Loders Creek Dam

Emergency Action Plan

Date: 30 September 2020.

Approved by the delegate of the Chief Executive, Department of Natural Resources, Mines and Energy until 1 July 2021.
Edits to this version are shown in grey
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1. Distribution and control

1.1. Preparation and authorisation

This Emergency Action plan has been prepared by the Senior Flood Mitigation Planning Officer, and has been authorised for Issue to DNRME by the Manager City Assets.

1.2. Distribution lists

Tables 1 to 3 are distribution lists for notifications to updates to this EAP. Recipients of notifications are responsible for disseminating advices regarding any updates as appropriate to their position in accordance with the dam Standing Operating Procedures.

Table 1: Recipients of hard copies

<table>
<thead>
<tr>
<th>Copy #</th>
<th>Hard copy held by – position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Executive Coordinator Stormwater Beaches and Waterways</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Senior Technical Officer Assets and Operations - Roads and Drainage Maintenance</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Executive Coordinator Disaster Management</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dam Safety Regulator (DNRME)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Recipients of notification to update USB

<table>
<thead>
<tr>
<th>Copy #</th>
<th>USB copy held by – position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Executive Coordinator Disaster Management Unit</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Manager City Assets</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Executive Coordinator Stormwater Beaches and Waterways</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Coordinator Lakes and Waterways</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Senior Flood Mitigation Planning Officer</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: List of recipients of notification iSPOT reference

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of Transport &amp; Infrastructure/Local Disaster Coordinator</td>
<td></td>
</tr>
<tr>
<td>Executive Coordinator Disaster Management</td>
<td></td>
</tr>
<tr>
<td>Manager City Assets</td>
<td></td>
</tr>
<tr>
<td>Manager City Maintenance</td>
<td></td>
</tr>
<tr>
<td>Executive Coordinator Stormwater Beaches and Waterways</td>
<td></td>
</tr>
<tr>
<td>Coordinator Lakes and Waterways</td>
<td></td>
</tr>
<tr>
<td>Senior Technical Officer Assets and Operations - Roads and Drainage Maintenance</td>
<td></td>
</tr>
<tr>
<td>Executive Coordinator Parks and Landscape Maintenance</td>
<td></td>
</tr>
<tr>
<td>Executive Coordinator Construction</td>
<td></td>
</tr>
<tr>
<td>Supervisor Protective Services Operations</td>
<td></td>
</tr>
<tr>
<td>Senior Flood Mitigation Planning Officer</td>
<td></td>
</tr>
</tbody>
</table>
2. Introduction

2.1. Background

Loders Creek Dam is a Referable Dam as defined by the Queensland Water Supply (Safety and Reliability) Act 2008 and associated Guidelines.

An EAP is one of a number of dam management documents. Others include the dam Standing Operating Procedures, and the dam Detailed Operation and Maintenance Manual.

Where appropriate this EAP references the Loders Creek Dam Standing Operating Procedures (SOP).

2.2. Purpose

This Emergency Action Plan (EAP) is to inform key stakeholders of action to be undertaken when conditions, which may adversely impact on the dam, occur. Key stakeholders include residents downstream of the dam.

The EAP describes the coordination of necessary actions by the City of Gold Coast (City) and its officers to provide timely notification to Disaster Management groups and affected persons in the event of an Emergency Event at the Loders Creek Dam.

The EAP also provides guidance for managing developing circumstances, which may lead to an Emergency Event ultimately being declared at the dam e.g.

- Heavy rain falling, which may result in water flowing over the dam spillway, if rain were to continue.
- Suspected movement of the dam embankment, which requires survey to confirm if movement has occurred before declaring an event.

In these circumstances, the EAP will be referenced without being invoked.

Further information regarding this EAP is available from the City of Gold Coast City Assets branch (Ph. 1300 694 222 and ask for Referable Dams officer).
2.3. Scope

The EAP details Emergency Events and Action Procedures for the following events:

- Water flowing over the spillway of the dam (triggers prefaced with ‘F’)
- Excessive or New Seepage (triggers prefaced with ‘S’)
- Movement of the Dam – which may escalate to include a dam breach (triggers prefaced with ‘M’)
- Earthquake (triggers prefaced with ‘E’)
- Damage to Concrete or Embankment Sections – which may escalate to include a dam breach (triggers prefaced with ‘D’)
- Terrorism/Security Threat (triggers prefaced with ‘T’).

2.3.1. Emergency events and action procedures

Procedures have been developed for various scenarios that may pose a risk to the dam.

Each procedure documents a series of events that trigger a decision or action.

Each procedure is laid out in a tabular format accompanied by a description to support the decision or required action.

2.3.2. Training

Training in the application of this EAP and a program of test and review exercises are guided by the Loders Creek Dam SOPs.

2.4. Limitation

This EAP only covers the situation at the Dam itself, although the effect of dam failure on downstream residents is included as inundation mapping.

This EAP does not deal with general flooding issues downstream of the dam. General flooding downstream of the Loders Creek Dam is managed by the City’s Loders Creek Flood Emergency Decision Support System and the City’s Local Disaster Management Plan.

2.5. Disaster management arrangements/emergency arrangements

Disasters and hazards

The Queensland Disaster Management Act 2003 provides the following description of disaster:

Meaning of Disaster

A disaster is a serious disruption in a community, caused by the impact of an event that requires a significant coordinated response by the State and other entities to help the community recover from the disruption.

Serious disruption means —

a) loss of human life, or illness or injury to humans; or

b) widespread or severe property loss or damage; or

c) widespread or severe damage to the environment
The Queensland Disaster Management Act 2003 states:
Part 1 Preliminary, Division 2 Objects
• s4A Guiding Principles
  (c) local governments should primarily be responsible for managing (disaster) events in their local
government area;
Part 2 Disaster management groups and committees, Division 3 Local government disaster management
groups
• s29 Establishment
A local government must establish a Local Disaster Management Group (a local group) for the Local
government’s area
• s30 Functions
  (c) to help the local government for its area to prepare a local disaster management plan
In the event of a disaster, decision-making authority for disaster management in the local government area
rests with the Chairperson of the Local Disaster Management Group. In the City of Gold Coast, the Mayor is
the Chairperson of the Local Disaster Management Group.
Local government is best situated to provide first-hand knowledge and understanding of social, economic,
infrastructure and environmental issues within their respective communities and are ideally placed to support
their community from a disaster management perspective. This is achieved through the Local Disaster
Management Group (LDMG) where Local Governments coordinate their response to a disaster.
When a disaster event influences water levels in the Loders Creek Dam in a way, which may adversely
impact on a community, the City will be lead agency in the coordination of the disaster event.
When an emergency or disaster event occurs at Loders Creek Dam, which may or may not adversely impact
on a community, Queensland Police Service or another emergency service; dependent on the emergency,
will be lead agency. The City of Gold Coast may, in this instance be required as a support agency for the
event.
Reference has been made to Manual 23 - Emergency Management Planning for Floods Affected by Dams,
published by Emergency Management Australia in the preparation of this EAP and the Local Disaster
Management Plan.

