



Emergency Action Plan

Chinaman Creek Dam

Cloncurry Shire Council



Dam ID - 384
Document No. EAP – 001_M
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Date: September 2025



Emergency Activation Quick Reference

The following flood and non-flood related trigger events have been identified as events that would lead to the activation of this Emergency Action Plan (EAP), these events and accompanying flow charts are detailed further in Section 8.

Dam Hazard	Alert	Lean Forward	Sunny Day Failure	Stand Up	Stand Down
Sunny Day Failure (Section 8.2)	• Identification of new or increased seepage, sand boils, slips, deformation, slumping, wave erosion or cracking • Earthquake reported or felt in the area	• Progression / worsening of items identified under "Alert" activation level • Public warnings and evacuation preparation	• Flooding expected downstream • Evacuation (if required)	• Dam inspections have not identified any safety issues or structural integrity issues, OR • Any dam issues are no longer considered to be likely to lead to dam failure	
Flood related					
Flood related (Section 8.3)	• Storage level at 191.22 m AHD and rising (20 mm above spillway invert) AND • Heavy Rainfall over dam catchment • Dam expected to fill and spill over spillway • Downstream creek levels to rise	• Storage level at 192.22 m AHD and rising AND • Flood inflows and discharges taking place through spillway • Some flooding expected or commencing downstream • Public warnings and evacuation preparation	• Storage level at 192.22 m AHD and rising AND • Major flood inflows and discharges taking place through spillway/fuse plug • Extensive flooding expected or commencing downstream • Evacuation	• Water is no longer flowing through the spillway or has reduced to a level where downstream flooding is no longer a threat • Dam inspections have not identified any safety issues or structural integrity issues • Downstream flooding has reduced and is no longer a threat to the public	
Flood related + Dam Failure (Section 8.3)	• Storage level at 191.22 m AHD and rising (20 mm above spillway invert) AND • Heavy Rainfall over dam catchment • Dam expected to fill and spill over spillway • Identification of new slips, slumping, deformation, cracking or damage	• Storage level at 192.22 m AHD and rising AND • Flood inflows and discharges taking place through spillway • Progression / worsening of items identified under "Alert" activation level • Public warnings and evacuation preparation	• Storage level at 192.72 m AHD and rising AND • Major flood inflows and discharges taking place through spillway/fuse plug • Dam failure possible or in progress • Extensive flooding expected or commencing downstream • Evacuation	• Water is no longer flowing through the spillway or has reduced to a level where downstream flooding is no longer a threat • Dam inspections have not identified any safety issues or structural integrity issues • Downstream flooding has reduced and is no longer a threat to the public • Any dam issues are no longer considered to be likely to lead to dam failure	
Terrorism					
Terrorism (Section 8.4)	• Not applicable	• Not applicable	• Possible terrorist activity noticed at dam or threat received • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit) • Failure in progress or likely due to impact or explosion	• Possible terrorist activity dismissed	



Preparation and Authorisation

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Date: 29/09/2025

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Reviewed:

Date: 29/09/2025

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Approved:

Date: 29/09/2025

Philip Keirle – CEO Cloncurry Shire Council

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A	20.02.15	DRAFT ONLY	TR	AV	P.Fitchat	D.Neeves
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C	05.12.17	FINAL – Revised to address DLGWV comments and additional modelling information	RC	NTK	B.Pearce	B.Milligan
D	29.06.18	FINAL – Revised to address DNRME comments	MA	BP	B.Pearce	J.Morris
E	26.08.19	REVIEW – Amendments to Personnel & Notification List	MA	BP	B.Pearce	D.Bezuidenhout
F	14.10.20	REVIEW – Amendments to Personnel & Notification List	MA	MA	M.Anderson	D.Bezuidenhout
G	26.07.21	REVIEW – CC Distribution List & Table 11 & Notification List	MA	MA	M.Anderson	P.Keirle
H	15.03.22	REVIEW – Revised	BK	JA	P. Keirle	P.Keirle
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J	02.10.23	Review – Amendments to Personne & Notification List	MA	MA	C.Rohan	P.Keirle
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L	07.03.25	Final – Revised to address DLGWV comments	ND	NTK	C.Rohan	P.Keirle
M	24.09.25	Final – Revised to address non-substantive changes.	ND	NTK	C.Rohan	P.Keirle



Controlled Copy Distribution List

Controlled copies of the EAP shall be sent to the following recipients. Updated copies are to be delivered to each recipient following each amendment to this EAP.

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A complete Notification List is provided in Section 10 of this EAP.



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1. References, Definitions, and Abbreviations

1.1 References/Associated Documents

Table 1 Table of associated documents

Ref.	Document Title	Reference/Location
1	Emergency Action Plan for Referable Dam Guideline v4 (RDMW 2023)	https://www.resources.qld.gov.au/_data/assets/pdf_file/0018/84015/eap-guideline.pdf
2	Water Supply (Safety and Reliability) Act 2008	https://www.legislation.qld.gov.au/view/pdf/2017-07-03/act-2008-034 https://www.legislation.qld.gov.au/view/html/inforce/current/act-2008-034
3	Water Act 2000	https://www.legislation.qld.gov.au/view/html/inforce/2018-10-25/act-2000-034
4	Queensland Dam Safety Management Guidelines v3.1 (RDMW 2024)	https://www.resources.qld.gov.au/_data/assets/pdf_file/0007/78838/dam-safety-management.pdf
5	Queensland Disaster Management Guidelines	https://www.disaster.qld.gov.au/disaster-management-guideline
6	Local Government Act	https://www.legislation.qld.gov.au/view/html/inforce/current/act-2009-017#
7	Bureau of Meteorology	http://www.bom.gov.au/
11	Chinaman Creek Dam Operations and Maintenance Manual (OMM)	https://infoxpert.edrms/docs/BCS/WATER%20SUPPLY/DESIGN%20AND%20CONSTRUCTION/Buildings.%20Structures%20and%20Plant%20(Historical)/Chinaman%20Creek%20Dam/190101%20-%20Chinaman%20Creek%20Dam%20-%20DOMM%20(2).docx
12	Dam Data Book (DDB)	https://infoxpert.edrms/docs/BCS/WATER%20SUPPLY/DESIGN%20AND%20CONSTRUCTION/Buildings.%20Structures%20and%20Plant%20(Historical)/Chinaman%20Creek%20Dam/190101%20-%20Chinaman%20Creek%20Dam%20Data%20Book%20(1).docx
13	Dam Safety Condition Schedule (DSCS)	https://infoxpert.edrms/docs/BCS/WATER%20SUPPLY/LIAISON/Industry%20and%20Government%20Organisations/2024/240830%20-%20Changed%20Safety%20Conditions%20-%20Various%20Dams.msg
14	CSC FATIGUE MANAGEMENT Procedure	"I:\5. Shared Documents\Policies, Procedures, and Strategies\Procedures\WHS 1001-34 - Fatigue Management Procedure v1.1.pdf"
15	CSC Local Disaster Management Plan	local-disaster-management-plan-november-2024 (cloncurry.qld.gov.au)

1.2 Definitions

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

Table 2 Table of terms set out in The Water Supply and Reliability Act

Terms set out in The Water Supply Safety and Reliability Act (QLD 2008)	
Dam Hazard	For a dam, means a reasonably foreseeable situation or condition that may:



Terms set out in The Water Supply Safety and Reliability Act (QLD 2008)	
	a. cause or contribute to the failure of the dam, if the failure may cause harm to persons or property; or b. require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property.
Dam Hazard Event	For a dam, means an event arising from a dam hazard if: a. persons or property may be harmed because of the event; and b. a coordinated response involving 2 or more of the relevant entities mentioned in paragraphs (b) to (d) of the definition relevant entity is unlikely to be required to respond to the event; and c. the event is not an emergency event.
Disaster Management Plan	Of a district group or local government, means the groups or local government's disaster management plan under the <i>Disaster Management Act</i> .
District Group (District Disaster Management Plan)	For an emergency action plan (EAP), means a district group established under the <i>Disaster Management Act</i> , section 22 whose disaster district under that Act could, under the plan, be affected by a dam hazard.
Emergency Event	For a dam, means an event arising from a dam hazard if: a. persons or property may be harmed because of the event; and b. any of the following apply: i. a coordinated response involving 2 or more of the relevant entities mentioned in paragraphs (b) to (d) of the definition relevant entity is likely to be required to respond to the event; ii. the event may arise because of a disaster situation declared under the <i>Disaster Management Act</i>; iii. an entity performing functions under the State disaster management plan may, under that plan, require the owner of the dam to give the entity information about the event.
Local Group (Local Disaster Management Group)	For an EAP, means a local group established under the <i>Disaster Management Act</i> , section 29 whose local government area could, under the plan, be affected by a dam hazard.
Notice Response	A dam owner's written response to a notice following an assessment of an EAP by a local government or district group.
Relevant Entity	For a dam, means each of the following under the emergency action plan for the dam: a. the persons who may be affected, or whose property may be affected, if a dam hazard event or emergency event were to happen for the dam; Examples for paragraph (a) • the owners of parcels of farmland adjacent to the dam • residents of a township b. each local group and district group for the emergency action plan; (Each local government whose local government area may be affected if a dam hazard event or emergency event were to happen for the dam); c. the chief executive officer; d. another entity the owner of the dam considers appropriate. Example for paragraph (d) • the Queensland Police Service

Table 3 Table of terms consistent with Queensland disaster management arrangements

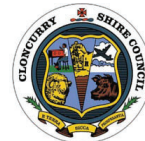
Terms consistent with Queensland disaster management arrangements	
Activation Levels	The four levels of EAP activation are: Alert: a heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. Lean Forward: An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared. 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 in accordance with the provision of the Act. Stand Down: Transition from responding to an event back to normal core business and or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present. The movement through these levels of activation is not necessarily sequential. It should be applied with flexibility and adaptability and be tailored to the location and event. Triggering one of these levels of activation may not necessarily mean a similar activation of the LDMG.
Bureau of Meteorology flood level classifications	The three levels of flooding are: Minor flooding: This causes inconvenience such as closing of minor roads and the submergence of low-level bridges and makes the removal of pumps located adjacent to the river necessary. Moderate flooding: This causes the inundation of low-lying areas requiring the removal of stock and / or the evacuation of some houses. Main traffic bridges may be closed by flood waters. Major flooding: This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas widespread flooding of farmland is likely.
Chemical spill or toxic condition	The contamination of water in the storage of the dam that could create a public safety or downstream release hazard.
Dam crest failure	Dam crest flood is when failure occurs during a flood event with the water level at the crest of the non-overflow section of the dam embankment. – for an embankment dam, is the lowest point of the embankment crest. – for a concrete dam, is the level of the non-overflow section of the dam, excluding handrails and parapets if they do not store water against them. – for a concrete faced rockfill dam, is the lowest point of the crest structure or point on a wave wall designed to take water load.
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.
Earthquake	A sudden release of energy in the Earth's crust or upper mantle, usually caused by a movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include: – Settlement, longitudinal or traverse cracking in an embankment dam that could lead to piping or overtopping if the settlement is greater than the available freeboard. – Settlement, sliding or overturning of monoliths in the dam wall. – Initiation of seepage lines in the foundations or abutments that could lead to piping. – Liquefaction of foundation sands leading to slope failure and loss of freeboard causing overtopping if the settlement is greater than the available freeboard. – Damage and potential inoperability of appurtenant works.
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above 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.

Terms consistent with Queensland disaster management arrangements	
Probable maximum flood (PMF)	The flood resulting from probable maximum precipitation coupled with catchment conditions that are optimal for generating maximum runoff.
Probable maximum precipitation (PMP)	The theoretical greatest depth of precipitation for a given duration that is, based on meteorological methods of maximisation, physically possible over a particular catchment area.
Probable maximum precipitation design flood (PMP-F)	Probable maximum precipitation design flood is the flood resulting from probable maximum precipitation coupled with standard catchment conditions that can be expected.
'Sunny Day' failure	'Sunny Day' dam failure is where the failure occurs at the full supply level and there is no concurrent rain associated flooding.
Vandalism or Terrorist Activity	A deliberate attempt to damage or fail a dam.

1.3 Abbreviations

Table 4 Acronyms / abbreviations

Acronym	Term
AEP	Annual Exceedance Probability
ANCOLD	Australian National Committee of Large Dams
AHD	Australian Height Datum
ARI	Average Recurrence Interval
BOM	Bureau of Meteorology
CSC	Cloncurry Shire Council
DDS	Director of Dam Safety (DLGWV)
DLGWV	Queensland Department Local Government, Water and Volunteers
DMG	Disaster Management Group
DR	Director of Works & Environmental Services
DTMR	Queensland Department of Transport and Main Roads
EAP	Emergency Action Plan
EAP0	Emergency Action Plan Officer
EAP0 1 & 2	Emergency Action Plan Backup Officers
EER	Emergency Event Report
ES	Environmental Services
EWS	Early Warning System
FIA	Failure Impact Assessment
FSL	Full Supply Level
LDC	Local Disaster Coordinator
LDCC	Local Disaster Coordination Centre
LDMG	Local Disaster Management Group
ML	Megalitre
OMM	Operations and Maintenance Manual
PAR	Population at Risk
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation



Acronym	Term
PWC	Personal Watercraft
QAS	Queensland Ambulance Service
QFD	Queensland Fire Department
QLD	Queensland
QPS	Queensland Police Service
RL	Reduced Level
RPEQ	Registered Professional Engineer of Queensland
SCADA	Supervisory Control and Data Acquisition
SES	State Emergency Services
SMS	Short Message Service
SOP	Standard Operating Procedure
UHF	Ultra High Frequency

2. Introduction

2.1 Context

Under the Water Supply (Safety and Reliability) Act 2008 (the Act), the owner of a referable dam must have an approved Emergency Action Plan (EAP) for the dam. In accordance with the Queensland Guidelines, a Referable dam is 'referable if a failure impact assessment (FIA) demonstrates there would be two or more populations at risk (PAR) if the dam were to fail' (RDMW 2024).

The local government area that may be affected by a dam hazard for Chinaman Creek Dam (CCD) has been determined as Cloncurry Shire Council (CSC).

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 chemical spill/toxic conditions):

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

In accordance with section 352H(2) of the Act, the EAP may provide for the dam owner to make arrangements with a relevant entity for warnings to be given by the relevant entity on behalf of the dam owner in appropriate circumstances. Section 352HA of the Act states that before giving the chief executive an EAP, the owner of the dam must give a copy of the plan to each local government whose area may be affected by a dam hazard identified in the plan, and each district group for the plan. Section 352HB of the Act states that the local government must assess the EAP for consistency with its disaster management plan. In its assessment, the local government must consult with the local 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.

2.2 Purpose

CSC are committed to maintaining a comprehensive dam safety management program aimed at ensuring the continued safe and reliable operation of its dams. This EAP is to pre-plan the coordination of necessary actions by CSC in the event that a condition at CCD triggers the action of this EAP. This document is prepared in order to comply with the requirements under the Water Supply (Safety and Reliability) Act 2008.

The purpose of this EAP is:



- To allow CSC to respond quickly to potential dam hazard events as soon as they are identified and to undertake targeted and effective intervention actions to prevent the situation developing into a hazard.
- If an emergency dam hazard event develops that could endanger the integrity of CCD, this EAP describes procedures and actions which should be followed by CSC staff in the event of such an emergency.
- Provide timely warning to the Population at Risk (PAR) allowing them to take appropriate actions and appropriate emergency response and management agencies, for example the Local Disaster Management Group (LDMG), allowing them to implement protective measures to minimise the risk of harm to the downstream communities as well as properties.

It is possible for more than one dam hazard to exist at CCD. In such a circumstance, it may be necessary to act on the procedures within separate emergency actions simultaneously.

The focus of this EAP is the management of dam hazards at CCD by CSC (owner of the dam) and the communication and notification of dam hazards to CSC LDMG, District Disaster Management Group (DDMG) and broader community (PAR). However, the EAP sits within the broader emergency response framework. This EAP has been assessed and considered to be consistent with the CSC Local Disaster Management Plan.

2.3 Scope

The CSC EAP:

- Identifies emergency conditions which could endanger the integrity of the dam and the safety of people downstream, and which require immediate action.
- Provides details about the dam that are relevant to a dam hazard.
- Identifies circumstances that indicate a material increase in the likelihood of a dam hazard event and/or emergency event happening.
- Provides triggers for activation of a tiered response to dam hazard event and/or emergency event.
- Identifies roles and responsibilities in responding to a dam hazard event and/or emergency event.
- Provides notification, warning, and communication protocols.
- Provides inspection, monitoring, and reporting protocols during emergencies.
- Provides other relevant information that may assist with identifying the area affected by a dam hazard event and/or emergency event, and the management of such.

The EAP is supported by the associated CSC dam safety documentation and procedures established for maintaining structural safety of CSC dams. These are in accordance with the Dam Safety Condition Schedule (DSCS) issued by the Dam Safety Regulator and include:

- Internal Dam Safety Routine Inspections and Surveillance Programs in accordance with the dam's Operation and Maintenance Manual (OMM), Standard Operating Procedures (SOPs) and the DSCS.
- Comprehensive inspections (5 yearly) by Dams Engineer (RPEQ). These inspections are carried out in accordance with Queensland (QLD) Dam Safety Management Guidelines.
- Dam instrumentation monitoring and dam control surveys as per the dam's OMM.

This document is reviewed annually with the current approved version of the EAP available for free download from the website for the Queensland Government (<https://www.business.qld.gov.au/industries/mining-energy-water/water/industry-infrastructure/dams/emergency-action-plans/map>).

2.4 Scheduled Review, Update and Distribution of EAP

The Director of Infrastructure and Environment (DR) is responsible for the revision and distribution of this EAP. An annual review of the overall plan should be conducted to assess its workability and efficiency, and to plan for the improvement of weak areas.

- Contact details and prioritisation of relevant entities, including the PAR are correct.
- Currency of flood inundation models and associated maps.
- Approved or proposed residential and/or commercial development downstream of the dam.
- Wording and frequency of notification and warning messages are relevant.



- Wording of notifications and warning messages are understood by downstream residents.
- If the pre-prepared EA System GIS polygons are appropriate, tested and lodged with the DDMG.
- If the EAP is consistent with the disaster management plan(s).
- Content from any Emergency Event Reports (EER) that were submitted for the dam in the previous 12 months.
- Learnings from EAP training scenarios.
- If the EAP reflects industry best practice.
- Scheduled dam improvement/maintenance works within the next 12 months.

Provided the annual review resulted in non-substantive changes being required, a complete EAP (in PDF format) is to be submitted to the chief executive under section 352Q of the Act to amend the approved EAP to:

- Correct a minor error, or
- Make a change that is not a change of substance, for example: update contact phone numbers, minor changes to warning messages.

Examples of what may be considered as non-substantial changes during the annual review includes:

- Correcting grammatical errors – Formatting changes
- Updating contact details
- Improving the maps
- Effectiveness that does not change the intent of the EAP
- Clarifying explanations
- Clarity of wording

The amendments must be minor in nature and must not change the intent of the EAP. Changes to the triggers for escalation of hazards to emergency events, increases in the number of PAR, or new modelling associated with the production of inundation maps will be assessed as substantive in nature.

To ensure all contact details are correct and the non-substantive amendments do not conflict with the disaster management plan(s), the proposed changes should be shared with the local government and the DDMG. For non-substantive changes, the local government and DDMG are not required to provide the dam owner with a notice.

However, in the event the chief executive subsequently determines the proposed EAP amendment is a change of substance, the dam owner will be advised and requested to undertake the required 30 business day consultation with the local government and the DDMG.

Examples of what may be considered as substantial changes and require a new EAP assessment and approval by the chief executive review includes:

- The dam structure
- The triggers for escalation of a dam hazard event and/or dam emergency event
- Additional dam emergency events added to the EAP
- An increase in PAR
- Changes to inundation maps and/or associated information

If the dam owner is uncertain as to whether the changes in the EAP are substantive in nature, they are encouraged to contact the department via email at damsafety@DLGWV.qld.gov.au.

The dam's OMM should be cross-referenced when any updates are made to the EAP. Updates made to the EAP that also apply to the OMM are to be noted and applied to ensure consistency.

2.5 Emergency management plan updates and training

Under the Act, the owner of a referable dam must have an approved EAP for the dam. Referable dams, by definition, would put lives at risk if they were to fail.

This EAP is to be reviewed by CSC and the LDMG on an annual basis. A dam safety exercise shall be conducted annually as part of the EAP review process. The exercise may be undertaken as a "Desktop" exercise or alternatively as a field exercise where the lines of communication and the responses of the different agencies are tested.



This EAP is to be included in training for dam operators, key council staff involved in the management or operation of the dam, and any response agencies.

Larger scale exercises involving coordination between the Disaster Management Agencies and other authorities should be conducted at least every 5 years.

2.6 Community Information

Initially letters will be sent to all residents identified as being in the maximum flood zone downstream of the dam explaining the procedures undertaken in the case of an emergency, the communication methods, and maps of the design flood levels. Further meetings or discussion will be held if required with these residents and any other interested persons to explain and discuss these procedures and what can be expected. These letters will be sent annually prior to the wet season.

Each year in advance of the approaching wet season CSC will review the list of current contact phone numbers of downstream residents to make sure this contact list is as accurate as possible in the event that it is required for notification purposes. This involves contacting all stakeholders to inform them of the purpose of the call to remind them specifically of the Dam Safety relating to CCD whilst also confirming all their current contact information.

2.7 Emergency Event Report (EER)

Following an emergency event where the activation level has reached Stand Up level, an EER containing the following information should be completed and submitted to DLGWV within 30 business days from the end of the emergency event:

- Description of the event
- Instrumentation readings (where appropriate)
- Description of any observed damage (including photos)
- Details of communications that took place during the emergency (communications logs)
- A review of the adequacy of the EAP
- Recommendations or suggested changes to the EAP

2.8 Lessons Learnt

Learnings from Emergency Events are also used to update the EAP on an annual basis where applicable. Following the training exercise or following activation of the EAP (Section 8) the activity performance will be reviewed with any 'lessons learnt' in this section as part of the regular document updates.

2.9 Fatigue Management

CSC is responsible for managing fatigue of the dam personnel, ensuring they can recognise the signs of fatigue and there are adequate available staff to manage a prolonged event through to stand down.

Fatigue Management Procedure – presents the strategies to effectively control the risk associated with workplace and emergency event fatigue.

3. Dam Details

3.1 Chinaman Creek Dam Technical Data

Table 5 General Dam Details

Description	Value
General	
Owner	Cloncurry Shire Council
Property Description	Lot 34 SP121871
Coordinates	20°42'59.36"S 140°28'43.27"E
Construction Completed	1993
Licence No.	43708J
Location	Cloncurry
Maximum Impact Assess. Cat.	Category 1
Catchment Area	164 km ²
Type of Dam	Mass concrete gravity dam with a zoned earthfill levee and fuse plug
Full Supply Level	191.2 m AHD
Storage at Full Supply Level	2,750 ML
Inundated Area at FSL	125 ha
Concrete Gravity Dam	
Type	Mass concrete gravity dam with ogee crest spillway
Crest level (non-overflow section)	RL 194.65 m AHD
Total length	153 m
Spillway length	90 m
Non overflow length	63 m
Non overflow crest width	3.5 m
Non overflow slopes	Upstream: Nil Downstream: 0.56H : 1V
Total volume of concrete	11,000 m ³ approx.
Spillway	
Type	Uncontrolled concrete ogee crest
Crest level	191.2 m AHD
Crest length	90 m
Maximum height	13.7 m above river bed
Energy dissipation method	Roller and impact action stilling basin
Levee	
Type	Zoned earthfill
Crest level	RL 194.4 m AHD
Crest length	2,115 m
Maximum height	7 m (to foundation level)



Description	Value
Slopes	2.5H : 1V
Total volume of fill	119,000 m ³
Fuseplug spillway	
Type	Zoned earth and general fill
Crest level	RL 193.5 m AHD
Crest length	130 m
Maximum height	2.6 m approx. (to foundation level)
Total volume of fill	3100 m ³
Intake works	
Purpose	Flood harvesting
Description	Two 750 L/s submersible pumps discharging into two 900 mm diameter rubber ring joint reinforced concrete pipes in the dam, connecting to ductile iron pipework
Outlet Works	
Purpose	Town water supply
Description	Three 450 mm diameter knife gate valves mounted on vertical riser pipe of same diameter. The inlet levels are as follows: RL 184.43 m AHD RL 187.20 m AHD RL 189.2 m AHD
Probable Maximum Precipitation - Flood (1 in 6,100,000 AEP)	
Peak Flood Inflow	6749 m ³ /s
Peak Spillway Discharge	6551 m ³ /s

Note: Levels shown on Dam Drawings are on a local datum that is 1.22 m below Australian Height Datum (AHD), All levels referred to in this document are AHD levels unless otherwise stated.

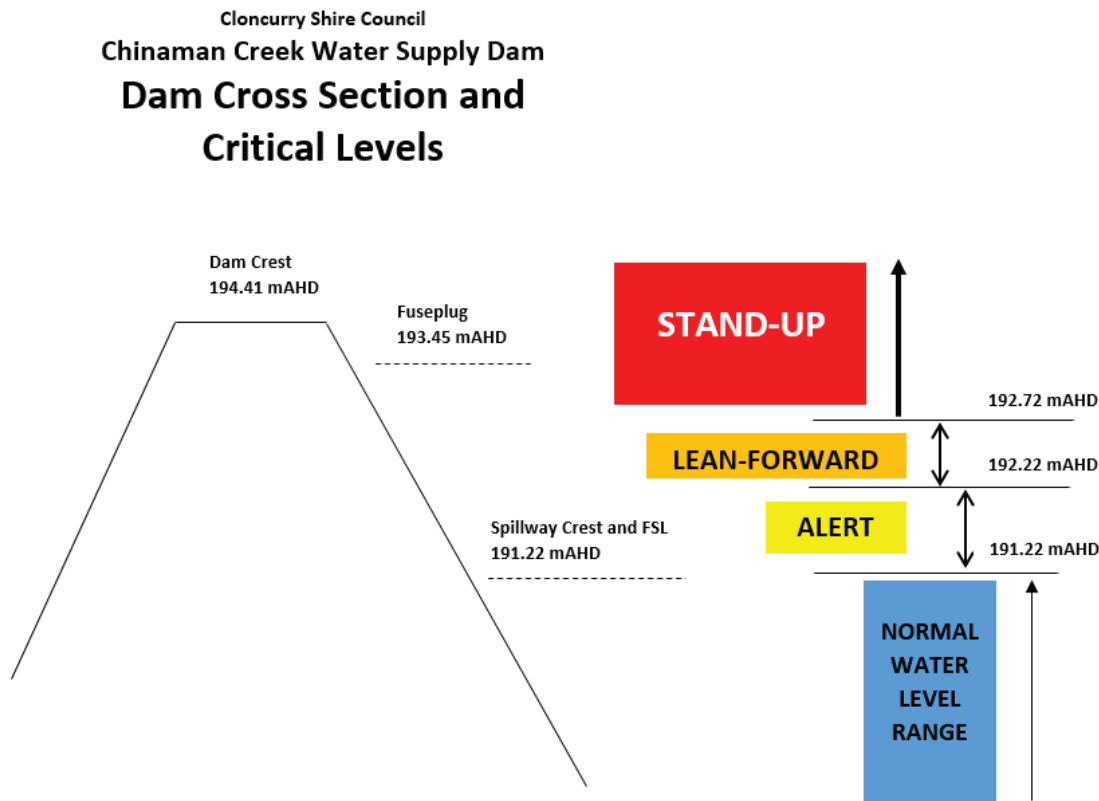


Figure 1 Chinaman Creek Dam Critical Water Levels (not to scale)

3.2 Overview of Chinaman Creek Dam

Chinaman Creek Dam was constructed in 1993 and is owned and operated by Cloncurry Shire Council. The dam is a 13.5 m high concrete gravity structure comprising seven monoliths and impounds the 2.75 GL reservoir which provides the town water supply for Cloncurry. An uncontrolled ogee spillway is incorporated into the concrete gravity structure, spanning the four central monoliths. Detailed design drawings are contained in Appendix A.

The dam is located upstream of Cloncurry Township on Chinaman Creek, a small tributary of the Cloncurry River. The Dam is located approximately 500 metres upstream from the confluence of Chinaman Creek and Cloncurry River. In turn, the confluence is approximately 2000 m to the southwest of Cloncurry Township (Figure 2).

The dam receives inflows via runoff from the Chinaman Creek catchment as well as water harvesting from the Cloncurry River. The flood harvesting channel and pump station intake are situated at the dam left abutment .

An associated zoned earth fill levee approximately 900 m south (i.e., to the right of the right abutment) of the gravity dam forms part of the reservoir impoundment. A diversion drain is located adjacent to the levee. A fuse plug spillway to the south of Black Mountain provides additional spill capacity once the reservoir rises to 2.2 m above the level of the main ogee spillway.

In addition to the water supply function for Chinaman Creek Dam, the dam also serves as a recreational facility for the community. The dam is predominantly used for water skiing and recreational fishing. Consideration must be made to the transient visitors of the Dam when assessing the potential for people and property at risk of harm.

The population of Cloncurry is in excess of 3,644 persons (2021 census). The latest Failure Impact Assessment (GHD 2023) indicates a zero population at risk (PAR) for a sunny day failure. In the same study, an incremental PAR of 18.5 was calculated for a 1 in 200 year AEP event at the dam coupled with a 1 in 20 year AEP event in Cloncurry River.

