MOODY CREEK DETENTION BASINS
KANIMBLA, CAIRNS

EMERGENCY ACTION PLAN

REFERABLE DAM IDs: 2470 & 1946

Revision: 6
Revision Date: OCTOBER 2020

Controlled Copy No:
Issued To:

Dam Owner: Cairns Regional Council, 119 – 145 Spence Street (PO Box 359), Cairns, Qld 4870

Approved by the delegate of the Chief Executive, Department of Natural Resources, Mines and Energy until 1 August 2021.
EMERGENCY ACTION PLAN

MOODY CREEK DETENTION BASINS, KANIMBLA, CAIRNS

<table>
<thead>
<tr>
<th>Referable Dam Register Numbers</th>
<th>2470 &amp; 1946</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current as at: 27/09/2019</td>
<td>Approved by Chief Executive</td>
</tr>
<tr>
<td>Approved to: Cairns Regional Council (CRC) PO Box 359 CAIRNS QLD 4870</td>
<td></td>
</tr>
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ENDORSEMENT TABLE
This document has been prepared by the dam owner Cairns Regional Council, in consultation with key disaster and local government personnel and is endorsed by the following personnel:

<table>
<thead>
<tr>
<th>Position</th>
<th>Date endorsed</th>
<th>Print name</th>
<th>Signed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acting General Manager Infrastructure Services Cairns Regional Council</td>
<td>30/09/2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager Infrastructure Planning Cairns Regional Council</td>
<td>29/09/2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acting Manager Cairns Works Maintenance Cairns Regional Council</td>
<td>29/09/2020</td>
<td></td>
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</tbody>
</table>

Pursuant to section 352HB Water Legislation (Dam Safety) Amendment act 2017 – the local government has reviewed this Emergency Action Plan and considers it consistent with Cairns Regional Council’s Disaster Management Plan

Chief Executive Officer on behalf of Cairns Regional Council | 30/09/2020 |
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PO Box 359
CAIRNS QLD 4870

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REVISION TABLE

<table>
<thead>
<tr>
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<th>DATE</th>
<th>AUTHOR</th>
<th>REVIEWER</th>
<th>APPROVAL</th>
<th>DATE</th>
<th>DEWS LETTER</th>
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<tr>
<td>1</td>
<td>Feb 2010</td>
<td>Cairns Regional Council</td>
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<td>6/07/2011</td>
<td>#3232345</td>
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<td>2</td>
<td>Sep 2014</td>
<td>Cairns Regional Council</td>
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<td>No</td>
<td>N/A</td>
<td>#4371870</td>
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<td>3</td>
<td>Aug 2015</td>
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<td>Yes</td>
<td>3/06/2016</td>
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<td>Sept 2018</td>
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<td>14/12/2018</td>
<td>#5953577</td>
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<td>5</td>
<td>Sept 2019</td>
<td>Cairns Regional Council</td>
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<td>Minor amendments</td>
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<td>6</td>
<td>Sept 2020</td>
<td>Cairns Regional Council</td>
<td></td>
<td>Minor amendments</td>
<td></td>
<td></td>
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</tbody>
</table>

ABBREVIATIONS TABLE

| AEP | Annual Exceedance Probability |
| ARI | Average Recurrence Interval |
| CRC | Cairns Regional Council |
| DDC | District Disaster Coordinator |
| DDCC | District Disaster Coordination Centre |
| DDMP | District Disaster Management Plan |
| DDMG | District Disaster Management Group |
| EAP | Emergency Action Plan |
| LDMG-CR | Local Disaster Management Group - Cairns Region |
| PMF | Probable Maximum Flood |
| PS  | Queensland Police Service |
| SDCC | State Disaster Coordination Centre |
| SDMG | State Disaster Management Group |
| SITREP | Situation Report |
## DISTRIBUTION OF EMERGENCY ACTION PLAN

<table>
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<th>POSTAL ADDRESS</th>
<th>DIST. COPY No.</th>
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<tbody>
<tr>
<td>Mayor, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>1</td>
</tr>
<tr>
<td>Councillor for Division 4, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>2</td>
</tr>
<tr>
<td>Chief Executive Officer, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>3</td>
</tr>
<tr>
<td>General Manager Infrastructure Services, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>4</td>
</tr>
<tr>
<td>Manager Cairns Works Maintenance, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>5</td>
</tr>
<tr>
<td>Coordinator Civil Maintenance, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>6</td>
</tr>
<tr>
<td>Coordinator, Local Disaster Management Group – Cairns Region, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>7</td>
</tr>
<tr>
<td>District Disaster Coordinator, District Disaster Management Group, Queensland Police Service Superintendent</td>
<td>Cairns Police District Office 5 Sheridan Street CAIRNS QLD 4870</td>
<td>8</td>
</tr>
<tr>
<td>Executive Manager, Queensland Fire and Emergency Services</td>
<td>QFES Far Northern Region PO Box 920 CAIRNS QLD 4870</td>
<td>9</td>
</tr>
<tr>
<td>Queensland Police Service, Cairns Metropolitan Inspector</td>
<td>Cairns Police District Office 5 Sheridan Street CAIRNS QLD 4870</td>
<td>10</td>
</tr>
<tr>
<td>Queensland Water Supply Regulator, Department of Energy and Water Supply</td>
<td>Queensland Water Supply Regulator Department of Energy and Water Supply PO Box 15456 City East QLD 4002</td>
<td>11</td>
</tr>
<tr>
<td>Manager Marketing &amp; Communications, Cairns Regional Council</td>
<td>Cairns Regional Council PO Box 359 CAIRNS QLD 4870</td>
<td>12</td>
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</tbody>
</table>
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1. INTRODUCTION

WorleyParsons was engaged by the Cairns Regional Council to undertake detailed design of the Moody Creek Detention Basin, also known as ‘Detention Basin 1’ and construction was completed in September 2015.

Detention Basin 1 (referable dam register number 2470) consists of an earth embankment structure with a maximum height of 12.1 metres with a concrete spillway and ogee control crest of 390 metres width. The low flow pipe is a 1650 millimetre diameter reinforced concrete pipe fitted with a steel trash rack. The temporary flood storage provided by this basin is about 197 Mega Litres.

A separate smaller detention basin was constructed in 2002, 200m downstream of Detention Basin 1 and is also known as ‘Detention Basin 1A’, which is the terminology adopted from the Moody Creek Drainage Management Plan (2011) prepared by VDM Consulting.

Detention Basin 1A (referable dam register number 1946) consists of an earth embankment structure with a maximum height of approximately 8 metres with a concrete spillway on the downstream face and a width of 20 metres. A low flow pipe with a diameter of 1500 millimetres passes through the structure to maintain regular flows. The temporary flood storage provided by the basin is about 33 Mega Litres at the spillway crest level.

Following the construction of Detention Basin 1, Detention Basin 1A will remain in service, however, the emergency conditions and mitigation measures in this document will be aimed at addressing the impacts of Detention Basin 1 which has the greater failure impact risks.

1.1 OBJECTIVE OF THE PLAN

This document is intended to guide responsible personnel through identifying and responding to hazardous conditions associated with the operation of the Moody Creek Detention Basins.

Emergencies are dynamic events which evolve rapidly, and this plan does not cover all possible combinations of events.

Emergency response personnel should maintain situational awareness at all times, and exercise their best judgment in their response. The safety of the public and all emergency response personnel should not be compromised in implementing this plan.

1.2 UPDATING THE EMERGENCY ACTION PLAN

The Emergency Action Plan (EAP) will be reviewed for adequacy every one year or alternate timeframe as advised in writing from the Department of Natural Resources, Mines and Energy.

Telephone contact details will be updated annually or as required with changes to State and Local Government contact details.

Following any update to the Plan, it will be distributed as per the Distribution Control Sheet.
1.3 DAM OWNER RESPONSIBILITIES

The responsibility for the safety of a dam rests with the dam owner, and is required under the *Emergency Action Plan for Referable Dams (2020)* guideline to:

- Develop and maintain an emergency action plan (EAP);
- Respond in accordance with the approved EAP in all emergencies;
- Review and seek approval for updated EAPs as required, to ensure it is always up to date and includes current contact details for relevant parties;
- Distribution of current EAP to all parties listed in the distribution list;
- Regular on-site monitoring and visual inspection of the conditions at the dam. The dam owner is responsible for conducting a safety evaluation of the dam and to identify any deficiency in the dam’s safety. Where deficiencies exist, the dam owner is required to take appropriate steps to minimise the potential risk of dam failure from these deficiencies;
- Provide timely and accurate notifications to all relevant parties mentioned in the notification list in the event of a dam emergency. The dam owner shall be responsible for continuously reporting the status of the dam and the event in accordance with the EAP;
- Make appropriate dam safety related decisions based on advice from a consulting engineer where appropriate. The dam owner is also responsible for authorising immediate expenditure so that urgent repair work will not be delayed;
- Report incidents and failures at the dam to the dam safety regulator in accordance with the safety conditions including activation of the EAP;
- Establish and maintain a communication plan for the timely notification of affected persons during impending and actual emergencies or significant changes in releases or outflows from dams during floods;
- Provide the relevant disaster management group with details of emergency response actions at the dam (for example, downstream release hazards and dam failure hazards) and estimates of their downstream impacts; and
- Notify people of the risks.