3. Definitions

The following definitions are used throughout this manual:
The Owner City of Gold Coast
Asset Custodian Manager City Assets
Dam Hazard Rising water levels, seepage, damage or other matters which may lead to
an Emergency Event
Dam Hazard Event An event arising from a Dam Hazard, which has not escalated to an
Emergency Event
Dam Hazard Manager Senior Flood Mitigation Planning Officer, City Assets, or alternate officer as
per Table 6 Roles and Responsibilities
Dam Inspector Designated Maintenance Officers
Dam Safety Regulator DNRME
Emergency Event An escalated Dam Hazard Event where the Emergency Action Plan for the
dam is invoked
Emergency Event Report  A report forwarded to the Dam Safety Regulator after an Emergency Event
Field Staff  May be the DHM, or other suitable trained staff from City Assets or City Maintenance. Can be any person in the case of acts of terrorism, suspected terrorism or security threats.

3.1. Abbreviations and glossary of terms

The following abbreviations or Glossary of Terms applies when using this emergency Action Plan:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHD</td>
<td>Australian Height Datum</td>
</tr>
<tr>
<td>City</td>
<td>City of Gold Coast</td>
</tr>
<tr>
<td>DHM</td>
<td>Dam Hazard Manager (see also DIM)</td>
</tr>
<tr>
<td>DIM</td>
<td>Dam Incident Manager (see also DHM)</td>
</tr>
<tr>
<td>DMU</td>
<td>Disaster Management Unit</td>
</tr>
<tr>
<td>DNRME</td>
<td>Department of Natural Resources, Mines and Energy</td>
</tr>
<tr>
<td>EAP</td>
<td>Emergency Action Plan</td>
</tr>
<tr>
<td>ECDM</td>
<td>Executive Coordinator Disaster Management or nominated relief</td>
</tr>
<tr>
<td>eDRMS/iSPOT</td>
<td>City’s enterprise document records management system</td>
</tr>
<tr>
<td>LDCC</td>
<td>Local Disaster Coordination Centre</td>
</tr>
<tr>
<td>LDMG</td>
<td>Local Disaster Management Group</td>
</tr>
<tr>
<td>RL</td>
<td>Reduced Level – metres AHD</td>
</tr>
<tr>
<td>SOP</td>
<td>Standing Operating Procedures</td>
</tr>
</tbody>
</table>

3.2. LDMG activation levels

The following terms relate to levels of emergency services activation under Queensland disaster management arrangements.

As Events develop, LDC or Chair LDMG will determine the appropriate Activation Level, based on factors including (but not limited to):

- Conditions at the dam
- Conditions downstream unrelated to the dam e.g. tides and storm surges
- Weather forecasts

<table>
<thead>
<tr>
<th>Activation Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert</td>
<td>A heightened level of vigilance and preparedness due to the possibility of an event in the area of responsibility. Some action may be required and the situation should be monitored by staff capable of assessing and preparing for the potential threat.</td>
</tr>
<tr>
<td>Lean Forward</td>
<td>An operational state prior to ‘stand up’ characterised by a heightened level of situational awareness of a disaster event (either current or impending) and a state of operational readiness. Disaster coordination centres are on stand-by; prepared but not activated.</td>
</tr>
<tr>
<td>Stand Up</td>
<td>The operational state following ‘Lean Forward’ whereby resources are mobilised, personnel are activated and operational activities commenced. Disaster coordination centres are activated.</td>
</tr>
<tr>
<td>Stand Down</td>
<td>Transition from responding to an event back to normal core business and/or recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present.</td>
</tr>
</tbody>
</table>
4. Emergency communications and contact list

4.1. Emergency communications

Communications at the dam site, which is not normally manned, consist of mobile phone.

The Dam Hazard Manager, or his delegate, is responsible for reporting on rainfall, water levels and dam condition. The Dam Hazard Manager is responsible for identifying hazard and emergency situations.

The offices of the City of Gold Coast – City Assets, located at Nerang, can be contacted by telephone, and mobile phone.

Emergency Services and Bureau of Meteorology can be contacted by telephone.

4.2. Contact list

Table 5 contains a list of contact names and telephone numbers that can be used to contact each person during an emergency.

Table 2: Contact list

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Telephone</th>
<th>Mobile</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department of Natural Resources, Mines and Energy (DNRME)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNRME 24 hour hotline</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director, Dam Safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City Assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager City Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Coordinator Stormwater Beaches and Waterways</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinator Lakes and Waterways</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Flood Mitigation Planning Officer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Disaster Management Unit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Coordinator Disaster Management Unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disaster Management Unit Duty Officer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Disaster Coordinator/Director Transport and Infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City Maintenance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Technical Officer Assets and Operations Roads and Drainage Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City Security</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After-hours Protective Services Duty Officer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
All Contact details shall be reviewed annually as per Loders Creek Dam Standing Operating Procedures.

Lists of properties affected by flooding and dam break events are shown in Appendix C.

5. Public notifications

Arrangements for public notifications dealing with flooding and/or evacuations relating to the dam are included in the Public Information and Warnings Sub-Plan of the City Local Disaster Management Plan.

All forms of communications are utilised in times of emergency to ensure affected persons are informed of circumstances, which may affect them as they unfold.

Examples of communication channels include:
- Main-stream media (TV, radio)
- Social media (Twitter, Facebook)
- SMS to mobile phones in impacted areas
- Recorded messages to landline telephones in impacted areas

Text messages to mobile phones and recorded messages to landline telephones are sent via the Emergency Alert (EA) system (www.emergencyalert.gov.au) which is a national alerting system used for all emergencies. The timing of messages is dictated by circumstances at the time (including whether there are other higher priority emergencies, which are also utilising the EA system), takes into account conditions beyond the dam and is in accordance with the City Local Disaster Management Plan.

The EA system delivers messages to all phones (including unlisted numbers) in specific areas identified for particular emergencies. Access to unlisted numbers is managed by the EA system, and numbers are not accessible by any person.