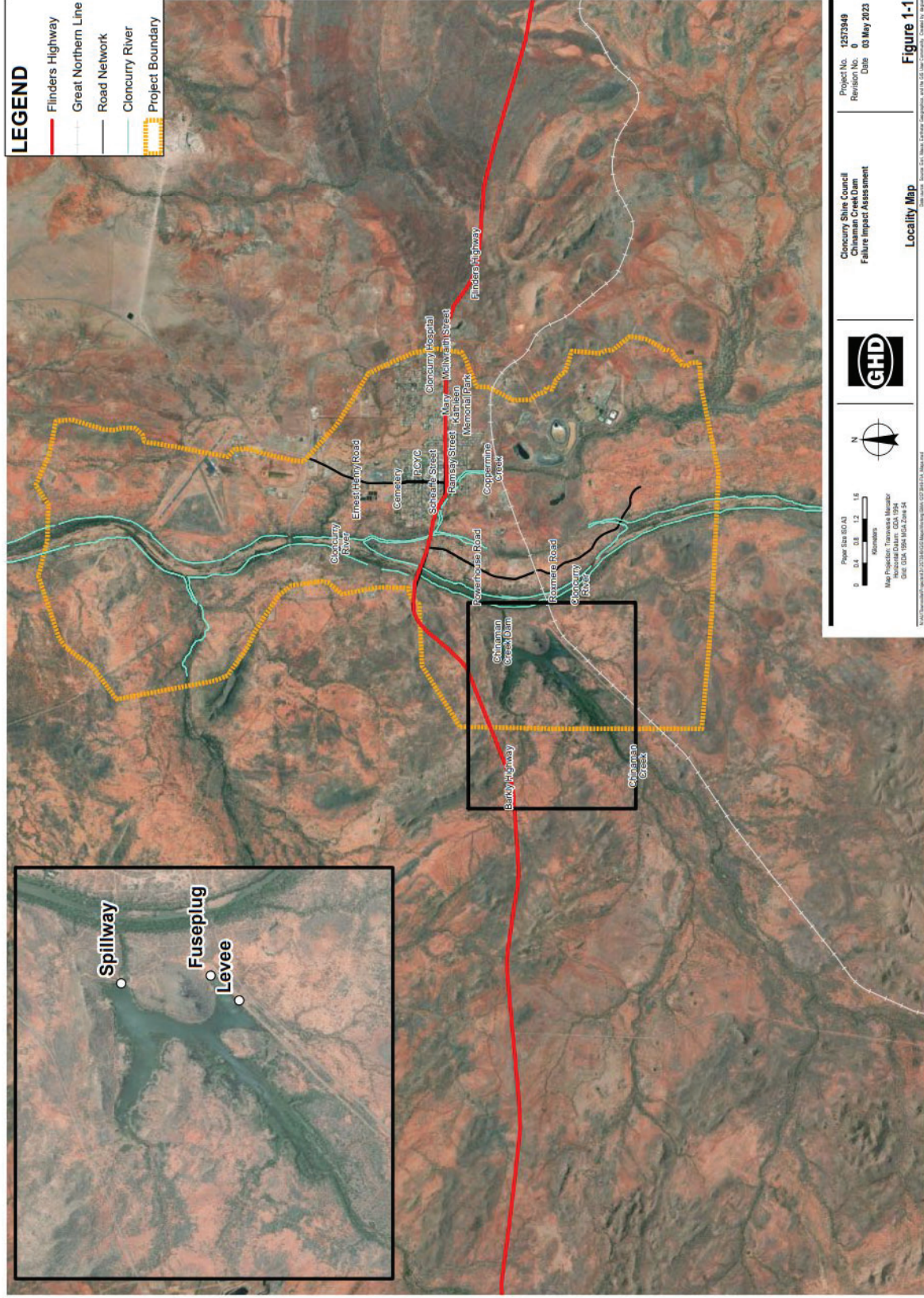


Figure 2

Locality Map

3.3 Dam Access

The main access to the dam is via Chinaman Creek Dam Road, which is itself reached via Barkly Highway. Chinaman Creek Dam Road provides access to the left abutment of the concrete gravity dam (Figure 3). The crest is not trafficable; however, an access track connects the left and right abutments via a crossing of the downstream channel. Hence the right abutment is not accessible from Chinaman Creek Rd when the dam is spilling or when tailwater is present.

The right abutment, fuse plug, and levee are accessible via unsealed access track(s) adjacent to the rail line which runs south of the levee (Figure 4). During flood conditions, access via these tracks may be difficult. The rail line track can be accessed by following the Barkly Highway from Cloncurry and turning left on to Cloncurry Duchess Rd. The track can then be accessed by turning left at the first rail level crossing along Cloncurry Duchess Rd.

It is important to note that the dam is on the opposite side of the Cloncurry River to the township. Therefore, during major flooding (events greater than 2% AEP), the dam may be inaccessible from the township if the Barkly Highway (i.e., Ernest Henry Bridge) is affected. Furthermore, if the personnel is sent to the dam for monitoring and observations or there are recreational users of the dam present, there is the possibility of being isolated from the township.



Figure 3 Primary Dam Access (Accessed via Google Earth, 2024)



Figure 4 Secondary Dam Access (Accessed via Google Earth, 2024)

3.4 Instrumentation

Chinaman Creek Dam's instrumentation includes an onsite monitoring facility, as well as four remote monitoring facilities in the vicinity of the dam that provide information on water levels and rainfall data.

3.4.1 On-site Monitoring and Early Warning System

In 2024, a SCADA system was set up at Chinaman Creek Dam that includes reservoir level and rainfall monitoring. The primary dam level monitoring equipment was installed on the left abutment of the concrete dam, which is also where the rain gauge is located.

In addition to the instrumentation, several CCTV cameras were installed and connected to the SCADA system for visual monitoring of important dam features, these include:

- A CCTV camera on the non-overflow abutment
- A CCTV camera downstream of the spillway, and
- A CCTV camera on the fuse plug embankment

An early warning system was also installed at Chinaman Creek Dam at this time. This consists of a siren, located on Powerhouse Road, which is connected to the SCADA system, that activates by SMS from the CEO of CSC (or their approved delegate).



Figure 5 Scada Instrumentation Plan (Nearmap, 2024)



3.4.2 River Level Data (Ernest Henry Bridge)

The gauge located at the Ernest Henry Bridge (where the Barkly Highway crosses the Cloncurry River) is approximately 2 km northeast of the dam. The gauge (BOM station number 529011) is downstream of the dam and provides river level heights in the Cloncurry River. The flood level plot can be viewed at the following web address:

<http://www.bom.gov.au/fwo/IDQ65399/IDQ65399.529011.plt.shtml>

This gauge is part of the flood warning system for the Flinders River. The Bureau of Meteorology issues flood warnings for the Cloncurry River as part of this warning system. For reference, historic flood levels (in metres) are shown in relation to their severity in Table 6.

Table 6 Historic Flood Levels at Ernest Henry Bridge

MAJOR	14	0.2% AEP @ 13.84 m*
	13	
	12	
	11	1% AEP @ 11.62 m*
	10	2% AEP @ 10.74 m* Bridge Deck @ 10.50 m March 1997 @ 10.01 m
	9	
	8	Jan 2009 @ 8.03 m
	7	Jan 1991 @ 7.80 m Feb 2009 @ 7.79 m Jan 1974 @ 7.26 m
MODERATE	6	
	5	Jan 1982 @ 5.70 m Mar 2011 @ 5.41 m
MINOR	4	Feb 1991 @ 4.85 m Jan 1984 @ 4.80 m
	3	

* AEP flood levels obtained from: DHI (2014). DNRM Flood Hazard Mapping: Phase 3b - Cloncurry. December 2014.

3.4.3 Rainfall Data (Cloncurry Town, Cloncurry AP AWS and Cloncurry TM/MAN)

Rainfall data for these monitoring locations can be viewed at the following web address:

http://www.bom.gov.au/cgi-bin/wrap_fwo.pl?IDQ60372.html

3.4.4 Monitoring Locations

The location of monitoring stations in the region is shown in Figure 6. Other rainfall gauges in the region can be monitored in order to provide a more complete picture on weather conditions and the extent of the weather system(s).

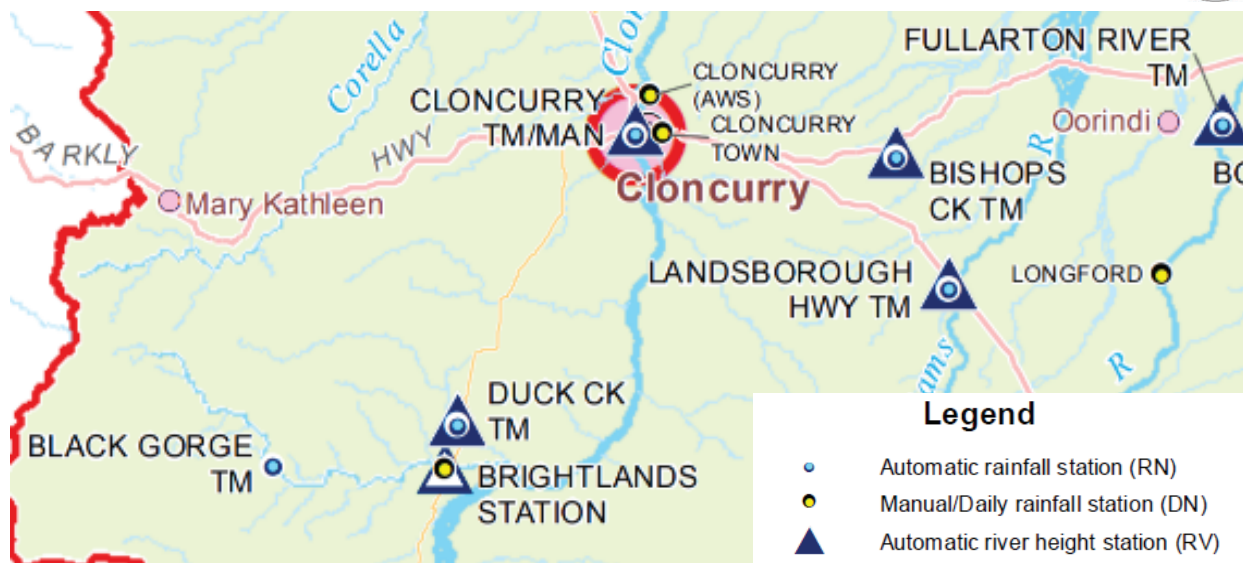


Figure 6 Monitoring Stations in the Region

3.5 Maintenance Inspection

To reduce the likelihood of the dam failing under normal operating conditions (dam water level at or below full supply level or minor flows only through the spillway) a program of regular inspection and maintenance needs to be undertaken. This includes the activities noted in the Table 7 below.

Table 7 Chinaman Creek Dam Maintenance and Inspection Schedule

Activity	Description / Details	Timing / Frequency
Dam Safety Inspections ⁽¹⁾	Comprehensive	5 Yearly
	Annual / Periodic	12 Monthly
	Routine Visual ⁽²⁾	At least 3 Times A Week
	Special / Emergency	As Required (Dependent Upon Changes Within the Environment) e.g. floods, earthquakes etc.
	Safety Review	20 Years
Weed and Tree Removal	Monitored and Conducted	Annually
Mowing and Slashing	Monitored and Conducted	Annually

Notes:

1. Based on a "High A" ANCOLD category
2. As per ANCOLD Guidelines on Dam Safety Management (2003)

3.6 Risks and Issues

The following risks and issues may need to be considered in respect to the operation, use and activation of this EAP:

- This EAP addresses emergencies arising from events at Chinaman Creek Dam only. The emergency response required for flooding of the township of Cloncurry due to large flows in the Cloncurry River are documented elsewhere in the Cloncurry Local Disaster Management Plan (CSC 2023).
- Water levels in the dam will rise quickly under heavy rainfall events.
- The location of the dam being a short distance upstream of the township of Cloncurry (approximately 2 km) results in any changes at the dam impacting in a short period (within 30 minutes) on the township.



- It is emphasised that even though flood warning times can be quite large for the Cloncurry River (days), warning times for dam emergency events are very short and very rapid response is required to effectively implement this EAP (minutes to hours).
- Where possible and safe to do so, dam operators should be mobilised early to view the developing situation at the dam. This action may need to be based on predictions of a storm or high rainfall event developing.
- Operators attending site are to be aware that due to flooding and inundation of local roads, they may become isolated at the site until flood levels recede. It is recommended operators attending the dam are equipped with drinking water, food, and appropriate clothing and communications systems suitable for the expected duration of the event (up to 24 hrs). It is noted however, that operators will not be isolated at the dam as a matter of course. The intent is for operators to remain on site only while safe to do so.
- The situations likely to lead to implementation of this EAP are also likely to see intense rainfall conditions elsewhere in the area (up to 200 mm/hr for a 1% AEP and up to 120 mm/hr for a 20% AEP, for 15 minute duration events). This will increase the hazards and risks associated with implementing this plan. Hazards may include dangerous road conditions, reduced visibility, flooding of local roads, downed power lines, trees being blown over and emergency services unable to travel to and from the dam site.
- Consideration should be given to mobilising at least 2 operators to the site to enable safe inspection and monitoring. Operators must not be sent to a potential hazardous situation alone. The remote monitoring system should be used as an alternative where practicable during emergency events.
- Resources required to respond to a dam safety event may be limited due to these resources being previously deployed elsewhere in the region as a result of the wet weather event, and the time required to organise and for the resources to travel to site.
- Failure of the dam and the loss of storage capacity will have an impact on the ability of the dam to provide and maintain a potable water supply for Cloncurry. Separate water supply arrangements may need to be implemented following the event.

3.7 Impact of Flooding Downstream of Chinaman Creek Dam

Flood modelling was undertaken in 2023 as part of the Failure Impact Assessment (FIA) for Chinaman Creek Dam. Selected flood inundation maps are included in Appendix C of this EAP and provide guidance on the area and the streets and roads that may be impacted by various flood scenarios.

The critical PAR was calculated to be 18.5 for a failure of the Chinaman Creek Dam during the 1 in 200 year AEP event, whilst a 1 in 20 year AEP event was concurrently taking place in the Cloncurry River. There is no PAR as a result of sunny day failure. As such, the dam is considered a Category 1 referable dam. The FIA concluded that there was a maximum total PAR of 1149 during a 1 in 2,000 year AEP dam failure event, whilst a 1 in 200 year AEP event was concurrently taking place in the Cloncurry River.

3.8 Dam Flooding Emergency Event Notification List

In extreme floods up to PMF, flooding could generally impact properties to the west of Railway Street and Ernest Henry Mine Road and east of Burke Development Road as shown in the maps identified in Appendix C.

The Notification polygon for the PAR downstream of the dam can be found in Appendix E.

4. Emergency Events

4.1 Alert Levels

Each alert level includes a colour coding which is used to define the level of action outlined in the corresponding flow charts and action plans. Whilst this EAP provides for a situation to develop in stages, it is to be recognised that under some circumstances the immediate activation of this plan to 'Dam Safety Emergency' may be required. Furthermore, the dam has the potential for its water level to quickly rise. Consideration should be given to escalating from ALERT to STAND-UP if the rate of water level rise is expected to be rapid or may exceed the capacity of responders to react promptly.

Table 8 Alert Level Definitions

Level	Description
ALERT (Dam Safety Alert)	Conditions are developing or have developed that raise the need for closer monitoring of the dam.
LEAN FORWARD (Dam Safety Event)	Conditions exist or are developing further where the dam is filling with water and there is potential for further water level rises OR for dam safety issues to develop or have been observed. The dam is intact but there is potential for it to fail.
STAND-UP (Dam Safety Emergency)	Conditions exist or are developing where major flooding downstream of the dam is expected AND / OR failure of the dam is expected or has occurred.
STAND-DOWN (Dam Safety Threat Reducing)	Rainfall or inflows to the dam are reducing and the water level of the dam is dropping. Downstream flooding has reduced and is no longer a threat to the public. Any dam safety issues are no longer considered to be likely to lead to dam failure.

4.2 Normal Operating Conditions

Under normal operating conditions where minor or low flows in Chinaman Creek are occurring (up to 50% AEP flood) and no dam safety issues are evident or developing, there is no threat to residents downstream of the dam or the township of Cloncurry. The dam has the capacity to safely fill to full supply level and for discharges to occur through the dam's main spillway (typically dam water levels are ≤ 191.7 m AHD with up to 0.5 m of water flowing over the spillway). This is regarded as a normal situation if it does not affect downstream residents or roadways but depending on forecast conditions may require a heightened level of awareness to be adopted.

4.3 Potential Dam Safety Issues

Possible dam safety issues that could develop at the dam include those outlined in Table 9. The issues outlined are in addition to emergency issues resulting from high inflows from the catchment / major flooding and inundation.



Table 9 *Potential Dam Safety Issues*

Possible Dam Safety Issues	Description / Characteristics	Emergency Event Issues
Seepage erosion or piping failure developing	Identification of changes in seepage patterns at the levee embankment. Changes can include turbidity/colour (evidence of loss of embankment material) and/or increased flow rates.	Potential for the seepage to develop into a piping failure.
Overtopping of the dam	Water is discharging over and above the abutments of the main dam and also over and above the crest of the levee embankment	Major flooding downstream. Potential for erosion of the levee embankment to take place and develop into a breach.
“Sand Boil” downstream of dam	A raised mound with a discharge of water near or downstream of the dam toe.	Development of a piping failure at depth beneath the dam.
Scour	Wave Scour on levee embankment and/or scour around fuseplug	Loss of levee embankment fill and destabilisation of the levee embankment (slips). Potential for breach if large slips occur. Unexpected or premature activation of the fuseplug
Inundation of downstream toe of levee embankment	Saturation of the embankment fill at the downstream toe of the levee embankment	Potential for instability (slips) to develop in the downstream batter as the flood level recedes. Potential for breach if large slips occur and undercut the embankment toe.
Longitudinal cracks in levee embankment or crest (cracks parallel with crest alignment)	Straight or curved cracks in the levee embankment crest or batters	Embankment instability leads to slip failures developing and the potential for a breach. Potential for overtopping if freeboard is lost at the area of the slope failure.
Transverse cracks in levee embankment or crest (cracks running across crest alignment)	Fissures or cracks in the levee embankment crest or batters	Transverse cracks create an open water path through the embankment with the potential for piping through the crack if the water level is above the level of the crack base. Potential for further erosion to develop and potential for a breach.
Slips, slumps, or settlements in the levee embankment	Depressions in the embankment. Depressions or bulges on the embankment batters	Embankment instability developing that could develop further including a breach of the embankment owing either to piping or overtopping if freeboard is lost
Loss of erosion protection to fuseplug	Loss of riprap and/or mattress	Exposure of the embankment fill and potential for development of erosion Breach of the embankment is possible if erosion is continuing. Unexpected or premature operation of the fuseplug
Leakage through concrete joints	Excessive or increased leakage through joints in the concrete gravity dam	The potential for instability (excessive movement of the concrete monoliths) can lead to the development of a breach
Spillway apron damage	Loss of concrete and/or exposure of reinforcement in spillway apron	Potential for undermining the dam foundation leading to the development of a piping failure at depth beneath the dam
Spillway debris	Large trees or objects trapped against the spillway during flood flow	Potential damage to spillway crest and/or increase in flood levels due to inefficient spillway operation and/or premature activation of the fuse plug



5. Roles and Responsibilities

5.1 Summary

The **Chair of the Local Disaster Management Group (LDMG)** is responsible for coordinating the event response actions, notifications and when applicable, declaring an Emergency. This may include liaising with external agencies including Queensland Fire Department and the Department Local Government, Water and Volunteers; and the Local Disaster Management Group.

The **Chief Executive Officer of Cloncurry Shire Council (CEO)** is responsible for the activation and appropriate understanding and execution of this plan. The CEO is further responsible for providing advice and support to the Local Disaster Management Group (LDMG), IF AND WHEN ACTIVATED.

The **Director of Infrastructure and Environment (DR)** is responsible for providing support to the Local Disaster Management Group in the form of up-to-date operational and meteorological information.

The **Emergency Action Plan Officer (EAPO)** is responsible for providing support to the Director of Infrastructure and Environment (DR) in the form of up-to-date dam and meteorological conditions.

The **Emergency Action Plan Backup Officers (EAPO-1 and EAPO-2)** are responsible for [providing support to the Emergency Action Plan Officer (EAPO) as directed by the EAPO and DR.

The **Local Disaster Coordination Centre (LDCC)** is a predetermined location from which the event response can be managed. This location must have adequate communications and provisions for disaster management and must be immune to flood waters.

5.2 Responsibilities of the Chair of the Local Disaster Management Group (CLDMG)

- Activating the Local Disaster Management Plan when appropriate
- Receive and review information from the CEO and DR regarding the status of the emergency
- Convene and subsequently update the LDMG and manage its functions
- Review of data and information received
- Issuing warning notifications and alerts
- Arrange for post-evacuation support for people at risk of harm, if required
- Declaring Stand Down of the LDMG when applicable

5.3 Responsibilities of the Chief Executive Officer of Cloncurry Shire Council (CEO)

- Activation of this Emergency Action Plan
- Declaring an Emergency when applicable
- Activation of the early warning system (siren)
- Establish the LDCC including the provision of resources
- Receive and review information from the EAPO and/or the DR regarding the status of the emergency
- Advise and update Director Dam Safety, Department of Regional Development Manufacturing and Water throughout the emergency event
- Take action to coordinate appropriate responses as per the Emergency Action Plan and the Local Disaster Management Plan
- Receive and review information from the EAPO and/or the DR regarding the status of the emergency
- Coordinate disaster operations including external response agencies



- Coordinate the issuing of flood warnings and evacuation notices (including the door knocking, use of sirens, and the National Emergency Alert System)
- Maintain a log of the event, actions taken, and all communications
- Provide a report on the event to the Director of Dam Safety (DLGWV)
- Declaring Stand Down of the EAP when appropriate.

5.4 Responsibilities of the Director of Infrastructure and Environment (DR)

- Approve the person undertaking and/or relieving in the role of EAPO, EAPO-1, and EAPO-2
- Ensure the EAPO, EAPO-1 and EAPO-2 are conversant with the Emergency Action Plan
- Assign resources as required to support the EAPO, EAPO-1, and EAPO-2
- Monitor regional weather conditions
- Evaluate reports from the EAPO and provide directions where required in this plan
- Maintain a log of the event, actions taken, and all communications
- Ensure the Emergency Alerts are tested through the State Disaster Coordination Centre by 1 September each year to ensure effectiveness.
- Ensure the Emergency Action Plan is distributed according to the Distribution List and that the police and counter-disaster organisations are conversant with the plan

5.5 Responsibilities of the Emergency Action Plan Officer (EAPO)

- Monitor the dam for any potential emergency conditions
- Monitor local weather conditions
- Confirm with the DR the names and contact details of the personnel undertaking the backup support roles of the EAPO-1 and EAPO-2
- Immediately notify the EAPO-1 and EAPO-2 when the EAP is initiated
- Report to and receive instructions from the DR in time of emergency
- Report to and receive instructions from the CEO of the DR cannot be contacted in time of emergency
- Take steps to ensure personal safety and the safety of other EAP officers and the public
- Record details in the storage logbook and take photographs of the event. Details which should be recorded are:
 - Time and date
 - Water level reading
 - Rain gauge readings
 - Details of all phone calls
 - Actions or directions from the DR
- Communicate all up-to-date recordings to the DR for evaluation during the emergency or if DR cannot be contacted, the CEO. Projections and opinions based on the experience of similar events of specialist knowledge may be given. The EAPO may give ONLY factual information to the media and public
- In the likelihood of adverse weather or stream flow conditions or at any other time that the EAPO is unable to fulfil their duties, advise EAP Backup Officer 1 (EAPO-1) and EAP Backup Officer 2 (EAPO-2) of any intended absence from the area and ensure contact details are correct
- Keep the EAP in a clean, secure facility, which is easily accessible during an impending emergency event. • Maintain the storage logbook
- Prepare an Emergency Event Report after an emergency event and send it to the DR.



5.6 Responsibilities of the Emergency Action Plan Officer (EAPO) Backups (EAPO-1 and EAPO-2)

- Assist the EAPO in times of emergency
- Undertake the responsibilities of the EAPO should that person be unavailable

If, during adverse weather conditions, the EAPO-1 and EAPO-2 have not been contacted by EAPO they shall:

- Attempt to contact the EAPO
- Contact the DR if contact with the EAPO cannot be made



6. Communication and Evacuation Responsibilities

6.1 Overview

The purpose of this section is to identify who is responsible for emergency warnings, notification of PAR and initiation of evacuations of PAR if required. Generally, PAR in the closest vicinity of the dam, as well as PAR where primary communications techniques have failed, should be notified as priority.

It is possible that for CCD this plan may need to be activated and an evacuation of residents initiated in the following situations:

- When there is little or no notice of a dam hazard event and where the Local Disaster Management Arrangements are not operational;
- When a dam hazard event is developing and the Local Disaster Management Arrangements are activated and become operational as a result of the dam hazard event; or
- The Local Disaster Management Arrangements have already been activated as part of an ongoing disaster event.

6.2 Prior to LDMG / LDCC Activated and Operational

It is possible that this plan may need to be activated and an evacuation of residents initiated with little or no notice and prior to the Local Disaster Management Group (LDMG) being activated and the Local Disaster Coordination Centre (LDCC) becoming operational. In this scenario, all public warnings and the initiation of the evacuation of PAR will be on the authorisation of the EAPO or CEO. Warnings are to be issued by the most effective means as determined by the EAPO or CEO and may include phone and SMS (to effected properties), door knocking if safe to do so and an emergency alert request to the State Disaster Coordination Centre.

Should an evacuation order be broadcast and if deemed necessary, the EAPO is to call 000 and request police assistance and 132 500 to request SES assistance in evacuating the PAR. The EAPO will direct on-site ground visits (subject to the safety of available Council and Emergency Services Officers) to ensure the message has been distributed.

As this emergency action plan, and the hazards identified within, has the potential to impact the residents of Cloncurry, it is the responsibility of the EAPO or CEO for the distribution and co-ordination of the early warnings and evacuation /emergency response to the PAR within CSC until such time that advice has been received from the LDMG that they are activated and their LDCC is operational.

6.3 LDMG / LDCC Activated and Operational

It is possible that this plan may need to be activated in response to a developing dam hazard event or during an ongoing disaster event where a planned evacuation of residents may be required to be initiated.

Once the LDMG has been activated and the LDCC is operational, all public warnings will be distributed through the relevant LDCC upon the recommendation of EAPO or CEO and on the authorisation of the relevant Chairperson LDMG. Warnings are to be issued by the most effective means as determined by the LDMG and may include phone and SMS (to effected properties), door knocking if safe to do so, radio warnings, local electronic and print media outlets and emergency alert requests to the State Disaster Coordination Centre.

It is the role of each LDC through the LDCC to ensure that communication with and evacuation of PAR is in accordance with this Emergency Action Plan upon the request of the EAPO or CEO.

Should an evacuation order be broadcast and if deemed necessary, the evacuation shall be conducted in accordance with the Local Disaster Management Plan (LDMP) by the Queensland Police Service (QPS). QPS will

direct on-site ground visits with the assistance of resources made available through the LDCC, subject to the safety of available Council and Emergency Services resources to ensure the message has been distributed.

6.4 Partner Agencies

A number of partner agencies are responsible for or can provide assistance in providing public information and warnings that may be relevant to a dam hazard event.

Partner agencies that also provide public information and warnings in the event of an emergency or disaster include:

- Queensland Fire Department (QFD) – coordinates media and public information regarding fire, chemical or gas emergency situations.
- Bureau of Meteorology (BoM) – provides cyclone, flood (flood alert, flood watch and flood advice), severe storm (including thunderstorm), tsunamis, land gales and severe bushfire weather advice.
- State Disaster Coordination Centre – provides an operational venue for disaster related events while providing State level support for disaster management responses.
- Queensland Police Service (QPS) – has responsibility for providing information about a locally managed terrorist incident and evacuation coordination.
- District Disaster Coordinator (DDC) – advises detail of mandatory evacuations and declarations under the Disaster Management Act 2003 (DMA), relating to any disaster event.
- Queensland Health – for information regarding a public health epidemic or heat wave.

CSC – for local information on road closures, traffic routes, evacuations, evacuation centres, recovery hubs, public cyclone shelters, debris clean-up and all matters relating to the activation of the LDMG and LDMP.

6.5 Community Warning

In imminent failure events, it is feasible for direct warning of those affected most quickly by potential flood waters to be directly notified by disaster responders. The responsibility for such warning rests with Police and SES.

Notwithstanding, it is appropriate to have community warnings distributed using the Emergency Alert (EA) system. Partially complete Emergency Alert Request forms along with EA polygons are provided in Appendix E. A completed Emergency Alert Request form should be submitted by the LDMG to the State Disaster Coordination Centre (SDCC) watch desk (contact details are provided in Appendix E). These messages and polygons have been pre-loaded with the watch desk to expedite the EA process. In time-critical situations, a representative of CSC may be required to submit the EA request directly with the SDCC.

The Australian Warning System (AWS) is the national approach to information and warnings for hazards and aims to provide consistent warnings to communities to ensure people know what to do when they see a warning level.

There are three (3) warning levels:



Advice: An incident has started. There is no immediate danger. Stay up to date in case the situation changes.



Watch and Act: There is a heightened level of threat. Conditions are changing and you need to start taking action now to protect you and your family.



Emergency Warning: An emergency warning is the highest level of warning. You may be in danger and need to take action immediately. Any delay now puts your life at risk.



The AWS is presented in Appendix E. These warnings have been designed to inform the community about what impacts are to be expected, and what actions they should take to remain safe in the event of a dam hazard resulting in downstream flooding from the dam. These warning messages have been written using simple, easy to understand language to ensure the information contained within the warnings is as accessible as possible to downstream PAR.





7. PAR Notification and Communications Protocol

7.1 Equipment

The means of communication to be engaged for this EAP and to be used by the resources responding to a dam safety incident shall include:

- Landline Telephone
- Mobile Telephone (including text messaging)
- Satellite Telephone (where mobile phone coverage is not available or unreliable)
- Local ABC and FM Radio Broadcast
- Police radio
- Email
- UHF Radio

All persons engaged in this plan shall maintain a log of any communications sent or received together with any corresponding actions taken, observations and other relevant notes. Refer Appendix F.

The National Emergency Alert System is also considered to be a means of issuing alerts and warnings via SMS (Text) messages through nominated polygons.

It is to be noted that both Satellite Telephone and Mobile Phone systems can be impacted by adverse weather conditions. Where possible, backup communications are to be provided.

7.2 Internal Communications

During all but the most severe operating conditions, telephones should be used as the main form of communication. Staff performing dam safety operations or responding to an event must have access to a mobile phone. If mobile phone communications at CCD are hampered, staff performing dam safety operations or responding to an event must have access to a Council landline, satellite phone or UHF/VHF radio at all times.

7.3 External Communications

The primary form of communication to external groups such as the PAR and other relevant emergency service responders shall be by telephone.

The CSC shall be responsible for keeping the Notification List and PAR Notification List from the EAP updated. These lists must be reviewed annually and updated by the 1st October each year.

Due to the speed that a potential emergency could occur and the number of people to be contacted it may be impractical to rely solely upon contact by telephone. For these reasons the contact with the PAR and other relevant emergency contacts will also be through email and SMS messaging where these contact details have been provided and face to face contact should it be safe to do so. Radio broadcasts and other public media releases may also be used. The emergency warning system (siren) shall be activated by the CEO, or their delegate, when Stand Up is reached.