1.4 MAINTENANCE OF POPULATION AT RISK REGISTER

A failure impact assessment was undertaken in 2014 by WorleyParsons as part of the design of the detention basin ([#4552749](Moody Creek Detention Basin; Failure Impact Assessment (2014), prepared for Cairns Regional Council by WorleyParsons)). While this document identified the population at risk (PAR) on plan, no formal PAR register was developed, nor was the PAR communicated with directly. A register of the PAR has been created in the WHISPIR platform, and an ongoing engagement program with the PAR is planned to ensure they understand the risk they may face, suitable preparation and response activities.
## 2. DETENTION BASIN TECHNICAL DATA

### 2.1 DETENTION BASIN 1 LOCATION

#### GENERAL

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
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<td>Dam Name</td>
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</tr>
<tr>
<td>Location</td>
<td>E 145.725060°  S 16.920439° (WGS84)</td>
</tr>
<tr>
<td>Address</td>
<td>Lot 812 Ramsey Drive, Kanimbla, Cairns Queensland 4870</td>
</tr>
<tr>
<td>Stream Name</td>
<td>Moody Creek</td>
</tr>
<tr>
<td>Year of Construction</td>
<td>2015</td>
</tr>
<tr>
<td>Referable Dam Register Number</td>
<td>2470</td>
</tr>
<tr>
<td>Owner’s Name</td>
<td>Cairns Regional Council</td>
</tr>
<tr>
<td>Owners’ Address</td>
<td>119 – 145 Spence Street CAIRNS QLD 4870</td>
</tr>
<tr>
<td>Owners Phone No</td>
<td>(07) 4044 3044</td>
</tr>
<tr>
<td>Operator’s Address</td>
<td>Cairns Regional Council</td>
</tr>
<tr>
<td>Purpose</td>
<td>Flood detention</td>
</tr>
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#### EMBANKMENT

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<thead>
<tr>
<th>Field</th>
<th>Details</th>
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<tr>
<td>Type of Construction</td>
<td>Homogenous earth fill embankment, concrete ogee crest spillway and uncontrolled flow outlet pipe (conduit)</td>
</tr>
<tr>
<td>Height of Structure</td>
<td>12.1 metres (above creek bed)</td>
</tr>
<tr>
<td>Elevation of Crest of Earth Dam</td>
<td>31.50m AHD</td>
</tr>
<tr>
<td>Crest Width</td>
<td>4 metres</td>
</tr>
<tr>
<td>Crest Length</td>
<td>230 metres</td>
</tr>
<tr>
<td>Spillway Width</td>
<td>30 metres</td>
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### RESERVOIR

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<tr>
<th>Feature</th>
<th>Details</th>
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<tbody>
<tr>
<td>Maximum Storage Level (spillway level)</td>
<td>28.85m AHD</td>
</tr>
<tr>
<td>Maximum Storage at Spillway Level</td>
<td>197 Mega Litres</td>
</tr>
<tr>
<td>Surface Area at Maximum Storage</td>
<td>7.0 hectares</td>
</tr>
<tr>
<td>Upstream Catchment Area</td>
<td>194 hectares</td>
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### SPILLWAY

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<td>Type</td>
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<tr>
<td>Spillway Crest Level</td>
<td>28.85m AHD</td>
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<tr>
<td>Spillway Width</td>
<td>30 metres</td>
</tr>
<tr>
<td>Design Capacity</td>
<td>190m$^3$/s (approximately the Probable Maximum Flood discharge)</td>
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### OUTLET CONDUIT

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<tr>
<td>Outlet Type</td>
<td>Reinforced concrete pipe with steel trash rack</td>
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<tr>
<td>Outlet Level</td>
<td>20.5m AHD</td>
</tr>
<tr>
<td>Outlet Size</td>
<td>1,650mm diameter</td>
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<td>Maximum Outlet Capacity</td>
<td>21m$^3$/s</td>
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### ADDITIONAL INFORMATION

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<tr>
<td>Location</td>
<td>Refer to Figure 2.1</td>
</tr>
<tr>
<td>Local Datum</td>
<td>All elevations are given in metres relative to Australian Height Datum (AHD)</td>
</tr>
<tr>
<td>Detention Basin Design Drawings</td>
<td>Refer to Appendix A</td>
</tr>
<tr>
<td>Stage Storage Curve</td>
<td>Refer to Appendix B</td>
</tr>
<tr>
<td>Stage Discharge Curve</td>
<td>Refer to Appendix C</td>
</tr>
<tr>
<td>Basin Inundation Depths</td>
<td>Refer to Appendix D for Probable Maximum Flood (PMF) depths in the vicinity of the Moody Creek detention basins</td>
</tr>
<tr>
<td>Dam Failure Impact Mapping</td>
<td>The consequence of dam failure due to piping during a 20 year Average Recurrence Interval (ARI) flood is shown in the flood mapping contained in Appendix E. The mapping shows all dwellings that would be subject to a total depth of flooding greater than 300mm (including the flood wave height). The consequence of dam crest failure during the Probable Maximum Flood (PMF) is shown in the flood mapping contained in Appendix F.</td>
</tr>
<tr>
<td>Site Access</td>
<td>Access to the detention basin is direct from Ramsey Drive, Kanimbla</td>
</tr>
<tr>
<td>Operation Comments</td>
<td>There are no operational controls built into the basin, so there cannot be any manual changes applied to control of flows through the low-flow pipe or over the spillway.</td>
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</table>
Council has installed a remote monitoring system on the embankment crest. The installation has been fitted with a rain gauge, pan/tilt/zoom camera and gauge plates with indicative water heights at the basin and concrete spillway walls.

Live monitoring of the detention basin is now possible and rainfall data will be collected from the remote monitoring system to feed the Bureau of Meteorology’s analytical software Enviromon for advice from the Bureau Flood Warning Centre. The basin will also be concurrently monitored by Council maintenance staff and reports are compiled regularly in conjunction with routine maintenance activities in the surrounding park. A sample of the inspection sheet is provided in Appendix G. Details of the remote monitoring station are provided in Appendix O.

### HAZARD RATING

Refer to reports:

#4552749 Moody Creek Detention Basin; Failure Impact Assessment (2014), prepared for Cairns Regional Council by WorleyParsons

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Population at Risk</th>
<th>Failure Impact Rating</th>
<th>Hazard Classification</th>
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<tr>
<td>10,000 Year ARI / 0.001% AEP PMF Crest Failure</td>
<td>596</td>
<td>Category 2</td>
<td>High A</td>
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<tr>
<td>20 Year ARI / 5% AEP Piping Failure (Spillway Level Failure)</td>
<td>86</td>
<td>Category 1</td>
<td>High B</td>
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### 2.2 DETENTION BASIN 1A LOCATION

#### GENERAL

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<th>Field</th>
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<tr>
<td>Dam Name</td>
<td>Moody Creek Detention Basin 1A</td>
</tr>
<tr>
<td>Location</td>
<td>E 145°43’31” S 16°55’22” (WGS84)</td>
</tr>
<tr>
<td>Address</td>
<td>Lot 810 Ramsey Drive, Kanimbla, Cairns Queensland 4870</td>
</tr>
<tr>
<td>Stream Name</td>
<td>Moody Creek</td>
</tr>
<tr>
<td>Year of Construction</td>
<td>2002</td>
</tr>
<tr>
<td>Referable Dam Register Number</td>
<td>1946</td>
</tr>
<tr>
<td>Owner’s Name</td>
<td>Cairns Regional Council</td>
</tr>
<tr>
<td>Owners’ Address</td>
<td>119 – 145 Spence Street CAIRNS QLD 4870</td>
</tr>
<tr>
<td>Owners Phone No</td>
<td>(07) 4044 3044</td>
</tr>
</tbody>
</table>
| **Operator’s Address** | Cairns Regional Council  
119 – 145 Spence Street  
CAIRNS QLD 4870 |
<table>
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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Flood detention</td>
</tr>
<tr>
<td><strong>EMBANKMENT</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Type of Construction** | Zone filled embankment 1:3 Vertical/Horizontal upstream and  
                        downstream slopes                                     |
| **Height of Structure** | 7.5 metres                                                    |
| **Elevation of Crest of Earth Dam** | 24.50m AHD                                                   |
| **Crest Width**       | 4.5 metres                                                    |
| **Crest Length**      | 98 metres                                                     |
| **RESERVOIR**         |                                                               |
| **Maximum Storage Level** | 24.5m AHD                                                   |
| **Maximum Storage at Spillway Level** | 33 Mega Litres                                              |
| **Surface Area at Maximum Storage** | 3.5 hectares                                               |
| **SPILLWAY**          |                                                               |
| **Type**              | Broad crested weir with reinforced concrete slab and downstream chute |
| **Spillway Crest Level** | 22.5m AHD                                                   |
| **Surface Area at Maximum Storage** | 1.8 hectares                                               |
| **Spillway Width**    | 20 metres                                                     |
| **Spillway Crest Width** | 15.5 metres                                              |
| **Design Capacity**   | 160m³/s (approximately the Probable Maximum Flood discharge) |
| **OUTLET CONDUIT**    |                                                               |
| **Outlet Type**       | Single reinforced concrete pipe                              |
| **Outlet Level**      | 17.2m AHD                                                     |
| **Outlet Size**       | 1,500mm diameter                                              |
| **Maximum Outlet Capacity** | 50m³/s                                                   |
### ADDITIONAL INFORMATION

<table>
<thead>
<tr>
<th>Location</th>
<th>Refer to Figure 2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Datum</td>
<td>All elevations are given in metres relative to Australian Height Datum (AHD)</td>
</tr>
<tr>
<td>Detention Basin Design Drawings</td>
<td>Refer to Appendix H</td>
</tr>
<tr>
<td>Stage Storage Curve</td>
<td>Refer to Appendix I</td>
</tr>
<tr>
<td>Stage Discharge Curve</td>
<td>Refer to Appendix J</td>
</tr>
</tbody>
</table>

#### Dam Failure Impact Mapping
The consequence of dam failure due to piping during a 20 year Average Recurrence Interval (ARI) flood is shown in the flood mapping contained in Appendix E. The mapping shows all dwellings that would be subject to a total depth of flooding greater than 300mm (including the flood wave height).

The consequence of dam crest failure during the Probable Maximum Flood (PMF) is shown in the flood mapping contained in Appendix F.

#### Site Access
Access to the detention basin is direct from Ramsey Drive, Kanimbla.

#### Operation Comments
There is no remote or manual flow control or monitoring facilities at the detention basin.

The basin will be monitored by Council maintenance staff and reports are compiled regularly in conjunction with routine maintenance activities in the surrounding park. A sample of the inspection sheet is provided in Appendix G.

### HAZARD RATING

Refer to reports:
[962958 Moody Creek Detention Basin Report on Comprehensive Dam Failure Impact and Consequence Assessment by GHD (2002)]

<table>
<thead>
<tr>
<th>50 Year ARI / 2% AEP Piping Failure (Spillway Level Failure)</th>
<th>Population at Risk</th>
<th>73</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure Impact Rating</td>
<td>Category 1</td>
<td></td>
</tr>
<tr>
<td>Hazard Classification</td>
<td>High C</td>
<td></td>
</tr>
</tbody>
</table>

For larger floods including the Dam Crest Flood and Probable Maximum Flood were assessed to have equal or lower estimated population of risk due to the incremental discharges between flood and dam break analysis.
Figure 2.1 Location Map of the Moody Creek Detention Basins and Surrounds
3. EMERGENCY MANAGEMENT FRAMEWORK

The EAP is a standalone plan detailing the actions to be undertaken to minimise the risk of harm to persons or property if a dam hazard event or emergency event for the dam occurs (s 352E(2)). The EAP is implemented by the dam owner, with support from the Local Disaster Management Group(s) LDMG(s).