The landline messages are spoken by a computer and there is no option to respond when the message is delivered. Pre-scripted EAs (refer below) have been developed for use during Dam Hazard Events. Prevailing conditions at the time of the emergency will dictate which alert is sent.
### Landline Message

<table>
<thead>
<tr>
<th>DAM ALERT 1 - (advice message – flood events)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is an advice from the City of Gold Coast managing a flood event at Loders Creek Dam. Listen to radio for updated information, or visit <a href="http://www.disaster.qld.gov.au">www.disaster.qld.gov.au</a>. For flood assistance contact the State Emergency Service on 132 500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAM ALERT 2 - (advice message – non-flood events)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is an advice from the City of Gold Coast managing //ISSUE// at Loders Creek Dam. Listen to radio for updated information, or visit w w w dot disaster dot q l d dot gov dot au.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAM ALERT 3 - (watch and act)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a City of Gold Coast flood message. The Loders Creek Dam is expected to cause flooding in low-lying areas adjacent to Loders Creek from Sungold Avenue to the Broadwater. If you are in this area you should prepare to move to higher ground. For more information listen to local radio or visit w w w dot disaster dot q l d dot gov dot a u. For flood assistance contact the State Emergency Service on 132 500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAM ALERT 4 - (emergency warning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency emergency. This is an emergency Warning from the City of Gold Coast regarding an emergency at Loders Creek Dam affecting low-lying properties adjacent to Loders Creek from Sungold Avenue to the Broadwater. If you are in this area, evacuate to higher ground immediately. For more information listen to local radio, or visit w w w dot disaster dot q l d dot gov dot a u. For flood assistance contact the State Emergency Service on 132 500</td>
</tr>
</tbody>
</table>

### SMS Message

| City of Gold Coast managing flood event at Loders Creek Dam. Listen to radio for advice. |

| City of Gold Coast managing //ISSUE// at Loders Creek Dam. Listen to radio for advice. |

| City of Gold Coast advise emergency at Loders Creek Dam. Prepare to move to higher ground. Listen to radio for advice. |

| City of Gold Coast advise emergency at Loders Creek Dam. Evacuate immediately to higher ground. |

Note: The proposed warnings are a guide only and should be amended based on the circumstances of the event.

### 6. Roles and responsibilities

#### 6.1. Schedule of roles and responsibilities

The Schedule of Roles and Responsibilities nominates the position/title of each Officer responsible for given actions or roles under the EAP.

Contact details of relevant positions or agencies are included in Section 4.2: Contact List.
Figure 1: Notification chart

NOTES:
1. There is a distinction between a DAM HAZARD EVENT and an EMERGENCY EVENT. Reporting to DNRME is only required during an EMERGENCY EVENT.
2. Early notifications to Disaster Management Unit will act as warnings that an EMERGENCY EVENT may be imminent. DMU will use these early notifications as a communication tool for pre-planning and for the decision to activate LDMG.
3. 'Other Sources' include but are not limited to City Natural Hazards team.

Table 3: Roles and responsibilities

<table>
<thead>
<tr>
<th>Position</th>
<th>Alternate position</th>
<th>Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam Hazard Manager</td>
<td>Rostered Backup Dam Hazard Manager</td>
<td>Monitor weather and water levels during office-hours(^1) and after-hours during an event. Act as Dam Hazard Manager. Provide technical support to Disaster Management Centre. Liaise with Director DNRME Dam Safety. Submit Emergency Event Report to DNRME.</td>
</tr>
<tr>
<td>DMU Duty Officer</td>
<td>Coordinator Disaster Management</td>
<td>Act as liaison between Dam Hazard Manager and LDMG for purposes of reporting conditions at dam.</td>
</tr>
<tr>
<td>Duty Security Officer</td>
<td>Alternate Duty Officer</td>
<td>Monitor weather and water levels outside office-hours. Advise rostered Dam Hazard Manager when trigger occurs after-hours.</td>
</tr>
</tbody>
</table>

\(^1\) 8:00am to 5:00pm Monday to Friday except public holidays
Loders Creek Dam Emergency Action Plan

Transport and Infrastructure – Plan – Lakes and Waterways

7. General information about Loders Creek Dam

Table 4: Summary of dam features

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
</tr>
<tr>
<td>Name of Dam</td>
<td>Loders Creek Dam</td>
</tr>
<tr>
<td>Owner of Dam</td>
<td>City of Gold Coast</td>
</tr>
<tr>
<td>Owner’s Representative</td>
<td>Manager City Assets</td>
</tr>
<tr>
<td>Construction Authority</td>
<td>City of Gold Coast</td>
</tr>
<tr>
<td>Construction Periods</td>
<td>1977</td>
</tr>
<tr>
<td>Safety Review dates</td>
<td>2008 by GHD Pty Ltd (limited scope)</td>
</tr>
<tr>
<td><strong>Principal features</strong></td>
<td></td>
</tr>
<tr>
<td>Purpose</td>
<td>Flood retention</td>
</tr>
<tr>
<td>Full Supply Level</td>
<td>11.89</td>
</tr>
<tr>
<td>Storage at Full Supply Level</td>
<td>395 ML</td>
</tr>
<tr>
<td>Embankment Crest Elevation</td>
<td>RL 13.55m originally, subsequently raised by landfill on downstream batter</td>
</tr>
<tr>
<td>Embankment Height (above lowest toe)</td>
<td>Approx 7m</td>
</tr>
<tr>
<td>Embankment Length</td>
<td>Approximately 360m</td>
</tr>
<tr>
<td>Embankment Crest Width</td>
<td>Approx 4m</td>
</tr>
<tr>
<td>Foundation Elevation (lowest natural surface)</td>
<td>RL 5.0m</td>
</tr>
<tr>
<td>Minimum Drawdown Level</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Embankment data</strong></td>
<td></td>
</tr>
<tr>
<td>Wall Type</td>
<td>Zoned earth embankment</td>
</tr>
<tr>
<td>Upstream Slope (2006 Survey)</td>
<td>2.8 H:1V</td>
</tr>
<tr>
<td>Downstream Slope (2006 Survey)</td>
<td>2.8 H:1V</td>
</tr>
<tr>
<td><strong>Outlet works</strong></td>
<td></td>
</tr>
<tr>
<td>Reinforced concrete outlet pipe</td>
<td>1650mm diameter inlet, 1950 diameter outlet Note: Diameter changes at buried chamber</td>
</tr>
<tr>
<td>Grade</td>
<td>1.7%</td>
</tr>
<tr>
<td>Length</td>
<td>Approx 100m</td>
</tr>
<tr>
<td>Inlet Apron level</td>
<td>RL 4.80m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>Alternate position</th>
<th>Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinator Natural Hazards</td>
<td></td>
<td>Provide technical Support</td>
</tr>
<tr>
<td>Manager City Assets</td>
<td></td>
<td>In charge of Asset.</td>
</tr>
<tr>
<td>LDMG</td>
<td></td>
<td>Notify (including evacuate as required) residents of developing condition at dam and evacuate as required.</td>
</tr>
</tbody>
</table>
### Parameter Description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance to Pipeline</td>
<td>RL 5.15m</td>
</tr>
<tr>
<td>Discharge</td>
<td>13m³/s – Reservoir level at RL 11.9m</td>
</tr>
<tr>
<td>Riparian releases</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Description of spillway

| Spillway Type                  | Open unlined spillway with un-gated overflow with concrete control crest on spillway and downstream rock-fill with chain-wire cover |
| Spillway Crest Level           | 11.89m AHD                                       |
| Spillway Crest Length          | 41.0 m                                           |
| Design Head                   | Not Known                                        |
| Maximum Discharge Capacity     | Not Known                                        |
| Chute length                  | None                                             |
| Energy dissipation Method      | None                                             |

