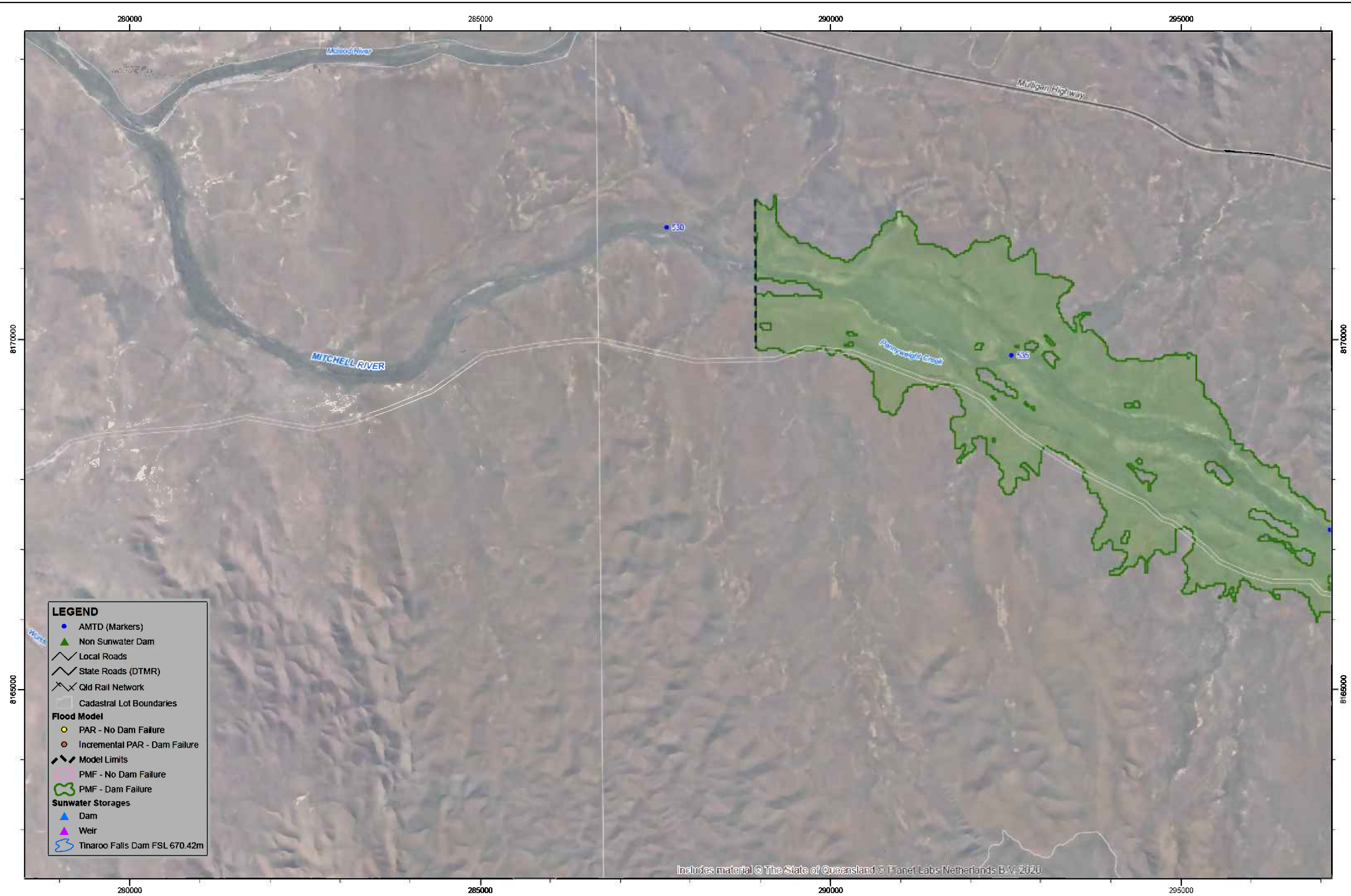
**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

| | |
|-----------------|----------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 11 OF 12 | |
| DATE JUNE 2022 | |