As Moody Creek Detention Basin 1 is located immediately upstream from Detention Basin 1A, it is recommended that the two structures be managed together during an emergency. However, it should be noted that due to flooding of the incoming tributary between the two basins, it may not be possible to move between Basin 1 and Basin 1A.

As extensive flooding is expected to occur within the wider Cairns urban area during any flood emergency that affects the Moody Creek basins, co-operation is to be maintained with the Local Disaster Management Group - Cairns Region (LDMG-CR).

3.1 EMERGENCY CONDITIONS

Release from the detention basin can occur via both the low flow conduit and the spillway. These releases are uncontrolled during weather events. There is no existing mechanism to control the release of water from the detention basin.

The emergency conditions catered for in this document include the incremental impacts of embankment failure due to piping during a 5% AEP rainfall event and overtopping failure during the PMF. The more critical of the two situations modelled is the piping failure scenario, where the failure mode is progressive affecting a greater amount of the population (than the PMF scenario) at short notice.

3.2 RELATIONSHIP TO OTHER PLANS

This plan is a subordinate to the Cairns District Disaster Management Plan (Cairns District Disaster Management Group, 2014), and the Local Disaster Management Plan – Cairns Region (Cairns Regional Council, 2019).

Information presented here is intended to assist with the management of a flooding emergency in the Moody Creek catchment that may be affected by the status and operation of the Moody Creek Detention Basins. The risk posed by the Moody Creek Detention Basin is noted in section 5 of the Local Disaster Management Plan - Cairns Region 2019.
3.3 STAGES OF EMERGENCY SERVICES ACTIVATION

As set out in the Cairns District Disaster Management Plan (Cairns District Disaster Management Group, 2014) and the Local Disaster Management Plan – Cairns Region (Cairns Regional Council, 2019, emergency services activation follows the following stages:

- Alert;
- Lean Forward;
- Stand Up; and
- Stand Down.

The stages are defined as:

**Alert** A heightened level of vigilance and preparedness due to the possibility of an event in the area of responsibility. No action is required; however, the situation should be monitored by the District Maintenance Coordinator (Central) or a suitable delegate, capable of assessing the potential of the threat.

**Lean Forward** - 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 standby; prepared but not activated. Information is received that the district may be impacted by a hazard. Relevant entities, including local governments, are requested to Lean Forward and contact details confirmed. District Disaster Coordination Centre (DDCC) is checked for operational readiness. The District Disaster Coordinator (DDC) may convene a preliminary meeting of all or some DDMG members. The DDC and Deputy Chair may perform a monitoring role without activating the DDCC. Advice will be forwarded to the relevant entities including a preliminary situation report to the State Disaster Coordination Centre (SDCC).

**Stand Up** - The operational state following ‘lean forward’ whereby resources are mobilised, personnel are activated and operational activities commenced. Information is received that the impact of a hazard within the district is imminent. Relevant members, including local governments, are requested to Stand Up. The DDCC should be operated on a 24-hour basis (refer DDCC SOPs). There should be ongoing liaison between the DDCC, LDMGs and the SDMG, including Situation Reports (SITREP, as per Appendix P), as required by the reporting requirements of this plan.

**Stand Down** - Transition from responding to an event back to normal core business and/or recovery operations. The event no longer requires a coordinated operational response. When the requirements of disaster operations have been completed to the stage that the DDMG and DDCC are no longer required to be activated, they may be stood down.
4. ROLES, EAP ACTIVATION AND NOTIFICATION

In the event of an emergency condition, the following roles and procedures will be carried out by the nominated personnel from Cairns Regional Council, the owner of the Moody Creek Detention Basins.

4.1 COUNCIL CONTACT DETAILS

Cairns Regional Council, 119-145 Spence Street, Cairns
PO Box 359, Cairns, Qld 4870
Phone: (07) 4044 3044, Fax: (07) 40443022
Email: council@cairns.qld.gov.au

4.2 CAIRNS REGIONAL COUNCIL ORGANISATIONAL STRUCTURE

The organisational structure of Cairns Regional Council is available on the Council website at (http://www.cairns.qld.gov.au/aboutcouncil/corporate)

4.3 KEY ROLES

For the purposes of emergency management for the detention basins, two key roles are defined. These are the roles of Incident Manager and Site Supervisor

- Incident Manager – Responsible for declaring an incident and acting as the incident manager or director on the basis of information received from the site supervisor. The Incident Manager is also responsible for liaising with those persons and agencies listed in Table 4.1, and any others as required. The Incident Manager is responsible for nominating a site supervisor to monitor the basin during the emergency.
- Site Supervisor - responsible for leading the incident team from the detention basin site, monitoring the site conditions and notifying the Incident Manager of events which may affect the safety of those downstream from Detention Basin 1 and Detention Basin 1A. The site supervisor may be anyone nominated by the Incident Manager.

Various additional responsibilities are assigned to each of the above officers in this EAP depending on the nature of the incident (refer to Appendices K and L).

The above officers may, as necessary, delegate assigned tasks to others. It may be necessary to support the Site Supervisor and Incident Manager with additional staff during an emergency.

4.4 INITIATION OF AN EMERGENCY

Key members of the Cairns Regional Council, including the Coordinator Civil Maintenance, General Manager Infrastructure Services and Manager Cairns Works Maintenance, receive advance warnings from the Bureau of Meteorology of impending extreme weather events.

Other persons that become aware of an impending flood emergency or other non-flood related issues are to contact the Council Customer Service or After Hours Emergency Centre on (07) 4044 3044, or the Coordinator Civil Maintenance, or key staff.
Such persons may include:
- Other Cairns Regional Council staff; and
- State Emergency Service;

4.5 NOTIFICATION

In the case of an emergency situation, Manager Cairns Works Maintenance, or an appointed proxy, will act as Moody Creek Detention Basin Incident Manager. The Incident Manager will immediately notify key persons within the Cairns Regional Council listed in the Initial Notification List following, refer Table 4.1.

This decision on which key persons are contacted will be made by Manager Cairns Works Maintenance depending on the severity of the situation and likely timing of the expected impacts. Because time will be so short, that decision will need be based on the judgement of the Incident Manager.

Table 4.1: Initial Notification List

<table>
<thead>
<tr>
<th>CAIRNS REGIONAL COUNCIL</th>
<th>CONTACT DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Manager Infrastructure Services, Cairns</td>
<td></td>
</tr>
<tr>
<td>Manager Cairns Works Maintenance, Cairns</td>
<td></td>
</tr>
<tr>
<td>Coordinator Civil Maintenance</td>
<td></td>
</tr>
<tr>
<td>District Supervisor, Drainage, Central</td>
<td></td>
</tr>
</tbody>
</table>

A flow chart illustrating the emergency situation notification channels and responsibilities has been provided below. Refer Figure 4.1.
4.6 ACTIVATION OF THE EMERGENCY ACTION PLAN

In the case of an emergency situation, one or more of the Council Officers listed in the Initial Notification List above, as agreed at the time by General Manager Infrastructure Services, Manager Cairns Works Maintenance, after advising the Coordinator, Local Disaster Management Group-Cairns Region, will:

- Make a decision to activate the Emergency Action Plan, then
- Notify the Local Disaster Management Group – Cairns Region
- Notify Queensland Fire and Emergency Services
- Notify State Emergency Services Local Controller, Edmonton
- Notify Queensland Police Service
- Notify the Marketing & Communications Officer if public information & warnings are required
- Notify other persons/organisations listed in the Relevant Agencies Listing Table. Refer Table 4.2.
- The Incident Manager will also liaise when required with persons/organisations listed in Relevant Agencies Listing over, but in particular, QPS and the SES Local Controller, Cairns.
### Table 4.2: Relevant Agencies Listing

<table>
<thead>
<tr>
<th>NAME</th>
<th>CONTACT AND LOCATION</th>
<th>CONTACT DETAILS</th>
<th>NOTIFICATION REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cairns Regional Council</td>
<td>General Manager</td>
<td></td>
<td>• Advice from the Incident Manager on the severity of the rainfall and flood situation,</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td></td>
<td>the condition of the detention basin and likely timing of the expected impacts on</td>
</tr>
<tr>
<td></td>
<td>Services, Cairns</td>
<td></td>
<td>residents downstream of the basin</td>
</tr>
<tr>
<td></td>
<td>Manager Cairns</td>
<td></td>
<td>• Advice from the Coordinator of the Local Disaster Management Group (LDMG-CR) on the</td>
</tr>
<tr>
<td></td>
<td>Works Maintenance,</td>
<td></td>
<td>need for a response in accordance with the Local Disaster Management Plans</td>
</tr>
<tr>
<td></td>
<td>Cairns</td>
<td></td>
<td>• Advice from the Coordinator of the LDMG-CR on the need to activate the Emergency</td>
</tr>
<tr>
<td></td>
<td>Coordinator Civil</td>
<td></td>
<td>Action Plan (EAP) and call together the LDMG-CR</td>
</tr>
<tr>
<td></td>
<td>Maintenance (central), Cairns</td>
<td></td>
<td>• Advice from the Incident Manager and Coordinator of the LDMG-CR on the need to call</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>on the local QPS and SES, Cairns to assist with any necessary evacuations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Advice from the Coordinator of the LDMG-CR on the time to end the emergency event</td>
</tr>
<tr>
<td>NAME</td>
<td>CONTACT AND LOCATION</td>
<td>CONTACT DETAILS</td>
<td>NOTIFICATION REQUIREMENT</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Local Disaster Management Group – Cairns Region</td>
<td>Coordinator, Local Disaster Management Group – Cairns Region (LDMG-CR)</td>
<td></td>
<td>• Confirmation from Cairns Regional Council of a decision to activate the EAP&lt;br&gt;• Advice from QFES Area Controller – Far Northern Region or SES Local Controller of availability of resources to assist with the emergency&lt;br&gt;• Advice from OIC Cairns Police Station of availability of resources to assist with the emergency&lt;br&gt;• Advice from the LDMG-CR on strategic coordination of response in accordance with the Local Disaster Management Plans</td>
</tr>
<tr>
<td>Cairns Regional Council Chief Executive Officer</td>
<td>Chief Executive Officer</td>
<td></td>
<td>• Advice on the severity of the situation, condition of the detention basin and likely timing of the expected impacts on residents downstream of the basin&lt;br&gt;• Advice on any intention to activate the Emergency Action Plan&lt;br&gt;• Advice on any intention to call together the LDMG-CR so that the Mayor and Divisional Councillor can be briefed</td>
</tr>
<tr>
<td>NAME</td>
<td>CONTACT AND LOCATION</td>
<td>CONTACT DETAILS</td>
<td>NOTIFICATION REQUIREMENT</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------</td>
<td>-----------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Queensland Police Service | Queensland Police Service, Cairns Police (24 hrs) | (07) 4030 7000  | • Advice from Cairns Regional Council and Coordinator, LDMG-CR on the severity of the situation  
• Advice from Coordinator, LDMG-CR on the need for a response in accordance with the Local Disaster Management Plans  
• Advice from Coordinator, LDMG-CR on the need to activate the LDMG-CR  
• Advice from Coordinator, LDMG-CR or the Incident Manager on the likelihood of the need for evacuations |
| QFES                    | Emergency Management Coordinator, Executive Manager Emergency Management QFES, Inspector QFES |                           | • Advice from Cairns Regional Council and Coordinator, LDMG-CR on the severity of the situation  
• Advice from the Coordinator, LDMG-CR on the need for a response in accordance with the Local Disaster Management Plans  
• Advice from the Coordinator, LDMG-CR on the need to activate the LDMG-CR  
• Advice from Coordinator, LDMG-CR or the Incident Manager on the likelihood of the need for evacuations |