#### Sewer pipe under embankment

| Sewer Pipe Size               | 300mm diameter A.C. sewer                        |
| Approximate Location          | Under the dam in original ground to the south of the cut-off wall on the right bank |
| Construction Note             | The sewer was laid in sections and has been completely encased in concrete under the embankment; five collars (baffles) were provided under the embankment. The concrete collars were cut into the original ground and were intended to reduce the potential for piping failure along the pipe. |

#### Description of access

| Access Description            | Gated access track with standard City “Parks” lock |
| Access Route                  | Access is via Bailey Crescent, Wardoo Street or Smith Street |

#### Hazard rating

| Highest Risk Failure Mechanism| Piping failure or flood breach (to be confirmed) |
| Population at Risk            | >100                                               |
| Hazard rating (ANCOLD)        | High A                                             |

### 7.1. Access to Loders Creek Dam

The dam is located on Loders Creek, in the suburb of Southport in the City of Gold Coast, about 750m North West of the Wardoo Street intersection with Queen Street. The dam can be accessed from Bailey Crescent via a gate adjacent to the sewer pump station at the North West extent of Bailey Crescent. The dam would normally be accessible with a two-wheel drive vehicle.
A gate at the pump station provides vehicle access to the site. The gate is normally locked with a Parks 419 lock. Alternate access is possible from:

- Wardoo Street
- Smith Street adjacent to Parklands Drive intersection

Under NO CIRCUMSTANCES are lives to be endangered in attempting to cross-flooded roads in order to gain access to the dam or when undertaking inspections, taking monitoring readings for the dam, particularly when damage to the dam has been observed, or water levels are at high levels.
Figure 3: Aerial image of dam
8. **Documentation and reporting**

8.1. **Documentation – Dam Hazard/Emergency Event Log (Event Log)**

It is essential that activities and decisions undertaken during any Hazard or Emergency Event be duly recorded in chronological order in an Event Log.

The Event Log is to be maintained by the Dam Hazard Manager. Event Logs are to be scanned and indexed in eDRMS File No WF150/916/02

Event Logs are to be supported by other documentation such as Dam Safety Inspection Sheets.

The Event Log shall comply with the requirements of Australasian Inter-Service Incident Management System (AIIMS) and contain the following information as a minimum.

- A description of the event.
- Time, date and description of any actions.
- Regular recordings of storage level.
- Regular recordings of rainfall.
- Instrumentation recordings.
- Description of any observed damage.
- Photographs and / or sketches.
- Details of communication which took place during the emergency.
- Any further comments considered necessary, such as lessons learned.

A sample Dam Event Log Form pro-forma is included in Appendix A. Alternate formats may be used.

Comments regarding the adequacy of the EAP and any recommendations or suggested changes to the EAP should also be included.

8.2. **Reporting**

During inundation at the dam, all deficiencies/events/failures observed during inspections and remedial actions required/undertaken are to be immediately communicated to the Senior Flood Mitigation Planning Officer.

An emergency event involving the dam is to be reported to the DNRME Dam Safety Regulator within 48 hours, and an Emergency Event Report is to be forwarded to DNRME within 30 days of completion of the event in accordance with the Loders Creek Dam – Dam Safety Condition Schedule (refer Loders Creek Dam SOP: Event Reporting).
9. Hazard and emergency events and actions

9.1. Flooding

The flood telemetry system (station No 540359) at Loders Creek Dam is configured to send an SMS and/or email to the Senior Flood Mitigation Planning Officer, rostered Dam Hazard Managers and the Protective Services Duty Officer at pre-determined water levels. Contact phone numbers for each officer are listed on the Contact List - Table 5.

Water levels can be accessed from the Bureau of Meteorology (BOM) website at http://www.bom.gov.au/fwo/IDQ65388/IDQ65388.540359.tbl.shtml, the City Flood Alert PC at the Local Disaster Coordination Centre, or read directly from water level markers at the dam. Note that the BOM website water levels are delayed by approximately 20 minutes, and that the Flood Alert PC is not accessible to the public.

The City Assets branch of Transport and Infrastructure provides a framework of actions for City Maintenance and Disaster Management staff to follow when any trigger as defined in this EAP has occurred.

As the event continues, defined water levels within the dam trigger specific responses by relevant staff, such as undertaking inspections of the dam wall and associated hydraulic structures, recording data, communication to heighten alerts with relevant authorities, preparing for and recommending the evacuation of flood prone residents, monitoring weather forecasts/warnings and initiating urgent repairs as required.

Inspections are required as water levels within the dam reach certain heights (refer Table 8 for triggers) and whilst the dam water level is above the first trigger level. Inspections are to continue until inflows to the dam following the storm reduce such that the levels in the dam fall below the F-B trigger level. The frequency of inspections will vary according to the particulars of the rainfall event, and will be determined at the time by the Dam Hazard Manager.

Note that a number of action triggers will occur prior to an Emergency Event being declared. Invoking the EAP for flooding will only occur infrequently.

During rainfall events, the rostered Dam Hazard Manager is to ensure compliance with the Dam EAP. City Assets Branch and City Maintenance Branch have pools of trained staff that can be called upon to conduct inspections.

When the water level within the dam reaches 100% capacity and approaches the crest of the spillway, the DMU Duty Officer, on advice from the DHM, is to notify relevant authorities that certain roads must be closed and preparations made to evacuate residents of certain properties downstream of the dam, if general flooding hasn’t already caused these road closures and evacuations.

When water levels recede as a storm passes, the Dam Hazard Manager is to reset the event to progressively lower levels and advise the DMU Duty Officer accordingly. The decision to stand down the response teams and to close the event is to be jointly made by the Dam Hazard Manager and the LDC, taking into account the rainfall pattern of the storm (intensity, duration and distribution), catchment hydrology and any other relevant factors.
## Loders Creek Dam Emergency Action Plan

### Process

**Transport and Infrastructure – Plan – Lakes and Waterways**

---

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
</table>
- Security staff monitors rainfall data outside office hours and advise rostered DHM when trigger occurs.  
- DHM assumes control of event at dam, initiates an inspection of the dam as appropriate and records details on a Dam Event Log Form for this event.  
- DHM liaises with DMU Duty Officer. |
| **F-B**     | Water level reaches R.L. 8.5 m (approximately 50% capacity) | - DHM initiates an inspection of the dam as appropriate and records details on a/the Dam Event Log form for this event.  
- DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies as required. |
| **F-C**     | Water level reaches R.L. 10.5 m (approximately 80% capacity, 1.5m below spillway crest) | - DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies.  
- At F-C and F-D: LDC or Chair LDMG directs that LDCC undertake evacuation planning with LDMG partner agencies. |
| **F-D**     | Water level reaches R.L. 11.5 m (approximately 95% capacity, 0.3m below spillway crest) | - DHM initiates an inspection of the dam as appropriate and records details on a/the Dam Event Log form for this event.  
- DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies.  
- At F-C and F-D: LDC or Chair LDMG directs that LDCC undertake evacuation planning with LDMG partner agencies. |

### Dam HAZARD EVENT ALERT levels

**Note:** These DO NOT constitute an emergency event

LDC or Chair LDMG to consider appropriate LDMG activation level at each alert.