If the situation dictates, an emergency warning will be requested through the State Disaster Coordination Centre utilising the standard alert request forms and alert polygon (Appendix E).



7.4 Interrupted Communications

It is to be noted that the primary communication strategies can be impacted by adverse conditions through a loss of telecommunications infrastructure, power supply or both. Where possible, backup communications strategies are to be implemented.

The following strategies will be used for the distribution of local warnings and/or information:

- If local power and/or telecommunications are lost (site is isolated from CSC/LDCC);
 - Maintain communications through satellite phone or vehicle mounted UHF/VHF radio between the site and LDCC if there is adequate site access and it is safe to do so.
 - Manually distribute information through face to face / doorknocking if it is safe to do so;
 - Broadcast warnings and alerts by radio, TV and internet (where auxiliary power is available to residents or residents have battery powered radio sets in their emergency kits)
 - Attempt to re-establish mobile phone, SMS and landline communication on an hourly basis.
- If general power and/or telecommunications are lost (all sites are isolated);
 - Maintain communications through satellite phone or vehicle mounted UHF/VHF radio between the site and LDCC if there is adequate site access and it is safe to do so.
 - Assume site based incident control in accordance with relevant activation triggers in the EAP until communication with the CSC is re-established.
 - Attempt to re-establish contact through locally based alternate emergency services providers such as SES, QPS and QFD.
 - Manually distribute information through face to face / doorknocking if it is safe to do so;
 - Broadcast warnings and alerts by ABC radio (where auxiliary power is available to residents or residents have battery powered radio sets in their emergency kits)
 - Attempt to re-establish all forms of communication on an hourly basis.

7.5 Issue Flood Warning & Evacuation Notices

The following methods of issuing flood notifications, warnings, and evacuation notices (refer to Appendix E for message templates) are to be used where appropriate:

- Warnings issued using the National Emergency Alert “Polygon” System (SMS alert through the mobile phone system)
- Use of loud speakers via a vehicle travelling the streets
- Door knocking
- Local emergency response personnel making public broadcasts and where necessary door knocking individual residences or places of occupancy
- Local media releases including Radio and Television
- The sounding of a siren or other audible warning devices to alert both general and transient populations
- Through social media

7.6 Communication Plan

As noted above, all persons engaged in this plan shall maintain a log of any communications sent or received together with any corresponding actions taken, observations and other relevant notes. Refer Appendix F.

The communication plan provided in Appendix E should be followed.

The siren shall be activated at Stand Up Level to alert one of the areas with the highest potential for vulnerability on and surrounding Powerhouse Road.



8. EAP Activation

8.1 Overview

At Chinaman Creek Dam there are a number of different events that may lead to this EAP being activated. The activation of the EAP is the sole responsibility of the CEO. The deactivation of EAP and the declaration of Stand Down is also the sole responsibility of the CEO.

The following events are considered to be the most relevant for the dam. The scenarios outlined below are to be used as a guide to the possible dam safety events and emergency situations along with the actions and responses that may need to be considered.

It is important to note that an event may unfold differently from the scenarios outlined below. This may be due to varying rainfall patterns, several storm events following in quick succession, or other factors. The scenarios below are to be used as a guide only in developing appropriate responses.

8.2 Sunny Day Failure

Under this scenario (refer to Figure 7 and Table 11), a failure develops during a period of dry weather (i.e., low, or nil precipitation in the dam catchment and low or nil inflow to the dam). Failure of the dam occurs when it is least expected and is not related to flood conditions or during periods of high rainfall. There have been no indications in the past of any dam safety issues and the last dam safety inspection did not identify any seepage, cracking movement, or other issues. The following conditions may, however, be applicable:

- Generally fine weather conditions (inflow to the dam may vary from nil to low stream flows)
- The dam water level is at or below Full Supply Level

Under this scenario, there is low risk to people or property for the downstream population as the PAR has been determined to be zero in the 2023 Failure Impact Assessment. However, recreational users of Chinaman Creek Dam would be at risk of harm as a dam safety emergency could still be triggered by any of the following:

- Changes in seepage
- Sand boils develop along the toe of the downstream embankment or in the vicinity of the toe
- Water flowing from cracks or development of 'piping' holes in the embankment
- Slips, slumps, or movement of material on the embankment
- Development of cracks, horizontal movement, or settlement of the dam embankment
- Damage to or failure of the spillway or fuse plug

Other stability issues or a combination of any of the above leads to concerns around the stability of the dam embankment or spillway.

8.2.1 Earthquake

Under this scenario, an earthquake has been reported or felt in the area surrounding the dam catchment and possible damage has occurred to one of the embankments. This damage could take the form of cracking, deformation or increased or new seepage areas.

To assist with the identification of trigger events a Modified Mercalli Intensity scale is provided in Table 10.



Table 10 *Modified Mercalli Intensity (MMI) scale (Geoscience Australia, accessed March 2023)*

Intensity	Shaking	Description/damage
1	Not felt	Not felt except by a very few under especially favourable conditions
2	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
3	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
5	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
6	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
7	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
8	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
9	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
10	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

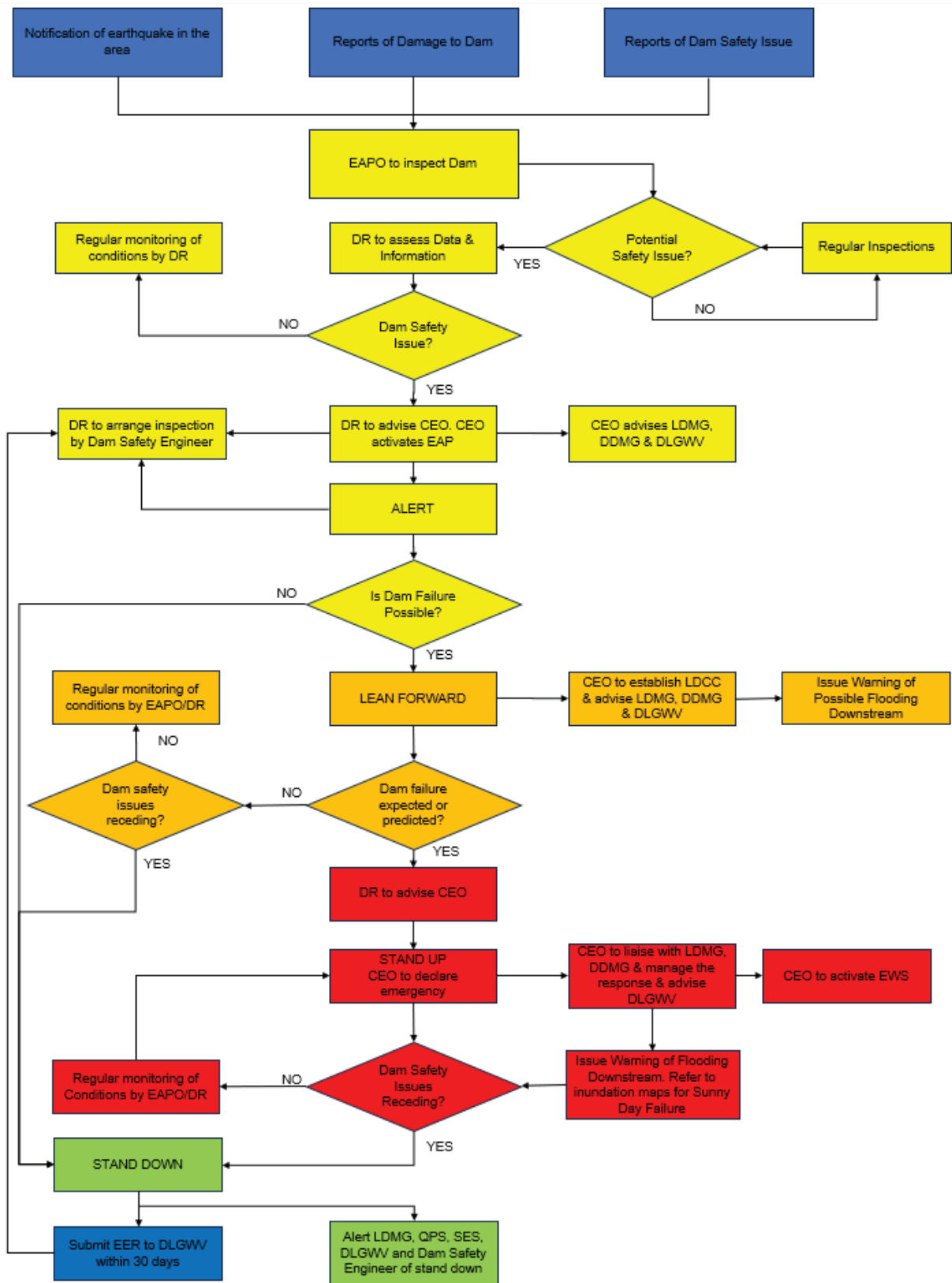


Figure 7 Sunny Day Failure flowchart



Table 11 Actions for Sunny Day Failure

Sunny Day Failure						
	Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & Environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
ALERT	Conditions have been identified that raise the need for closer monitoring of the dam. Observed conditions on site through visual inspection, public notification or through CCTV include: – Reports or identification of sabotage or vandalism. – Report of an earthquake in the region with intensity less than 5 Modified Mercalli (MMi). – Identification of dam safety issues that could develop further if not addressed in a timely manner. – Minor Seepage/Leakage changes. – Minor Scour. – Minor Cracking.	Evacuate all members of public/personnel from the dam site. Inspection of the dam following reports of damage, earthquake or other event. Undertake increased frequency of monitoring as required. Provide hourly updates to DR. Immediately advise DR of any changes. Take photos of the issues. Observe and quantify any seepage and take samples of seepage (if applicable). Record data and information and maintain log of all communications in the Storage Log Book. Ensure that the spillway access gate remains locked and signage in place: DAM SITE CLOSED DUE TO UNSAFE CONDITIONS.	Request EAPO to attend site and undertake inspection upon receipt of any reports of damage, earthquake or other event. Inspect the dam (if possible) with the EAPO. Review all data and information received from the EAPO. Arrange for inspection of the dam by an experienced Consulting Dam Safety Engineer and take remedial actions based on advice. Contact the CEO if there are possible concerns about a dam safety issue developing. Provide regular updates to CEO of situation. Record data and information and maintain log of all communications (refer to Appendix F). If Dam Failure is possible or likely, advise CEO and go to LEAN FORWARD.	ACTIVATE EAP Notify LDMG of the activation to “Alert” level. Notify the DDMG to a developing situation and the possible need to mobilise and implement emergency actions. Review all data and information received. Advise the Director Dam Safety (DLGWV) of dam safety event and keep informed of the event through all stages. Record data and information and maintain log of all communications (refer to Appendix F).	Review emergency response plan and possible actions. Maintain a log of all communications (refer to Appendix F).	None.



Sunny Day Failure					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & Environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
The dam is intact but there is potential for it to fail. Observed conditions on site through visual inspection, public notification or through CCTV include: – Further development of the dam safety issues identified at the ALERT stage. – Major Seepage/Leakage changes. – Report of an earthquake in the region with intensity greater than or equal to 5 Modified Mercalli (MMI). – Major Cracking. – “Sand Boils” downstream of the dam.	Evacuate all members of public/personnel from the dam site. Continue to monitor and inspect dam. Provide hourly updates to DR. Immediately advise DR of any changes. Take photos of the issues. Record data and information and maintain log of all communications in the Storage Log Book Ensure that the spillway access gate remains locked and signage in place: DAM SITE CLOSED DUE TO UNSAFE CONDITIONS	Inspect the dam (if possible) with the EAPO. Review all data and information received from the EAPO. Arrange for additional resources to attend site (if required). Contact the CEO if there are possible concerns about a dam safety issue developing (dam failure predicted or expected) Provide hourly updates to CEO of situation. Record data and information and maintain log of all communications (refer to Appendix F). If Dam failure predicted or expected, advise CEO and go to STAND-UP.	ESTABLISH LDCC Notify LDMG of the activation to “Lean Forward” level Notify the DDMG of the situation and the forecast conditions and impacts. Provide hourly updates to LDMG. Assign resources to assist EAPO and DR. Issue warning messages (refer to Appendix E). Advise Director Dam Safety (DLGWV) of developing issue. Record data and information and maintain log of all communications (refer to Appendix F).	Manage response to event as directed by CEO. Evacuate residents if directed by CEO. Maintain a log of all communications (refer to Appendix F).	None.

LEAN FORWARD



Sunny Day Failure					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & Environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
Failure of the dam is imminent or has occurred. Observed conditions on site through visual inspection, public notification or through CCTV include: – Reports or identification of acts of terrorism. – Further development of the dam safety issues identified at the LEAN FORWARD stage. – Identification of dam safety issues that are likely to result in a breach developing in the dam (irrespective of the water level in the dam or existing or forecast inflows) – Active piping in the embankment. – Slips/Slumps/Settlement. – Major deformations.	Evacuate all members of public/personnel from the dam site. Continue to monitor and inspect dam. Provide hourly updates to DR. Immediately advise DR of any changes. Take photos of the issues. Record data and information and maintain log of all communications in the Storage Log Book. Ensure that the spillway access gate remains locked and signage in place: DAM SITE CLOSED DUE TO UNSAFE CONDITIONS.	Inspect the dam (if possible) with the EAPO. If lives are at immediate risk call 000 immediately. If lives are not at immediate risk, but suspicious activity is witnessed, refer to Section 8.4 for notifications. Review all data and information received from the EAPO. Arrange for additional resources to attend site (if required). Contact the CEO if there are possible concerns about a dam safety issue developing into a breach and causing downstream flooding. Provide hourly updates to CEO of situation. Record data and information and maintain log of all communications (refer to Appendix F). If dam safety issue has receded, advise CEO and go to STAND DOWN.	DECLARE EMERGENCY Notify LDMG of the activation to “Stand Up” level. Notify DDMG of the situation and the forecast conditions and impacts. Activate EWS (siren). Provide hourly updates to LDMG. Assign resources to assist EAPO and DR. Issue media alerts and information (refer to Appendix E). Advise Director Dam Safety (DLGWV) of developing issue. Record data and information and maintain log of all communications (refer to Appendix F).	Manage response to event as directed by CEO. Maintain a log of all communications (refer to Appendix F).	Co-ordination of response if the event escalates to a wider area. Provision of additional resources from outside the area if required.

STAND-UP



Sunny Day Failure					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & Environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
Dam inspections have not identified any safety issues or structural integrity issues. Any dam issues are no longer considered to be likely to lead to dam failure.	Prepare a report and provide data to the DR on the event. Provide copy of event log to DR. Continue regular inspections and monitoring. Unlock the spillway access gate and signage in place: DAM SITE OPEN.	Undertake a full inspection of the dam. Arrange for a special inspection and report of the condition of the dam (if it did not breach) or if the dam breached arrange for an investigation into the cause of the dam breach. Prepare a report on works or actions to be undertaken to restore the embankment and associated infrastructure. Prepare a written report on the event to the CEO. Arrange for any repair works to be undertaken. Maintain records of any communication or actions taken to assess the dam condition, cause of the incident or subsequent repairs. Place copy of EAPO and WTP event logs into the file system. Stand down the EAPO.	DECLARE STAND-DOWN Advise LDMG and DDMG that event has passed and emergency response services can stand down. Stand down the LDMG and close the LDCC. Notify the Director Dam Safety, DLGWV at Stand-Down and provide EER report within 30 business days after stand down. Coordinate and conduct a review of the event and the responses. Place copy of event log into the file system.	Prepare a report on the event and the responses. Participate in a review of the event and the responses.	None

STAND-DOWN



8.3 Flood Inflows and Dam Safety Issues

Under this scenario, conditions exist, are developing, or are predicted to develop where flood inflow is taking place or is expected to occur (refer to Figure 8 and Table 12). The dam water level is rising or expected to rise above the full supply level (discharges taking place through the main spillway and discharges through the fuse plug may occur)

An additional scenario is when the dam is experiencing minor or major flood inflows (with discharges through the main and fuse plug expected or taking place) AND a dam safety issue is identified or developing. A breach of the dam or scouring around the abutments may potentially occur such that the discharge flow rate from the dam increases or is expected to increase substantially.

The following conditions may be applicable (one or more of the following):

- Heavy or high-intensity rainfall in the catchment
- The upstream catchment has been saturated from previous rainfall events or the rainfall event is expected to quickly saturate the catchment and runoff to commence within a short period of time
- Major storm activity or high rainfall events are predicted over the catchment. The rainfall event may include a high rainfall intensity event (>100mm per hour) or a rainfall system that is continuous over a long period of time
- The dam is expected to fill quickly and discharges to commence through the main spillway and likely through the fuse plug
- A dam safety issue is developing or that may lead to a breach of the dam in conjunction with a rainfall event
- Overtopping of the dam crest and erosion of the dam crest are expected or taking place

Under this scenario (Flood Inflows to Dam and potentially a Dam Safety Issue), a dam safety emergency could be triggered by any of the following:

- Flood inflows taking place (flood warnings issued for the region by BOM)
- Dam water levels are expected to rise above or have reached the nominated trigger levels (see Table 12)
- Dam water levels rising to the point where discharges are taking place or expected to take place around the abutments
- Inflows are expected to fill the dam to the dam crest level or to overtop the dam
- Dam safety issues identified (refer to Table 9) or developing that are likely to lead to failure of the dam or the dam has been found to have failed
- Development of a scour bypass around the abutments

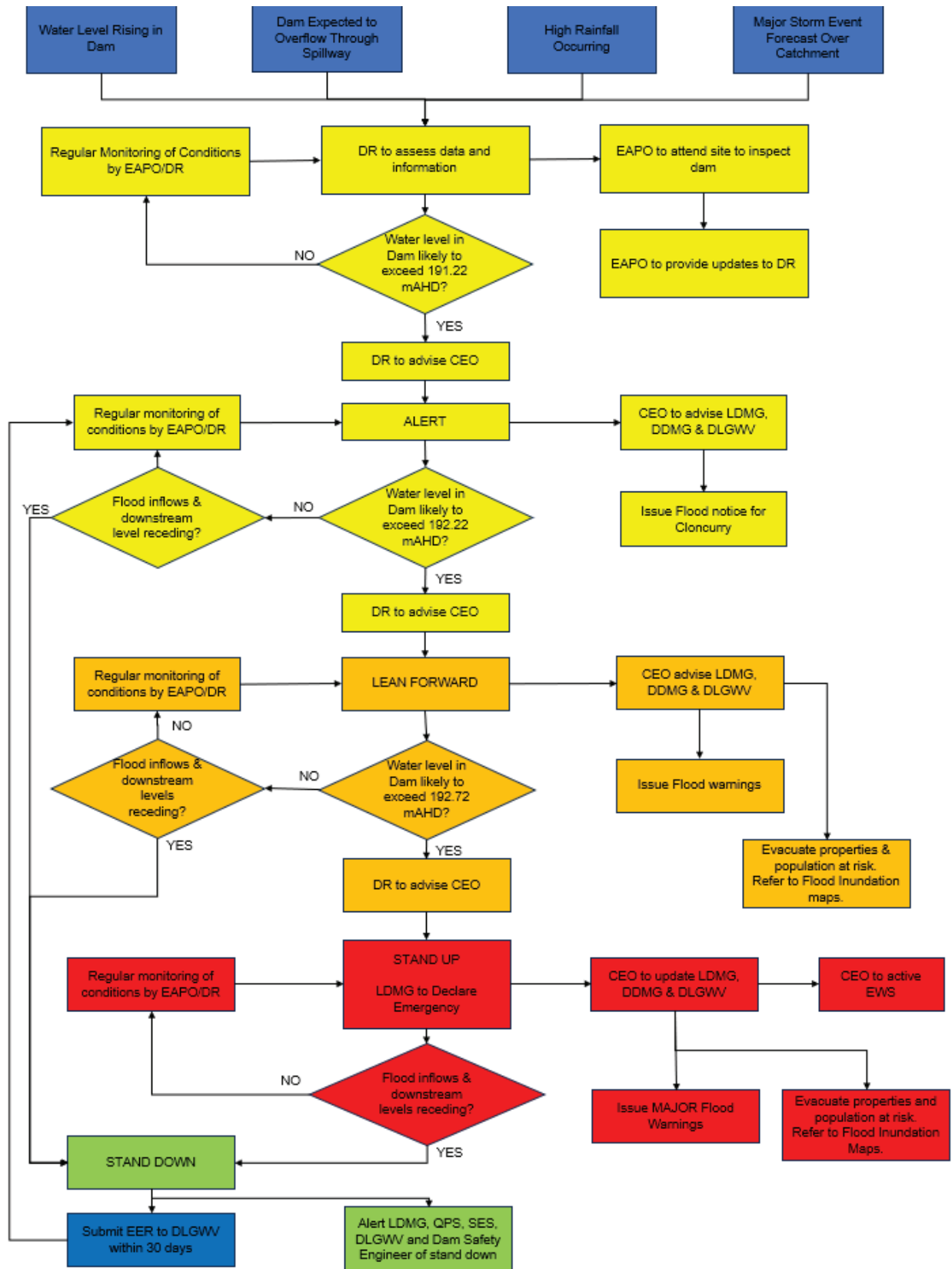


Figure 8 Flood Inflow flowchart



Table 12 Action for Flood Inflow

Cloncurry Shire Council					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
Barkly Highway bridge flood gauge height > 3.0 m AHD, Water level in the dam reaches 191.22 m AHD, measured from gauge board or through Council's online water level monitoring dashboard, with forecasts for further rain/dam inflows. Flooding may also be accompanied by conditions which are developing or have developed that raise the need for closer monitoring of the dam. Observed conditions on site or through CCTV/SCADA include – Identification of dam safety issues that could develop further if not addressed in a timely manner – Minor Seepage/Leakage changes – Minor Scour – Minor Cracking – Loss of erosion protection to fuseplug – Minor spillway damage/debris.	Evacuate all members of public/personnel from the dam site. Additional dam inspection prior to wet weather conditions or storm events (if safe to do so). Undertake increased frequency of monitoring as required. Notification of Cloncurry Police. Provide hourly updates to DR. Immediately advise DR of any changes. Immediately advise DR of any dam safety issues. Take photos of the issues. Record data and information and maintain log of all communications in the Storage Log Book. Ensure that the spillway access gate remains locked and signage in place: DAM SITE CLOSED DUE TO UNSAFE CONDITIONS.	Monitor weather conditions for storm activity and flood warnings. Request EAPO to attend site and undertake prior to storm or flood event. Inspect the dam (if possible) with the EAPO. Review all data and information received from the EAPO. Arrange for additional resources to attend site (if required). Contact the CEO if there are possible concerns about the likelihood of conditions developing. Provide hourly updates to CEO of situation giving water levels, discharge, trigger levels and expected rate of rise. Contact the CEO if there are possible concerns about a dam safety issue developing. Record data and information and maintain log of all communications (refer to Appendix F). If dam level is likely to exceed 192.22 m AHD, advise CEO and go to LEAN FORWARD.	ACTIVATE EAP Notify LDMG of the activation to "Alert" level Notify the DDMG to a developing situation and the possible need to mobilise and implement emergency actions. Review all data and information received. Advise the Director Dam Safety (DLGWV) of dam safety event and keep informed of the event through all stages Issue media alerts and information (refer to Appendix E). Record data and information and maintain log of all communications (refer to Appendix F).	Review emergency response plan and possible actions. Maintain a log of all communications (refer to Appendix F).	None.

ALERT



Cloncurry Shire Council					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
Barkly Highway bridge flood gauge height > 3.0 m AND Water level in the dam reaches 192.22 m AHD, measured from gauge board or through Council's online water level monitoring dashboard, with forecasts for further rain/dam inflows. Flooding may also be accompanied by: - Further development of the dam safety issues identified at the ALERT stage - Major Seepage/Leakage changes. - Major Cracking "Sand Boils" downstream of the dam. - Inundation of the downstream toe of the levee embankment. - The dam is intact but there is potential for it to fail.	Evacuate all members of public/personnel from the dam site. Continue to monitor and inspect dam (if safe to do so). Record dam water levels (and time of recording) – refer Appendix H. Notification of Cloncurry Police. Provide hourly updates to DR. Immediately advise DR of any changes. Immediately advise DR of any dam safety issues. Take photos of the issues. Record data and information and maintain log of all communications in the Storage Log Book. Ensure that the spillway access gate remains locked and signage in place: DAM SITE CLOSED DUE TO UNSAFE CONDITIONS.	Review all data and information received from the EAPO. Arrange for additional resources to attend site (if required). Provide hourly updates to CEO of situation giving water levels, discharge, trigger levels and expected rate of rise. Contact the CEO if there are concerns about a dam safety issue or breach developing. Record data and information and maintain log of all communications (refer to Appendix F). If dam level is likely to exceed 192.72 m AHD, advise CEO and go to STAND-UP.	ESTABLISH LDCC. Notify LDMG of the activation to "Lean Forward" level. Notify DDMG of the situation and the forecast conditions and impacts. Review all data and information received. Provide hourly updates to LDMG. Assign resources to assist EAPO and DR. Issue media alerts and information (refer to Appendix E). Advise Director Dam Safety (DLGW) of developing issue. Record data and information and maintain log of all communications (refer to Appendix F).	Manage response to event as directed by CEO. Evacuate residents if directed by CEO. Maintain a log of all communications (refer to Appendix F).	None.

LEAN FORWARD



STAND-UP					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
Barkly Highway bridge flood gauge height > 3.0 m AND Water level in the dam reaches 192.72 m AHD, measured from gauge board or through Council's online water level monitoring dashboard, with forecasts for further rain/dam inflows. Flooding may also be accompanied by: - Further development of the dam safety issues identified at the LEAN FORWARD stage. - Identification of dam safety issues that are likely to result in a breach developing in the dam (irrespective of the water level in the dam or existing or forecast inflows). - Active piping in the embankment. - Slips/Slumps/Settlement - Major deformations. - Failure of the dam is imminent or has occurred.	Evacuate all members of public/personnel from the dam site. Ensure EWS is activated and functioning as intended. Continue to monitor and inspect dam if possible. Provide hourly updates to DR. Notification of Cloncurry Police. Immediately advise DR of any changes. Immediately advise DR of any dam safety issues. Take photos of the issues. Record data and information and maintain log of all communications in the Storage Log Book. Record dam water levels (and time of recording) – refer to Appendix H. Ensure that the spillway access gate remains locked and signage in place: DAM SITE CLOSED DUE TO UNSAFE CONDITIONS.	Inspect the dam if possible with the EAPO. Review all data and information received from the EAPO. Arrange for additional resources to attend site (if required). Contact the CEO if there are concerns about a dam safety issue developing. Provide hourly updates to CEO of situation. Record data and information and maintain log of all communications (refer to Appendix F). If dam water level has receded below 191.22 m AHD and no further rain or inflows are expected, advise CEO and go to STAND DOWN.	DECLARE EMERGENCY Notify LDMG of the activation to "Stand Up" level Notify DDMG of the situation and the forecast conditions and impacts. Activate EWS (siren) Provide hourly updates to LDMG. Assign resources to assist EAPO and DR. Issue media alerts and information (refer to Appendix E). Advise Director Dam Safety (DLGWV) of developing issue. Record data and information and maintain log of all communications (refer to Appendix F).	Manage response to event as directed by CEO. Issue evacuation orders on advice from CEO. Maintain a log of all communications (refer to Appendix F).	Co-ordination of response if the event escalates to a wider area. Provision of additional resources from outside the area if required.



SHIRE OF CLONCURREY					
Emergency Action Plan					
Trigger	Emergency Action Plan Officer (EAPO)	Director of Infrastructure & environment (DR)	Chief Executive Officer (CEO)	Local Disaster Management Group (LDMG)	DDMG
Rainfall or inflows to the dam are reducing and the water level of the dam is dropping. Conditions may include: - Water is no longer flowing through the spillway or has reduced to a level where downstream flooding is no longer a threat, confirmed via physical inspection and/or Council's online water level monitoring dashboard. - Dam inspections have not identified any safety issues or structural integrity issues. - Downstream flooding has reduced and no longer a threat to the public. - Any dam issues are no longer considered to be likely to lead to dam failure.	Prepare a report and provide data to the DR on the event. Ensure EWS is deactivated. Provide copy of event log to DR. Continue regular inspections and monitoring. Unlock the spillway access gate and signage in place: DAM SITE OPEN.	Undertake a full inspection of the dam. Arrange for a special inspection and report of the condition of the dam (if it did not breach) or if the dam breached arrange for an investigation into the cause of the dam breach. Prepare a report on works or actions to be undertaken to restore the embankment and associated infrastructure. Prepare a written report on the event to the CEO. Arrange for any repair works to be undertaken. Maintain records of any communication or actions taken to assess the dam condition, cause of the incident or subsequent repairs. Place copy of EAPO and DR event logs into the file system. Stand down the EAPO.	DECLARE STAND-DOWN Advise LDMG that event has passed and DDMG can stand down. Stand down the LDMG. Notify the Director Dam Safety, DLGWV of stand-down and provide EER report within 30 business days after stand down. Coordinate and conduct a review of the event and the responses. Place copy of event log into the file system.	Prepare a report on the event and the responses. Participate in a review of the event and the responses.	None.

STAND-DOWN



8.4 Terrorism

Chinaman Creek Dam is considered to be a low-value target for terrorism. As the dam does not have any outlet works or other infrastructure that could be easily damaged and release a sudden flow of water, a terrorist act on the dam is considered unlikely to trigger a dam safety event. Similarly, the dam does not have any population at risk in the event of sunny day failure dam break.

To create a breach in the dam wall would require extensive excavation/preparation and/or the use of a large amount of explosive material. This type of activity may be noticed by local residents and reported and investigated before a dam breach could be developed.

Any sabotage or vandalism should be treated as serious, and the following actions should be implemented:

1. Immediately notify the Chief Executive Officer.
2. Take photographs of the damage.
3. Barricade the area to enable site inspection/investigation.
4. Report the incident to QPS using the following contacts (based on priority levels):
 - Priority 1 triple zero (if lives are at immediate risk call 000 immediately)
 - Priority 2 Police Link 131 444 or the Local Police Station (If no immediate life threat)
 - Priority 3 National Security Hotline (1800 1234 00)
5. If safe to do so, Conduct a dam safety inspection to determine the extent of damage.



9. Post Event

The Water Supply (Safety and Reliability) Act 2008 requires dam owners to submit an Emergency Event Report (EER) to the:

Chief Executive

Department of Local Government, Water and Volunteers

GPO Box 2247, Brisbane, Queensland 4001

within 30 business days after the end of the emergency event (e.g., following Stand Down) or, at a period agreed to in writing by the chief executive and the dam owner.