**AFTER HOURS**
State Disaster Coordination Centre Watch Desk – 24/7 hours
SES Duty Operations Officer Far North (Cairns)
<table>
<thead>
<tr>
<th>Senior Drainage Engineer</th>
<th>Cairns Regional Council RPEQ</th>
</tr>
</thead>
</table>

- Need for visual inspection and condition assessment of dam and associated works during or after the flood event
- Need for assessment of the pattern or severity of rainfall or flooding at the basin
- Need for advice on rectification of any flood damage or failure of the dam during the event
<table>
<thead>
<tr>
<th>NAME</th>
<th>CONTACT AND LOCATION</th>
<th>CONTACT DETAILS</th>
<th>NOTIFICATION REQUIREMENT</th>
</tr>
</thead>
</table>
| Cairns Regional Council, Operational Staff Central | Coordinator Civil Maintenance, Cairns or staff working under the Coordinator | | • Initial and ongoing advice on the need for a response in accordance with the Local Disaster Management Plans  
• Updates on any deterioration with the integrity of the dam or failure situation  
• Advice on storage levels and overflows  
• Communicate data from monitoring at the detention basin to Incident Manager or other Regional Council contacts |
| Director Dam Safety, DNRME | Director Dam Safety | | • Advice of details of activation of EAP to ‘Stand-up’ level of activation.  
• Keep the Dam Safety Regulator informed of any changes in dam status as emergency situation develops.  
• Notify any incidents or failures in accordance with safety conditions applied to the dam. |
| Cairns Regional Council Communications | Manager Marketing and Communications | | • Advice of the severity of the situation, the condition of the detention basin and likely impacts on residents downstream of the basin  
• Advice on the need for a response in accordance with the Local Disaster Management Plans and to activate the EAP  
• Advice on decisions made by the LDMG-CR  
• Advice on the need for any evacuations  
• Progress reports on the weather event and any impacts on residents downstream  
• Advice on the final outcome and recover action required |
<table>
<thead>
<tr>
<th>NAME</th>
<th>CONTACT AND LOCATION</th>
<th>CONTACT DETAILS</th>
<th>NOTIFICATION REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cairns Regional Council Media</td>
<td>Media Coordinator</td>
<td></td>
<td>• Advice of the severity of the situation, the condition of the detention basin and likely impacts on residents downstream of the basin&lt;br&gt;• Advice on the need for a response in accordance with the Local Disaster Management Plans and to activate the EAP&lt;br&gt;• Advice on decisions made by the LDMG-CR&lt;br&gt;• Advice on the need for any evacuations&lt;br&gt;• Progress reports on the weather event and any impacts on residents downstream&lt;br&gt;• Advice on the final outcome and recover action required</td>
</tr>
<tr>
<td>Bureau of Meteorology</td>
<td>Weather radar:&lt;br&gt;Rainfall and river conditions&lt;br&gt;Forecasts</td>
<td><a href="http://www.bom.gov.au/qld">www.bom.gov.au/qld</a></td>
<td>• Disseminated information regarding the emergency event – rainfall, flood levels, flood inundation and population affected by the event</td>
</tr>
</tbody>
</table>

Emergency Action Plan for Moody Creek Detention Basins

FOR APPROVAL

#4840721
5.0 EMERGENCY ACTION PLAN TRIGGER CONDITIONS

5.1 FLOOD RELATED EVENT TRIGGERS

The following flood related emergency conditions may require an emergency response, including the evacuation of downstream residents (refer Table 5.1).

Rainfall information will be obtained from Council’s new installation directly at the basin, and other existing Bureau of Meteorology alert stations “031011 Cairns Aero QLD” and “031222 Cairns Racecourse QLD”. Details on the monitoring system are attached in Appendix O.

The appropriate emergency response protocols are outlined for each trigger in Appendix K.

Table 5.1: Flood Related Trigger Events

<table>
<thead>
<tr>
<th>TRIGGER DESCRIPTION</th>
<th>EAP PROTOCOL</th>
<th>ACTIVATION STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall exceeds 60 mm in less than hour, 83 mm in less than 2 hours or 100 mm in less than 3 hours (39% AEP Event)</td>
<td>F1</td>
<td>ALERT</td>
</tr>
<tr>
<td>Rainfall exceeds 83 mm in less than hour, 115 mm in less than 2 hours or 140 mm in less than 3 hours (10% AEP Event); and/or Water Level in basin reaches spillway crest (28.85m AHD or 8.35m Gauge Datum)</td>
<td>F2</td>
<td>LEAN FORWARD</td>
</tr>
<tr>
<td>Water level in basin reaches 29.00m AHD or 8.5 m Gauge Datum</td>
<td>F3</td>
<td>STAND UP</td>
</tr>
<tr>
<td>Water level rises to within 500mm of embankment crest level or 10.5 m Gauge Datum</td>
<td>F4</td>
<td>STAND UP</td>
</tr>
<tr>
<td>Overtopping of the embankment crest</td>
<td>F5</td>
<td>STAND UP</td>
</tr>
<tr>
<td>Damage to spillway or embankment toe</td>
<td>F6</td>
<td>STAND UP</td>
</tr>
<tr>
<td>Increased or New Seepage through the embankment</td>
<td>F7</td>
<td>STAND UP</td>
</tr>
<tr>
<td>Detention basin levels dropping and discharge controlled by pipe conduit</td>
<td>F8</td>
<td>STAND DOWN</td>
</tr>
</tbody>
</table>
5.2 NON-FLOOD RELATED EVENT TRIGGERS

The following trigger conditions relate to non-flooding emergencies (refer Table 5.2). These events do not pose an immediate hazard to the downstream community. However, any significant rainfall during such an event will trigger the flood related emergency protocols. As the structure may have been damaged by these events, the flood response may need to be escalated more rapidly.

The appropriate emergency response protocols are outlined for each trigger in Appendix L.

Table 5.2: Non-Flood Related Trigger Events

<table>
<thead>
<tr>
<th>TRIGGER DESCRIPTION</th>
<th>EAP PROTOCOL</th>
<th>ACTIVATION STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake</td>
<td>N1</td>
<td>N/A</td>
</tr>
<tr>
<td>Differential movement of partial collapse of the basin</td>
<td>N2</td>
<td>N/A</td>
</tr>
<tr>
<td>Landslide into the basin</td>
<td>N3</td>
<td>N/A</td>
</tr>
<tr>
<td>Damage to the detention basin</td>
<td>N4</td>
<td>N/A</td>
</tr>
<tr>
<td>Blockage of the low flow pipe</td>
<td>N5</td>
<td>N/A</td>
</tr>
</tbody>
</table>

5.3 TERRORISM

Note that in the event of terrorist activity, associated communications, actions and priority order of notifications will be escalated to the National Security Hotline (1 800 123 400), Police Counter-Terrorism Liaison Officer and triple zero to ensure an effective Counter-Terrorism response.

5.4 COMPLEX EMERGENCIES

Multiple incidents may occur either simultaneously or within a sufficiently short period that creates interaction between the incidents. If this occurs, emergency services must manage these multiple incidents as one larger, integrated emergency.

Emergency services should adopt the posture related to the most serious incident.

Complex emergencies may result in multiple emergency response plans being activated. The activation of one plan does not necessarily deactivate another.
6.0 EMERGENCY RESPONSE PROTOCOLS

6.1 INCIDENT MANAGER AND SITE SUPERVISOR

Refer to Appendix K for specific emergency response protocols of the Incident Manager and Site Supervisor for Flood Related Trigger Conditions (F1 to F8).

Refer to Appendix L for emergency response protocols for Non-Flood Related Trigger Conditions (N1 to N5).

6.2 DISSEMINATION OF FLOOD WARNINGS

The overall responsibility for activating the EAP rests with the Incident Manager. The activation of the LDMG-CR is defined in the Cairns LDMP (see Appendix A.1 Activation of the LDMG) and will be managed by the LDC to provide the appropriate level of support through the Local Disaster Coordination Centre (LDCC). It is envisaged that in the majority of events the LDMG-CR will be simultaneously activated or already at an activation level in support of CRC Infrastructure Services Department as the dam owner. Cairns Regional Council (CRC), as both the dam owner and the local government whose area may be affected by the event, has developed this EAP in close consultation with the Local Disaster Coordinator (LDC) and, where possible, has applied existing local disaster management plans and procedures to communicate with and manage the safety of the identified PAR. If concurrent flooding has not resulted in the activation of the LDMG-CR, will do so at either the request of the Incident Manager or the ‘Alert’ trigger level. The LDMG-CR will then take carriage of the following responsibilities:

- Manage the notification of PAR during all stages of a PMF emergency event;
- Manage communication with PAR and the broader Cairns community;
- Undertake strategic decision making to assess the requirement to evacuate PAR;
- Issue voluntary evacuation advice to PAR;
- Request directed evacuation through the DDMG Cairns (if appropriate); and
- Manage the evacuation of PAR (voluntary and directed).