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
</table>
| **F-1**     | Water level reaches R.L. 11.8m (approximately 100% capacity, at spillway crest) | - DHM initiates an inspection of the dam as appropriate and records details on the Dam Event Log form for this event.  
- DHM advises KDR (Light Rail operator)  
- DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies.  
- DHM contacts Coordinator Environmental Management Systems for an environmental assessment.  
- LDC or Chair LDMG directs that LDCC consider closing Wardoo Street, Baratta Street and Beale Street footbridge if not already closed.  
- DHM informs DNRME 24hr hotline. |
| **F-2**     | Water level reaches R.L. 12.3m (0.5m over spillway crest) | - DHM initiates an inspection of the dam as appropriate and records details on a/the Dam Event Log form for this event.  
- DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies.  
- LDC or Chair LDMG directs that LDCC consider closing Johnston Street and Smith Street if not already closed, and consider evacuating Zone 1 properties if not already evacuated for other reasons.  
- DHM informs DNRME 24hr hotline. |
Alert level | Triggers | Action
--- | --- | ---
F-3 | Water level reaches R.L. 12.8m (1.0m over spillway crest) | DHM initiates an inspection of the dam as appropriate and records details on the Dam Event Log form for this event. DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies. LDC or Chair LDMG directs that LDCC consider closing Musgrave Avenue if not already closed. The DHM informs DNRME 24hr hotline.

F-4 | Water level reaches R.L. 13.3m (1.5m over spillway crest) | DHM initiates an inspection of the dam as appropriate and records details on the Dam Event Log form for this event. DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies. LDC or Chair LDMG directs that LDCC consider evacuating Zone 2 properties if not already evacuated for other reasons. The DHM informs DNRME 24hr hotline.

Dam POST-EVENT actions
- DHM and Local Disaster Coordinator to jointly determine when to stand down response staff, and to declare dam event closed.
- DHM to advise City Protective Services and KDR of dam event closure.

* Dam Hazard Manager to advise DNRME of the Emergency Event within 48 hours of the event being declared, and also to submit an Emergency Event Report to DNRME within 30 days of the event being closed.

9.2. Excessive or new seepage occurrence
Monitoring seepage is part of routine dam maintenance. The following is for when unusual seepage volume, location or quality is observed.

9.2.1. Inspections
When seepage of an unusual pattern is observed, carry out inspection and log seepage details. Assess the quantity of seepage looking for signs of:
- increase in seepage quantity
- signs of cloudy seepage/increased turbidity.

Cloudy seepage is created by removal of fines and material from the dam embankment. Increasing seepage could be potentially linked to piping, caused by the removal of fines creating a conduit for water through the dam wall. The Dam Hazard Manager is to initiate constant monitoring from a safe distance.
9.2.2. Assessment
The Dam Hazard Manager is to assess the situation and take immediate action to investigate thoroughly. If substantial increase occurs in flow of seepage, Dam Hazard Manager to declare Emergency Event S-1.

9.2.3. Investigation
Dam Hazard Manager to undertake site investigation and proceed with appropriate actions such as:
- direction of remedial works
- engaging specialist Dam Safety Consultants
- elevate the event to Emergency Event S-2.

9.2.4. Potential dam failure
If a potential dam failure is suspected the Dam Hazard Manager is to immediately elevate the event to Emergency Event S-2.

9.2.5. Standing down
Once the event has been resolved, the Dam Hazard Manager is to stand down the event response team and close the event.

9.2.6. Reporting
Field staff are to complete Event Log and submit to Dam Hazard Manager.

If the Dam Hazard Event is escalated to an Emergency Event, the Dam Hazard Manager is to submit an Emergency Event Report to DNRME within 30 days of the event being closed.

Table 5: Seepage – triggers and actions (‘S’ triggers)

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers Note: Where triggers for other event scenarios occur simultaneously, the greater trigger is to control actions.</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-A</td>
<td>Field staff become aware of seepage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Field staff alert DHM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DHM assesses situation and either:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Invokes Emergency Event Trigger S-1 immediately</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Activates further investigation to confirm seepage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- No further action</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Seepage – triggers and actions (‘S’ triggers)

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers Note: Where triggers for other event scenarios occur simultaneously, the greater trigger is to control actions.</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-A</td>
<td>Field staff become aware of seepage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Field staff alert DHM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DHM assesses situation and either:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Invokes Emergency Event Trigger S-1 immediately</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Activates further investigation to confirm seepage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- No further action</td>
<td></td>
</tr>
</tbody>
</table>
### Alert level and Triggers

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>Seepage occurring at unusual rate, or of increased turbidity</td>
<td>• DHM informs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DMU &amp; LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Director Transport and Infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DNRME 24hr hotline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM records details on Dam Event Log Form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM advises KDR (Light Rail operator).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM engages Dam Safety Engineer as appropriate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM contacts Coordinator Environmental Management Systems for an environmental assessment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LDC or Chair LDMG directs that LDCC closes Wardoo Street, Baratta Street and Beale Street footbridge and undertakes evacuation planning with LDMG partner agencies to evacuate Zone 1 and 2 properties.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM informs DNRME 24hr hotline.</td>
</tr>
<tr>
<td>S-2</td>
<td>Seepage considered likely to cause dam failure</td>
<td>• DHM informs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DMU &amp; LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Director Transport and Infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DNRME 24hr hotline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM records details on Dam Event Log Form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM engages Dam Safety Engineer as appropriate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LDC or Chair LDMG directs that LDCC closes Johnston Street, Smith Street and Musgrave Avenue and evacuates Zone 1 and 2 properties.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHM informs DNRME 24hr hotline.</td>
</tr>
</tbody>
</table>

### Dam POST-EVENT actions

- DHM and Local Disaster Coordinator to jointly determine when to stand down response staff, and to declare dam event closed.
- DHM to advise City Protective Services and KDR of dam event closure.

* Dam Hazard Manager to advise DNRME of the Emergency Event within 48 hours of the event being declared, and also to submit an Emergency Event Report to DNRME within 30 days of the event being closed.