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Document: S:\RW_WaterResources\GIS_Data\SW_Mareeba Umbillah WSS\Threats\allDam_CRA2022\Drawings\Arch\Map_256192-A.mxd
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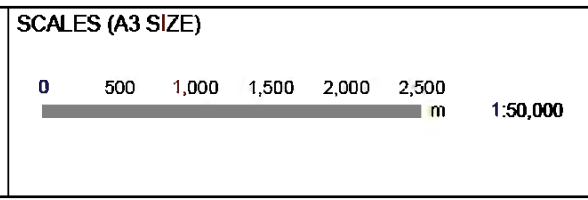
MAP PRODUCED BY:
 WATER RESOURCES & DAM SAFETY
 TEL: (07) 3120 0000



| REVISION | DATE | BY | CHKD | PSD | REMARKS |
|----------|----------|----|------|-----|----------------|
| | 29/06/22 | A | JJ | RJ | ISSUED FOR USE |

MAP INFORMATION
 Projected Coordinate System: Mapping Grid of Australia (MGA2020) Zone 55
 Levels Datum: Australian Height Datum (AHD).

REFERENCE DRAWINGS
 256189 - Keymap



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| DRAWN | DESIGNED |
| IDH | |
| CHECKED | CHECKED |
| | JJ |
| APPROVED | |
| R. JENSEN | |
| 29/6/2022 | |
| RPEQ: 23733 | |



**TINAROO FALLS DAM
 DAM BREAK ANALYSIS 2022
 PROBABLE MAXIMUM FLOOD
 PRIMARY SPILLWAY FAILURE
 INUNDATION PLAN**

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|-----------------|------|
| CONTRACT NUMBER | |
| DRAWING NUMBER | REV. |
| 256192 | A |
| SHEET 12 OF 12 | |
| DATE JUNE 2022 | |

Appendix B4: TINAROO FALLS DAM ACCESS ROUTES DURING FAIR AND ADVERSE WEATHER CONDITIONS

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

Helipad coordinates:

UTM: 55K 345086 E, 8100819 S

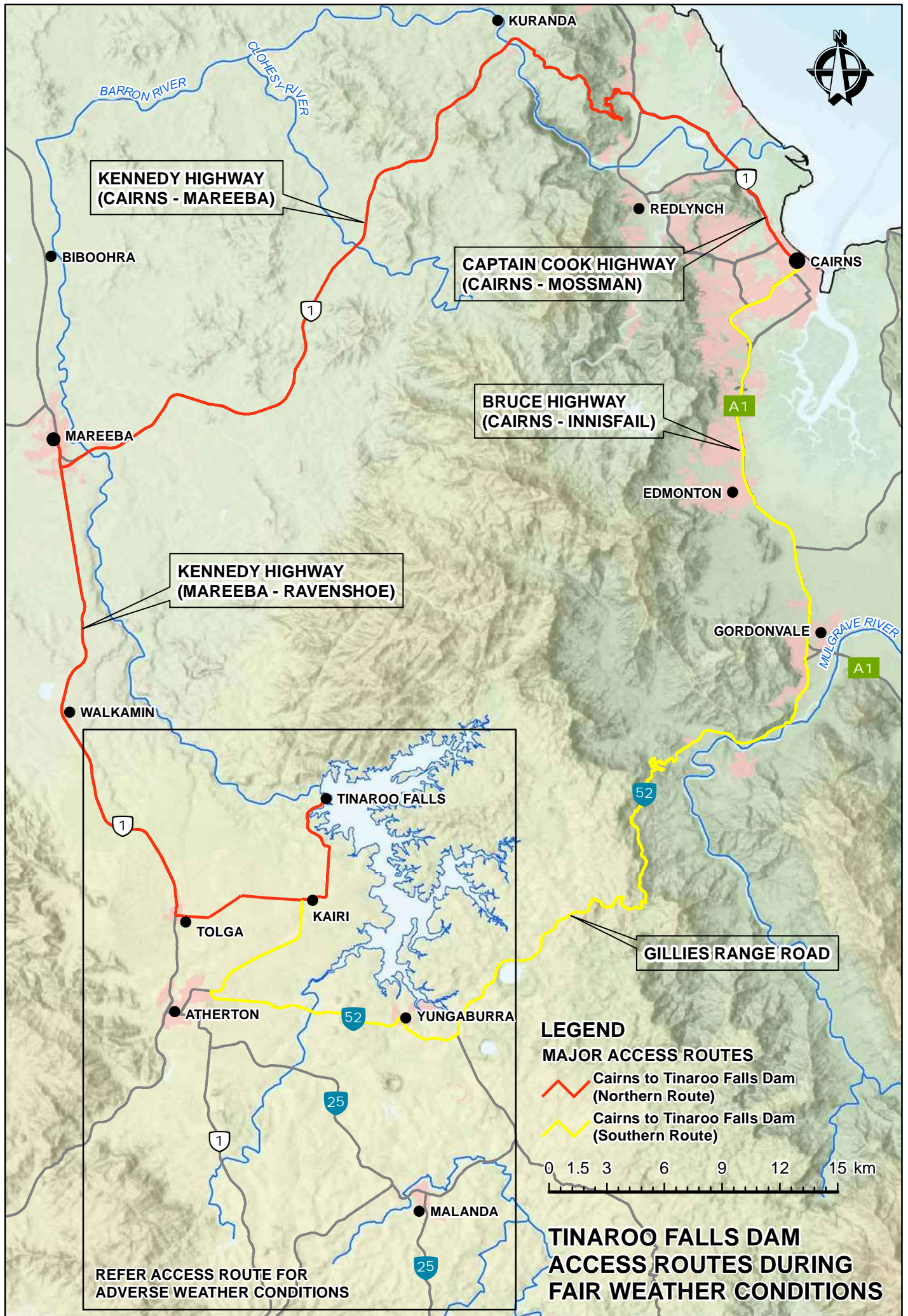
Dec degrees: Lat -17.172339 degrees, Long 145.544238 degrees