The DR will conduct a post-event debrief with key Incident Response Staff, LDC to capture challenges and learnings from the activation of the EAP. The DR will draft an Emergency Event report for completion, review and submission to DLGWV. A copy of the report will be provided to the CEO and LDC. The EER report should be comprehensive but appropriate in details to reflect the severity of the event. A template for this is provided in Appendix G.



10. Notification List

Internal Notification (refer flow charts in Section 8)						
Title/Name		Name	Location	Phone Business	Mobile and A/H	
EAP Officer		Scott Barker	Cloncurry	07 4742 4100	0407 196 482	
EAP Backup 1		Bipin Chaudhary	Cloncurry	07 4742 4100	0483 123 323	
EAP Backup 2		Frederick Martin	Cloncurry	07 4742 4100	0404 572 921	
Management Contacts						
Director, Infrastructure and Environment		Chris Rohan	Cloncurry	07 4742 4100	0477 197 661	
CEO Cloncurry Shire Council		Philip Keirle	Cloncurry	07 4742 4100	0408 495 335	
LDMG Local Disaster Coordinator						
External Notification (includes priority list for external notifications)						
Priority	Title/Name		Name	Location	Phone Business	Mobile and A/H
Disaster Management Groups						
1	1. Senior Sergeant – Mount Isa District Disaster Management Executive Officer		Adam King	Mount Isa	-	0429 322 148
	2. Emergency Management Queensland Watch Desk Officer		-	Kedron	07 3635 2387	-
Queensland Police Service						
2	1. Emergency Management Coordinator – Queensland Police – Northern Region		Elliot Dunn	Mount Isa	-	0416 150 512
	2. Police Duty Phone		Duty Officer	Cloncurry	07 4742 8888	0404 014 800
Dam Safety Regulator						
3	Director Dam Safety		Chris Nielsen	Brisbane	07 3199 4848	0436 658 451
Consulting Dam Safety Engineer						
4	GHD Pty Ltd		Nicholas Thomas-Kinsella	Townsville	07 4720 0437	0422 533 294



11. References

Airbus (2024) Imagery accessed via Google Earth

ANCOLD (2003) Guidelines on Dam Safety Management

Cloncurry Shire Council (2021) Cloncurry Local Disaster Management Plan

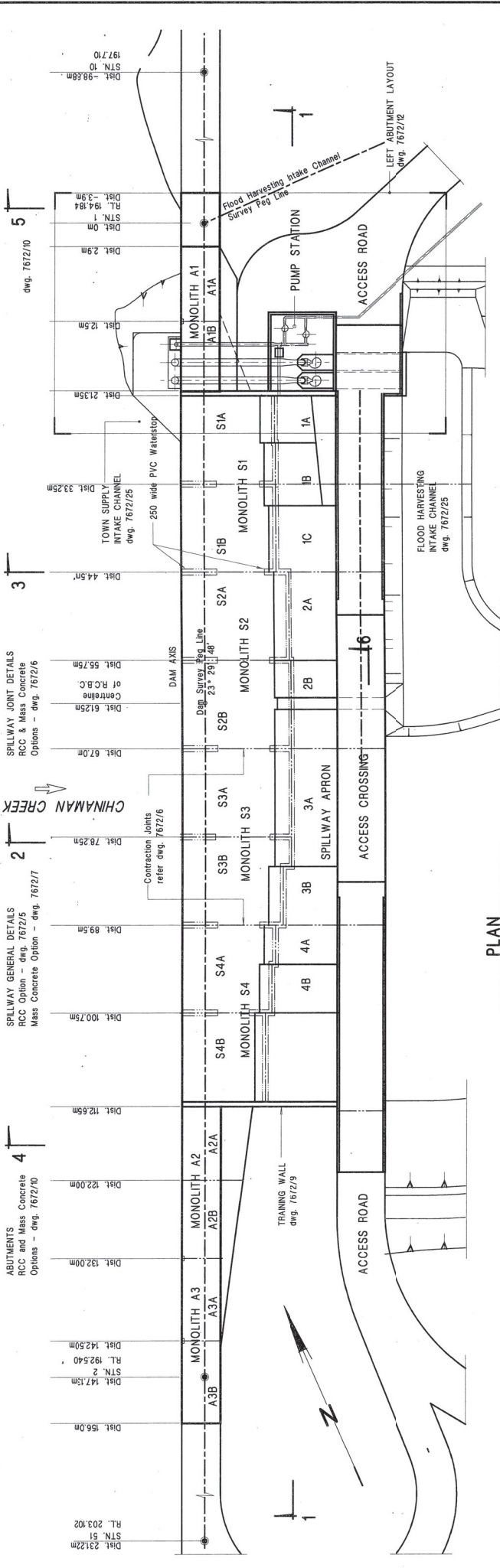
GHD (2023) Chinaman Creek Dam Failure Impact Assessment

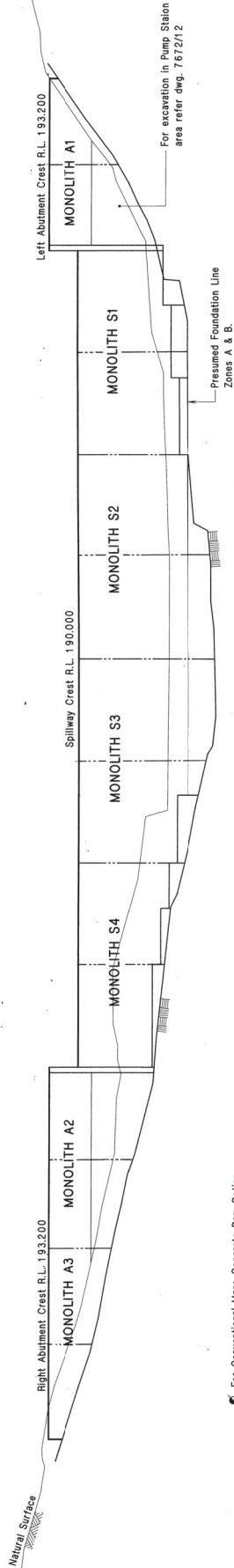
RDMW (2023) Emergency Action Plan for Referable Dam Guideline

RDMW (2024) Queensland Dam Safety Management Guidelines

Appendix A

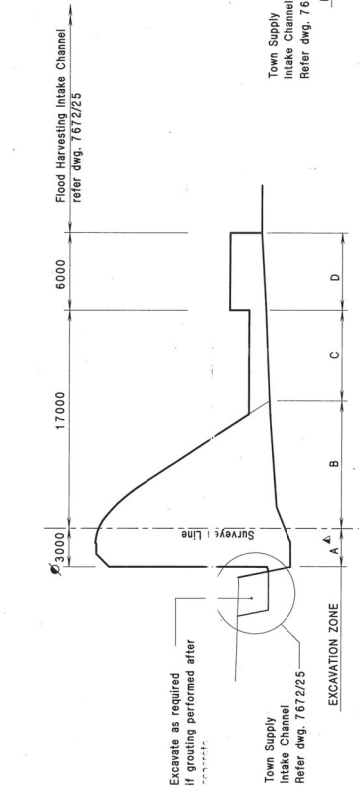
Dam Drawings



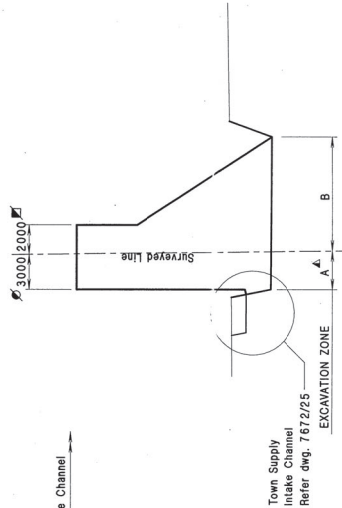


- For Conventional Mass Concrete Dam Option this dimension to be 2200.
- Minimum dimension of Zone A excavation to be 3000 for both Dam Options.
- For Conventional Mass Concrete Drain Option this dimension to be 1300

SECTION 1
Dwg. 7672/2



TYPICAL SECTION THROUGH SPILLWAY
N.T.S.



TYPICAL SECTION THROUGH ABUTMENTS
N.T.S.

MINIMUM EXCAVATION REQUIREMENTS

- ZONE A: Excavate until moderately weathered rock or better is exposed over a sufficient area as determined by the Superintendent. Excavate sheared zones or highly or completely weathered zones and calcitic zones to depth equal to twice the width or as determined by the Superintendent, and fill with dental concrete. The Superintendent may direct that limited areas of Drummy rock able to be penetrated by grout shall remain in place.
- ZONE B: As for Zone A, but the Superintendent may direct that areas of closely-jointed rock may remain in place and that up to 15% of the foundation may consist of highly weathered rock, provided that no one area exceeds 2 sq.m and that all zones of calcitic rock shall be removed.
- ZONE C & D: Generally moderately weathered rock with up to 30% of H.W. rock allowed in C and 50% allowed in D. In particular, jointed rock provided it is not loose, shall be left in place to allow drainage for pressure relief.

NOTES

- All dimensions in millimetres and levels in metres u.o.d.

AS CONSTRUCTED

R. SAUNDERS
Date 3/95
MONTYRE & ASSOCIATES INC.
A MEMBER OF THE M & A ENGINEERING GROUP

REVISIONS

No.	BY	DATE	DESCRIPTION	APPD
A	JCH	3/95	As Constructed Details Added	AS

REFERENCES

Before commencing work, all controlling dimensions on the drawings must be verified on the site, particularly those relative to spot levels, alignments, other structures and services. Figured dimensions take preference over scaled.

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LEVEL DATUM REF. B.M.			
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FIELD BOOK			

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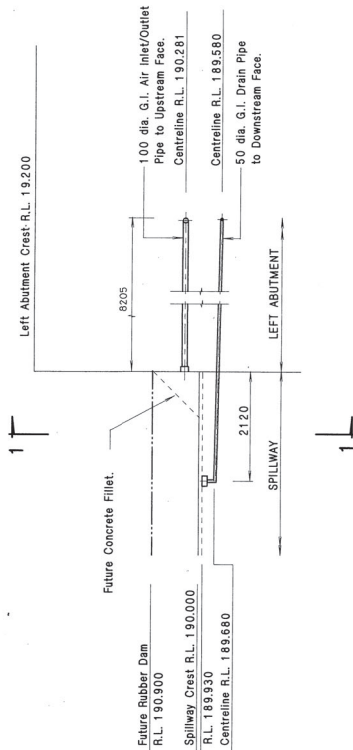
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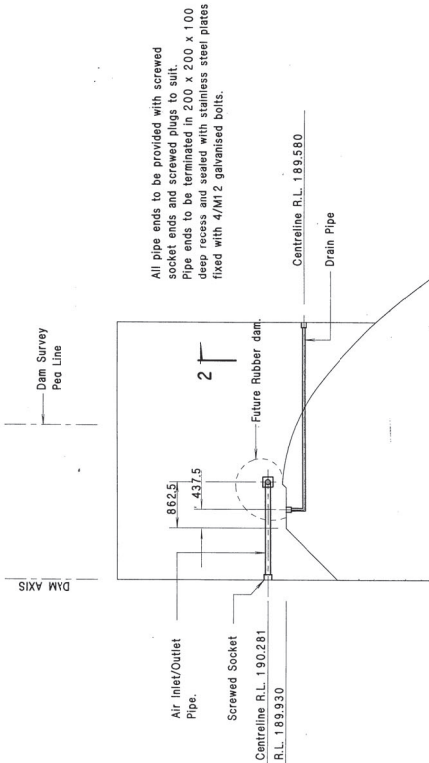
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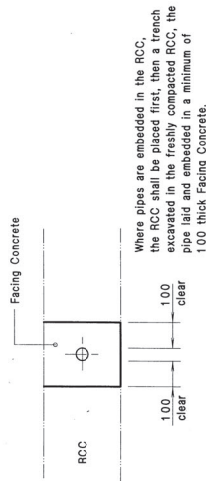
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ELEVATION - LOOKING UPSTREAM



SECTION 1-1



SECTION 2
TYPICAL

NOTES

- Details shown are for RCC Option. Conventional Mass Concrete Option is similar - vary pipe lengths to suit.
- All galvanised materials placed in concrete to be passivated.
- All dimensions in millimetres and levels in metres u.o.n.

AS CONSTRUCTED

R. SAUNDERS

Date 3/95

McINTYRE & ASSOCIATES
CONSULTING ENGINEERS
A MEMBER OF THE M & A ENGINEERING GROUP

REVISIONS

A JCM 3.95 As Constructed Details Added

DESCRIPTION

APPD

DWG. No.

SURVEYORS

LEVEL DATUM
REF. B.M.

FIELD BOOK

LEVEL BOOK

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McINTYRE & ASSOCIATES
CONSULTING ENGINEERS
A.C.N. 009 881 127
A MEMBER OF THE M & A ENGINEERING GROUP



CLONCURRY SHIRE COUNCIL

CHINAMAN CREEK DAM
PROVISION FOR FUTURE RUBBER DAM

SCALE
0 500 1000
U.O.N.

7672/11 A



FLOOD HARVESTING WORKS

COLLECTION TOWN SUPPLY WORKS

NOTES

AS CONSTRUCTED

Date 3.94 **mc** **McINTYRE & ASSOCIATES^{INC}**
CONSULTING ENGINEERS A.C.N. 508 881 127

CLONCURRY SHIRE COUNCIL

CHINAMAN CREEK DAM
LEFT ABUTMENT LAYOUT

SCALE M	0 1000 mm	7672/12	B
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McINTYRE & ASSOCIATES PT. LTD.
CONSULTING ENGINEERS
A.C.N. 009 881 127

SIGNED W. M.	RS/PS B. H.	PASSED	A. L. Manning DATE
		DATE	

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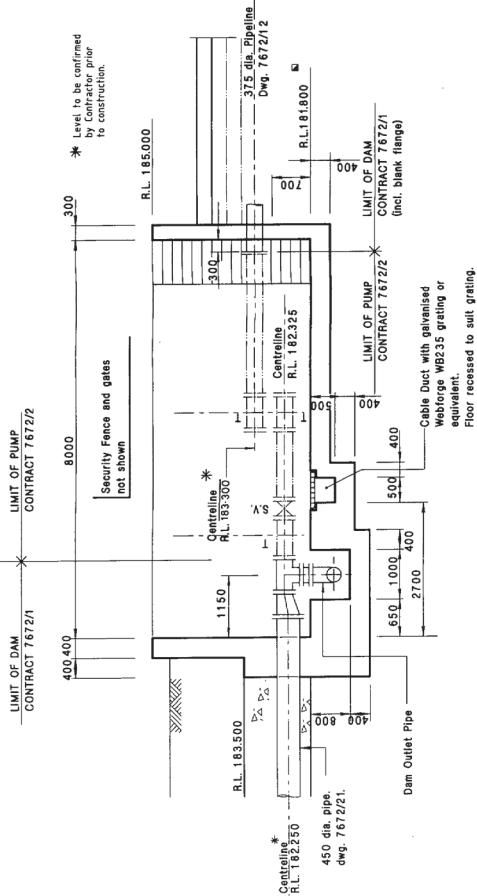
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Figured dimensions take preference over
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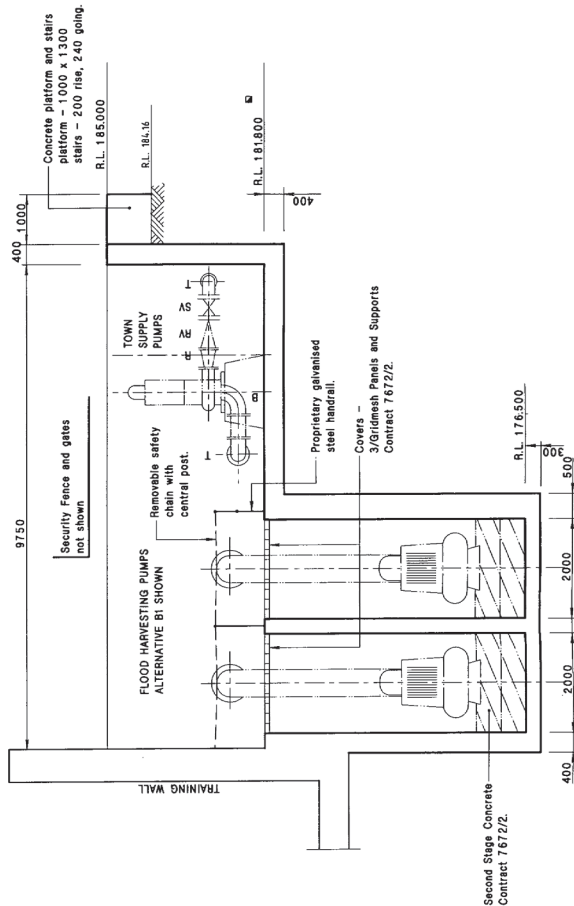
1. Name of the person or organization to whom the report is made 2. Address of the person or organization to whom the report is made 3. City and State of the person or organization to whom the report is made 4. Date of the report 5. Name of the person or organization making the report 6. Address of the person or organization making the report 7. City and State of the person or organization making the report 8. Date of the report 9. Name of the person or organization making the report 10. Address of the person or organization making the report 11. City and State of the person or organization making the report 12. Date of the report 13. Name of the person or organization making the report 14. Address of the person or organization making the report 15. City and State of the person or organization making the report 16. Date of the report	17. Name of the person or organization making the report 18. Address of the person or organization making the report 19. City and State of the person or organization making the report 20. Date of the report 21. Name of the person or organization making the report 22. Address of the person or organization making the report 23. City and State of the person or organization making the report 24. Date of the report
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B	BH		394, As Constructed Contract 7672/1	gpc
A	JM	8/92	g Town Supply Discharge amended	gpc

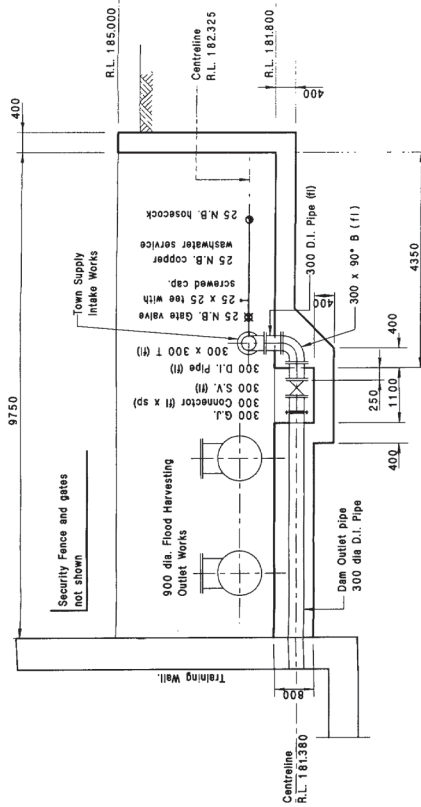


SECTION 2
Dwg. 7672/13

For actual floor levels and fall for drainage refer Plan dwg. 7672/13



SECTION 3
Dwg. 7672/13



SECTION 4
Dwg. 7672/13

NOTES

- All dimensions in millimetres and levels in metres above sea level.
- For pipework legend refer dwg. 7672/13.

AS CONSTRUCTED

B. WRIGHT
DATE: 3.9.21

McINTYRE & ASSOCIATES
A MEMBER OF THE M & A ENGINEERING GROUP

McINTYRE & ASSOCIATES
CONSULTING ENGINEERS
A.C.N. 005 981 127
A MEMBER OF THE M & A ENGINEERING GROUP

CLONCURRY SHIRE COUNCIL
CHINAMAN CREEK DAM
PUMP STATION

Sheet 2 of 3

GENERAL DETAILS

Scale: 0 500 1000

7672/14 B

SURVEYORS
LEVEL DATUM
REF. B.M.

Before commencing work, all controlling dimensions on the drawings must be verified on the site, particularly those relative to vertical alignment, other structures and services. Figured dimensions take precedence over scaled.

REFERENCES

REV	BY	DATE	DESCRIPTION
B	BM	3.9.21	As Constructed Details Contract 7672/1
A	JM	8/93	Town Supply Discharge amended

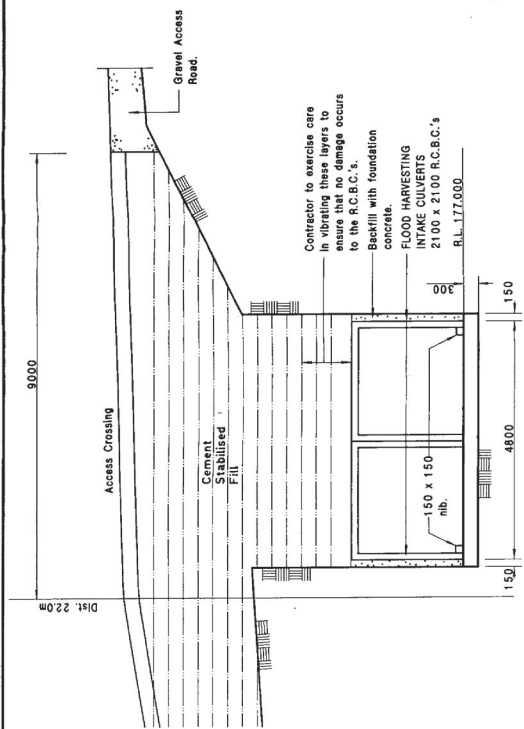
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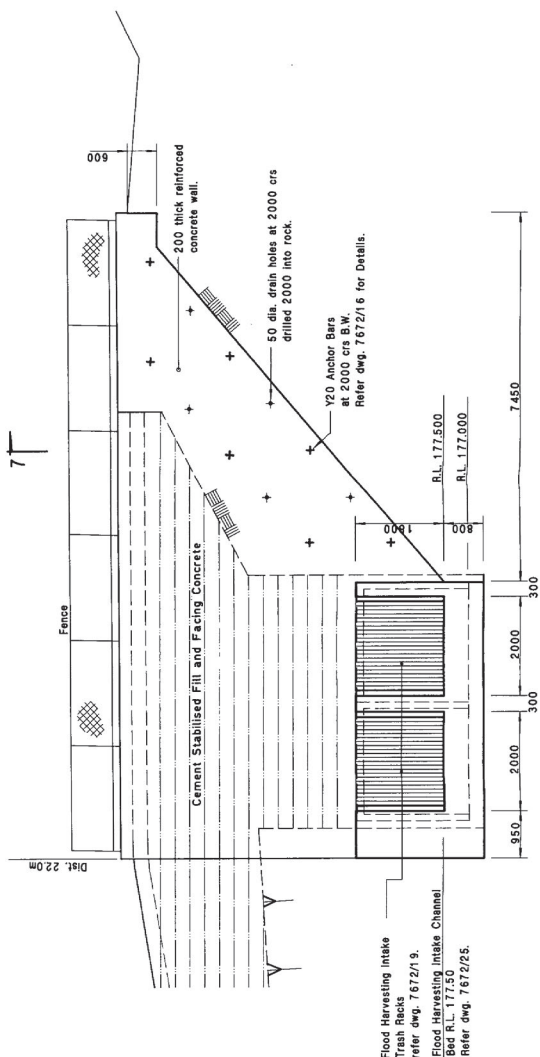
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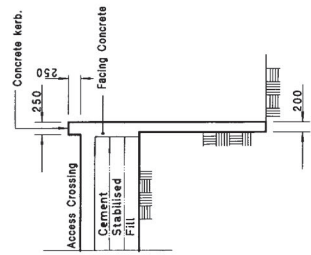
DESCRIPTION



SECTION 5
Dwg. 7672/13



SECTION 6
Dwg. 7672/13



SECTION 7
Dwg. 7672/13

NOTES
• All dimensions in millimetres and levels in metres u.o.a.

AS CONSTRUCTED
R. SAUNDERS
Date 3/95
McINTYRE & ASSOCIATES
A MEMBER OF THE M & A ENGINEERING GROUP

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AS CONSTRUCTED

R.SAUNDERS

Date 3/95

McINTYRE & ASSOCIATES
CONSULTING ENGINEERS
A MEMBER OF THE M & A ENGINEERING GROUP

ROADS & PLATFORMS TYPICAL SECTION

NTS

150mm Gravel
Pavement
4%
VERIES

CONDUIT TRENCH TYPICAL SECTION

NTS

For conduit layout through and
around structures refer to
refer dg, 7672/13.

LEGEND

- IP LB4
- Set-out IP
- Finished Surface RL
- Conduit, Number & Diameter
of Conduit.
- Road Set-out Line

NOTES

- * Security Fencing And Gates to be
2m high chainlink with barbed wire
vertical extensions in accordance
with AS1755 and AS2423
- * All levels and dimensions in
metres u.o.n.
- * Refer dg. 7672/12 for lighting
to Left Abutment Area &
Electrical Legend.

CLONCURRY SHIRE COUNCIL

CHINAMAN CREEK DAM

SITEWORKS

LEFT ABUTMENT

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McINTYRE & ASSOCIATES
CONSULTING ENGINEERS
A.C.N. 009 881 127
A MEMBER OF THE M & A ENGINEERING GROUP

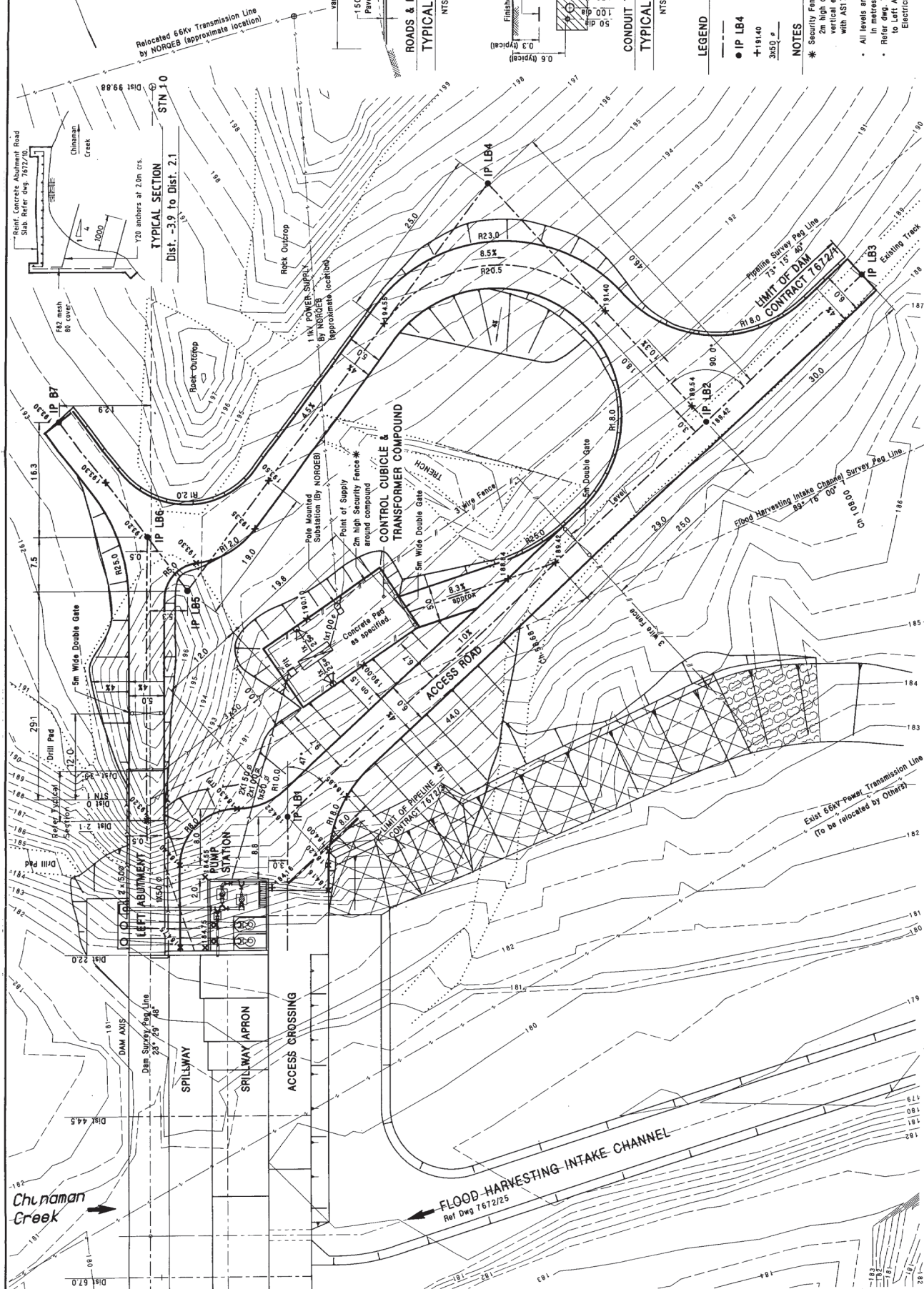
DESIGNED BY P. Basso
DRAWN BY J. P. Basso
CHECKED BY J. P. Basso
DATE 11.9.92