The LDMG-CR has a range of communication methods to assist external communications during an emergency event. The LDMG-CR through Council’s Disaster Management utilises the interactive information gateway ‘Cairns Disaster Dashboard’ at disaster.cairns.qld.gov.au which provides real-time emergency news feeds, interactive mapping and intelligence directly linked to the LDCC information management system. CRC has established the locally contextualised early warning system ‘Cairns Alert’ which disseminates alerts and warnings for all hazards to registered users via email and SMS. The service is free and allows for residents to “opt in” or have been identified from CRC rates database to receive messages as a result of known impact areas. The objective of ‘Cairns Alert’ is the early notification of PAR preceding an authorised EA campaign. The LDMG-CR will also utilise (where appropriate) the National Emergency Alert System that sends messages via landlines based on the location of the handset, via mobile phones based on an individual’s billing address, and mobile account holders based on the device’s location. Appendix F is a map that illustrates the emergency alert polygon area in which emergency alerts will be issued for a detention basin related incident. The polygon has been approved and has been imported into the State disaster management portal and the SDCC. Pre-approved messages have also been prepared to ensure timely dissemination of alerts to PAR. These are also attached at Appendix M and Appendix N.
The General Manager Infrastructure Services, Manager Cairns Works Maintenance or District Maintenance Coordinator (Central) will immediately advise the State Emergency Service, Queensland Police Service and Cairns Local Disaster Coordinator of the emergency situation. The Cairns Regional Council Marketing & Communications Officer has available, media release templates in line with the Local Disaster Management Plan’s operational sub-plan ‘Public Information & Warnings’. With the LDMG-CR activated all media releases will be issued from the LDCC only when authorised by the LDMG-CR.

The communications system WHISPIR will be used to issue emergency communications. Contact details for the PAR have been loaded in to WHISPIR, along with residents who have voluntarily signed up to the CRC emergency dashboard. In addition, Emergency Alerts will be sent to all the population within the polygon Appendix M and Appendix N.

6.3 EMERGENCY EVACUATION

Cairns Regional Council must notify the Local Disaster Management Group - Cairns Region (LDMG-CR) and the Queensland Police Service (QPS) if the situation dictates that evacuation is a consideration. The demographic of the PAR will be considered, including the nearby Aged Care facility.

The recommendation is to be made to the District Disaster Coordinator (DDC) for the authority to evacuate. Evacuation will then be identified, prioritised and conducted by the LDMG-CR and QPS through the DDC.

For notification of affected residents the State Emergency Alert (SEA) system is available for use to send an automated alert to any resident located within a defined area. The SEA will send a notice to any mobile/ land line phone registered for the area.

Population at risk warning polygons that apply to various Flood Related Trigger Conditions are provided in Appendix M and Appendix N. Also included are State Emergency Alert (SEA) requests (Voice Messages and SMS Messages) to accompany the polygons. These have been provided to Cairns Regional Council in digital GIS format

6.4 RESPONSE ACTIONS FOR COUNCIL OFFICERS

The general procedures for Council officers in response to the particular activation status (posture) of the emergency are provided in Table 6.1.
Table 6.1: Response Actions for Council Officers

<table>
<thead>
<tr>
<th>ACTIVATION STATUS</th>
<th>INCIDENT MANAGER (MANAGER CAIRNS WORKS MAINTENANCE OR DELEGATE)</th>
<th>MANAGER CAIRNS WORKS MAINTENANCE</th>
<th>GENERAL MANAGER INFRASTRUCTURE SERVICES</th>
<th>LOCAL DISASTER COORDINATOR</th>
<th>MANAGER MARKETING &amp; COMMUNICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALERT</td>
<td>Assign Site Supervisor and maintain regular contact</td>
<td>Inform those listed in the Notification List</td>
<td>Inform those listed in the Notification List (Refer Table 4.1)</td>
<td>Inform those listed in the Notification List. Cairns Alert advice/warning issued.</td>
<td>Inform those listed in the Notification List. Deploys pre-approved general and polygon specific CRC media releases</td>
</tr>
<tr>
<td></td>
<td>Report on changes in basin condition</td>
<td>Activate EAP, as agreed with GM Infrastructure Services and Manager Buildings &amp; Services</td>
<td>Prepare to engage dam safety consultant (if necessary)</td>
<td>Basin specific media releases in consultation with LDMG-CR and Marketing &amp; Communications if ‘Public information &amp; Warnings’ sub-plan is activated</td>
<td>Deploys pre-approved general and polygon specific CRC media releases</td>
</tr>
<tr>
<td></td>
<td>Inform those persons in the Notification List (refer Table 4.1) and Relevant Agencies Listing (refer Table 4.2)</td>
<td></td>
<td></td>
<td>Emergency Alert (EA) process activated if evacuation of PAR is required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confirm basin is cleared for operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Commence event log</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEAN</td>
<td>Monitor outflows from basin</td>
<td>Maintain contact with Incident Manager to assess severity of situation</td>
<td>Prepare to engage dam safety consultant (if not already)</td>
<td>LDMG-CR activated (if not already)</td>
<td>Deploys pre-approved general and polygon specific CRC media releases</td>
</tr>
<tr>
<td>FORWARD</td>
<td>Assess significant changes of basin water levels and embankment condition</td>
<td>Interpret and disseminate SITREPs</td>
<td></td>
<td>Determine level of integration of EAP response with operational sub-plans activated. Cairns Alert advice/warning issued.</td>
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<tr>
<td></td>
<td>Provide SITREPs to Manager Cairns Works Maintenance</td>
<td></td>
<td>Basin specific media releases in consultation with LDMG-CR and Marketing &amp; CommS if ‘Public information &amp; Warnings’ sub-plan is activated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interpret BoM data</td>
<td></td>
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Emergency Action Plan for Moody Creek Detention Basins

FOR APPROVAL

#4840721
<table>
<thead>
<tr>
<th>ACTIVATION STATUS</th>
<th>INCIDENT MANAGER (MANAGER CAIRNS WORKS MAINTENANCE OR DELEGATE)</th>
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<th>LOCAL DISASTER COORDINATOR</th>
<th>MANAGER MARKETING &amp; COMMUNICATION</th>
</tr>
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<td>Emergency Alert (EA) process activated if evacuation of PAR is required</td>
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<td>ACTIVATION STATUS</td>
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<tr>
<td>STAND UP</td>
<td>Monitor situation</td>
<td>Maintain contact with Incident Manager to assess severity of situation</td>
<td>Ensure Dam Safety Regulator is kept informed and facilitate their requests</td>
<td>Evacuation, if necessary, through LDMG-CR in consultation with QPS</td>
<td>Deploys pre-approved general and polygon specific CRC media releases</td>
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<td></td>
<td>Assess significant changes in water levels and basin condition</td>
<td>Interpret and disseminate SITREPs</td>
<td></td>
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<tr>
<td></td>
<td>Provide regular SITREPs to Manager Cairns Works Maintenance</td>
<td>Interpret and disseminate BoM data</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Interpret BoM data</td>
<td>Regularly provide updates to GM Infrastructure Services and LDC</td>
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<td></td>
<td></td>
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<tr>
<td>STAND DOWN</td>
<td>Complete final basin inspection</td>
<td>Inform GM Infrastructure and LDC of closure of incident</td>
<td>Notify CEO, Mayor and Dam Safety Regulator of closure of EAP</td>
<td>Note closure of EAP</td>
<td>Prepare media release for closure of EAP</td>
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<tr>
<td></td>
<td>Complete final basin SITREP</td>
<td>Review and compile Emergency Event Report for GM Infrastructure Services</td>
<td>Work to closure of relevant integrated plan and procedures</td>
<td></td>
<td>Mayor and CEO to review</td>
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<td></td>
<td>Assess if Remedial Action Plan is required</td>
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<td></td>
<td>Amend and release to media outlets</td>
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<tr>
<td></td>
<td></td>
<td>Stand down dam incident team and close EAP</td>
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</tbody>
</table>
6.5 DOCUMENTATION AND REPORTING DURING THE EMERGENCY
During the emergency, all significant events and correspondence should be recorded for later reference. This includes the following:

- Significant communications between departments within Council and to any external emergency services;
- The basin storage level;
- Condition of the basin embankment and associated structures;
- Reports on the level and extent of downstream flooding;
- The progress of any required evacuation of residents; and
- Any other matter relevant to the progression of the emergency.

This information should be kept for investigation of the event after it has occurred. Particular events and information are to be recorded by various parties, including the Incident Manager (via the Site Supervisor) and the Local Disaster Coordinator. The Manager of Cairns Works (Maintenance) will be responsible for coordination and compilation of reporting for the General Manager Infrastructure Services.

6.6 CONCLUSION OF THE EMERGENCY
The deactivation of this Emergency Action Plan, and the conclusion of the emergency, shall occur only once the hazard posed by the Moody Creek Detention Basins have passed.

The immediate danger is considered to have passed once the following conditions are met and can be confirmed by inspection of the basin:

- The basin is no longer impounding water;
- No significant rainfall has occurred since drawdown;
- No further significant rainfall is forecast; and
- Any contamination of the basin has been cleaned or contained.

At such time it is appropriate for emergency services to stand down.

If the above conditions are not met, but following assessment of the structure it is considered that there is no continuing hazard to the community, it may be appropriate to resume an ongoing alert status until such time that emergency services can be stood down.

Note, that the basin may have incurred damage due to flooding or other events during the emergency and as such, the complete deactivation of the Emergency Action Plan can only occur once it has been confirmed that the basin is safe for continued operation.

The office of the General Manager Infrastructure Services, Cairns Regional Council or their representative will direct staff experienced in dam design, maintenance and operation to conduct a visual inspection of the detention basin immediately after the emergency.

Information collated during this inspection and during the emergency event is to be recorded and reported to the office of the General Manager Infrastructure Services, Cairns Regional Council or their representative.

Where damage to the detention basin is noted during the above inspection, or Trigger Event F6 or F7 were activated during the emergency, an inspection by an experienced dam engineer will be required immediately. Emergency maintenance works may need to be undertaken to clear blockages, debris, or complete minor repairs.

The office of the General Manager Infrastructure Services, Cairns Regional Council or their representative will authorise closure of the Emergency Action Plan.
6.7 POST-EMERGENCY ADVICE
After inspection of the basin and closure of the EAP, the General Manager Infrastructure Services or their representative will disseminate information regarding the emergency to the following:

- Media and the general public through the Media Coordinator, Cairns Regional Council.
- DNRME Incident Hotline on [number] within 48 hours of the EAP activation.
- Bureau of Meteorology, Land, Weather and Flood Warnings number on [number].

6.8 DOCUMENTATION AND REPORTING AFTER THE EMERGENCY
If an event has occurred which has required emergency services to adopt a “stand up” posture, an Emergency Event Report must be compiled and reviewed by the Manager of Cairns Works (Maintenance) for the General Manager Infrastructure Services.