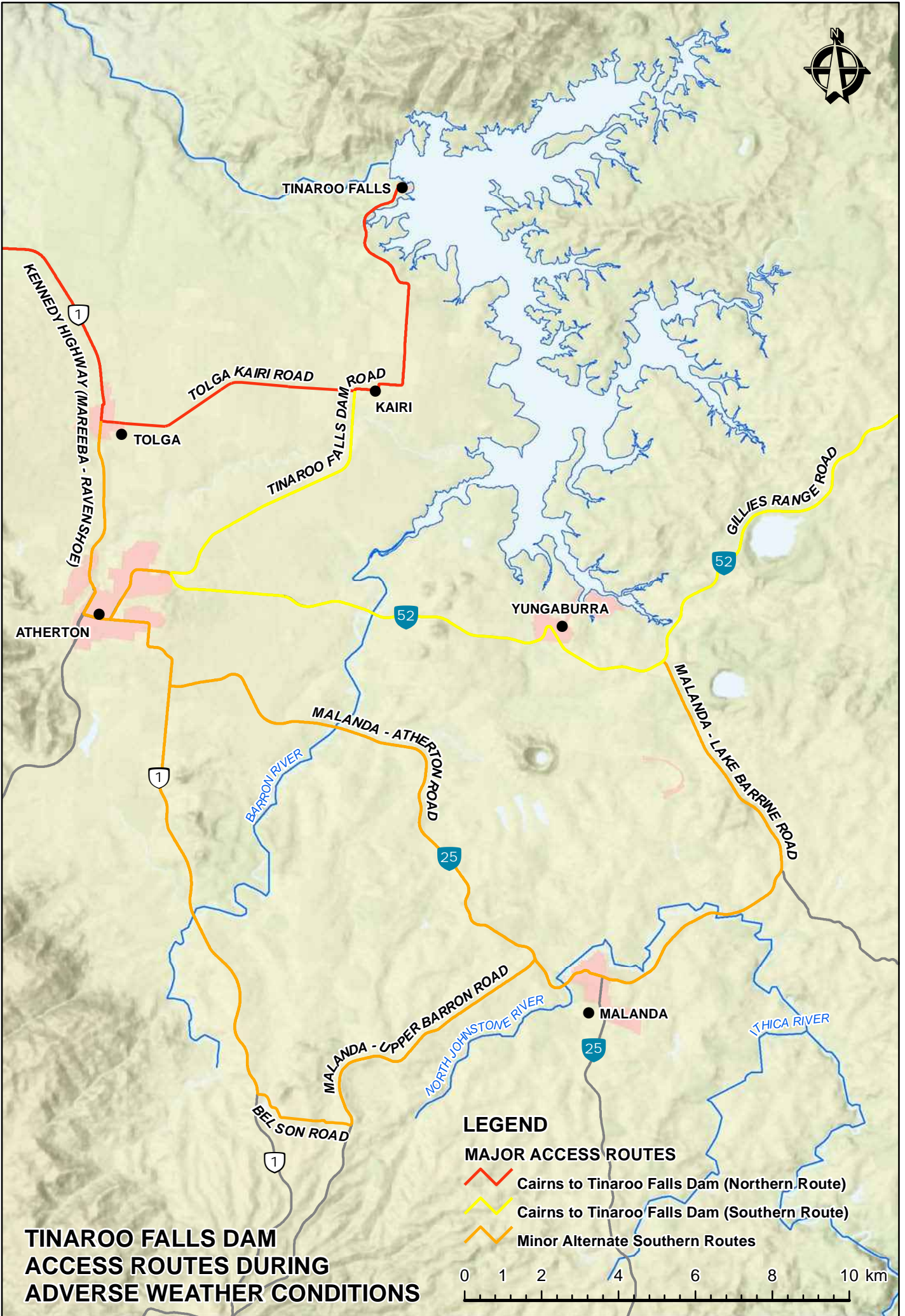
Helipad location description:

Behind the Rural Fire Station, to the north-east of saddle dam beside Tinaroo Falls Dam Rd.

| Details | Tinaroo Falls Dam access route |
|-------------|--|
| Distance | Approx. 45 km from Mareeba Depot / approx. 85 km from Cairns |
| Travel Time | Approx. 40 minutes (Mareeba) / approx. 90 minutes (Cairns) |
| Road type | Bitumen |
| Speed limit | 80–100 km/h |

The next two (2) pages are maps of access routes during fair and adverse weather conditions.



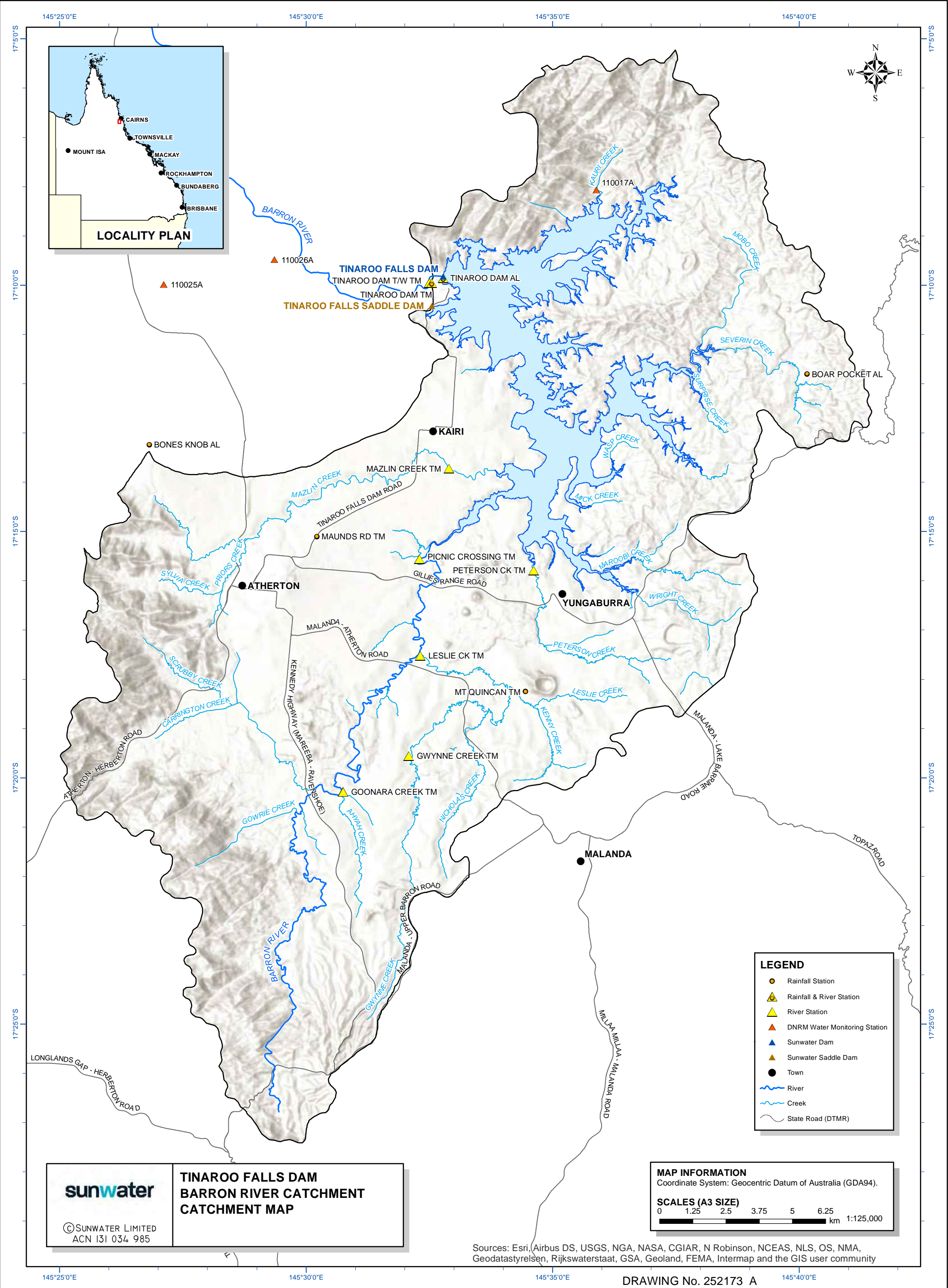


TINAROO FALLS DAM ACCESS ROUTES DURING ADVERSE WEATHER CONDITIONS

- LEGEND**
- MAJOR ACCESS ROUTES**
-  Cairns to Tinaroo Falls Dam (Northern Route)