### 9.3. Movement of dam

Movement is considered the general term associated with slide, slump, slip, scarp, bench and overstep area or change of grade. A series of movements may lead to the failure of the dam.
9.3.1. Inspection
During routine inspections when it appears that movement has occurred, the Dam Inspector is to record the
inspection details in an Event Log. Assess the quantity of movement looking for signs of:
- foundation movement
- overly steep grades
- local settlement
- cracking and slumping or slipping.
The Dam Inspector is to immediately notify the Dam Hazard Manager and resume constant monitoring from
a safe distance until stood down by the Dam Hazard Manager.

9.3.2. Assessment
Dam Hazard Manager to assess the situation and take immediate action to investigate thoroughly. If
warranted, Dam Hazard Manager to declare Emergency Event M-1.

9.3.3. Investigations
Dam Hazard Manager to undertake site investigation and proceed with appropriate actions such as:
- direction of remedial works
- engaging specialist Dam Safety Consultants
- elevate the event to Emergency Event M-2.

9.3.4. Potential dam failure
If a potential dam failure is suspected the Dam Hazard Manager is to immediately elevate the Event to
Emergency Event M-2.

9.3.5. Standing down
Once the event has been resolved, the Dam Hazard Manager is to stand down the event response team and
close the event.

9.3.6. Reporting
Field Staff are to complete Event Log and submit to Dam Hazard Manager.
If the Dam Hazard Event is escalated to an Emergency Event, the Dam Hazard Manager is to submit an
Emergency Event Report to DNRME within 30 days of event.

Table 6: Movement of dam – triggers and actions (‘M’ triggers)

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
</table>
| M-A         | Field staff become aware of apparent movement | • Field staff alert DHM  
• DHM assesses situation and either:  
  - Invokes Emergency Event M-1 immediately  
  - Activates further investigation to confirm movement  
  - No further action |

Note: Where triggers for other event scenarios occur simultaneously, the greater trigger is to control actions.

Note: These DO NOT constitute an emergency event. LDC or Chair LDMG to consider appropriate LDMG activation level at each alert.
**Alert level** | **Triggers**  
---|---
**M-1** | Confirmed movement of part or all of dam embankment  
**M-2** | Dam Safety Engineer or Dam Hazard Manager considers dam to be at risk of collapse

### Dam EMERGENCY EVENT* trigger levels

LDC or Chair LDMG to consider appropriate LDMG activation level at each alert

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
</table>
| M-1         | Confirmed movement of part or all of dam embankment | • DHM informs:  
- DMU & LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.  
- Director Transport and Infrastructure  
- DNRME 24hr hotline.  
- DHM records details on Dam Event Log Form.  
- DHM advises KDR (Light Rail operator).  
- DHM engages Dam Safety Engineer as appropriate.  
- DHM contacts Coordinator Environmental Management Systems for an environmental assessment.  
- LDC or Chair LDMG directs that LDCC closes Wardoo Street, Baratta Street and Beale Street footbridge and undertakes evacuation planning with LDMG partner agencies to evacuate Zone 1 and 2 properties.  
- DHM informs DNRME 24hr hotline. |
| M-2         | Dam Safety Engineer or Dam Hazard Manager considers dam to be at risk of collapse | • DHM informs:  
- DMU & LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.  
- Director Transport and Infrastructure  
- DNRME 24hr hotline.  
- DHM records details on Dam Event Log Form.  
- DHM engages Dam Safety Engineer as appropriate.  
- LDC or Chair LDMG directs that LDCC closes Johnston Street, Smith Street and Musgrave Avenue and evacuates Zone 1 and 2 properties given water levels at dam, weather and advice of Dam Safety Engineer.  
- DHM informs DNRME 24hr hotline. |

### Dam POST-EVENT actions

- DHM and Local Disaster Coordinator to jointly determine when to stand down response staff, and to declare dam event closed.  
- DHM to advise City Protective Services and KDR of dam event closure.

* Dam Hazard Manager to advise DNRME of the Emergency Event within 48 hours of the event being declared, and also to submit an Emergency Event Report to DNRME within 30 days of the event being closed.

### 9.4. Earthquake

In the event of an earthquake, concern centres on the structural stability of the dam. Movement could occur during the earthquake resulting in or leading to failure of the dam.
9.4.1. Inspections

The Dam Hazard Manager is to determine if the earthquake has the potential to damage the dam, and if so, to initiate an inspection.

Field staff to carry out visual inspection searching for damage. Assess the quantity of damage looking for signs of:

- foundation movement
- local settlement
- longitudinal or traverse cracking
- misalignment
- slumping or slipping.

Dam Hazard Manager to determine and initiate appropriate monitoring regime.

9.4.2. Assessment

Dam Hazard Manager to assess the situation and take immediate action to investigate thoroughly. If warranted, Dam Hazard Manager to declare Emergency Event E-1.

9.4.3. Investigations

Dam Hazard Manager to undertake site investigation and proceed with appropriate actions such as:

- direction of remedial works
- engaging specialist Dam Safety Consultants
- elevate the event to Emergency Event E-2.

9.4.4. Potential dam failure

If a potential dam failure is suspected the Dam Hazard Manager is to immediately elevate the Event to Emergency Event E-2.

9.4.5. Standing down

Once the event has been resolved, the Dam Hazard Manager is to stand down the event response team and close the event.

9.4.6. Reporting

Field Staff are to complete an Event Log and submit to Dam Hazard Manager.

If the Dam Hazard Event is escalated to an Emergency Event, the Dam Hazard Manager is to submit an Emergency Event Report to DNRME within 30 days of event.

Table 7: Earthquake – triggers and actions (‘E’ triggers)

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-A</td>
<td>The effect of an earthquake is felt within the Gold Coast</td>
<td>DHM determines whether a dam inspection should be undertaken and initiates inspection of dam, if considered necessary.</td>
</tr>
</tbody>
</table>

Note: These DO NOT constitute an emergency event. LDC or Chair LDMG to consider appropriate LDMG activation level at each alert.
## Alert level | Triggers | Action
---|---|---
**E-1** | Damage to Dam confirmed | - DHM informs:
  - DMU & LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.
  - Director Transport and Infrastructure
  - DNRME 24hr hotline.
- DHM records details on Dam Event Log Form.
- DHM advises KDR (Light Rail operator).
- DHM engages Dam Safety Engineer as appropriate.
- DHM contacts Coordinator Environmental Management Systems for an environmental assessment.
- LDC or Chair LDMG directs that LDCC considers closing Wardoo Street, Baratta Street and Beale Street footbridge and undertakes evacuation planning with LDMG partner agencies to evacuate Zone 1 and 2 properties based on water levels in dam.
- DHM informs DNRME 24hr hotline.