The report is to be submitted to the Department of Natural Resources, Mines and Energy (DNRME) within 30 days of the conclusion of the event.

The report should cover the following:

- A description of the event;
- The actions taken to implement this Emergency Action Plan, including:
  - Communications made and actions taken in response to the emergency;
  - Monitoring of the basin and the area affected or potentially affected by the emergency;
- A description of any damage to the basin embankment, including any relevant photos;
- An assessment of the extent to which the Detention Basin contributed to the emergency;
- An assessment of whether this Plan was effective;
- Recommend any changes to this Plan that would allow the plan to deal with similar emergencies more effectively;
- Details of any other matters that were relevant to the emergency, or any other matters prescribed under a regulation.
7.0 NON-EMERGENCY CONDITION REPORTING

An inspection and monitoring system is in place as required by the Emergency Action Planning for Referable Dams (2013). The three levels of inspections are as follows:

**Routine Inspections** — There are regular visual inspections undertaken by Council maintenance staff at least twice per month. This ensures any problems with the integrity of the dam are identified early so that remedial action can be undertaken in preparation for the upcoming wet season.

The regular maintenance undertaken in conjunction with these inspections include:

- Maintaining the ground vegetation to ensure that there is adequate growth covering the spillway, crest, channel, and the walls of the dam, especially in the lead up to the wet season;
- Ensuring the basin and outlet structures to be cleared of debris, rubbish and vegetation;
- Maintain the basin and ensure it is clear of wooded vegetation and heavy grasses to minimise the risk of blockage; and
- Maintain the outlet pipe system, trash rack and overflow channel in a state of good repair and clear of all debris.

A sample of the inspection sheet is provided in Appendix G.

Completed inspection sheets are compiled in the Moody Creek Detention Basin Data Book.

**Periodic Inspections** — Will be scheduled at the beginning and at the conclusion of the wet season and to be conducted by an experienced Engineer (RPEQ) for the purpose of identifying any physical deficiencies in the dam.

Cairns does not have any records of being severely affected by earthquakes, however, still presents a potential hazard for the region. A periodic inspection will be required following any earthquake activity warnings received by Council from Geoscience Australia.

At the conclusion of the inspection, the appointed Engineer will also review information obtained during previous routine inspections. These inspections provide the opportunity to identify any adverse trends in the condition of the dam and to make recommendations on any remedial action that may be required for the continued safe operation of the dam.

**Special Inspections** — These inspections are undertaken by an experienced Engineer (RPEQ) following any major natural weather event in the region and if a particular feature or operational aspect of the dam is of concern, i.e. after flood damage from a major rainfall event or foundation problem had been previously identified.
## APPENDICES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>PAGE</th>
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<tbody>
<tr>
<td>A</td>
<td>Detention Basin 1 Design Drawings</td>
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</tr>
<tr>
<td>B</td>
<td>Detention Basin 1 Storage Relationship Curve</td>
<td>54</td>
</tr>
<tr>
<td>C</td>
<td>Detention Basin 1 Discharge Curve</td>
<td>56</td>
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<td>D</td>
<td>Maximum depth of inundation at moody creek detention basins 1 and 1A during the PMF</td>
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</tr>
<tr>
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<td>Consequence of a crest failure during the probable maximum flood</td>
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<td>G</td>
<td>Sample Inspection Schedule Sheet</td>
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<td>H</td>
<td>Detention Basin 1A Design Drawings</td>
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<td>Detention Basin 1A Storage Relationship Curve</td>
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<td>Detention Basin 1A Discharge Curve</td>
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<td>Emergency Response Protocols for Flood Related Trigger Conditions</td>
<td>79</td>
</tr>
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<td>Emergency Response Protocols for Non-Flood Related Trigger Conditions</td>
<td>91</td>
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<td>M</td>
<td>Category 2 basin failure (Overtopping failure in PMF) warning polygon and emergency alert messages</td>
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<td>Category 1 basin failure (Piping failure in Q20 event) warning polygon and emergency alert messages</td>
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<td>O</td>
<td>Remote monitoring station login details</td>
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APPENDIX A

DETENTION BASIN 1 DESIGN DRAWINGS
APPENDIX B

DETENTION BASIN 1 STORAGE RELATIONSHIP CURVE
APPENDIX C

DETENTION BASIN 1 DISCHARGE CURVE
APPENDIX D

MAXIMUM DEPTH OF INUNDATION AT MOODY CREEK DETENTION BASINS 1 AND 1A DURING THE PMF

From WorleyParsons
APPENDIX E

CONSEQUENCE OF A PIPING FAILURE DURING THE 20 YEAR ARI FLOOD

From WorleyParsons
APPENDIX F

CONSEQUENCE OF A CREST FAILURE DURING THE PMF

From WorleyParsons
APPENDIX G

SAMPLE INSPECTION SCHEDULE SHEET
# DETENTION BASIN
## ROUTINE MAINTENANCE SHEET

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<td>Seepage / springs</td>
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<td>EMBANKMENT</td>
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**CURRENT DETENTION BASIN CONDITION**

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<td>Is there observed damage to the spillway</td>
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<td>Is there observed damage to the outlet?</td>
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<td>Is there observed damage to the monitoring equipment</td>
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**OTHER COMMENTS**

____________________________________________________________________________________

**SIGNATURE/INITIAL:**

---

Form to be filed under DM6 file # 27/3/1-* for Moody Creek, 27/3/2-* for McKinnon Creek
Hard copy to be filed in respective Data Book

---
APPENDIX H

DETENTION BASIN 1A DESIGN DRAWINGS

From GHD
Emergency Action Plan for Moody Creek Detention Basins

FOR APPROVAL

#4840721

Cairns City Council
Moody Creek Detention Basin
Bore Logs and Test Pits
FOR APPROVAL

C.E.C. Grants Number
70127-07
1-20-2007
20374-07

NOTES
1. REFER ORG. NO. 20251-07 FOR EXPLORATORY HOE LOCATIONS
2. THE INFORMATION IN BOXES REPRESENT THE INTERSECTIONS DRAWN BY THE GPS HISTORY FROM SURVEY OPERATIONS, WITH A 25-METER MAXIMUM DISTANCE BETWEEN MARKERS.
3. THE INFORMATION ON THE DETENTION BASIN IS BASED ON THE INFORMATION BASED ON THE INFORMATION PROVIDED BY THE CITY OF CAIRNS AND THE INFORMATION PROVIDED BY THE CITY OF CAIRNS CITY COUNCIL.
4. BORE LOGS AND TEST PITS ARE SUBJECT TO DETERMINATION OF THE CITY OF CAIRNS CITY COUNCIL.
APPENDIX I

DETENTION BASIN 1A STORAGE RELATIONSHIP CURVE

From GHD
Note: Translation from metres CCC datum to metres AHD is -100
APPENDIX J

DETENTION BASIN 1A DISCHARGE CURVE
Note: Translation from metres CCC datum to metres AHD is -100
APPENDIX K

EMERGENCY RESPONSE PROTOCOLS FOR FLOOD RELATED TRIGGER CONDITIONS AT DETENTION BASIN 1
F1: RAINFALL EXCEEDS 60 mm IN LESS THAN 1 HOUR, 83 mm IN LESS THAN 2 HOURS, OR 100 mm IN LESS THAN 3 HOURS (39% AEP EVENT)

ACTIVATION: **ALERT**

**Detention Basin 1 Site Conditions:**

Rainfall in excess of 60 mm in less than an hour, 83 mm in less than 2 hours or 100 mm in less than 3 hours is likely to commence filling of the basin. This may present a potential hazard to users of the open space inside the basin, but does not necessarily result in an emergency.

Significant discharge may occur through the low flow pipe.

If further rainfall occurs there may be flooding in downstream areas.

60 mm in less than an hour, 83 mm in less than 2 hours or 100 mm in less than 3 hours corresponds to approximately a 2 year recurrence (39%) event; however, the magnitude of the storm and consequent of flooding could be greater if such rain occurs over a shorter timeframe.

The Detention Basin sites should be readily accessible during this time for monitoring by the Site Supervisor and will continue so, until such time the rainfall intensity nears a 50 year recurrence (2% AEP) event level, where Ramsay Drive may be overtopped by one of the road crossing drains.

Incident Manager makes recommendation to LDMG-CR for issue of Cairns Alert McKinnon Creek Detention Basin EAP warnings.

**Actions:**

**Incident Manager**

- Notify persons listed in Table 4.1 (page 19).
- Nominate a Site Supervisor to monitor the sites.
- Monitor weather forecasts for the region.
- Actively monitor live video feed of the Detention Basins throughout the day

**Site Supervisor**

- Actively monitor the site throughout the day.
- Monitor water levels in the basin:
  - If water levels continue to rise, and approach or exceed the spillway crest level at 28.85m AHD, activate **Protocol F2**.
- Monitor weather forecasts for the region.
- Take action to prevent public access to the basin or basin crest.
- Monitor for flooding immediately downstream of Detention Basin 1 and Detention Basin 1A.
- Check for erosion downstream of the basin, particularly at the outlet from the low flow pipe:
  - If any erosion is noted, refer to **Protocol F6**.
Check for new or increased seepage flows through the basin, particularly near the low flow pipe outlet:
  o If new or increased seepage is noted, refer to Protocol F7.

If the detention basin levels are dropping and the discharge is being controlled by the pipe conduit, refer to Protocol F8 to check if all the conditions can be met to Stand Down.

F2: RAINFALL EXCEEDS 83 mm IN LESS THAN 1 HOUR, 115 mm IN LESS THAN 2 HOURS, OR 140 mm IN LESS THAN 3 HOURS (39% AEP EVENT); AND/OR

WATER LEVEL IN BASIN REACHES SPILLWAY CREST (28.85m AHD)

ACTIVATION: LEAN FORWARD

Detention Basin 1 Site Conditions:

Once the water level in the basin reaches 28.85m AHD, flows will commence over the spillway. As such, any further increase in the storage level will increase downstream flows significantly.

Actions:

Incident Manager

- If significant flooding is noted downstream, prepare a SITERP to advise persons/organisations in Table 4.2 (page 21) that there may be an increase in flooding as a result of spillway flows from the basin.
- Monitor weather forecasts for the region.
- Actively monitor live video feed of the Detention Basins.