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CHS Datum
Ref dg 7672/2

REVISIONS
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FIELD BOOK
LEVEL BOOK
PLOTTED
FIELD BOOK

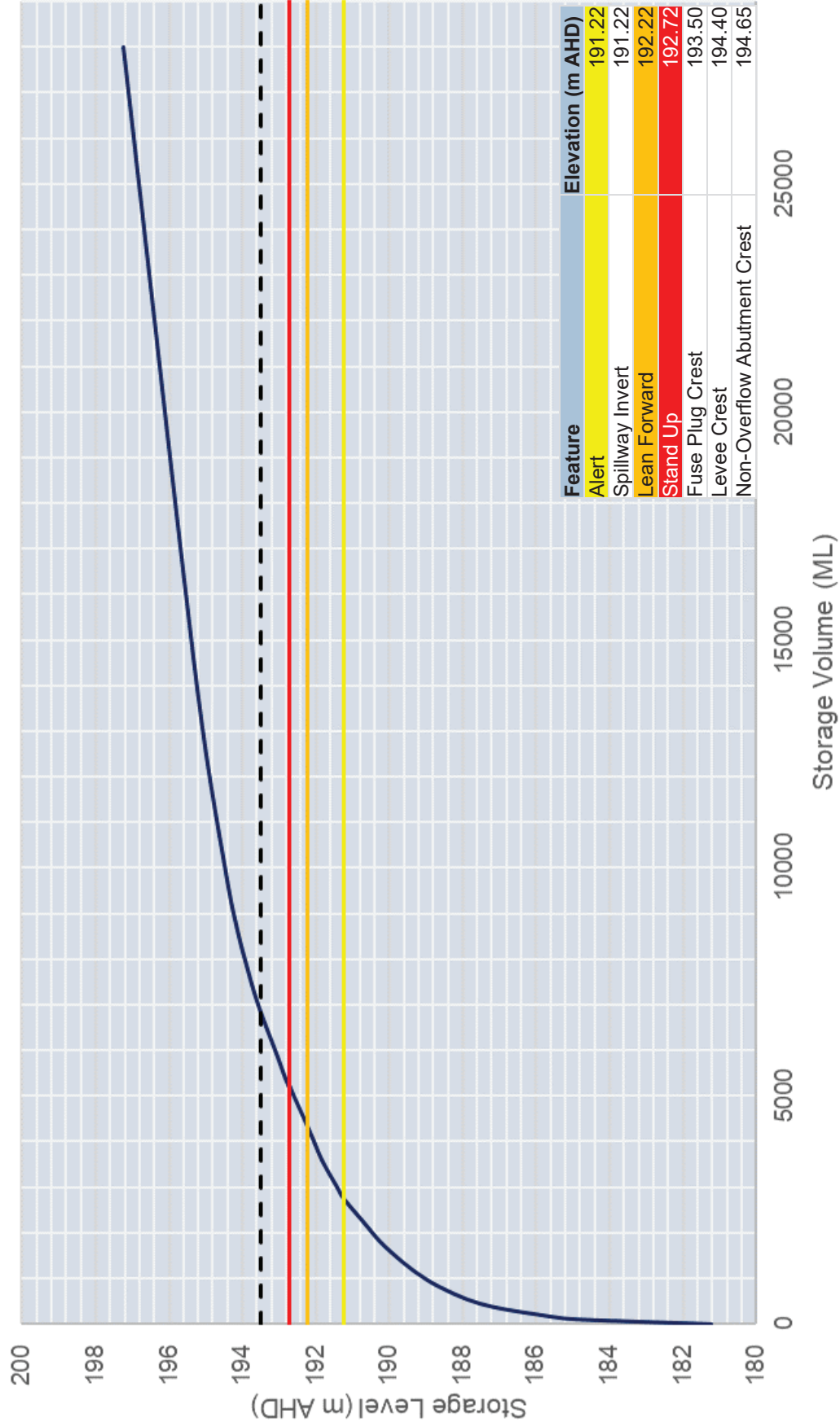
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on the site, particularly those relative to
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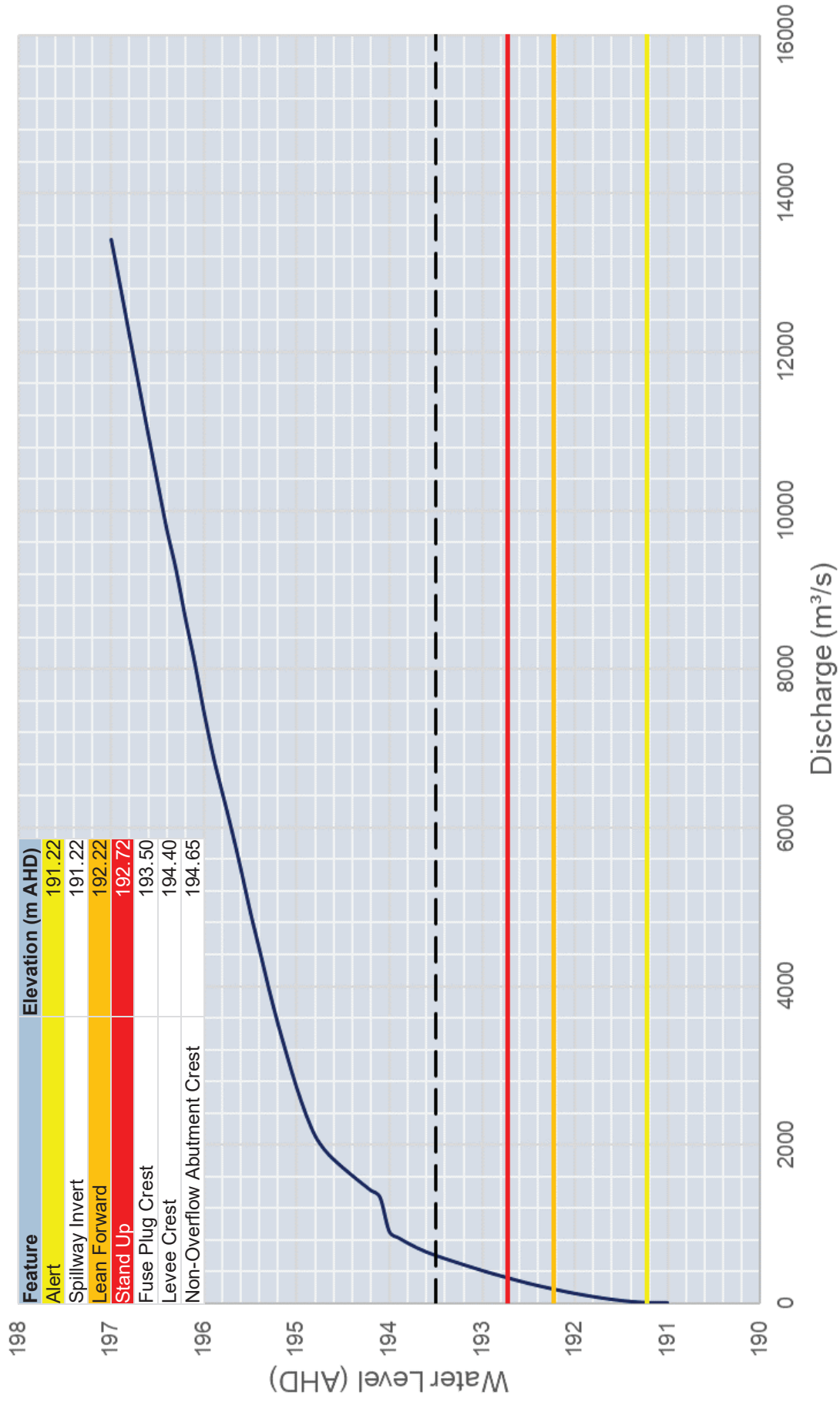
REVISIONS
DWG. No.
DESCRIPTION
APPD
DATE



Appendix B

Spillway and Storage Curves





Appendix C

Inundation maps



Event	Map Type	Map
Sunny Day Failure (SDF)	Maximum extent and flood hazard	Figure 1a Figure 1b Figure 1c Figure 1d Figure 1e Figure 1f
1 in 100 AEP with 1 in 5 AEP	Maximum extent and flood hazard (failure)	Figure 2a Figure 2b Figure 2c Figure 2d Figure 2e Figure 2f
Critical Incremental PAR Flood Event 1 in 200 AEP with 1 in 20 AEP	Maximum extent and flood hazard (failure)	Figure 3a Figure 3b Figure 3c Figure 3d Figure 3e Figure 3f
1 in 500 AEP with 1 in 10 AEP	Maximum extent and flood hazard (failure)	Figure 4a Figure 4b Figure 4c Figure 4d Figure 4e Figure 4f
Dam Crest Flood Event 1 in 100,000 AEP with 1 in 20 AEP	Maximum extent and flood hazard (failure)	Figure 5a Figure 5b Figure 5c Figure 5d Figure 5e Figure 5f
PMF with 1 in 2,000 AEP	Maximum extent and flood hazard (failure)	Figure 6a Figure 6b Figure 6c Figure 6d Figure 6e Figure 6f



Data Disclaimer

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community and Metromaps Queensland Concurry (Imagery date: 2020-07-18). Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

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Project No. 12573949

Revision No. 0

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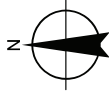
Cloncurry Shire Council

Chinaman Creek Dam

Emergency Action Plan

Sunny Day Failure

Flood Extent



Paper Size ISO A4
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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

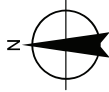
Figure 1a



Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

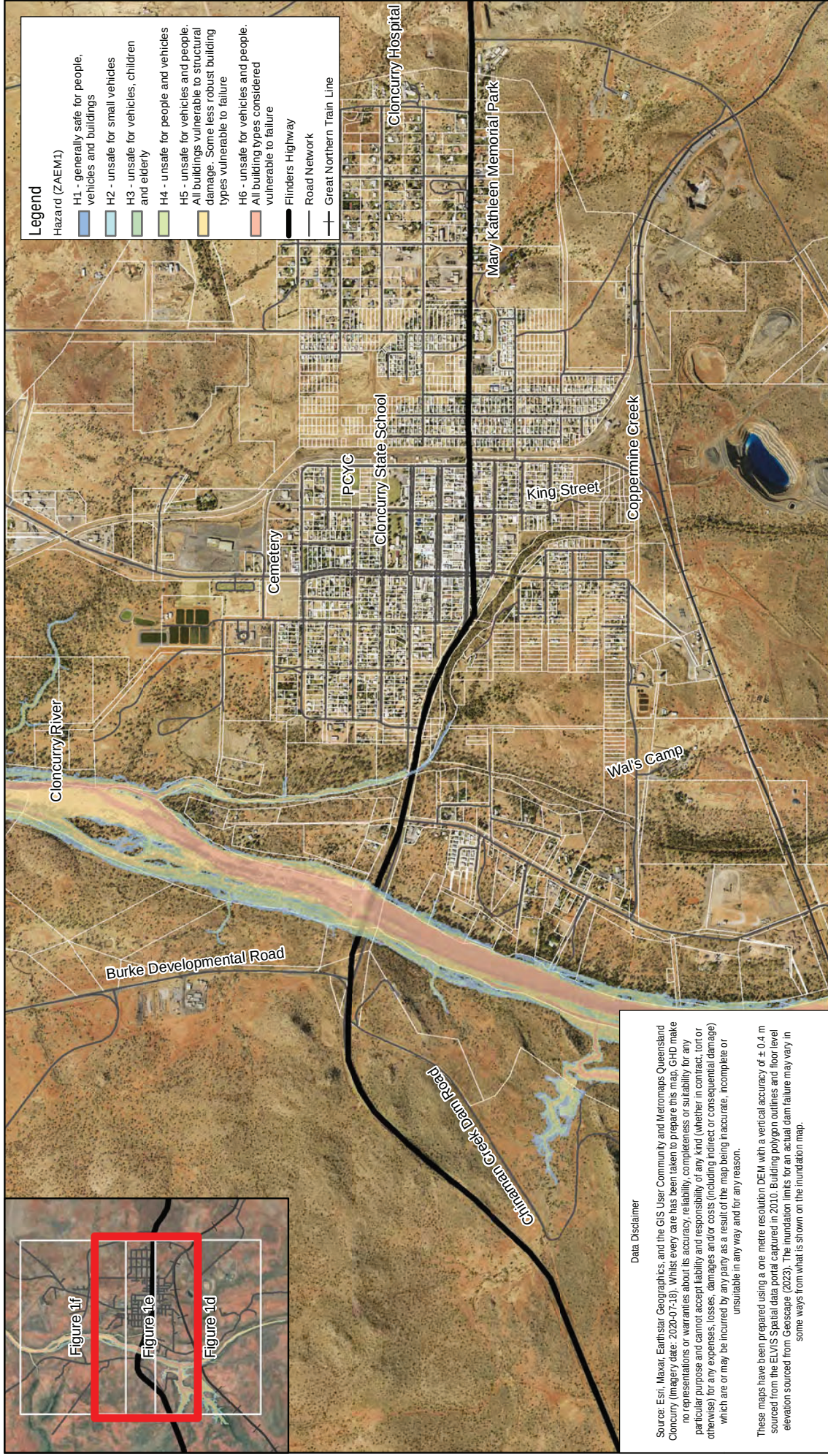
Sunny Day Failure
Flood Hazard



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

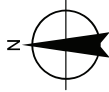
Figure 1d



Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

Sunny Day Failure Flood Hazard



Paper Size ISO A4
0 0.15 0.3 0.45 0.6
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54



Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

1 in 100 AEP with 1 in 5 AEP
Flood Extent

Figure 2a



Project No. 12573949
Revision No. 0
Date 25 Aug 2023

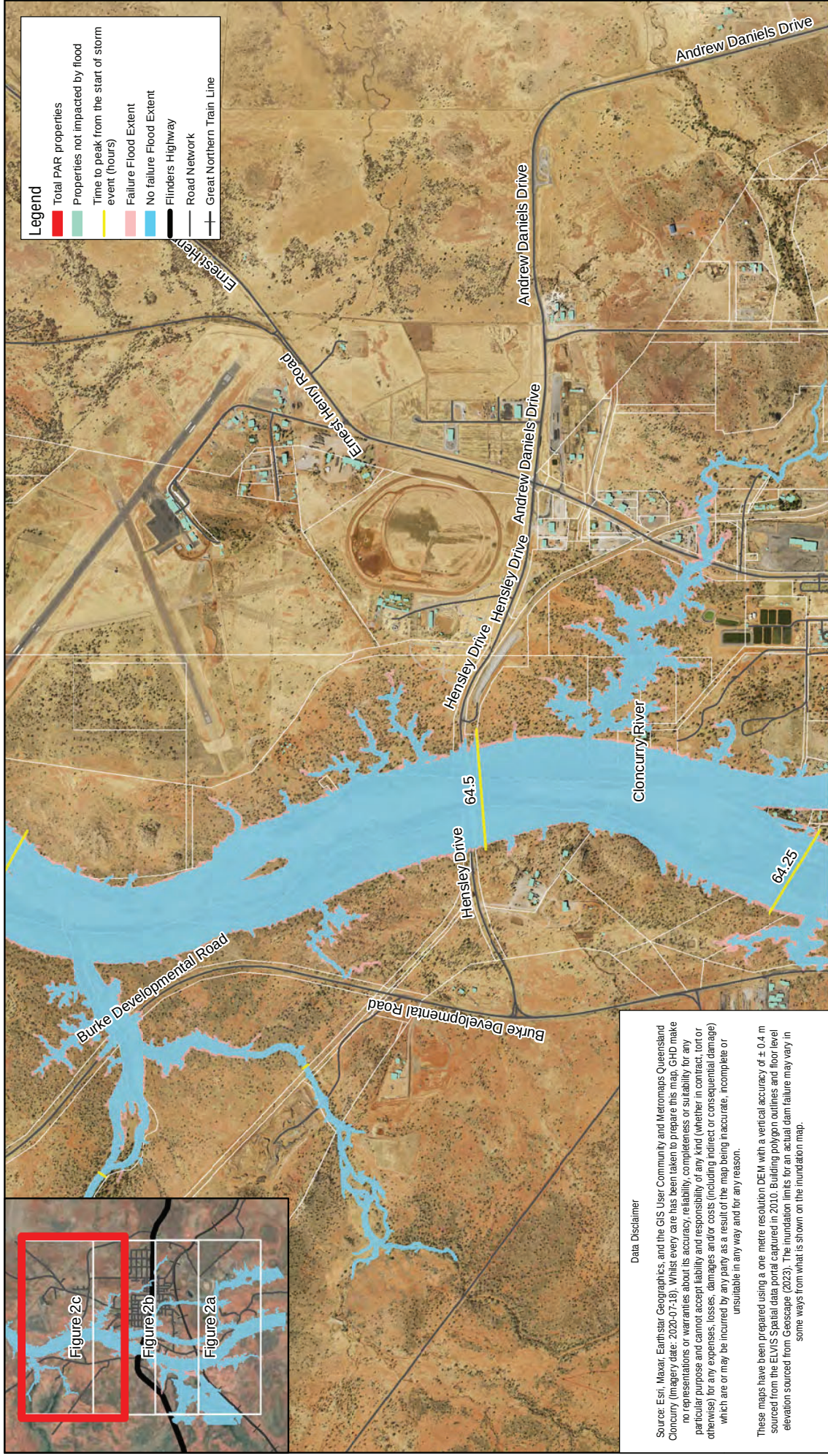
Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

1 in 100 AEP with 1 in 5 AEP
Flood Extent

Figure 2b

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Print date: 25 Aug 2023 - 16:11 (SMA record: 9)



Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

1 in 100 AEP with 1 in 5 AEP
Flood Extent



Paper Size ISO A4
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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

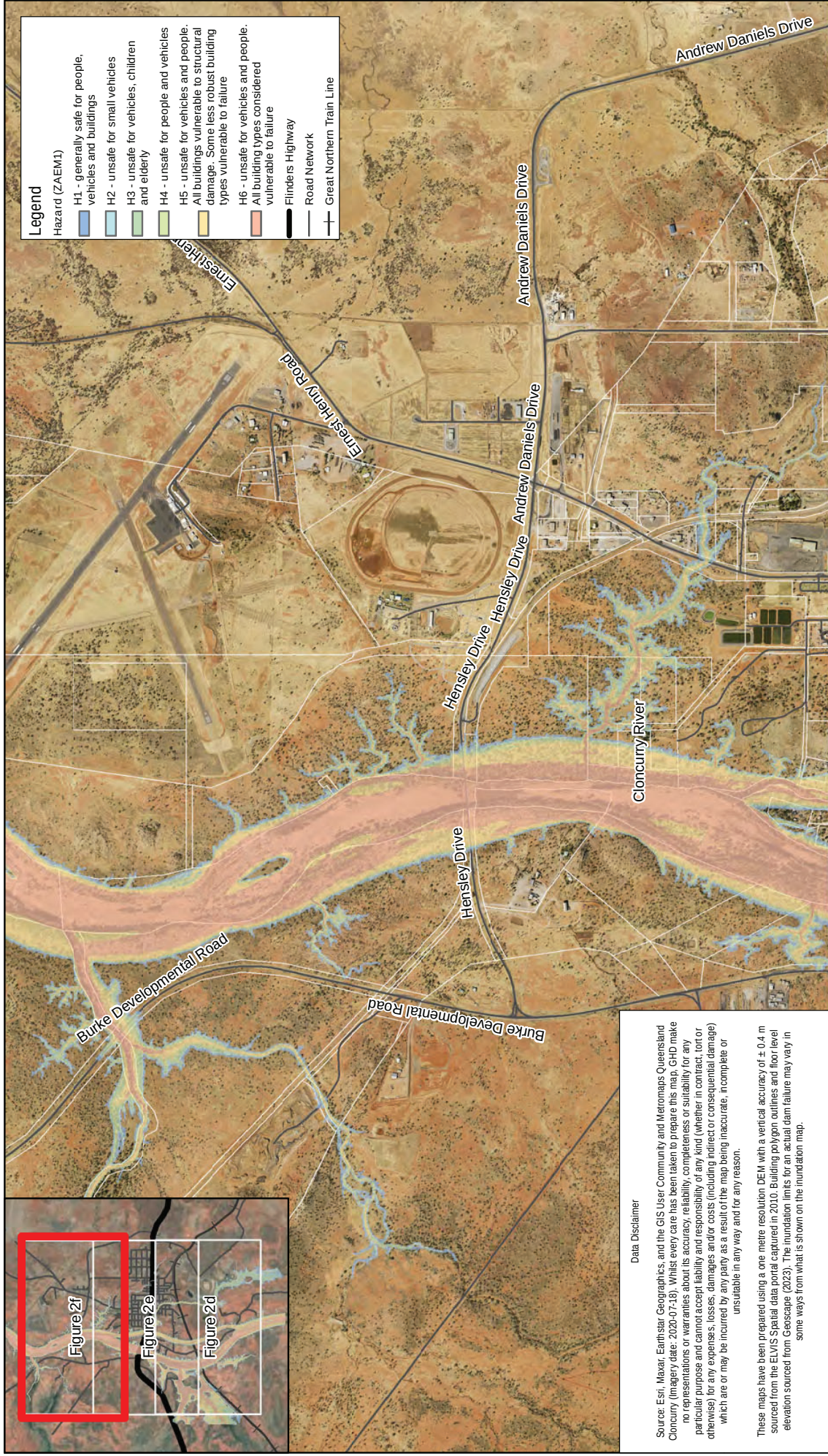
Figure 2c

Data source: Esri, Maxar, Earthstar Geographics, and the GIS User Community Metromaps Queensland Cairns (Imagery date: 2022-07-13). Created by mapband

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Print date: 25 Aug 2023 - 16:13 (SMA record: 10)



Data Disclaimer

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Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

1 in 100 AEP with 1 in 5 AEP
Flood Hazard (Failure)

Figure 2f



Data Disclaimer

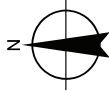
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community and Metromaps Queensland Cloncurry (Imagery date: 2020-07-18). Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

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Paper Size ISO A4



Kilometers



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

Critical Incremental PAR Flood Event
1 in 200 AEP with 1 in 20 AEP
Flood Extent

Project No. 12573949

Revision No. 0

Date 25 Aug 2023

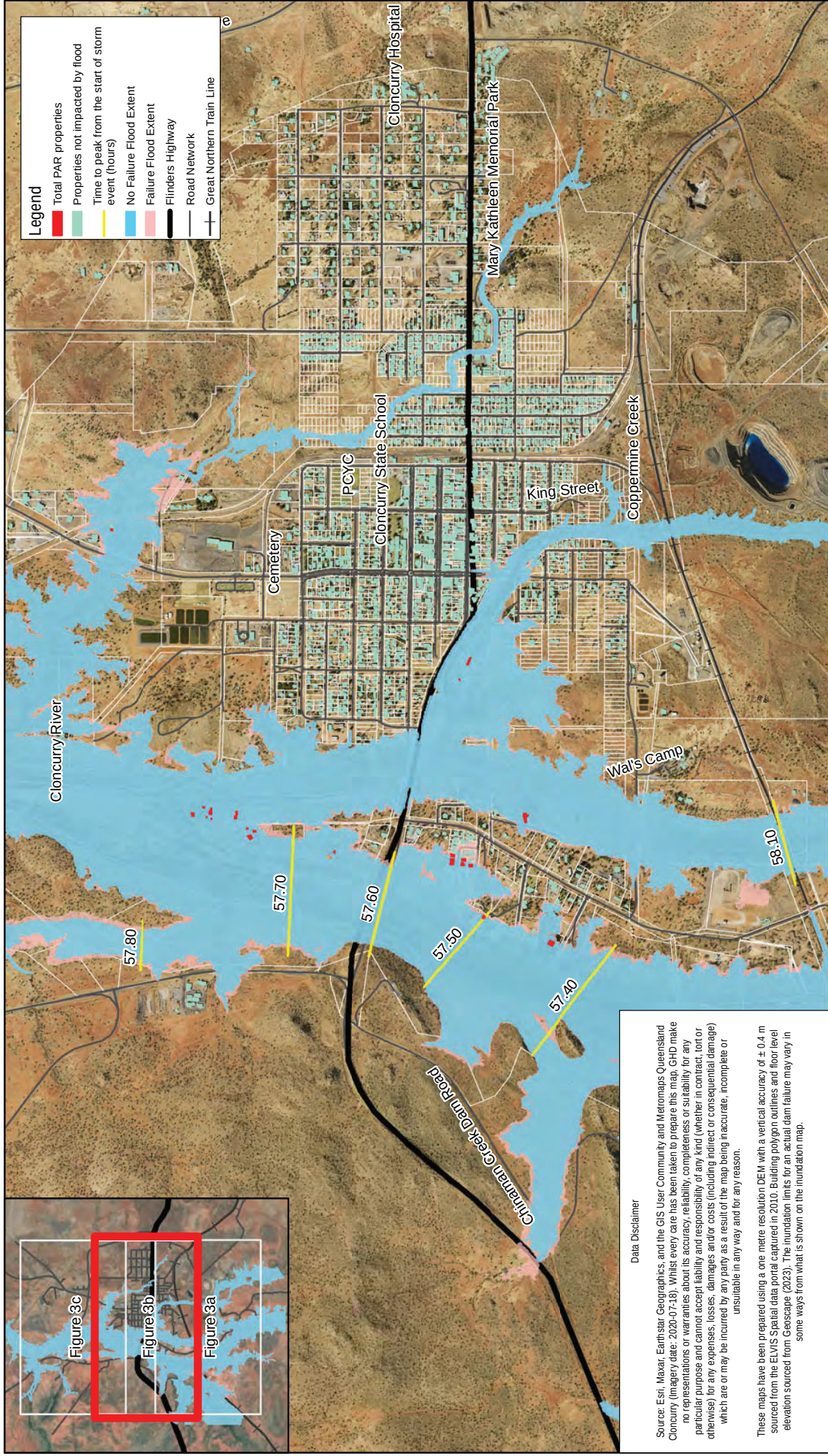
Figure 3a

Data source: Esri, Maxar, Earthstar Geographics, and the GIS User Community Metromaps Queensland Cairns (Imagery date: 2022-07-13). Created by mapbanda

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Print date: 25 Aug 2023 - 16:22 (SMA record: 14)



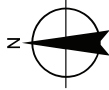
Data Disclaimer

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community and Metromaps Queensland Cloncurry (Imagery date: 2020-07-18). Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

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Paper Size ISO A4
0 0.15 0.3 0.45 0.6
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54



Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

**Critical Incremental PAR Flood Event
1 in 200 AEP with 1 in 20 AEP
Flood Extent**

Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Figure 3b

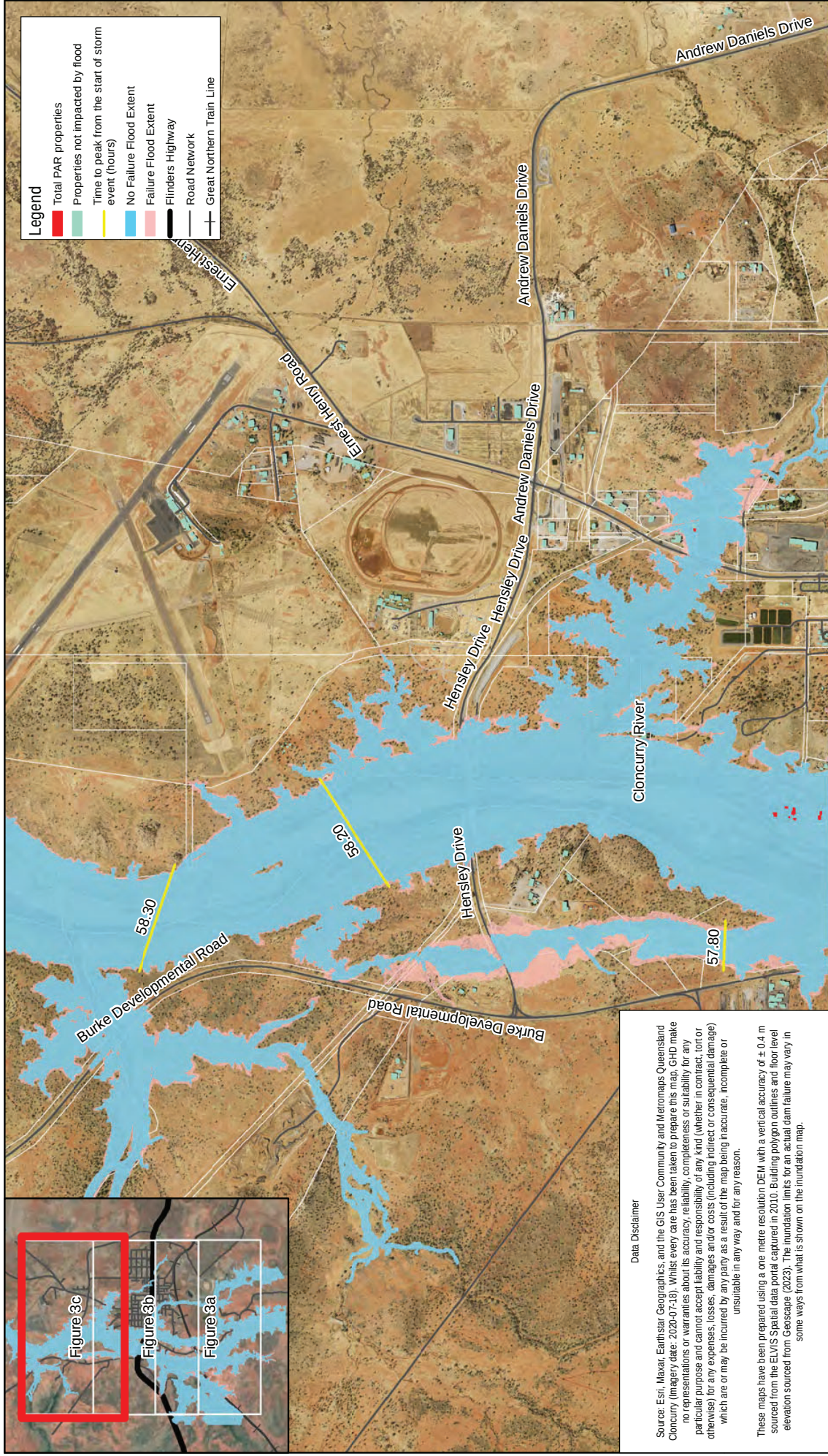
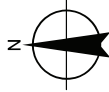