 -  Cairns to Tinaroo Falls Dam (Southern Route)
 -  Minor Alternate Southern Routes







LEGEND

- Rainfall Station
- ▲ Rainfall & River Station
- ▲ River Station
- ▲ DNRM Water Monitoring Station
- ▲ Sunwater Dam
- ▲ Sunwater Saddle Dam
- Town
- River
- Creek
- State Road (DTMR)

sunwater

**TINAROO FALLS DAM
BARRON RIVER CATCHMENT
CATCHMENT MAP**

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

SCALES (A3 SIZE)
0 1.25 2.5 3.75 5 6.25 1:125,000

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

APPENDIX C Equipment and technical information

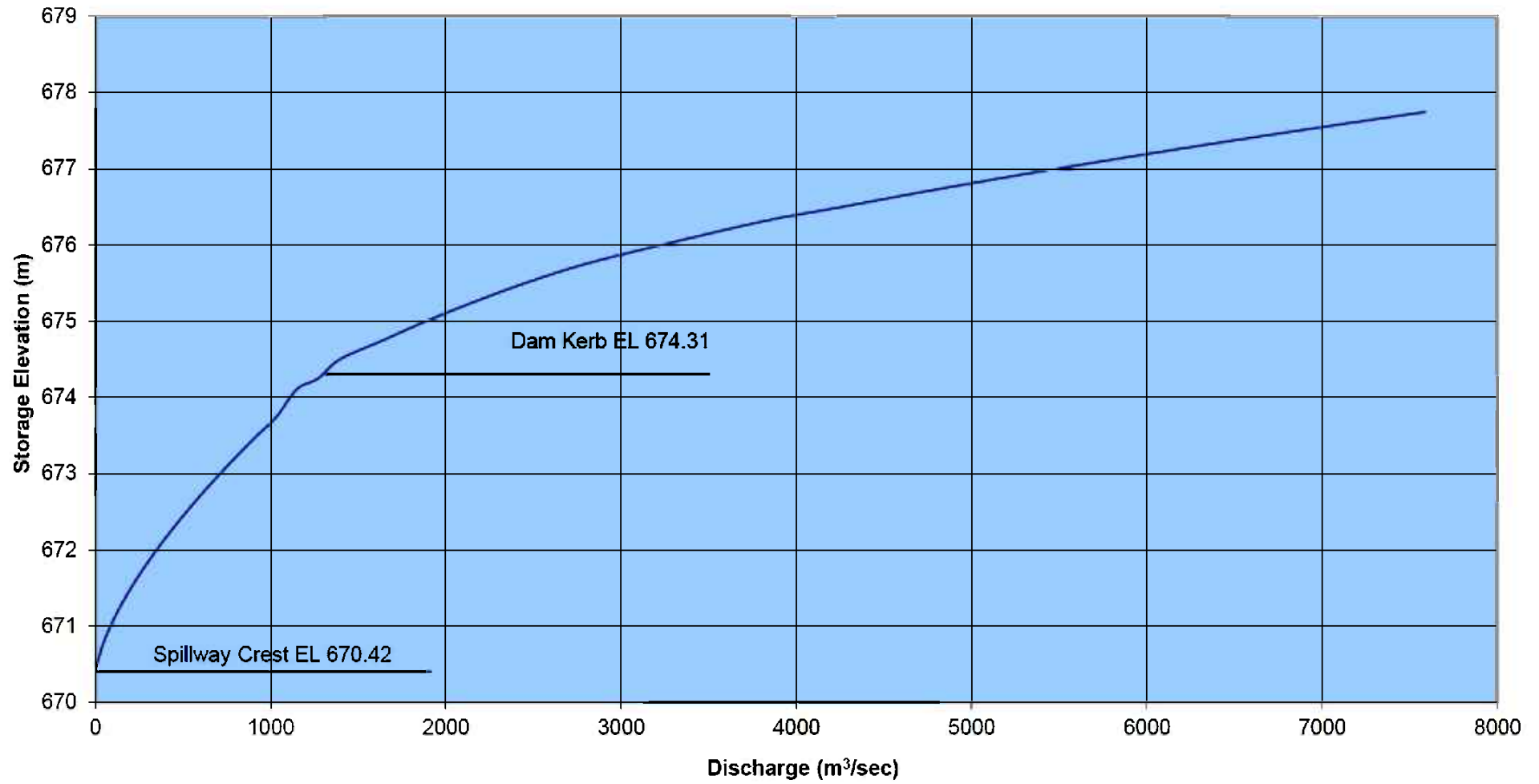
Appendix C1: List of equipment available during an emergency