**E-2** | Dam Safety Engineer or DHM considers dam to be at risk of collapse | - DHM informs:
  - DMU & LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.
  - Director Transport and Infrastructure
  - DNRME 24hr hotline.
- DHM records details on Dam Event Log Form.
- DHM engages Dam Safety Engineer as appropriate.
- LDC or Chair LDMG directs that LDCC considers closing Johnston Street, Smith Street and Musgrave Avenue and undertakes evacuation planning with LDMG partner agencies to evacuate Zone 1, 2 and 3 properties based on water levels in dam.
- DHM informs DNRME 24hr hotline.

## Dam POST-EVENT actions
- DHM and Local Disaster Coordinator to jointly determine when to stand down response staff, and to declare dam event closed.
- DHM to advise City Protective Services and KDR of dam event closure.

---

* Dam Hazard Manager to advise DNRME of the Emergency Event within 48 hours of the event being declared, and also to submit an Emergency Event Report to DNRME within 30 days of the event being closed.
9.5. Damage to the dam

Damage is caused by a foreign source creating a failure or possible future point of failure or possible weakness in the integrity of the dam.

9.5.1. Inspection

During routine inspection when damage is observed, the Dam Inspector is to log details of damage caused to the dam. Assess the damage looking for signs of:

- foundation movement
- overly steep slopes
- local settlement
- longitudinal or traverse cracking
- misalignment
- vertical displacement
- slumping or slipping.

Immediately notify the Dam Hazard Manager and resume constant monitoring from a safe distance until stood down by the Dam Hazard Manager.

9.5.2. Assessment

Dam Hazard Manager to assess the situation and take immediate action to investigate thoroughly. If structural damage has been sustained, Dam Hazard Manager to declare Emergency Event E-1.

9.5.3. Investigations

Dam Hazard Manager to undertake site investigation and proceed with appropriate actions such as:

- direction of remedial works
- engaging specialist Dam Safety Consultants
- elevate the event to Emergency Event D-2.

9.5.4. Potential dam failure

If a potential dam failure is suspected the Dam Hazard Manager is to immediately elevate the Event to Emergency Event D-2.

9.5.5. Standing down

Once the event has been resolved, the Dam Hazard Manager is to stand down the event team and close the event.

9.5.6. Reporting

Field Staff are to complete an Event Log and submit to Dam Hazard Manager. If the Dam Hazard Event is escalated to an Emergency Event, the Dam Hazard Manager is to submit an Emergency Event Report to DNRME within 30 days of event.
### Table 8: Damage to dam – triggers and actions (*D* triggers)

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
</table>
| **D-A** | Field Staff becomes aware of damage | - Field staff alerts DHM.  
- DHM assesses report and either:  
  - Invokes Emergency Event Trigger D-1 immediately  
  - Activates further investigation  
  - No further action required |
| **D-1** | Damage to dam which compromises dam integrity is confirmed | - DHM informs:  
  - DMU & LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.  
  - Director Transport and Infrastructure  
  - DNRME 24hr hotline.  
- DHM records details on Dam Event Log Form.  
- DHM advises KDR (Light Rail operator).  
- DHM engages Dam Safety Engineer as appropriate.  
- DHM contacts Coordinator Environmental Management Systems for an environmental assessment.  
- LDC or Chair LDMG directs that LDCC considers closing Wardoo Street, Baratta Street and Musgrave Avenue (if not already closed), Johnston Street and Smith Street and whether to evacuate Zone 1 and 2 properties based on water levels in dam.  
- DHM informs DNRME 24hr hotline. |
| **D-2** | Dam is compromised to the point when community safety is at risk | - DHM informs:  
  - DMU & LDMG (via DMU Duty Officer) for conditions at dam to be relayed to appropriate emergency response agencies.  
  - Director Transport and Infrastructure  
  - DNRME 24hr hotline.  
- DHM records details on Dam Event Log Form.  
- DHM engages Dam Safety Engineer as appropriate.  
- LDC or Chair LDMG directs that LDCC considers closing Wardoo Street, Baratta Street and Musgrave Avenue (if not already closed), Johnston Street and Smith Street and whether to evacuate Zone 1 and 2 properties based on water levels in dam.  
- DHM informs DNRME 24hr hotline. |
## 9.6. Terrorism/security threat to the dam

An act of terrorism occurs at the dam, or there is a suspected security threat.

### 9.6.1. Inspection

When an act of terrorism occurs, or is suspected to have occurred, details are to be logged. The Dam Hazard Manager is to be immediately notified.

### 9.6.2. Assessment

Once it has been confirmed that there has been an act of terrorism, or suspected terrorism, the Dam Hazard Manager is to declare Emergency Event T-1.

### 9.6.3. Investigations

Dam Hazard Manager to be available as required to assist appropriate authorities.

### 9.6.4. Potential dam failure

If a potential dam failure is suspected the Dam Hazard Manager is to immediately declare Emergency Event T-2.

### 9.6.5. Standing down

Once the event has been resolved, the Dam Hazard Manager is to stand down the event team and close the event.

### 9.6.6. Reporting

Field Staff are to complete an Event Log and submit to Dam Hazard Manager. If the Dam Hazard Event is escalated to an Emergency Event, the Dam Hazard Manager is to submit an Emergency Event Report to DNRME within 30 days of event.
Table 9: Terrorism/security threat to dam – triggers and actions ('T' triggers)

<table>
<thead>
<tr>
<th>Alert level</th>
<th>Triggers</th>
<th>Action</th>
</tr>
</thead>
</table>
| Dam HAZARD EVENT ALERT levels. Note: These DO NOT constitute an emergency event | Field Staff suspects actual or suspected terrorist act or security threat at dam | - Field staff alerts DHM.  
- DHM assesses report and either:  
  - Invokes Emergency Event Trigger T-1 or T-2 immediately  
  - Activates further investigation  
  - No further action required |

| Dam EMERGENCY EVENT* trigger levels | Threat to dam which may compromise dam integrity is confirmed | - DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies.  
- DHM notifies:  
  - Police (000) for terrorism matters  
  - National Security Hotline (1800 123 400) for suspicious activities  
- DHM records details on Dam Event Log Form.  
- DHM engages Dam Safety Engineer as appropriate.  
- DHM contacts Coordinator Environmental Management Systems for an environmental assessment.  
- LDC or Chair LDMG directs that LDCC considers closing Wardoo Street, Baratta Street and Beale Street footbridge and prepares, in conjunction with LDMG partner agencies, to evacuate Zone 1 and 2 properties based on water levels in dam.  
- DHM informs DNRME 24hr hotline. |

| | Threat to dam is such that community safety is at risk | - DHM liaises with DMU Duty Officer (or nominated relief contact) for conditions at dam to be relayed to appropriate emergency response agencies.  
- DHM notifies:  
  - Police (000) for terrorism matters  
  - National Security Hotline (1800 123 400) for suspicious activities  
- DHM records details on Dam Event Log Form.  
- LDC or Chair LDMG directs that LDCC considers closing Wardoo Street, Baratta Street and Beale Street footbridge (if not already closed), Johnston Street, Smith Street and Musgrave Avenue and whether to evacuate Zone 1 and 2 properties based on water levels in dam.  
- DHM informs DNRME 24hr hotline. |
### Alert level