Figure 3c

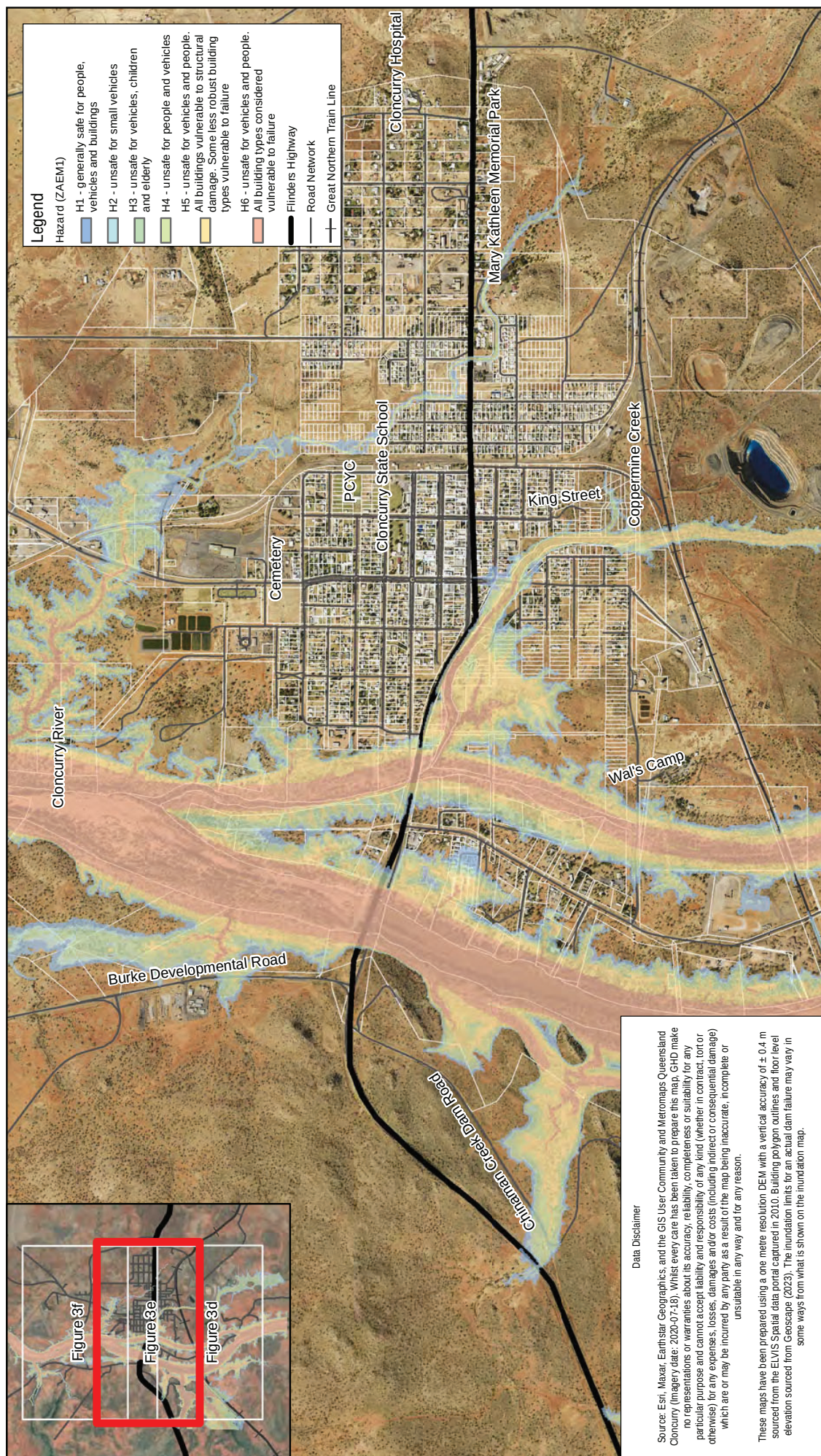


Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan
**Critical Incremental PAR Flood Event
1 in 200 AEP with 1 in 20 AEP
Flood Hazard (Failure)**



Paper Size ISO A4
0 0.15 0.3 0.45 0.6
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54



Project No. 12573949
Revision No. 0
Date 27 Aug 2023

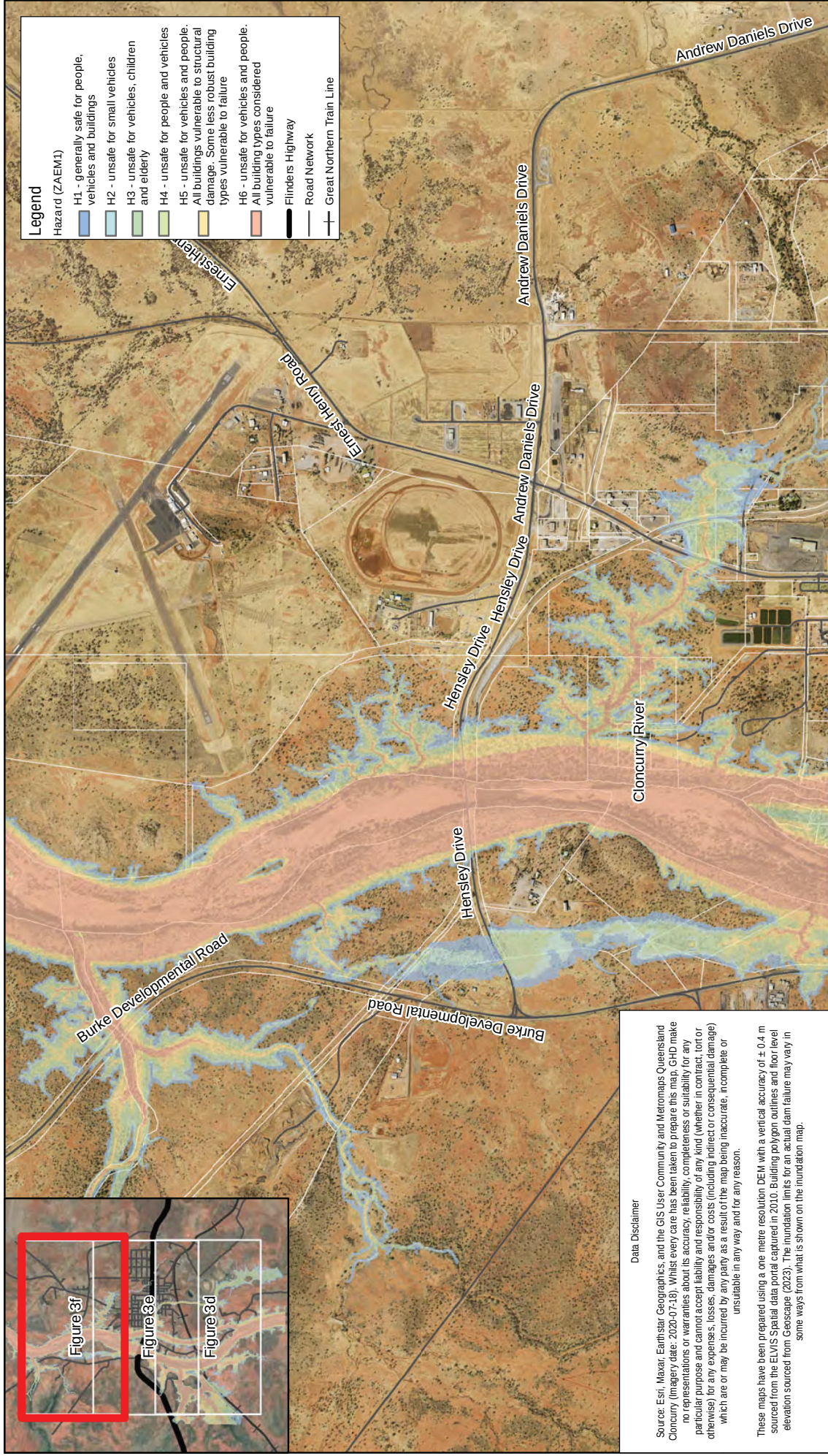
**Critical Incremental PAR Flood Event
1 in 200 AEP with 1 in 20 AEP
Flood Hazard (Failure)**

Figure 3e

Data source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community. Metromaps, Queensland, Cairns (Imagery date: 2022-07-13). Created by: n.r.albani

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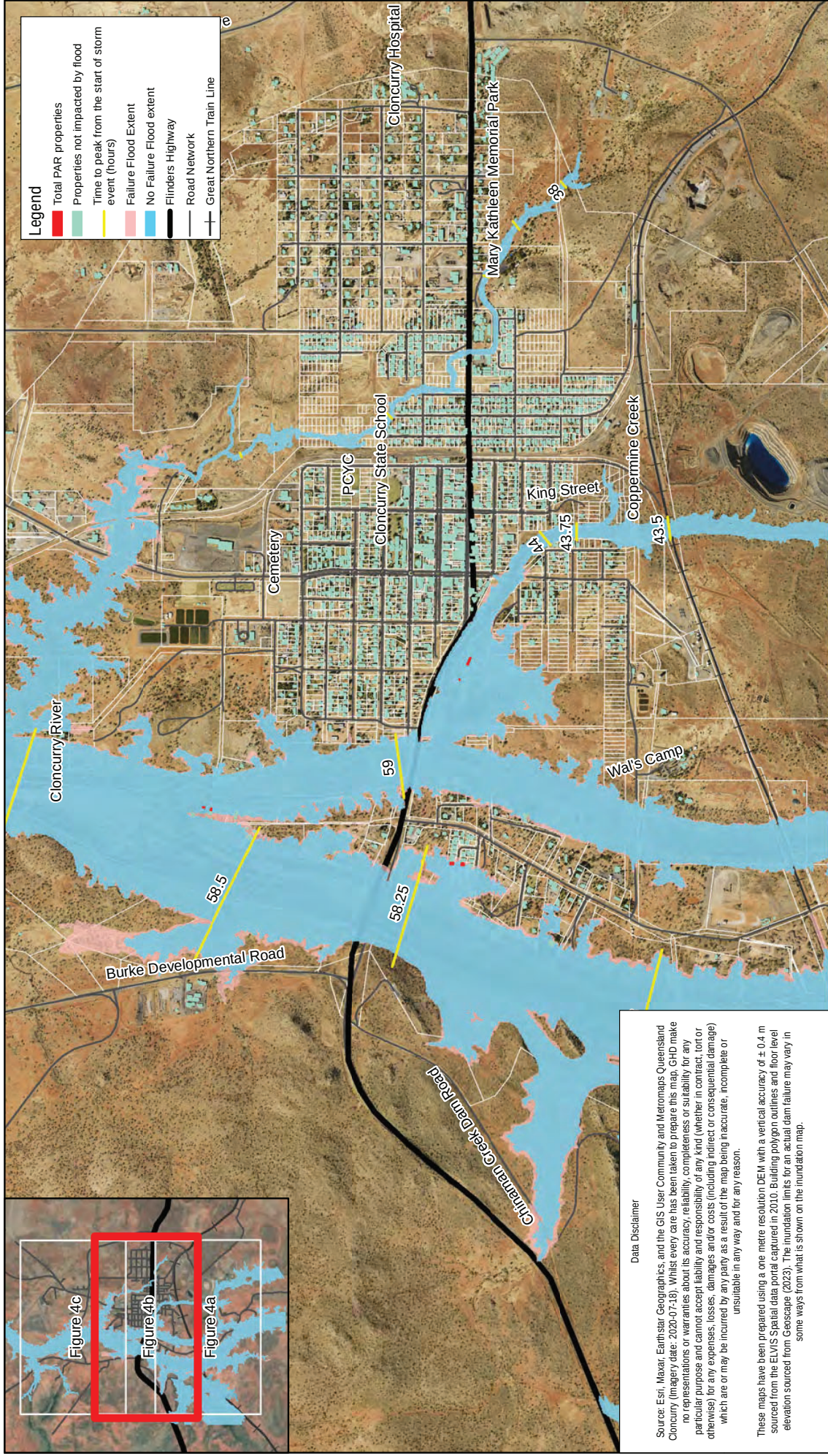


Project No. 12573949
 Revision No. 0
 Date 25 Aug 2023

Cloncurry Shire Council
 Chinaman Creek Dam
 Emergency Action Plan

1 in 500 AEP with 1 in 10 AEP
 Flood Extent

Figure 4a



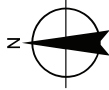
Data Disclaimer

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community and Metromaps Queensland Cloncurry (Imagery date: 2020-07-18). Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

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Paper Size ISO A4
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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54



Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

Project No. 12573949
Revision No. 0
Date 25 Aug 2023

1 in 500 AEP with 1 in 10 AEP
Flood Extent

Figure 4b



Project No. 12573949
 Revision No. 0
 Date 25 Aug 2023

Cloncurry Shire Council
 Chinaman Creek Dam
 Emergency Action Plan

1 in 500 AEP with 1 in 10 AEP
 Flood Extent

Figure 4c

Data source: Esri, Maxar, Earthstar Geographics, and the GIS User Community Metromaps Queensland Cairns (Imagery date: 2022-07-13). Created by mapband

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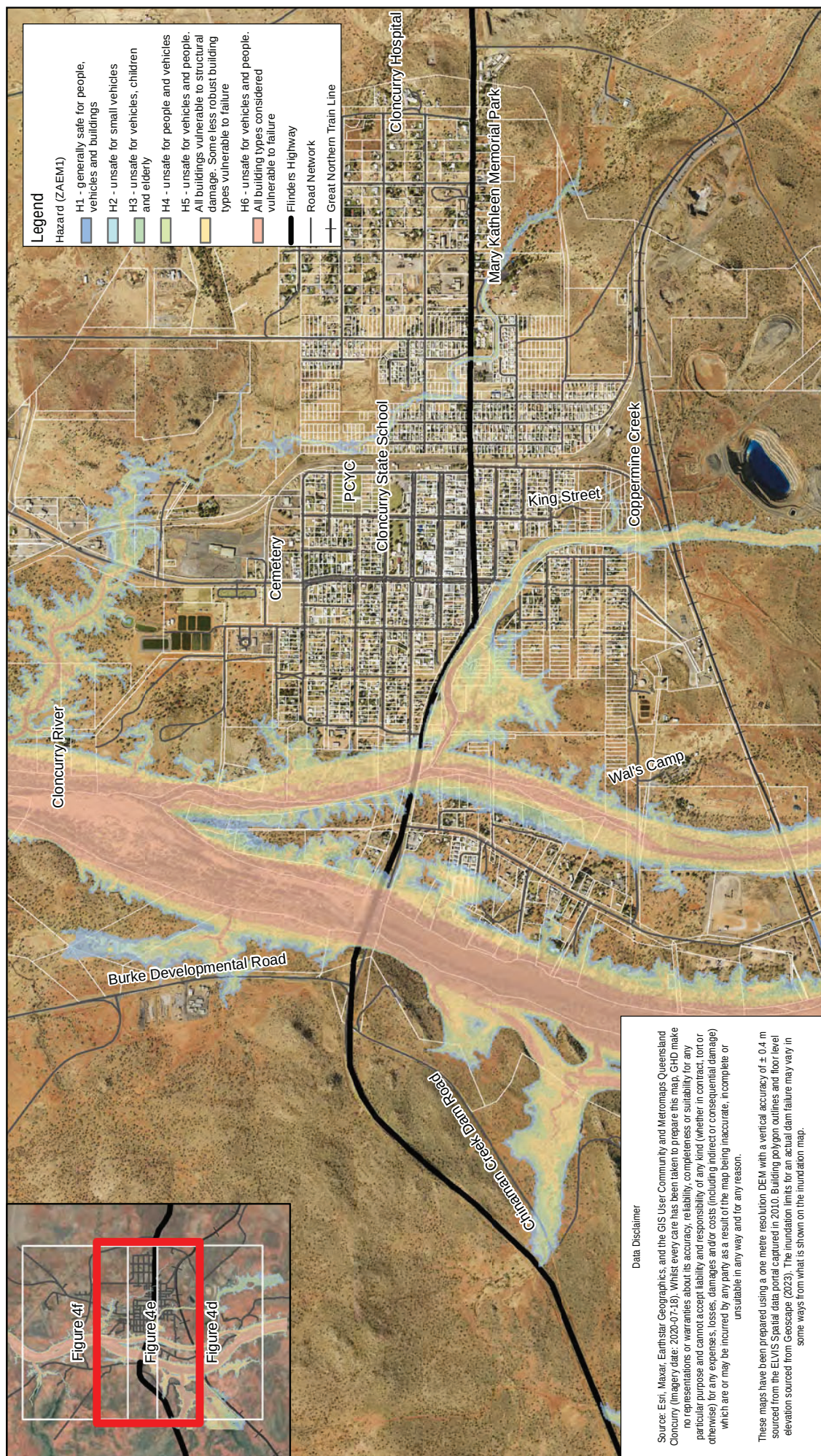


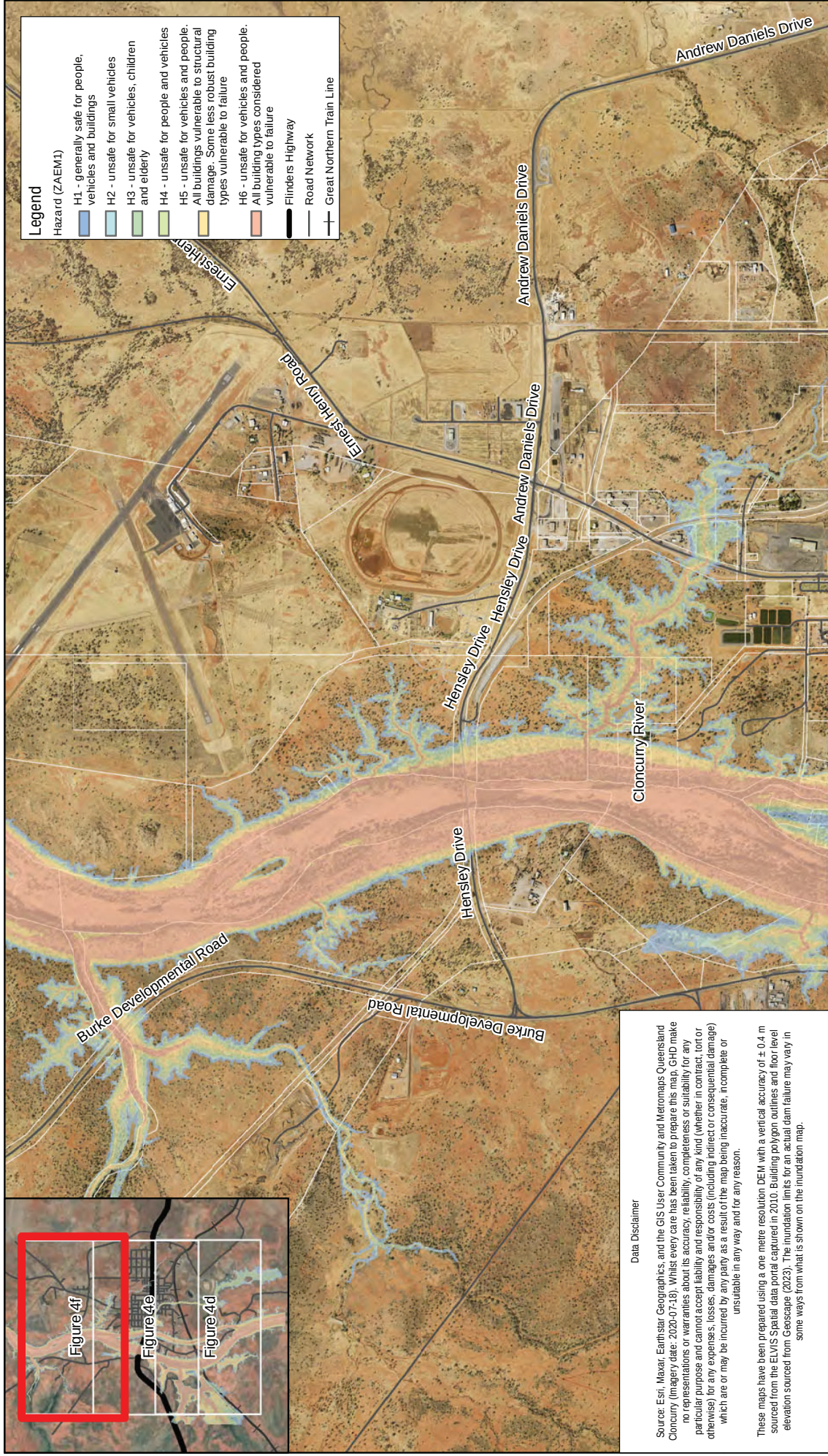
Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

1 in 500 AEP with 1 in 10 AEP
Flood Hazard (Failure)

Figure 4d

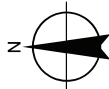




Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

1 in 500 AEP with 1 in 10 AEP
Flood Hazard (Failure)



Paper Size ISO A4
0 0.15 0.3 0.45 0.6
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

Figure 4f

Data source: Esri, Maxar, Earthstar Geographics, and the GIS User Community Metromaps Queensland Cairns (imagery date: 2022-07-13). Created by mighardan

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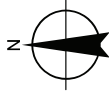
Data Disclaimer

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community and Metromaps Queensland Cloncurry (Imagery date: 2020-07-18). Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

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Kilometers

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Grid: GDA 1994 MGA Zone 54

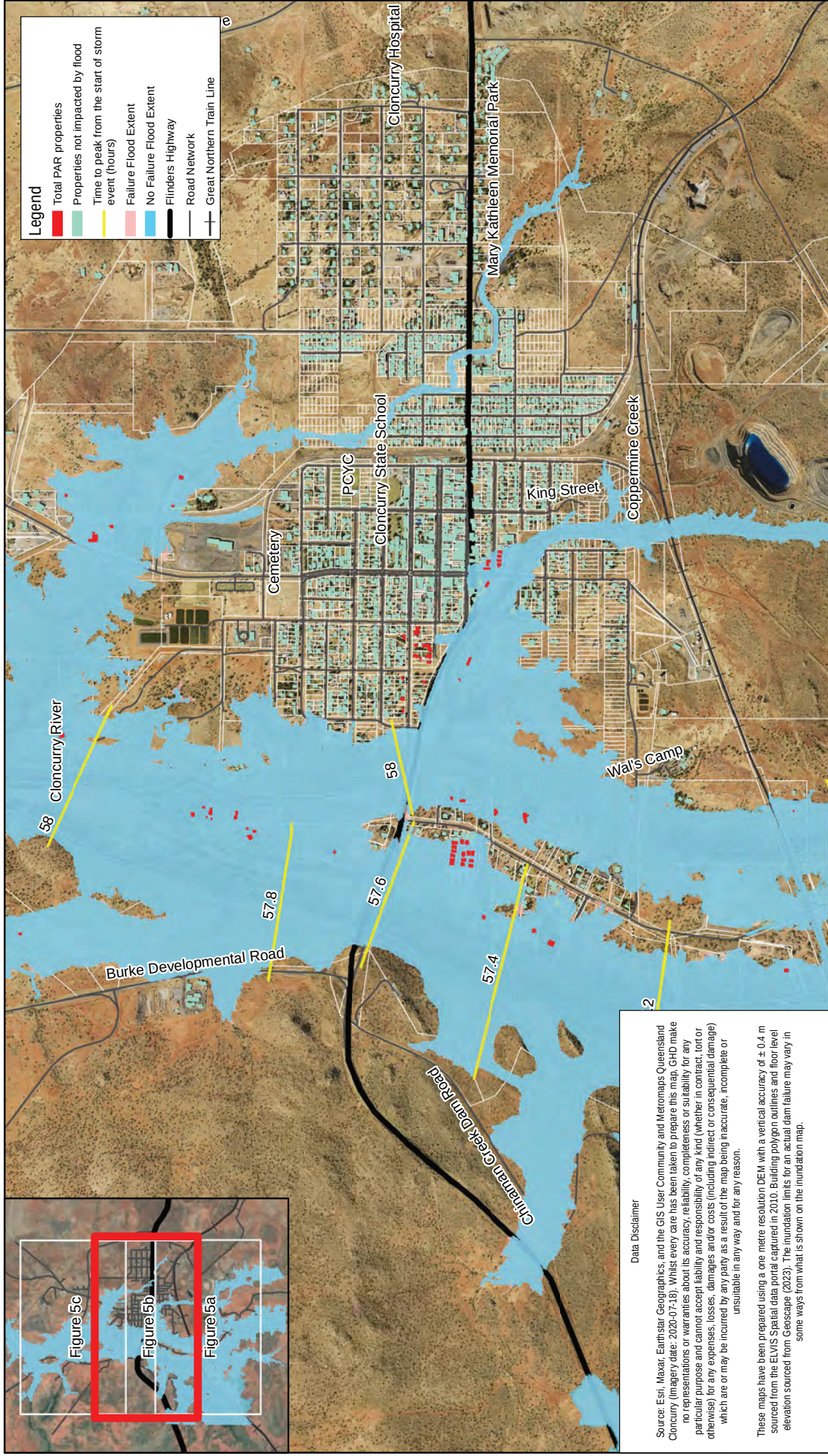


Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

**Dam Crest Flood Event
1 in 100,000 AEP with 1 in 20 AEP
Flood Extent**

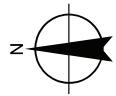
Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Figure 5a



Project No. 12573949
Revision No. 0
Date 25 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan
**Dam Crest Flood Event
1 in 100,000 AEP with 1 in 20 AEP
Flood Extent**



Paper Size ISO A4
0 0.15 0.3 0.45 0.6
Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

Figure 5b



Project No.	12573949
Revision No.	0
Date	25 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

Data source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community Metromaps Queensland Cairns (Imagery date: 2022-07-13). Created by: nrajbandari

Figure 5c



Project No.	12573949
Revision No.	0
Date	27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

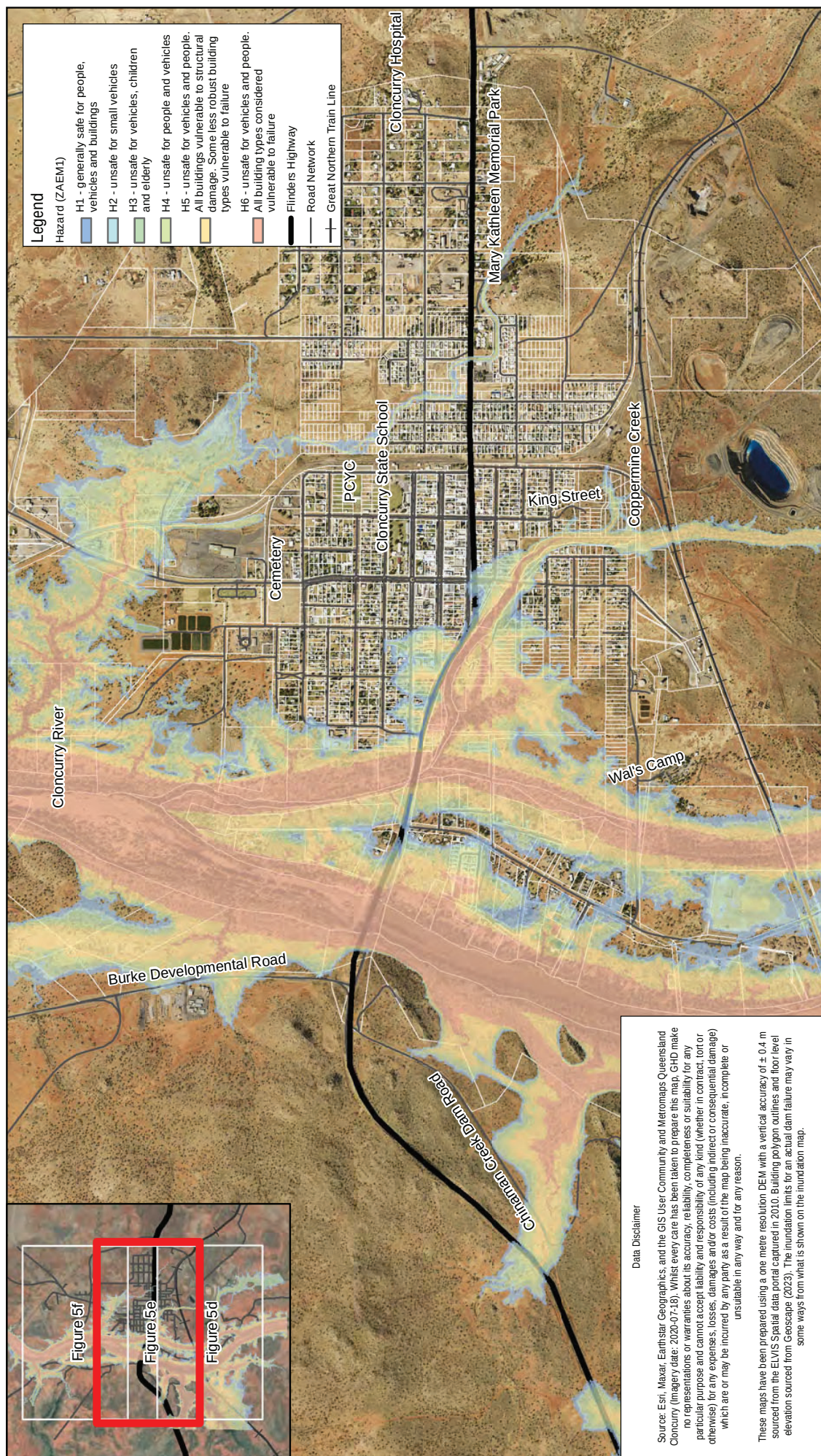
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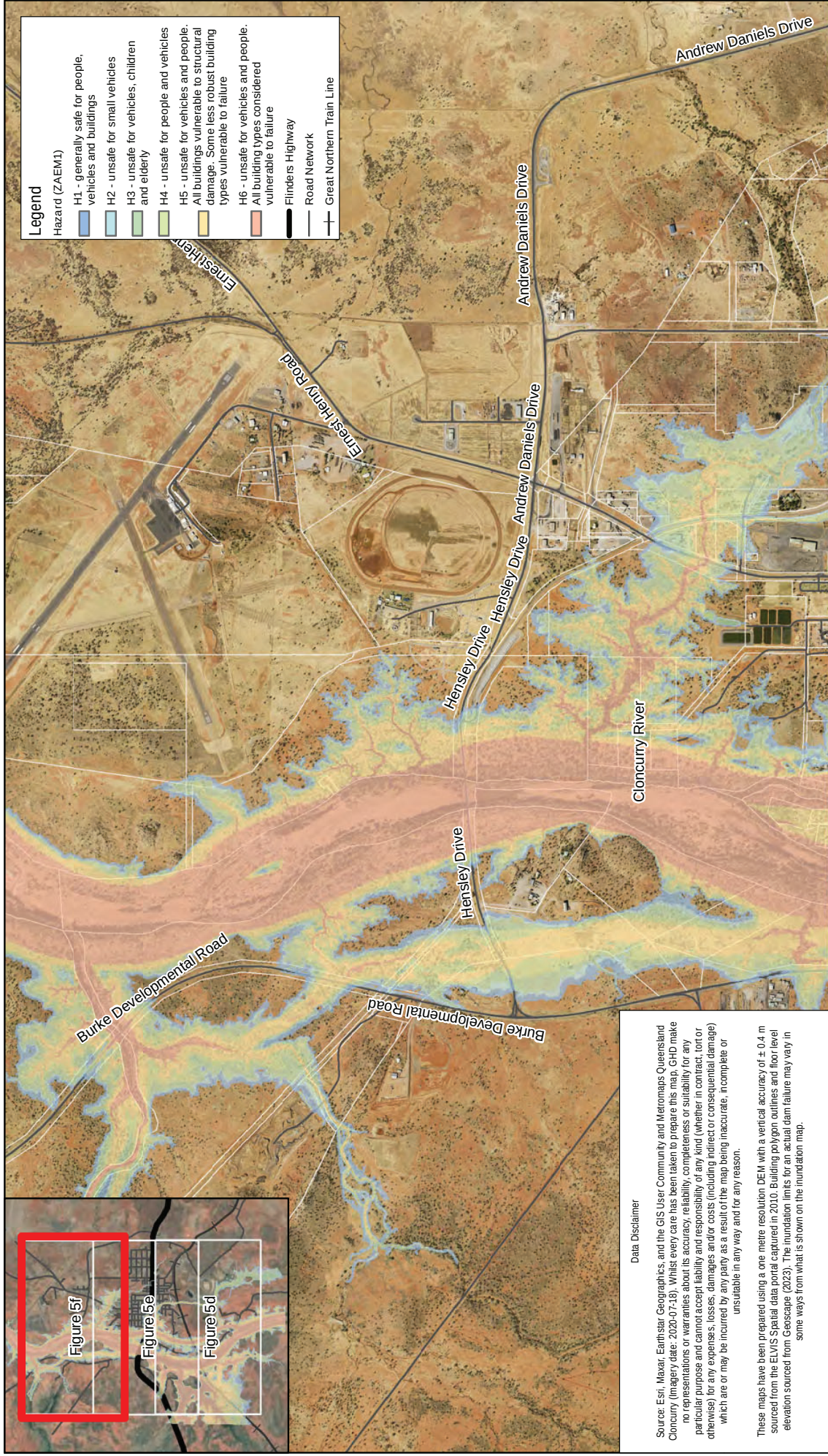
Figure 5d