Site Supervisor

- Monitor water levels in the basin:
  o If water levels rise to 29.00m AHD, activate Protocol F3.
- Monitor conditions along Ramsey Drive:
  o Maintain situational awareness of evacuation routes available to emergency personnel at the basin.
  o If significant, but not hazardous, flows start to occur across Ramsey Drive, evacuate all unnecessary personnel, including emergency response personnel, from the basin crest and the basin failure impact zone along Ramsey Drive (refer mapping in Appendix D).
- Continue to take action to prevent public access to the basin.
- Monitor for flooding downstream of Detention Basin 1 and Detention Basin 1A:
  - Advise Incident Manager if significant downstream flooding is noted.
- Check for erosion downstream of the basin, particularly at the outlet from the low flow pipe:
  - If any erosion is noted, refer to Protocol F6.
- Check for new or increased seepage through the basin embankment, particularly near the low flow pipe outlet:
  - If new or increased seepage is noted, refer to Protocol F7.
- If the detention basin levels are dropping and the discharge is being controlled by the pipe conduit, refer to Protocol F8 to check if all the conditions can be met to Stand Down.
F3: WATER LEVEL IN BASIN REACHES 29.00m AHD

ACTIVATION: STAND UP

Detention Basin 1 Site Conditions:

Once the water level in the basin reaches 29.00m AHD there is expected to be significant flooding across the downstream floodplain of Moody Creek, due to both outflows from Detention Basin 1 and flows along downstream tributaries not regulated by Basin 1.

Actions:

Incident Manager

- Prepare a SITREP (as per Appendix P) to advise persons/organisations in Table 4.2 (page 21) that there will be further increases in flooding as a result of spillway flows from the basin.
- Monitor weather forecasts for the region.
- Actively monitor live video feed of the Detention Basins.

Site Supervisor

- Monitor water levels in the basin:
  - If water levels come within 500 mm of the top of the embankment crest, activate Protocol F4.
- Monitor conditions along Ramsey Drive:
  - Regularly assess evacuation routes to the north and south.
  - If basin levels continue to rise then evacuation routes from the basin will be cut-off (refer to Protocol F4).
  - Site Supervisor to evaluate the situation and evacuate all remaining personnel from the site if necessary.
- Continue to take action to prevent public access to the basin.
- Continue to monitor flooding downstream of Detention Basin 1 and Detention Basin 1A.
- Check for damage to the spillway or the basin embankment:
  - If any damage or erosion is noted, refer to Protocol F6.
- Check for new or increased seepage through the embankment, particularly near the low flow pipe outlet:
  - If new or increased seepage is noted, refer to Protocol F7.
F4: WATER LEVEL WITHIN 500mm OF EMBANKMENT CREST

ACTIVATION: STAND UP

Detention Basin 1 Site Conditions:

If the water level in the detention basin comes within 500 mm of the crest of the embankment, there is an increased risk that the basin may be overtopped. Note that the water level may come within 500 mm of the top of the crest either as a result of the water filling the basin to 31.0m AHD, or as a result of damage to the embankment which has effectively lowered the crest height (locally or more widely spread).

Water levels approaching 31.0m AHD will generate extreme spillway flows (in the order of the PMF), and as a result extensive flooding is expected downstream from Detention Basin 1.

Detention Basin 1A is expected to be overtopped, which may cause failure of Basin 1A.

Actions:

Incident Manager

- Prepare a SITREP (as per Appendix P) to advise persons/organisations in Table 4.2 (page 21) that there will be further increases in flooding as a result of extreme spillway flows from the basin, and if water levels continue to rise there is a risk that the embankment may fail.
- Monitor weather forecasts for the region.
- Actively monitor live video feed of the Detention Basins.

Site Supervisor

- The evacuation routes from the basin along Ramsey Drive will be cut by this stage. Remaining personnel at the basin are to evacuate from the embankment crest and move to the higher ground near the Ramsey Drive roundabout.
- Monitor water levels inside the basin:
  - If water levels continue to rise, and approach the crest of the main embankment, activate Protocol F5.
- Check for overtopping of the embankment crest:
  - If overtopping of the crest, either as a result of the still water level rising, or as a result of wave action, then refer to Protocol F5.
  - If there are high winds, wave action may pose a hazard to personnel on the basin crest. Caution should be exercise by all personnel assigned to monitor the structure.
- Check for damage to the spillway or the basin embankment:
  - If any damage or erosion is noted, refer to Protocol F6.
- Check for seepage through the basin embankment:
  - If significant seepage is noted, refer to Protocol F7.
F5: OVERTOPPING OF THE EMBANKMENT CREST

ACTIVATION: STAND UP

Detention Basin 1 Site Conditions:

The general embankment of the basin is not expected to be overtopped during normal operation, even in the Probable Maximum Flood.

However, overtopping could occur as a result of excessive wave action in the basin, or where damage causes a lowering of the embankment crest. Note the structure is able to tolerate some minor overtopping of the crest as a result of wave action.

Overtopping may also occur as a result of excessive filling of the basin if the overflow spillway becomes obstructed. However, the spillway is unlikely to become obstructed and there is additional by-wash capacity along Ramsey Drive, so overtopping as a result of excessive filling is unlikely.

Actions:

Incident Manager

- Notify persons/ organisations in Table 4.2 (page 21) that failure of Detention Basin 1 could occur. This may lead to failure of Detention Basin 1A, if not already failed. Substantial flooding is expected downstream.
- The Emergency Alert messages provided in Appendix M are to be issued to all residents within the Category 2 basin failure flood warning polygon, also provided in Appendix M. Note that the Category 2 warning polygon is based on a crest failure impact during the modelled PMF event. The height of the flood wave is expected to be between 0.3 and 1.7 metres above the existing depth of flooding.
- Downstream of the failure impact zone (refer Appendix E and Appendix F) the height of the flood wave is expected to be less than 0.3 metres.
- If not already evacuated, all areas within the warning polygon are to be evacuated immediately.

The flood wave travel time from the failed Basin 1A to the first downstream house is approximately 2 minutes, and is about 18 minutes to Moody Street.

Site Supervisor

- Notify the Incident Manager of the basin condition.
- All remaining personnel are to evacuate from the basin crest to the higher ground near the Ramsey Drive roundabout.
- If possible, continue to monitor and record rainfall and water levels in the basin.
- Check for damage to the spillway or the basin embankment:
  - If any damage or erosion is noted, refer to Protocol F6.
- Check for seepage through the basin embankment:
  - If significant seepage is noted, refer to Protocol F7.
F6: DAMAGE TO THE SPILLWAY OR EMBANKMENT TOE

ACTIVATION: **STAND UP**

Detention Basin 1 Site Conditions:

Signs that the spillway could be damaged and/or the toe of the embankment is eroding:

- Uneven flow across the spillway crest, in the spillway chute or in the stilling basin;
- The presence of standing waves or “roosters tail” formations in the spillway chute;
- Shifting or movement of the concrete slabs forming the spillway;
- Erosion of embankment material on the outside of the spillway sidewalls;
- Erosion of embankment material around the outlet of the low flow pipe;
- Muddy appearance of flows downstream from the structure.

The appearance of any of the above during operation of the spillway (or during filling of the basin) indicates that failure of the embankment may be occurring. Immediate action should be undertaken to ensure the safety of those monitoring the structure and downstream residents.

**Actions:**

**Incident Manager**

- Notify persons/organisations in Table 4.2 (page 21) that failure of Detention Basin 1 could occur. This may lead to failure of Detention Basin 1A, if not already failed. Substantial flooding is expected downstream.
- If water levels in the basin are more than 200mm higher than the spillway crest level, the Emergency Alert messages provided in Appendix M are to be issued to all residents within the Category 2 basin failure warning polygon, also provided in Appendix M. All areas within the warning polygon are to be evacuated immediately. Note that the Category 2 warning polygon is based on a crest failure impact during the modelled PMF event. The height of the flood wave is expected to be between 0.3 and 1.7 metres above the existing depth of flooding.
- If water levels in the basin are less than 200mm higher than the spillway level (or lower than the spillway level), the Emergency Alert messages provided in Appendix N are to be issued to all residents within the Category 1 basin failure warning polygon, also provided in Appendix N. All areas within the warning polygon are to be evacuated immediately. Note that the Category 1 warning polygon is based on a piping failure impact during the modelled Q20 event, being approximately equivalent to the spillway level event. The height of the flood wave is expected to be between 0.3 and 2.2 metres above the existing depth of flooding.
- Downstream of the failure impact zone (refer Appendix E and Appendix F) the height of the flood wave is expected to be less than 0.3 metres.

The flood wave travel time from the failed Basin 1A to the first downstream house is approximately 2 minutes, and is about 18 minutes to Moody Street.
Site Supervisor

- Notify the Incident Manager of the basin condition immediately.
- Monitor conditions along Ramsey Drive:
  - All site personnel are to evacuate from the basin crest to adjacent high areas on Ramsey Drive.
  - Maintain situational awareness of evacuation routes available to site personnel.
- If possible, continue to monitor and record rainfall and water levels in the basin.
- Monitor flooding levels downstream of Detention Basin 1 and Detention Basin 1A.
- If safe access to the site is available by machinery and trucks, attempt to stabilise the eroded areas using large rocks.
F7: INCREASE IN SEEPAGE OR NEW AREAS OF SEEPAGE

ACTIVATION: STAND UP

Detention Basin 1 Site Conditions:

The appearance of new locations of seepage or a significantly increased rate of seepage through the embankment, particularly if the seepage is muddy or cloudy, while the structure is impounding water indicates that failure of the structure may be occurring. Immediate action should be undertaken to ensure the safety those monitoring the structure and downstream residents.

Particular attention should be given to monitoring areas around the low flow pipe outlet.

Actions:

Incident Manager

- Notify persons/ organisations in Table 4.2 (page 21) that failure of Detention Basin 1 could occur. This may lead to failure of Detention Basin 1A, if not already failed. Substantial flooding is expected downstream.
- If water levels in the basin are more than 200mm higher than the spillway crest level, the Emergency Alert messages provided in Appendix M are to be issued to all residents within the Category 2 basin failure warning polygon, also provided in Appendix M. All areas within the warning polygon are to be evacuated immediately. Note that the Category 2 warning polygon is based on a crest failure impact during the modelled PMF event. The height of the flood wave is expected to be between 0.3 and 1.7 metres above the existing depth of flooding.
Site Supervisor

- Notify the Incident Manager of the basin condition immediately.
- Monitor conditions along Ramsey Drive:
  - All site personnel are to evacuate from the basin crest to adjacent high areas on Ramsey Drive.
  - Maintain situational awareness of evacuation routes available to site personnel.
- If possible, continue to monitor and record rainfall and water levels in the basin.
- Monitor flooding levels downstream of Detention Basin 1 and Detention Basin 1A.
- If safe access to the site is available, attempt to plug the seepage locations using sandbags, earth, cement or grout.
- If water levels in the basin are less than 200mm higher than the spillway level (or lower than the spillway level), the Emergency Alert messages provided in Appendix N are to be issued to all residents within the Category 1 basin failure warning polygon, also provided in Appendix N. All areas within the warning polygon are to be evacuated immediately. Note that the Category 1 warning polygon is based on a piping failure impact during the modelled Q20 event, being approximately equivalent to the spillway level event. The height of the flood wave is expected to be between 0.3 and 2.2 metres above the existing depth of flooding.
- Downstream of the failure impact zone (refer Appendix E and Appendix F) the height of the flood wave is expected to be less than 0.3 metres.
- The flood wave travel time from the failed Basin 1A to the first downstream house is approximately 2 minutes, and is about 18 minutes to Moody Street.
**F8: DETENTION BASIN LEVELS DROPPING AND DISCHARGE CONTROLLED BY PIPE CONDUIT ACTIVATION: STAND DOWN**

**Detention Basin 1 Site Conditions:**

Flood receding with levels in the detention basin dropping.