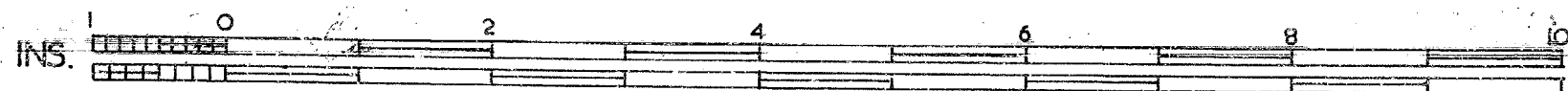
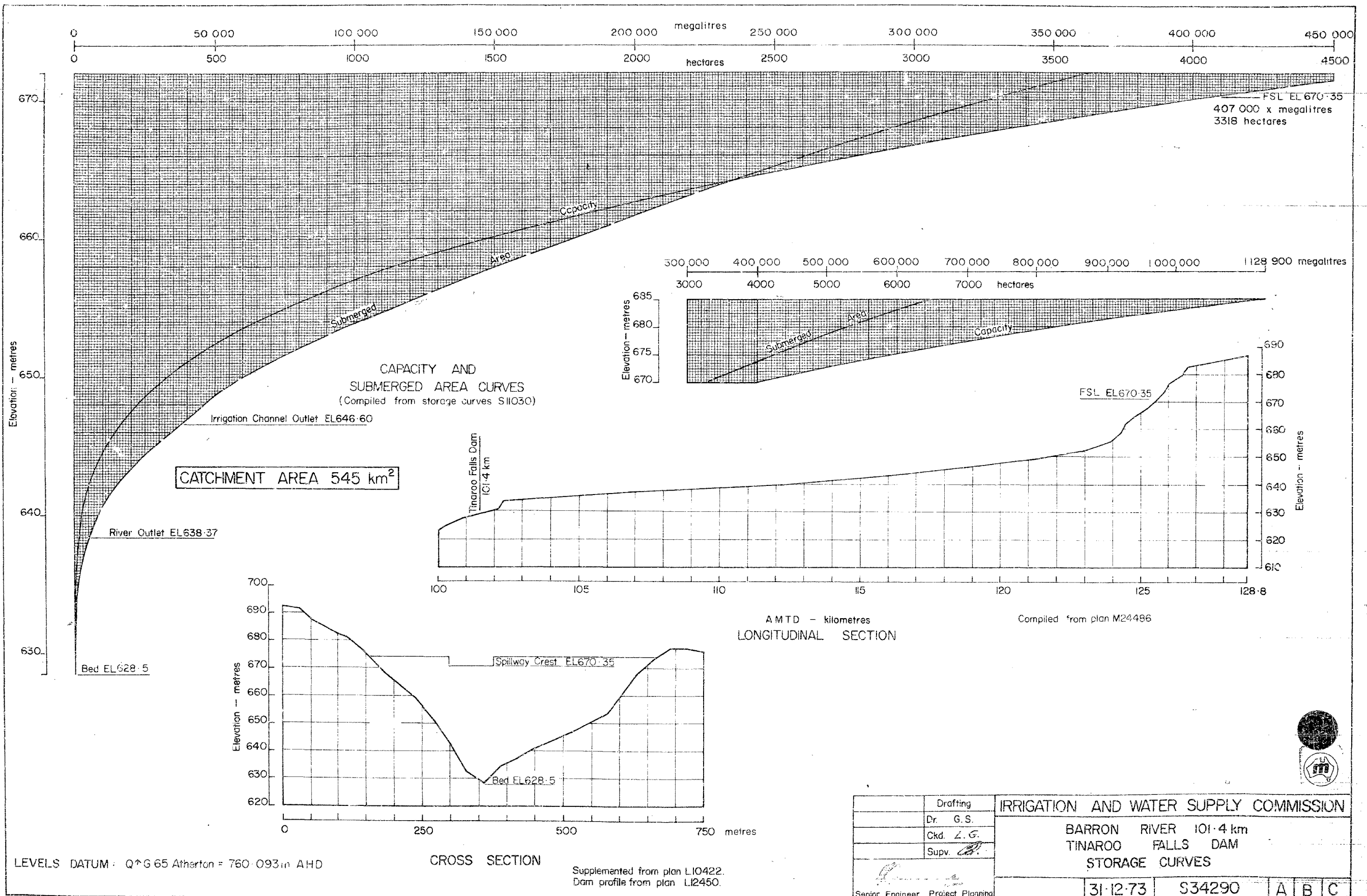
Appendix C2: Tinaroo Falls Dam spillway rating curve