Data Disclaimer

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community and Metromaps Queensland Concurrency (Imagery date: 2020-07-18). Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

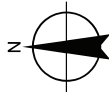
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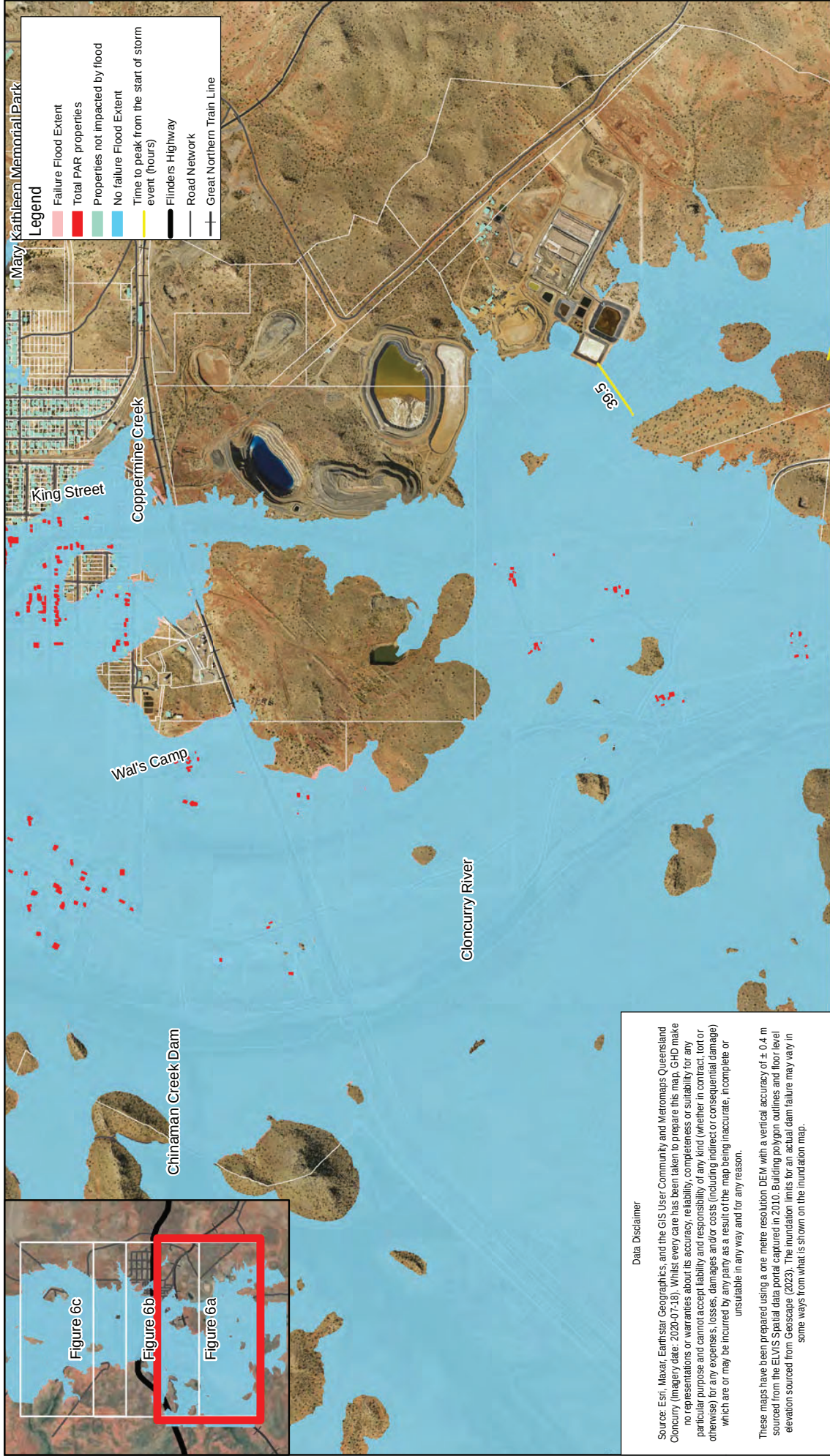
Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan
**Dam Crest Flood Event
1 in 100,000 AEP with 1 in 20 AEP
Flood Hazard (Failure)**



Paper Size ISO A4
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Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

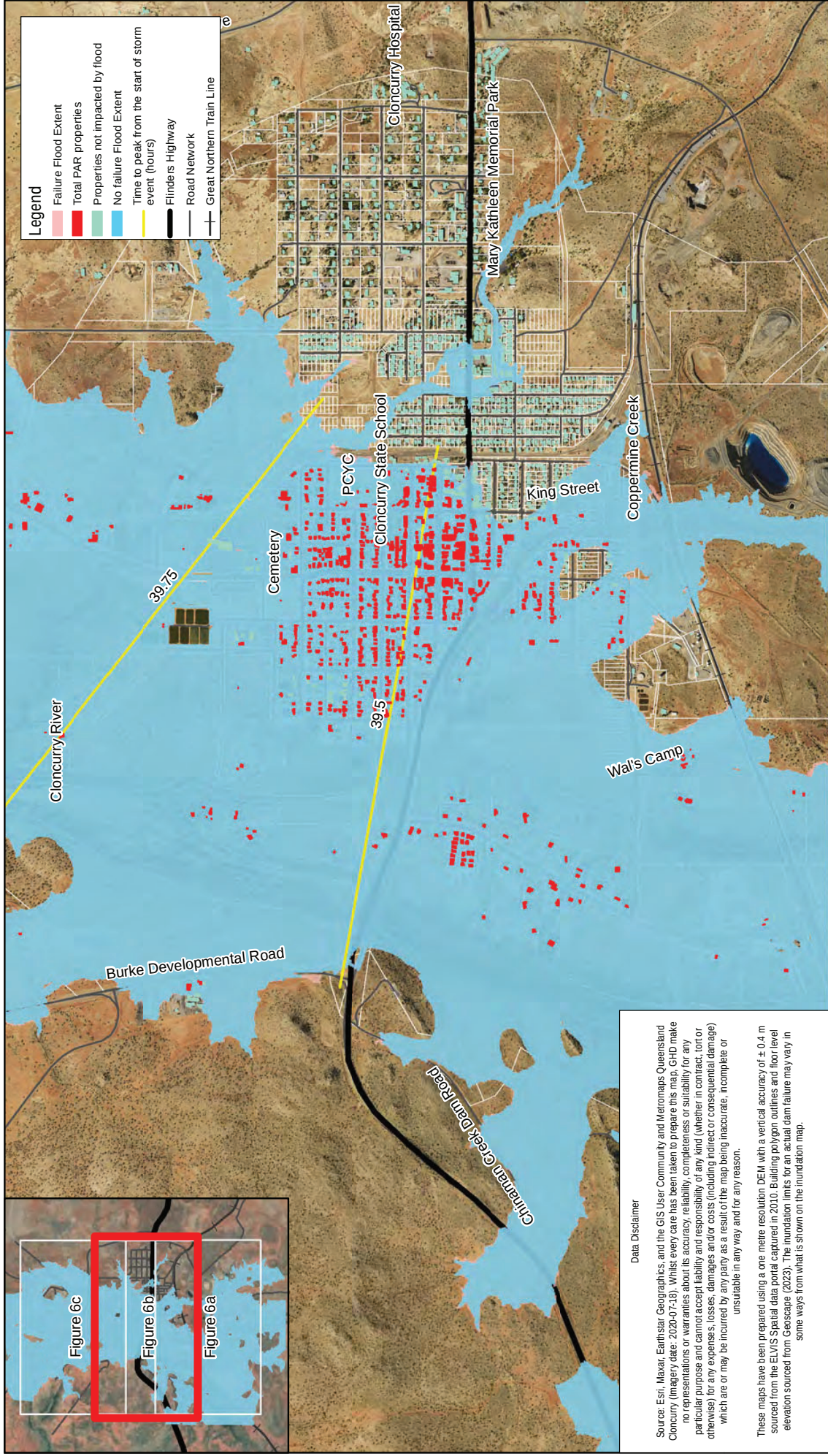
Figure 5f



Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan
**Probable Maximum Flood
with 1 in 2,000 AEP
Flood Extent**

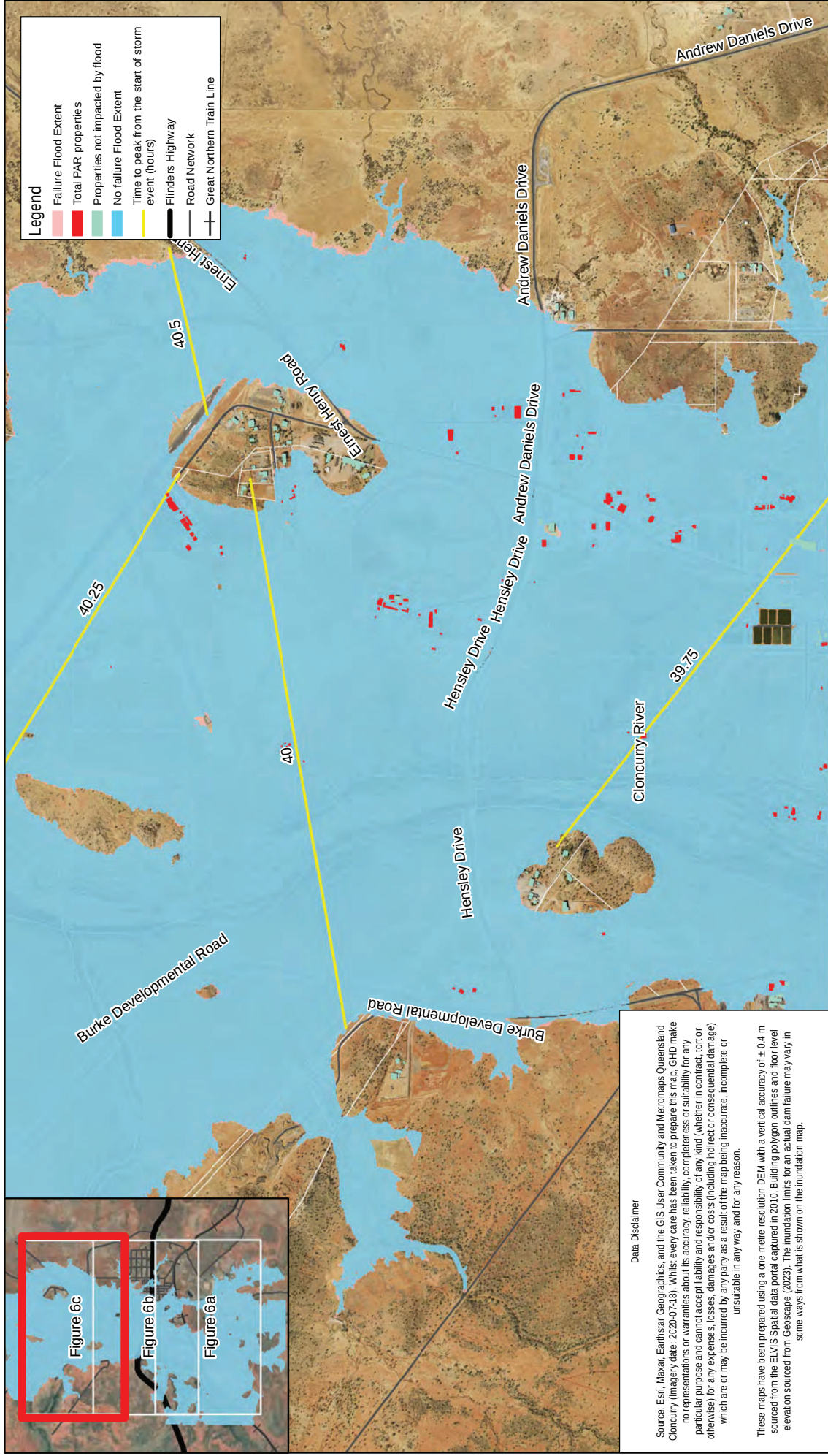
Figure 6a



Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan
**Probable Maximum Flood
with 1 in 2,000 AEP
Flood Extent**

Figure 6b

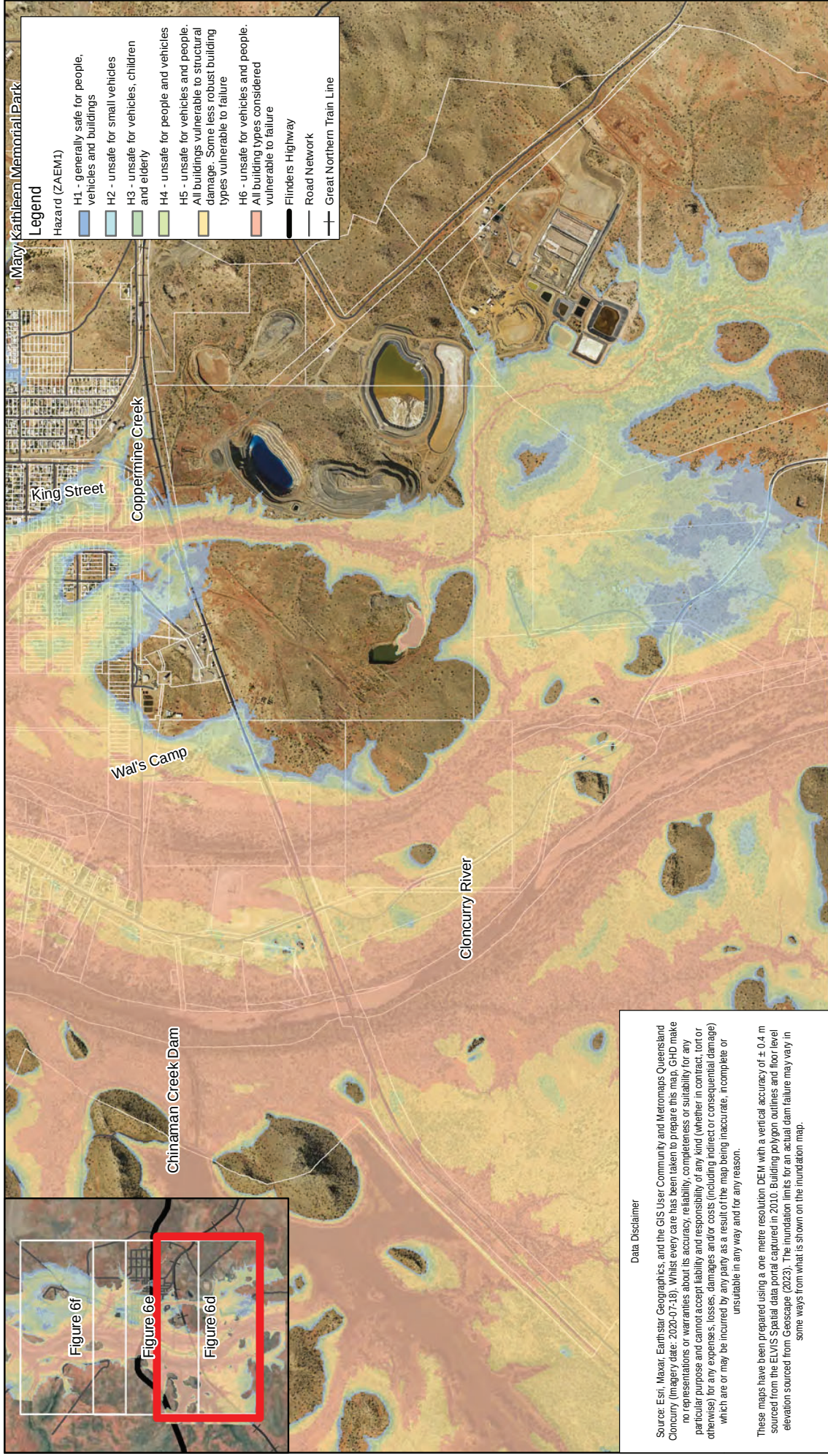


Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

**Probable Maximum Flood
with 1 in 2,000 AEP
Flood Extent**

Figure 6c



Project No. 12573949
Revision No. 0
Date 27 Aug 2023

Cloncurry Shire Council
Chinaman Creek Dam
Emergency Action Plan

**Probable Maximum Flood
with 1 in 2,000 AEP
Flood Hazard (Failure)**

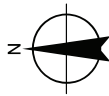
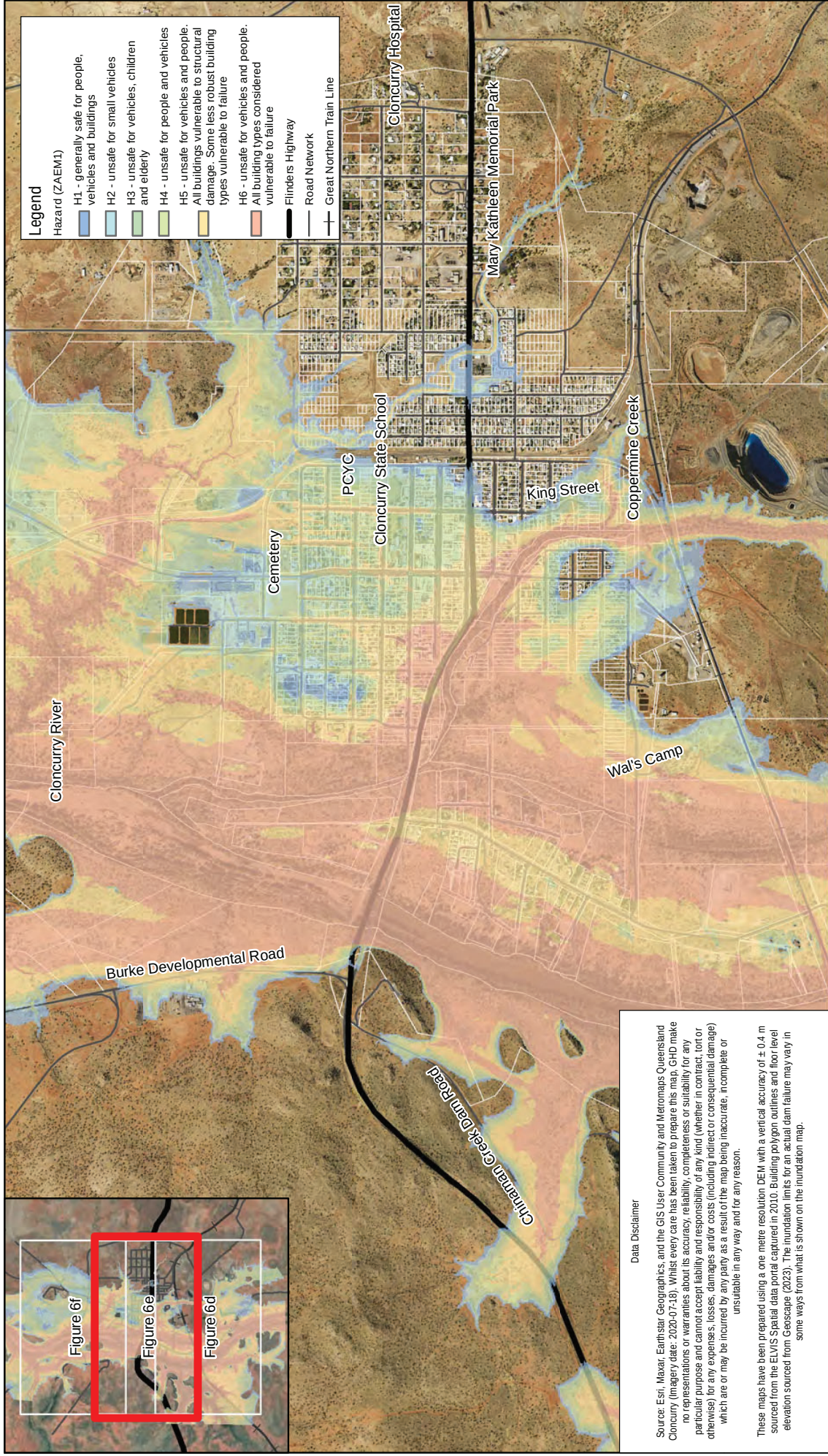
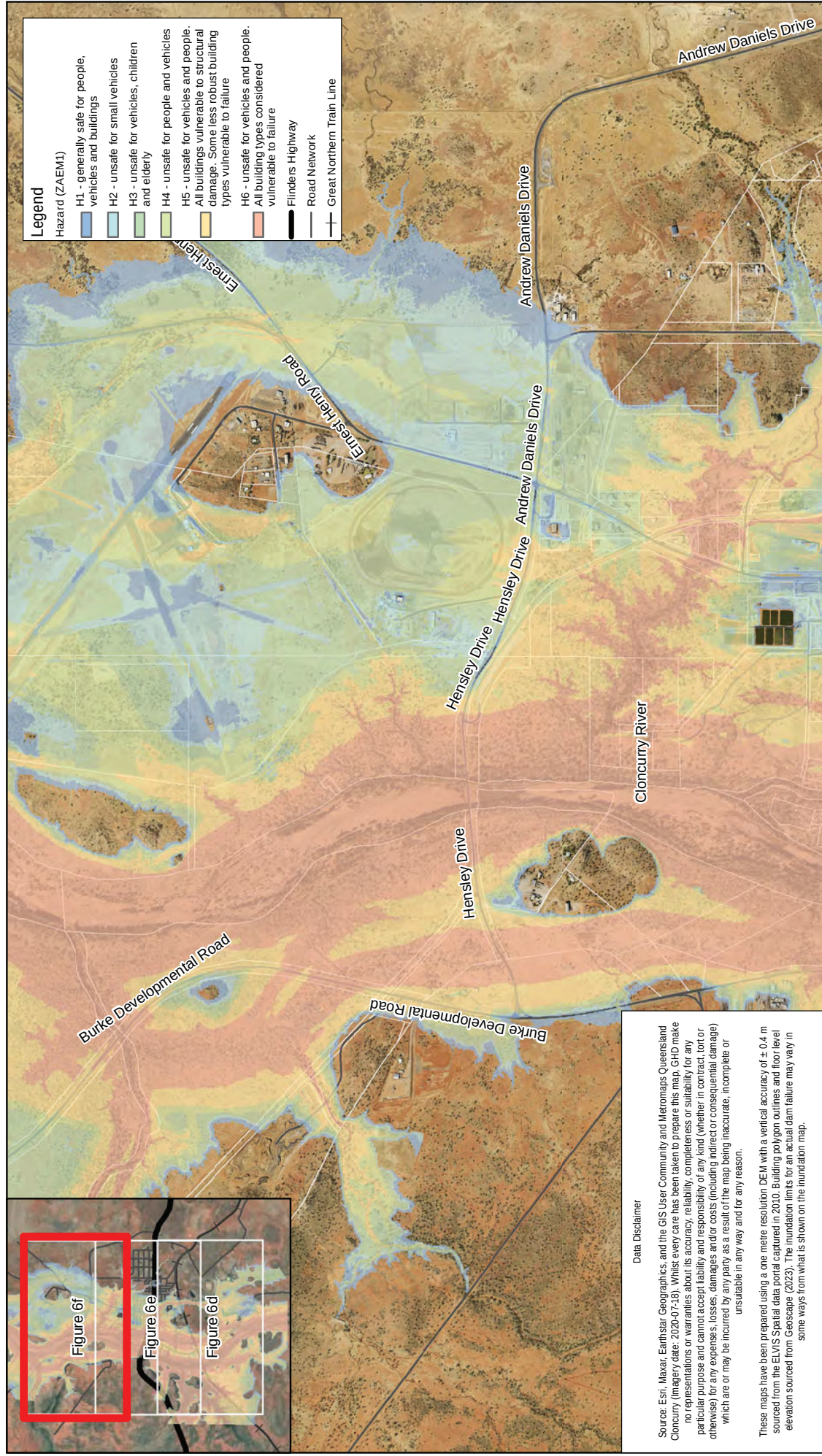


Figure 6d



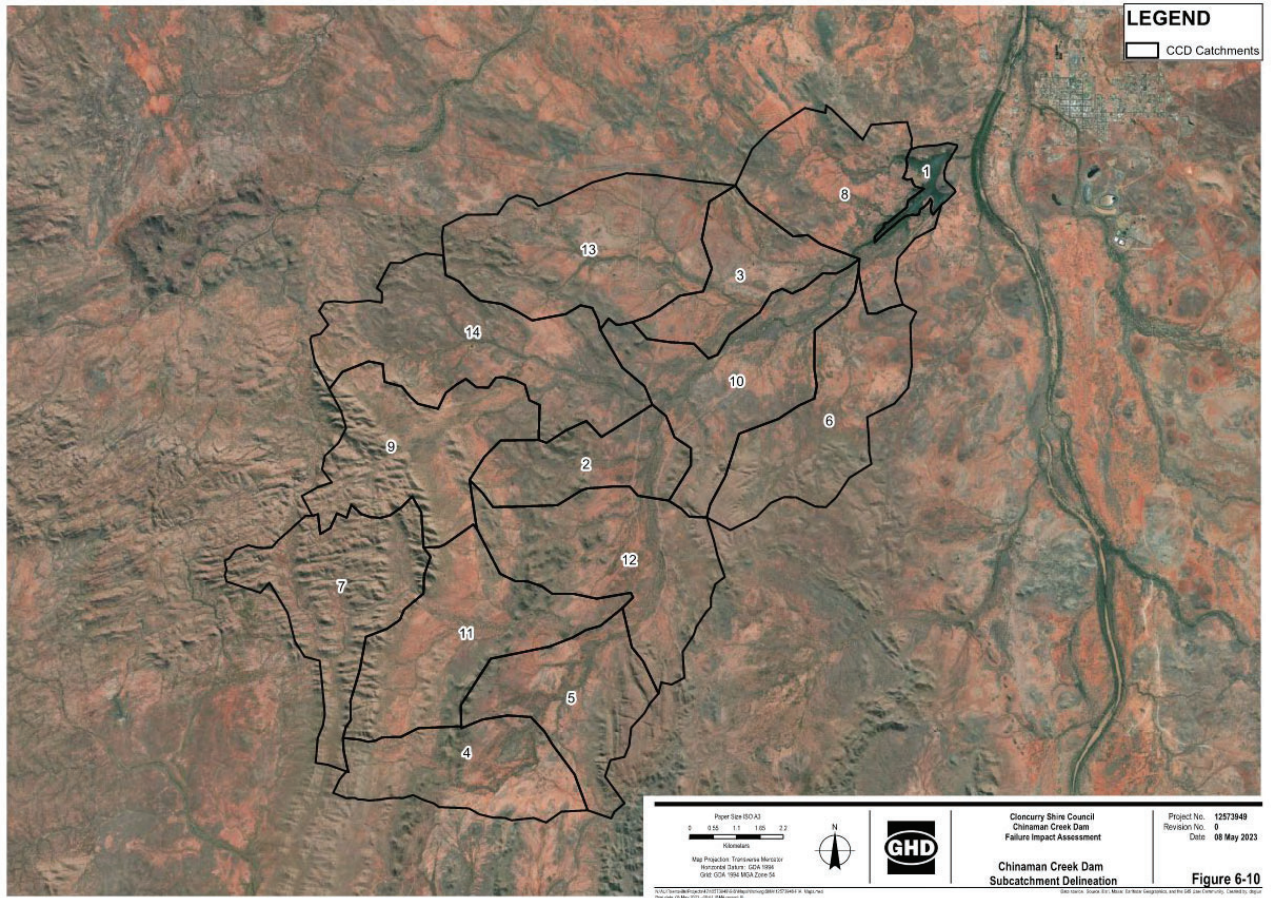


Appendix D

Catchment Plan



\\ghdnet\ghd\AU\Townsville\Projects\42\12573949\GIS\Maps\PDF\Report Figures



Appendix E

Warning Messages and Distribution



There are a number of methods of disseminating messages to areas likely to be affected by either a Dam Failure or by overtopping. To ensure that messages are received by the greatest population, multiple delivery methods are preferred. This, however, will be affected by the time of day and the anticipated onset of the flood event.

Message delivery options

Type	Pros	Cons
Emergency Alert	Pre loaded and checked campaigns, fast to distribute	Will have overflow to areas outside of effected area, required update of dashboard, expensive
Media (Radio/TV)	More information, better uptake due to trusted source	Lack of local media, would be restricted to mainly radio, minimal after hours capability.
Cloncurry Shire Disaster Dashboard	Is a trusted point of truth, able to provide more targeted information.	Required to be updated regularly.
Social Media	Easy to update, larger uptake from younger population	May not be trusted, allows for comments that may not be accurate
Door Knocking	Targeted and instant feedback, good for vulnerable population	Very slow and labour intensive
Loud Haller (PA System)	Rapid deployment of assets can be sed to target specific small areas	May cause panic, must not be the only source of information, cannot gauge uptake

The following warning messages may be used in the event of dam safety emergency. The appropriate message can be distributed to the media and others for release as part of providing messages to the residents and others in the area on developing situations or that an event has occurred. The wording provided in the following suggested messages is to be reviewed and amended by either the CEO or LDMG as required for each situation/scenario.

No media releases or messages are to be released without the approval of the CEO. Copies of all messages released to the public shall be kept including the date and time of release and the distribution list.

SMS alerts can be distributed through:

- The National Emergency alert System (Polygon for Cloncurry and surrounding area).
- Council SMS alert system which alerts whole town if activated; and
- Social Media platforms

Media releases can be made to local radio and television broadcasters.

Copies of any released messages must also be supplied to the EAPO and DR to provide guidance in communication with local residents and others.