**Triggers**

*Note: Where triggers for other event scenarios occur simultaneously, the greater trigger is to control actions.*

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dam POST-EVENT actions</strong></td>
</tr>
<tr>
<td>• DHM and Local Disaster Coordinator to jointly determine when to stand down response staff, and to declare dam event closed.</td>
</tr>
<tr>
<td>• DHM to advise City Protective Services and KDR of dam event closure.</td>
</tr>
</tbody>
</table>

* Dam Hazard Manager to advise DNRME of the Emergency Event within 48 hours of the event being declared, and also to submit an Emergency Event Report to DNRME within 30 days of the event being closed.
APPENDIX A:

DAM EVENT LOG FORM
### LODERS CREEK DAM EVENT LOG FORM

Completed form to be scanned and filed in WFT/05/16/02

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>WATER LEVEL (RLL)</th>
<th>Outlet Function</th>
<th>Rainfall since last observation</th>
<th>Weather Outlook</th>
<th>EMERGENCY TRIGGER</th>
<th>Upstream Embankment Condition</th>
<th>Downstream Embankment Condition</th>
<th>Creep Condition</th>
<th>Spillway Condition</th>
<th>Inspection carried out</th>
<th>ACTION TAKEN</th>
<th>Contacted</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**Inspector/Incident Manager**

Signature

**Contacts**

Senior Flood Mitigation Planning Officer

Disaster and Emergency Management Unit Deputy Officer

Coordinator Lakes and Waterways

Senior Technical Officer Roads Assets and Operations

Governor Security

1800 622 333 (24 hour hotline)

*SPOT #0042089 LODERS CREEK DRAIN INCIDENT LOG FORM (XCEL)*
APPENDIX B:

PRIORITY EVACUATION MAP
APPENDIX C:

EVACUATION PROPERTY LISTS
AND ROAD CLOSURES
The following evacuation areas have been prepared in consultation with the LDMG. The nature of storms is such that no two storms are identical, resulting in different extents of community impacts (e.g. inundated roads and properties) for different storms. When preparing the inundation map and lists in Appendices B and C, consideration has been given to a number of modelled storm scenarios (refer Appendix E).

The maps shown in Appendix E have been sourced from the Failure Impact Assessment for Loders Creek Dam prepared for the City by independent consultants in 2009. The maps show impacted areas for a dam failure during three different storm scenarios. The impacted areas for these scenarios have provided guidance to the LDMG when determining evacuation strategies.

Only properties impacted by dam related events are listed in this EAP. Other evacuation strategies exist for non-dam related flooding events. During major storm events there may be some overlap in evacuation areas.

A number of properties have been included because access to the property will be impacted, even though the residence will not be impacted. Where it is necessary to evacuate low-lying areas, any higher areas, which are accessed via the low-lying areas, will also be evacuated.

The following lists should be read in conjunction with the preceding maps.

Each evacuation list is ordered alphabetically, and includes the number of units at each address.

Developments undertaken since these lists were prepared may result in there being more residences than those listed.

During an evacuation emergency event, where real-time modelling from the Loders Creek Flood Emergency Decision Support System (DSS) shows different areas should be evacuated, the DSS data is to take precedence.

**High population at risk areas**

The following properties may have large numbers of people in attendance, and should be notified of any impending flood conditions in Loders Creek.

<table>
<thead>
<tr>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southport State Primary School (including reference to Beale Street footbridge)</td>
</tr>
<tr>
<td>Southport State High School (lower ovals)</td>
</tr>
<tr>
<td>Southport Tigers Rugby League</td>
</tr>
<tr>
<td>Southport Pony Club</td>
</tr>
<tr>
<td>Loders Creek Community Gardens</td>
</tr>
<tr>
<td>Owen Park (Old Southport Showgrounds)</td>
</tr>
<tr>
<td>Aged Care facility at 55 Worendo Street</td>
</tr>
<tr>
<td>Aged Care facility at 78 Stevens Street (accessed via 40 William Street)</td>
</tr>
<tr>
<td>Aged Care facility at 69-71 Walton Street</td>
</tr>
</tbody>
</table>

**Pages 45 to 51 have been redacted**
APPENDIX D:

WATER LEVEL REFERENCES
<table>
<thead>
<tr>
<th>Flood marker reading (Boards showing depth above/below spillway)</th>
<th>RL</th>
<th>Trigger</th>
<th>BoM reading (Telemetry)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50</td>
<td>13.30</td>
<td>F-4</td>
<td>13.30</td>
<td>Trigger F-4 = Water Level RL 13.30 (1.5m over spillway)</td>
</tr>
<tr>
<td>1.00</td>
<td>12.80</td>
<td>F-3</td>
<td>12.80</td>
<td>Trigger F-3 = Water Level RL 12.80 (1.0m over spillway)</td>
</tr>
<tr>
<td>0.50</td>
<td>12.30</td>
<td>F-2</td>
<td>12.30</td>
<td>Trigger F-2 = Water Level RL 12.30 (0.5m over spillway)</td>
</tr>
<tr>
<td>0.00</td>
<td>11.80</td>
<td>F-1</td>
<td>11.80</td>
<td>Trigger F-1 = Water Level RL 11.80 (100% capacity; water at crest)</td>
</tr>
<tr>
<td>-0.50</td>
<td>11.50</td>
<td>F-D</td>
<td>11.50</td>
<td>Pre-Emergency Event Trigger F-D = Water Level RL 11.50 (Approx. 95% capacity)</td>
</tr>
<tr>
<td>-1.00</td>
<td>10.80</td>
<td></td>
<td>10.80</td>
<td></td>
</tr>
<tr>
<td>-1.30</td>
<td>10.50</td>
<td>F-C</td>
<td>10.50</td>
<td>Pre-Emergency Event Trigger F-C = Water Level RL 10.50 (Approx. 80% capacity)</td>
</tr>
<tr>
<td>-2.00</td>
<td>9.80</td>
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<td>9.80</td>
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<tr>
<td>-3.30</td>
<td>8.50</td>
<td>F-B</td>
<td>8.50</td>
<td>Pre-Emergency Event Trigger F-B = Water Level RL 8.50 (Approx. 50% capacity)</td>
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<tr>
<td>-4.00</td>
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<tr>
<td>-5.00</td>
<td>6.80</td>
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<td>6.80</td>
<td>Pre-Emergency Event Trigger F-A = 50mm rain in 1 hour or less</td>
</tr>
</tbody>
</table>
APPENDIX E:

ESTIMATED FLOOD EXTENT MAPS FOR DAM BREACH DURING VARIOUS STORMS

Extract from Loders Creek Dam Failure Impact Assessment (2009)
Council of the City of Gold Coast

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