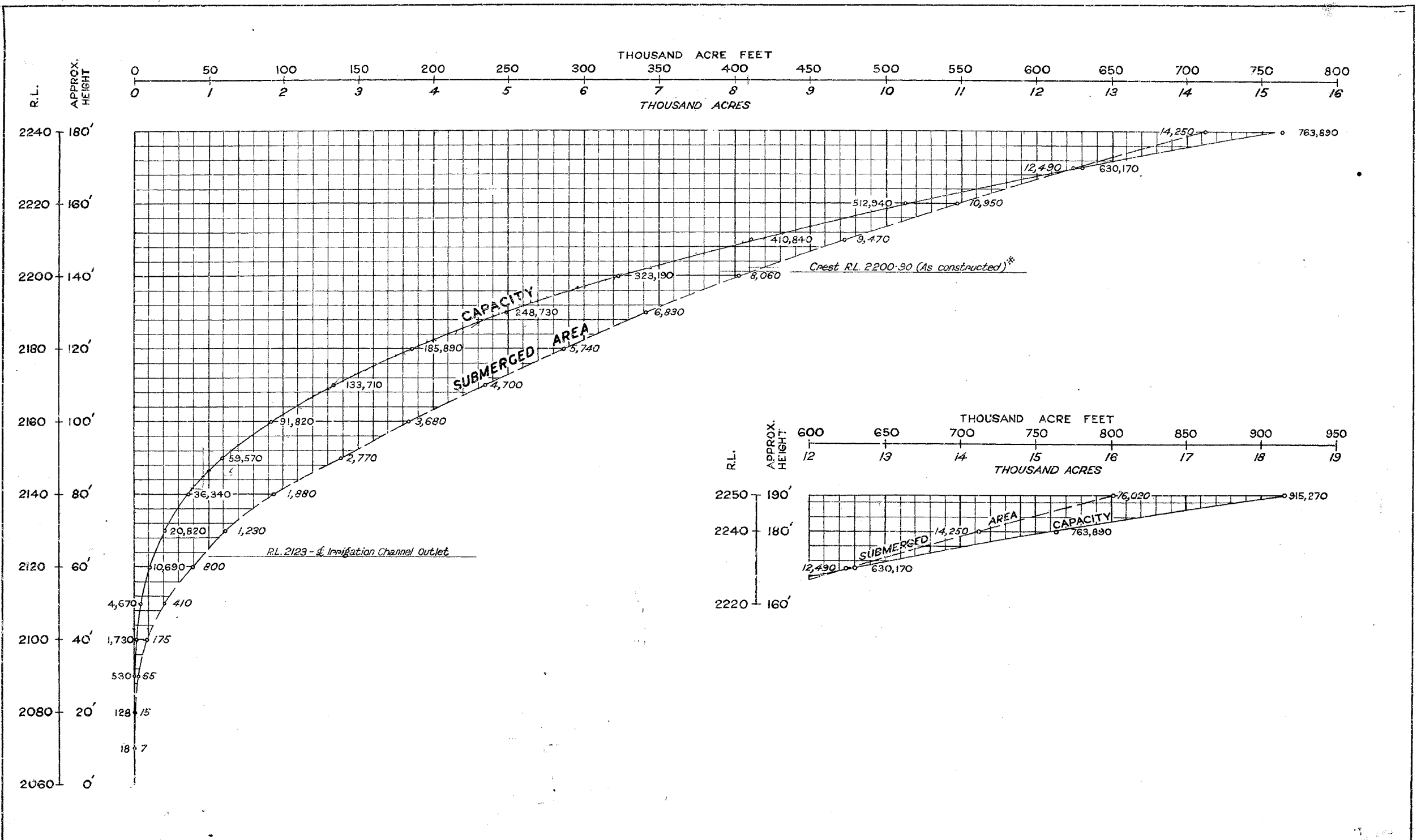
Appendix C3: Tinaroo Falls Dam storage curve