Communication Table – Sunny Day Failure

Activation level	Trigger for Communication	Group to contact	Method	AWS Symbol	Message Text
Alert	Earthquake reported or felt in the area with intensity less than 5 MM, OR Identification of new or increased seepage, sand boils, slips, deformation, slumping, wave erosion or cracking	- EAPO - DR - CEO - LDMG - DDMG - DLGWV	Phone	-	-
		Downstream residents	-	Not applicable	Not applicable
Lean Forward	Earthquake reported or felt in the area with intensity greater than 5 MM, OR Further development of the dam safety issues identified at the ALERT stage Major Seepage/Leakage changes Major Cracking “Sand Boils” downstream of the dam	- EAPO - DR - CEO - LDMG - DDMG - DLGWV	Phone		This is an Advice message from Cloncurry Council. A potential safety issue has been identified with Chinaman Creek Dam. STAY INFORMED. Further information is available from Cloncurry Council or https://dashboard.cloncurry.qld.gov.au/
		Downstream residents	-	Not applicable	Not applicable
Stand Up 1 (Potential Failure)	Identification of dam safety issues that are likely to result in a breach developing in the dam (irrespective of the water level in the dam or existing or forecast inflows) Reports or identification of acts of terrorism	- EAPO - DR - CEO - LDMG - DDMG - QPS & SES - DLGWV - Dam Safety Engineer	Phone	-	-
		Downstream residents	EA, AWS		This is a Watch & Act message from Cloncurry Council. Chinaman Creek Dam may fail and flash flood Western areas of Cloncurry. PREPARE TO EVACUATE. Further



Activation level	Trigger for Communication	Group to contact	Method	AWS Symbol	Message Text
Stand Up 2 (Developing Failure)	Failure of the dam is imminent or has occurred	- EAPO - DR - CEO - LDMG - DDMG - QPS & SES - Dam Safety Engineer - DLGWV	Phone	-	-
		Downstream residents	EA, AWS		This is an EMERGENCY WARNING message from Cloncurry Council. Imminent failure of the Chinaman Creek Dam. All residents between [to be advised based on specific event] are advised to take precautions and evacuate to the Emergency Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or https://dashboard.cloncurry.qld.gov.au/
Stand Down	Dam inspections have not identified any safety issues or structural integrity issues Any dam issues are no longer considered to be likely to lead to dam failure	- EAPO - DR - CEO - LDMG - DDMG - QPS & SES - Dam Safety Engineer - DLGWV	Phone	-	-
		Downstream residents	EA, AWS		Residents are advised the dam level is 191.2m and flooding is no longer occurring



F1177-EA-Request-Form SDF Lean Forward Flood Advice





EMERGENCY ALERT REQUEST 1.1

Location: Cloncurry

Date: / /
Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

- ☒ YES
 ☐ NO

DDMG Advised

- ☒ YES
 ☐ NO

Threat Direction Required?

- ☐ YES
 ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

This is an Advice message from Cloncurry Council. A potential safety issue has been identified with Chinaman Creek Dam. STAY INFORMED. Further information is available from Cloncurry Council or via dashboard dot Cloncurry dot q l d dot gov dot a u.

Type or handwrite SMS below (maximum of 160 characters including spaces)

This is an Advice message from Cloncurry Council. A potential safety issue has been identified with Chinaman Creek Dam. STAY INFORMED. Further information is available from Cloncurry Council or <https://dashboard.cloncurry.qld.gov.au/>

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



F1177-EA-Request-Form SDF –Watch and Act





EMERGENCY ALERT REQUEST 1.2

Location: Cloncurry

Date: / /
Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

- ☒ YES
 ☐ NO

DDMG Advised

- ☒ YES
 ☐ NO

Threat Direction Required?

- ☐ YES
 ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

This is a Watch and Act message from Cloncurry Council. Chinaman Creek Dam may fail and flash flood Western areas of Cloncurry. PREPARE TO EVACUATE. Further information is available from Cloncurry Council or via dashboard dot cloncurry dot q l d dot gov dot a u.

Type or handwrite SMS below (maximum of 160 characters including spaces)

This is a Watch & Act message from Cloncurry Council. Chinaman Creek Dam may fail and flash flood Western areas of Cloncurry. PREPARE TO EVACUATE. Further information is available from Cloncurry Council or <https://dashboard.cloncurry.qld.gov.au/>

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



F1177-EA-Request-Form SDF –Emergency Warning





EMERGENCY ALERT REQUEST 1.3

Location: Cloncurry

Date: / /

Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

- ☒ YES
 ☐ NO

DDMG Advised

- ☒ YES
 ☐ NO

Threat Direction Required?

- ☐ YES
 ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

This is an EMERGENCY WARNING message from Cloncurry Council. Imminent failure of the Chinaman Creek Dam. All residents between [to be advised based on specific event] are advised to take precautions and evacuate to the Emergency Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or via dashboard dot cloncurry dot q l d dot gov dot ay u.

Type or handwrite SMS below (maximum of 160 characters including spaces)

This is an EMERGENCY WARNING message from Cloncurry Council. Imminent failure of the Chinaman Creek Dam. All residents between [to be advised based on specific event] are advised to take precautions and evacuate to the Emergency Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or <https://dashboard.cloncurry.qld.gov.au/>

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



F1177-EA-Request-Form SDF Stand Down Flood Advice





EMERGENCY ALERT REQUEST 1.4

Location: Cloncurry

Date: / /
Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

☒ YES ☐ NO

DDMG Advised

☒ YES ☐ NO

Threat Direction Required?

☐ YES ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

Residents are advised the dam level is 191.2m and flooding is no longer occurring

Type or handwrite SMS below (maximum of 160 characters including spaces)

Residents are advised the dam level is 191.2m and flooding is no longer occurring

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



Communication Table – Flood Inflows and Dam Safety Issues

Activation level	Trigger for Communication	Group to contact	Method	AWS Symbol	Message Text
Alert	Barkly Highway bridge flood gauge height > 3.0 m AND Water level in the dam reaches 191.22 m AHD with forecasts for further rain/dam inflows	- EAPO - DR - CEO - LDMG - DDMG - DLGWV	Phone	-	-
		Downstream residents	-	Not applicable	Not applicable
Lean Forward	Barkly Highway bridge flood gauge height > 3.0 m AND Water level in the dam reaches 192.22 m AHD with forecasts for further rain/dam inflows	- EAPO - DR - CEO - LDMG - DDMG - DLGWV	Phone	-	
		Downstream residents	EA, AWS		This is an Advice message from Cloncurry Council. Heavy Rainfall is forecast over Chinaman Creek Dam catchment. Water level rises in Chinaman Creek and Cloncurry River are expected. Residents are warned of possible flooding and to prepare themselves accordingly. Further information is available from Cloncurry Council or https://dashboard.cloncurry.qld.gov.au/
Stand Up (significant flood)	Barkly Highway bridge flood gauge height > 3.0 m AND Water level in the dam reaches 192.72 m AHD with forecasts for further rain/dam inflows	- EAPO - DR - CEO - LDMG - DDMG - QPS & SES - Dam Safety Engineer - DLGWV	Phone	-	-



Activation level	Trigger for Communication	Group to contact	Method	AWS Symbol	Message Text
		Downstream residents	EA, AWS		This is an EMERGENCY WARNING message from Cloncurry Council. Due to a significant flood in Cloncurry River, all residents between [LDMG to advise] are advised to take precautions and evacuate now to the nominated Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or https://dashboard.cloncurry.qld.gov.au/
Stand Up (major flood and/or dam overtopping)	Barkly Highway bridge flood gauge height > 7.0 m AND Water level in the dam reaches 194.4 m AHD with forecasts for further rain/dam inflows	Downstream residents	EA, AWS		This is an EMERGENCY WARNING message from Cloncurry Council. Due to a significant flood in Cloncurry River, all residents between [LDMG to advise] are advised to take precautions and evacuate now to the nominated Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or https://dashboard.cloncurry.qld.gov.au/
Stand Down	Rainfall or inflows to the dam are reducing and the water level of the dam is dropping. Conditions may include: Water is no longer flowing through the spillway or has reduced to a level where downstream flooding is no longer a threat Dam inspections have not identified any safety issues or structural integrity issues Downstream flooding has reduced and no longer a threat to the public Any dam issues are no longer considered to be likely to lead to dam failure	- EAPO - DR - CEO - LDMG - DDMG - QPS & SES - Dam Safety Engineer - DLGWV Downstream residents	Phone	-	
		Downstream residents	EA, AWS		Residents are advised the dam level is 191.2m and flooding is no longer occurring. Return with caution.



F1177-EA-Request-Form Flooding Watch and Act





EMERGENCY ALERT REQUEST 2.1

Location: Cloncurry

Date: / /
Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

- ☒ YES
 ☐ NO

DDMG Advised

- ☒ YES
 ☐ NO

Threat Direction Required?

- ☐ YES
 ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

This is an Advice message from Cloncurry Council. Heavy Rainfall is forecast over Chinaman Creek Dam catchment. Water level rises in Chinaman Creek and Cloncurry River are expected. Residents are warned of possible flooding and to prepare themselves accordingly. Further information is available from Cloncurry Council or via dashboard dot cloncurry dot q l d dot gov dot a u.

Type or handwrite SMS below (maximum of 160 characters including spaces)

This is an Advice message from Cloncurry Council. Heavy Rainfall is forecast over Chinaman Creek Dam catchment. Water level rises in Chinaman Creek and Cloncurry River are expected. Residents are warned of possible flooding and to prepare themselves accordingly. Further information is available from Cloncurry Council or <https://dashboard.cloncurry.qld.gov.au/>

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



F1177-EA-Request-Form Flooding Lean Forward Flood Advice





EMERGENCY ALERT REQUEST 2.2

Location: Cloncurry

Date: / /
Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

- ☒ YES
 ☐ NO

DDMG Advised

- ☒ YES
 ☐ NO

Threat Direction Required?

- ☐ YES
 ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

This is an EMERGENCY WARNING message from Cloncurry Council. Due to a significant flood in Cloncurry River, all residents between [LDMG to advise] are advised to take precautions and evacuate now to the nominated Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or via dashboard dot cloncurry dot q l d dot gov dot a u.

Type or handwrite SMS below (maximum of 160 characters including spaces)

This is an EMERGENCY WARNING message from Cloncurry Council. Due to a significant flood in Cloncurry River, all residents between [LDMG to advise] are advised to take precautions and evacuate now to the nominated Evacuation Centre at [LDMG to advise]. Further information is available from Cloncurry Council or <https://dashboard.cloncurry.qld.gov.au/>

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



F1177-EA-Request-Form Flooding Emergency Warning





EMERGENCY ALERT REQUEST 2.3

Location: Cloncurry

Date: / /
Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone
 ☐ Storm Surge
 ☒ Flash Flood
 ☐ Flood
☐ Bushfire
 ☐ Fire Incident
 ☐ Smoke or Toxic Plume
 ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS)
 ☒ Watch & Act
 ☐ Advice

Campaign Mode

- ☒ Voice
 ☒ SMS – Location Based
 ☐ SMS – Service Address Based

LDMG Advised

☒ YES ☐ NO

DDMG Advised

☒ YES ☐ NO

Threat Direction Required?

☐ YES ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
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☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

Residents are advised to evacuate due to a significant flood in Cloncurry River.
All residents between [LDMG to advise] are advised to evacuate to the nominated Emergency Evacuation Centre at [LDMG to advise].

Type or handwrite SMS below (maximum of 160 characters including spaces)

All residents between [LDMG to advise] are to evacuate to the Evacuation Centre at [LDMG to advise].

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



F1177-EA-Request-Form Flooding Stand Down Flood Advice





EMERGENCY ALERT REQUEST 2.4

Location: Cloncurry

Date: / /

Time: : hrs

Requesting Officer:

Telephone:

Agency/Position: Cloncurry LDMG- Chair

Email:

Event
Type

- ☐ Cyclone ☐ Storm Surge ☒ Flash Flood ☐ Flood
☐ Bushfire ☐ Fire Incident ☐ Smoke or Toxic Plume ☐ Chemical Spill
☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
☐ Other (please specify):

Message Severity

- ☐ Emergency Warning (NOTE activates the SEWS) ☒ Watch & Act ☐ Advice

Campaign Mode

- ☒ Voice ☒ SMS – Location Based ☐ SMS – Service Address Based

LDMG Advised

☒ YES ☐ NO

DDMG Advised

☒ YES ☐ NO

Threat Direction Required?

☐ YES ☒ NO

Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached

STEP 2. Filename:

STEP 3. Spatial format: (Indicate the format used)

- ☐ KML *.kml (preferred format as per Spatial guidelines)
☐ ESRI *.dbf, *.prj, *.shp, *.shx
☐ GML *.gml, *.xsd
☐ MapInfo TAB *.dat, *.id, *.map, *.tab
☐ MapInfo Mid/Mif *.MIDI Sequence, *.mif
☐ OTHER(insert)

STEP 4. Messaging/spatial data, is it supplied via

- ☐ DMportal - specify filenames below
☐ FTP - specify filenames below
☐ Email
☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

Residents are advised the dam level is 191.2m and flooding is no longer occurring

Type or handwrite SMS below (maximum of 160 characters including spaces)

Residents are advised flooding is no longer occurring

SEND TO sdcc@qfes.qld.gov.au and call **07 36352387** TO CONFIRM

FOR USE BY SDCC

Requesting Officer:

Signature

/ /20

☐ Manual Transmission

EA User Name:

Signature

/ /20

☐ EMS Transmission

Authorising Officer Name:

Signature

/ /20

EA Campaign No. _____

EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au



Figure 9 Emergency alert polygon



AWS MESSAGING

The following templates may be used to develop a message to be released alongside the relevant Emergency Alert messages

During a dam failure event. The LOCATION, HAZARD and CALL TO ACTION should be reviewed and selected as appropriate for the current situation.

The list of places identified in the following templates are locations that fall within the alert polygons for Chinaman Creek Dam. Refinement of the impacted areas should occur in real-time if the situation permits.

The following templates can be used to create messages to warn people likely to be flooded to get ready to leave for their own safety. This could be due to danger from flooding, or likelihood of extended isolation.

The Watch and Act messages provided below are for using the following situations:

- Sunny Day Failure (Section 8.2)
- Flood inflows (Section 8.3)
- Terrorism (Section 8.4)



Possible dam failure > Advice > Monitor Conditions

Monitor Conditions – Cloncurry Shire Council Area – possible failure of CHINAMAN CREEK DAM as at [time, day, date, year]

Warning Level: ADVICE

Warning area: Cloncurry

This warning is from [issuing agency name].

People in the following places must **monitor conditions for possible flooding**:

- Cloncurry township

Water levels in Cloncurry may possibly start to rise. Monitor conditions in case of any changes.

If your life is in danger, call Triple Zero (000) immediately.

What you should do:

- **Monitor Conditions** in your area.
- Drive to conditions and remain alert. Be aware of road hazards, bridges or buildings caused by flooding and landslip may exist in your area. Consider the need to make alternative arrangements for work, children and travel.
- Use sandbags to block toilets, sinks and drains to stop sewerage backflow.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
 - Venue name and full address [add map link if available].
 - Venue name and full address [add map link if available].
- Warn friends, family and neighbours in the area of the possibility of dam failure.

More information:

For Cloncurry Shire Council updates and a map of areas that may flood, go to

<https://dashboard.cloncurry.qld.gov.au/>

The next update will be sent at [time, day, date] or when the situation changes.



Possible dam failure > Watch and Act > Prepare to leave and/or move to higher ground

PREPARE TO LEAVE AND/OR MOVE TO HIGHER GROUND – Cloncurry Shire Council Area – possible failure of CHINAMAN CREEK DAM as at [time, day, date, year]

Warning Level: WATCH AND ACT

Warning area: Cloncurry

This warning is from [issuing agency name].

People in the following places must **prepare to leave and/or move to higher ground to a safe place away from flooding**:

- Cloncurry township

Water levels in Cloncurry may rise rapidly. Prepare to leave and/or move to higher ground to a safe place.

Do not expect emergency services to come to your door.

If your life is in danger, call Triple Zero (000) immediately.

What you should do:

- Prepare to leave and/ or move to higher ground so you can go quickly if the water levels in Irvinebank start to rise. **Get ready now.**
- Decide where you and the people you live with will go. Find a safe and high place away from flooding.
- Take your mobile phone, medicine, ID, cash and keys with you
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
 - Venue name and full address [add map link if available].
 - Venue name and full address [add map link if available].
- Warn friends, family and neighbours in the area of the possibility of dam failure.

More information:

For Cloncurry Shire Council updates and a map of areas that may flood, go to

<https://dashboard.cloncurry.qld.gov.au/>

The next update will be sent at [time, day, date] or when the situation changes.



Possible dam failure > Emergency > Leave Immediately

LEAVE IMMEDIATELY– Cloncurry Shire Council Area – possible failure of CHINAMAN CREEK DAM as at [time, day, date, year]

Warning Level: EMERGENCY WARNING

Warning area: Cloncurry

This warning is from [issuing agency name].

People in the following places must **LEAVE IMMEDIATELY**:

- Cloncurry township

You are in serious danger. Leave immediately and/or get as high as you safely can where you are. There is likely to be dangerous, fast-moving flooding and debris at and around Cloncurry.

If your life is in danger, call Triple Zero (000) immediately.

What you should do:

- **GO NOW** to a safe place in a high part of Cloncurry away from Chinaman Creek Dam.
- Decide where you and the people you live with will go. Find a safe and high place away from flooding.
- Take your mobile phone, medicine, ID, cash and keys with you
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
 - Venue name and full address [add map link if available].
 - Venue name and full address [add map link if available].
- Take your mobile phone, medicine, identification, cash, and keys with you.
- Help others if you can.

More information:

For Cloncurry Shire Council updates and a map of areas that may flood, go to

<https://dashboard.cloncurry.qld.gov.au/>

The next update will be sent at [time, day, date] or when the situation changes.

Appendix F

Communication Log



Time	To/from	Name	Notes	Completed

Appendix G

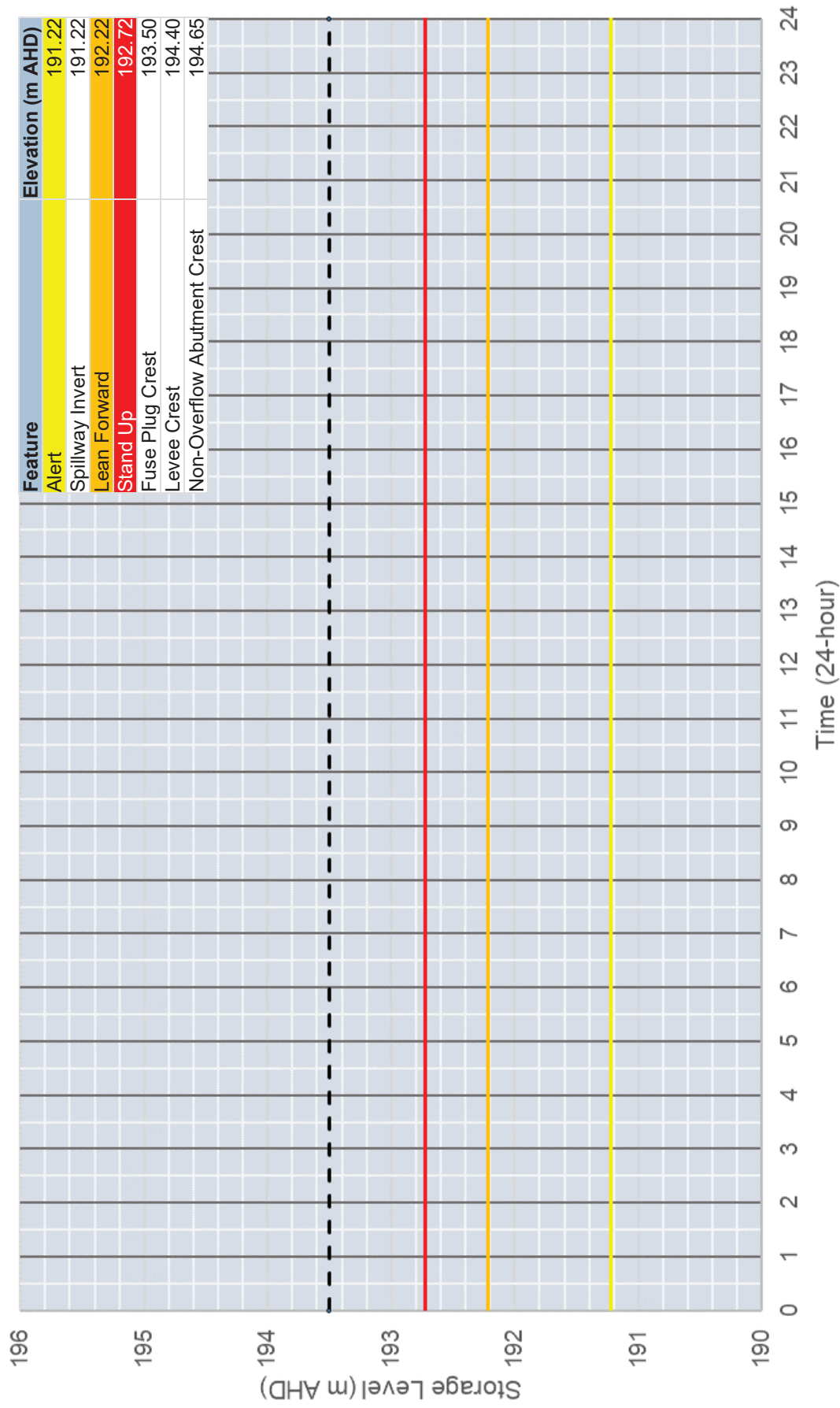
Emergency Event Report (EER)



Emergency Event Report for Chinaman Creek Dam	
Date:	
Completing officer's name:	
Description of the event	<i>Provide a description of the event. Was it part of a larger rain/flood event or cyclone?</i>
General comments and/or recommended changes to the EAP	<i>Provide comments on how effective the event was managed, learnings from the event, and are there any changes that could be made to the EAP to make it more effective.</i>
Management of the event	<i>Provide details of how the EAP was implemented. What actions were undertaken to monitor the dam and the affected area.</i> <i>What EAP activation triggers were reached? Provide the actual instrument and/or rain gauge readings Description of any damage to the dam, include photos of overflows, erosion, scouring etc.</i> <i>Details of communication undertaken with internal stakeholders and external parties i.e., PAR, Regulator, LDMG, Police, Social Media etc. Provide comment on if the communication strategy was effective. Did the PAR receive the SMS/Phone messages, did they act on the direction?</i> <i>Was power lost? Did this impact on communications? Include any other relevant information.</i>

Appendix H

Rate of Rise Plot



Appendix I

**Small to Medium Spillway Overflows
Standard Operating Procedure (SOP)**



CLONCURRY SHIRE COUNCIL

CHINAMAN CREEK DAM

STANDARD OPERATING PROCEDURES
FOR
SMALL TO MEDIUM SPILLWAY OVERFLOWS

SOP

DISTRIBUTION, APPROVAL AND REVISION CONTROL

DISTRIBUTION

Copy #	Position	Organisation
1	Chief Executive Officer of Cloncurry Shire Council (CEO)	CSC
2	Director of Works and Environmental Services (DR)	CSC
3	EAP Officer (EAPO)	CSC
4	EAP Backup Officer 1 (EAPO-1)	CSC

AUTHORISATION

Approved:

Date: ____/____/____

Director of Works and Environmental Services

REVISION STATUS

Revision No.	Date	Revision Description
0	1994	Original Issue
1	2010	EAP Update
2	October 2013	EAP Update - October 2013
3	December 2017	EAP Update – December 2017
4	July 2021	EAP Update
5	March 2022	EAP Update
6	September 2022	Final Revision
7	October 2023	EAP Update



1. Purpose

The Chinaman Creek Dam is managed by the Cloncurry Shire Council.

Part of the dam safety management program is to inspect the Dam immediately before the spillway starts to overflow. A secondary objective is to advise the public that access and egress to the area may be cut off due to local stream rises.

2. Scope

This procedure applies to spillway overflow events that are less than 193.4 m AHD (RL 192.2). The personnel are the Emergency Action Plan (EAP) Officers listed in the EAP for the Chinaman Creek Dam.

3. Personnel affected and responsibilities

Officer	Responsibilities
Water and Sewerage Plant Operator (EAPO-1 and EAPO-2)	The Officer responsible for carrying out weekly inspections at the dam.
Emergency Action Plan Officers (EAP Officers)	The Officer based at Cloncurry and at or near Chinaman Creek Dam responsible for carrying out EAP procedures for the Dam and this Standing Operating Procedure.
Director of Works and Environmental Services	The person responsible for approving the Standing Operating Procedures, the Operation and Maintenance Manual and the persons undertaking the role of EAP Officers and, for managing, receiving, storing and checking data for the Chinaman Creek Dam, reviewing and authorising documentation produced by the officer and consultants on the dam and initiating investigations into abnormal behaviour of the dam.
Dam Safety Regulator	The entity responsible for approving the Emergency Action Plan.

4. Actions

The EAP Officer should be aware of the storage height and rainfall conditions, and be able to estimate when the spillway is likely to overflow. Details for obtaining information on rainfall, storage and river gauge heights from the Bureau of Meteorology are given in the EAP.

- When possible, two hours before the spillway is estimated to overflow, the EAPO shall visit the dam if safe access is possible, and visually inspect the Dam for any deficiencies.
- Check for new cracking or increased crack widths in the spillway face and the concrete dam main wall.
- Advise any public at the dam that they should consider leaving the site immediately, while access and egress to the site is open. If they are unable to leave the site because of local stream rises or other reasons they should seek higher ground and await evacuation by police and emergency services.
- Close the gates to the dam spillway and display the dam site closed sign.
- Take a RL level at one-hour intervals.
- At a reasonable time, notify the DR of storage height and that a spillway discharge is likely. Regularly update the DR during the rainfall event. At least daily or as directed by the DR.
- Notify the Police in Cloncurry, and the EXO, LDMG, that a spillway discharge is likely. Also provide information to parties that are at the dam site and may be unable to leave safely.
- Refer Table 15 – Actions for Flood Inflow Flow Chart and follow all instructions.



- When no further rain or inflows are expected and the storage RL is less than 191.22 m AHD and falling, and local stream rises have fallen sufficiently to allow access to and egress from the site, the EAPO is to make an inspection of the Dam and advise the DR.
- Once given permission by the DR, the dam site can be reopened to the public.
- EXO advises the CEO, LDMG, QFD that the site has been opened to the public and stands down.

5. References

- Chinaman Creek Dam Emergency Action Plan
- Chinaman Creek Standing Operating Procedures (SOPs) AECOM September 2011

Appendix J

Inspection Safety Protocol



All Emergency Action Plan (EAP) officers who visit the dam site are to observe this protocol.

1. A mobile phone with backup is to be available at all inspections.
2. More than one person is to be at the site at all times.
3. Inspections are to be carried out only when conditions are deemed to be safe as per inspection and risk assessment/s.
4. The holder of the after-hours phone is to be advised of any inspection and subsequent completion. This person is to be contacted if any reasonable delay is anticipated.
5. When necessary, a certified boat with operable motor, oars, life jackets, and extra fuel will be utilised.
6. All personnel likely to be involved are to be informed of the above and to be made aware that they are mandatory requirements.
7. All personnel are to have had the site-specific safety induction.
8. In the event of unsafe or cut-off access due to flood waters, the spillway, downstream channel and fuse plug should be monitored via the CCTV cameras

Appendix K

Deficiencies Inspection Checklist



INSPECTION OF CONCRETE DAM

TYPE OF DEFICIENCY	LOOK FOR
SURFACE DEFECTS	– Honeycomb: Voids around aggregate. – Stratification: Non-uniform layers of aggregate in concrete. – Form Slippage: Uneven joints and surfaces. – Stains. – Impact damage.
DISPLACEMENT	– Displacement at joints between blocks. – Volume change in concrete. – Closing or opening of joints. – Loss of joint filler. – Cracking. – De-bonding of lifts. – Tilting, shearing, or shifting of hardware.
LEAKAGE and SEEPAGE	– Significant new leakage on downstream face. – Wetness in abutment or foundation adjacent to toe. – Major changes in leakage/seepage pattern or flow. – Water spurting or running out of joints or cracks. – Turbidity of the seepage.
MAINTENANCE CONCERNS	– Vegetation in joints between concrete locks. – Large accumulations of debris. – Missing or deteriorated joint filter. – Quality and condition of previous repairs.



INSPECTION OF LEVEES

TYPE OF DEFICIENCY	LOOK FOR
SEEPAGE	– A water flow or sand boil on the lower portion of the downstream slope or toe area, especially at the groins. – Wet areas or areas where the vegetation appears greener or lusher on the embankment slope or toe area. – Turbidity or cloudiness of the seepage.
CRACKING	– Desiccation Cracking: A random honeycomb pattern of cracks usually found on the crest and the downstream slope. – Transverse Cracking: Cracks that are perpendicular to the length of the dam usually found on the crest. – Longitudinal Cracking: Cracks that are parallel to the length of the dam. Longitudinal cracks may be associated with stability problems in the slopes.
INSTABILITY	– Slides on the upstream or downstream slopes. – Bulging, especially at the toe of the dam.
DEPRESSIONS	– Misalignment in the crest and embankment slopes found by sighting along fixed points. – Sinkholes found by checking and probing each depression. – Remember, sinkholes have steep, bucket like sides while minor depressions have gently sloping, bowl like sides.
MAINTENANCE CONCERNS	– Inadequate Slope Protection: Check for bald areas or areas where the protection is sparse or damaged. – Surface Runoff Erosion: Check for gullies or other signs of erosion. Make sure to check the low points along the upstream and downstream shoulders and groins since surface runoff can collect in these areas. – Inappropriate Vegetative Growth: Check for excessive and deep rooted vegetative growth. – Debris: Check for debris on and around the dam, especially near the spillway. – Animal Burrows: Check for damage caused by burrowing animals.



WHEN TO GET FURTHER ASSISTANCE

Several of the deficiencies covered above are very serious. If you observe any of the following deficiencies, you should consult with the Engineer.

- Sand boils or turbid seepage.
- Seepage that has increased since the last inspection (taking the reservoir level into consideration).
- Cracking that extends below the reservoir level or potential reservoir level.
- Transverse and longitudinal cracking.
- Deep seated slides or bulging associated with slides.
- Sinkholes or other large depressions.
- Deep rooted vegetation that might need to be removed.

Remember, whenever you are unsure whether or not a condition poses a threat to the safety of the dam, you should discuss your findings with the Director of Works & Environmental Services (DR).