Appendix C1 has been redacted

**Tinaroo Falls Dam Spillway Capacity Upgrade 2010
Spillway Rating Curve (Including flow over non-spillway monoliths)**





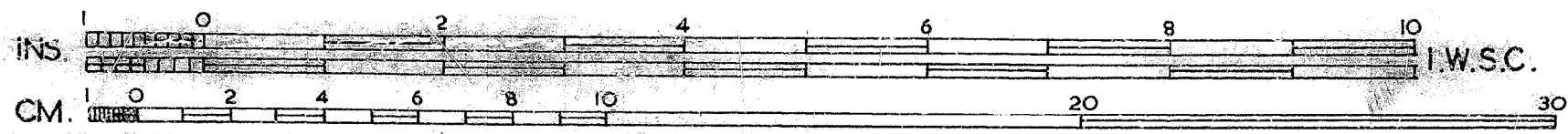


Compiled from Aerial Survey (Astrax) Contour Plans R.N. 10763-70.
 Levels Datum:- Tinaroo Falls (Deduct 0.56' to equate to State Datum (Athenon).)

* Crest Level at lowest point - Monolith 16 R.L. 2200.902 (See as constructed levels on File 6808-J/1 - 3.2.59).

| | | |
|--------------|--------------|------------|
| Revised | Dr. C.S.D. | Tr. C.S.D. |
| A Crest R.L. | Checked L.G. | |

| | | | |
|--|--|---------|-----------|
| IRRIGATION AND WATER SUPPLY COMMISSION | | | |
| MAREEBA - DIMBULAH IRRIGATION PROJECT | | | |
| TINAROO FALLS STORAGE | | | |
| CAPACITY AND SUBMERGED AREA CURVES | | | |
| | | S/11030 | 4-11-52 A |



APPENDIX D Interaction with local government and district groups

To be populated when EAP next completes a substantive review

Annexe — Tinaroo Dam AWS SMS Messages

Advice
Stay informed



Watch and Act
Prepare to leave



Emergency
Leave immediately
To be issued in consultation with council



| SMS | <p>ADVICE from Sunwater. Tinaroo Falls Dam is spilling excess water into Barron River. People downstream of Tinaroo Falls Dam should STAY INFORMED and MONITOR CONDITIONS. Water flows from Tinaroo Falls Dam expected to remain within beds and banks of river / may contribute to widespread/ localised/ overland flooding. Expect increased river flows in 6-12 hours / later today/ overnight/ tomorrow. There is no immediate danger. More information here: bit.ly/RecandSafety</p> | <p>FLOOD WATCH AND ACT from Sunwater. Excess water spilling from Tinaroo Falls Dam into Barron River has increased significantly. Water flows from Tinaroo Falls Dam may contribute to dangerous/widespread flooding downstream. Expect increased river flows in 6-12 hours / later today/ overnight/ tomorrow. People downstream of Tinaroo Falls Dam must PREPARE TO LEAVE in case the flood gets worse. Call Triple Zero (000) if your life is in danger. Call the SES on 132500 for flood help. More information here: bit.ly/RecandSafety</p> | <p>FLOOD EMERGENCY WARNING from Sunwater: People downstream of Tinaroo Dam must LEAVE IMMEDIATELY. Tinaroo 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. Mareeba Racecourse is a safe location. More information at Mareeba Emergency Management Dashboard emergency.msc.qld.gov.au and at Tablelands Regional Council https://dashboard.trc.qld.gov.au/</p> |
|-----|---|--|---|
|-----|---|--|---|