Discharges controlled by the outlet pipe conduit or the basin is no longer impounding water

No significant rainfall has occurred since drawdown

No further significant rainfall is forecast; and

Any contamination has been contained and/or blockages have been cleared form the low flow conduit

The incident manager and site supervisor is to continue to document the event with times, photographs, notes, video, communication logs and maintain communications.

Following the event, the General Manager Infrastructure Services, Cairns Regional Council or their representative will direct staff experienced in dam design, maintenance operation will conduct a visual inspection of the detention basin immediately after the emergency.

**Actions:**

**Incident Manager**

- Prepare a final SITREP to advise persons/organisations in Table 4.2 (page 21).

**Site Supervisor**

- Monitor water levels inside the basin:
- Issue a final notification advising the end of the emergency event.
- If safe access to the site is possible, attempt to locate isolated areas of defect in the basin and document.
APPENDIX L

EMERGENCY RESPONSE PROTOCOLS FOR NON-FLOOD RELATED TRIGGER CONDITIONS AT DETENTION BASIN 1
N1: EARTHQUAKE
ACTIVATION: N/A

Detention Basin 1 Site Conditions:
If seismic activity is noted in the vicinity of the basin it is possible that the structure may have been
damaged or has undergone slumping of the embankment crest.

Immediately initiate a routine inspection of the site and should there be any noted defects, then also
schedule a periodic inspection with an experienced Engineer.

Actions:

Incident Manager
- Nominate a Site Supervisor to inspect and monitor the condition of the structure.
- Monitor weather forecasts for the region.

Site Supervisor
- Monitor weather forecasts for the region:
  - If more than 180 mm of rainfall is expected to occur in less than 48 hours, or if the
    basin begins to impound water, activate Protocol F1.
  - As the structure may have been damaged, be prepared to escalate the flood
    emergency response more rapidly than otherwise would be the case.
- Conduct a visual inspection of the basin to look for signs of damage to the main embankment,
  spillway or low flow outlet pipe. Check if the spillway crest has cracked or slumped.
- Communicate basin condition to the Incident Manager.
- Arrange for a ground survey of the basin embankment to determine whether the crest of the
  embankment or spillway has slumped.
- Arrange for a Special Inspection, by an experienced dam engineer to inspect the structure
  and advise on the safety of the structure and any repair works required.
- Arrange for repair works to be undertaken.
N2: DIFFERENTIAL MOVEMENT OR PARTIAL COLLAPSE OF THE BASIN
ACTIVATION: N/A

Detention Basin 1 Site Conditions:

This protocol is activated on the receipt of advice that the basin has experienced differential movement between various components of the basin; for example, if the spillway walls move relative to the spillway base.

This protocol also covers any partial collapse of the structure, including the main embankment; for example, due to a slip or sliding failure.

Actions:

Incident Manager

- Nominate a Site Supervisor to inspect and monitor the condition of the structure.
- Monitor weather forecasts for the region.

Site Supervisor

- Monitor weather forecasts for the region:
  - If more than 180 mm of rainfall is expected to occur in less than 48 hours, or if the basin begins to impound water, activate Protocol F1.
  - As the structure may have been damaged, be prepared to escalate the flood emergency response more rapidly than otherwise would be the case.
- Conduct a visual inspection of the basin to look for signs of damage to the main embankment, spillway or low flow outlet pipe. Check if the spillway crest has cracked or slumped.
- Communicate basin condition to the Incident Manager.
- Arrange for a ground survey of the basin embankment to determine whether the crest of the embankment or spillway has slumped or been eroded.
- Arrange for a Special Inspection, by an experienced dam engineer to inspect the structure and advise on the safety of the structure and any repair works required.
- Arrange for any repair works to be undertaken.
N3: LANDSLIDE INTO THE BASIN

ACTIVATION: N/A

Detention Basin 1 Site Conditions:

A landslide of the natural slopes that form the basin may lead to damage of the basin embankment, and also blockage of the low flow outlet pipe.

Actions:

Incident Manager

- Nominate a Site Supervisor to inspect and monitor the condition of the structure.
- Monitor weather forecasts for the region.

Site Supervisor

- Monitor weather forecasts for the region:
  - If more than 180 mm of rainfall is expected to occur in less than 48 hours, or if the basin begins to impound water, activate Protocol F1.
  - As the structure may have been damaged, be prepared to escalate the flood emergency response more rapidly than otherwise would be the case.
- If the northern slope of the basin has collapsed into the basin, arrange an inspection of the slope by a suitably qualified geotechnical engineer.
  - Do not enter the basin until this inspection has been completed and the geotechnical engineer has confirmed that no further collapse is expected.
  - Engineer to specify any works required to rectify any further instability of the basin slopes.
- Conduct a visual inspection of the basin to look for signs of damage to the main embankment, spillway or low flow outlet pipe. Check if the spillway crest has cracked or slumped.
- If the low flow pipe has become blocked by debris or landslide material, it may be necessary to use a portable pump to remove water from the basin:
  - The drawdown of water must be conducted under the supervision of a geotechnical engineer to monitor for destabilisation of the basin embankment or surrounding terrain.
  - Use the pump to bypass the low flow pipe for as long as necessary to clear or repair the pipe.
- Arrange for a ground survey of the basin embankment to determine whether the crest of the embankment or spillway has slumped or been eroded.
- Arrange for a Special Inspection, by an experienced dam engineer to inspect the structure and advise on the safety of the structure and any repair works required.
- Communicate basin condition to the Incident Manager.
N4: DAMAGE TO THE DETENTION BASIN

ACTIVATION: N/A

Detention Basin 1 Site Conditions:

This protocol is to be activated on receipt of advice that damage to the basin has occurred, including damage to any associated structures:

- The main embankment and crest;
- The spillway and stilling basin;
- The low flow pipe and energy dissipater;
- Rip-rap and scour protection upstream or downstream of the embankment.

Damage may be accidental or deliberate; for example, accidental damage may arise due to excavation associated with the installation of pipes or conduits on the embankment along Ramsey Drive.

Actions:

Incident Manager

- Nominate a Site Supervisor to inspect and monitor the condition of the structure.
- Monitor weather forecasts for the region.

Site Supervisor

- Monitor weather forecasts for the region:
  - If more than 180 mm of rainfall is expected to occur in less than 48 hours, or if the basin begins to impound water, activate Protocol F1.
  - As the structure may have been damaged, be prepared to escalate the flood emergency response more rapidly than otherwise would be the case.
- Conduct a visual inspection of the basin to look for signs of damage to the main embankment, spillway or low flow outlet pipe. Check if the spillway crest has cracked or slumped.
- Communicate basin condition to the Incident Manager.
- Arrange for a ground survey of the basin embankment to determine whether the crest of the embankment or spillway has slumped or been eroded.
- Arrange for a Special Inspection, by an experienced dam engineer to inspect the structure and advise on the safety of the structure and any repair works required.
- Arrange for any repair works to be undertaken.
N5: BLOCKAGE OF THE LOW FLOW OUTLET PIPE
ACTIVATION: N/A

Detention Basin 1 Site Conditions:

Blockages of the low flow pipe may occur at the trash rack on the upstream end of the pipe, inside the pipe, or in the energy dissipater at the downstream end of the structure.

Note that blockage of the low flow pipe does not compromise the capacity of the basin to safely pass a flood up to and including the PMF. However, it does reduce the flood mitigation capacity of the structure during lesser events, such as the 20 and 100 year ARI events, and hence increase flooding can be expected downstream.

Conditions which may result in longer term impoundment of water can increase the likelihood of seepage and reduce embankment stability. However, the detention basin has been designed to account for longer term water impoundment resulting from blockage of the low flow pipe.

Actions:

Incident Manager

- Nominate a Site Supervisor to inspect and monitor the condition of the structure.
- Monitor weather forecasts for the region.

Site Supervisor

- Monitor weather forecasts for the region:
  - If more than 180 mm of rainfall is expected to occur in less than 48 hours, or if the basin begins to impound water, activate Protocol F1.
  - As the structure may have been damaged, be prepared to escalate the flood emergency response more rapidly than otherwise would be the case.
- If the northern slope of the basin has collapsed into the basin, refer to Protocol N3.
- If the basin is impounding water, it may be necessary to use a portable pump to remove water from the basin:
  - The drawdown of water must be conducted under the supervision of a geotechnical engineer to monitor for destabilisation of the basin embankment or surrounding terrain.
  - Use the pump to bypass the low flow pipe for as long as necessary to clear the blockage.
  - If it is safe to do so, clear the blockage from the pipe.
- Communicate basin condition to the Incident Manager.
APPENDIX M

CATEGORY 2 BASIN FAILURE (OVERTOPPING FAILURE IN PMF) WARNING POLYGON AND EMERGENCY ALERT MESSAGES
Emergency Action Plan for Moody Creek Detention Basins

FOR APPROVAL

#4840721
### APPENDIX 5: EMERGENCY ALERT REQUEST FORM

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**Incident/Event:** 
Flash Flood - Cat 2 Moody Ck Detention Basin Failure

**Requesting Officer:** (Name, contact number and email address, position, Local Government)
CairnsDCC@cairns.qld.gov.au / Local Disaster Coordinator / Cairns Regional Council

**Prepared By:** 
**Position:**

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Cyclone</th>
<th>Flash Flood</th>
<th>Flood</th>
<th>Storm Surge</th>
<th>Tsunami*</th>
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</thead>
<tbody>
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<td>Other (please specify):</td>
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</tbody>
</table>

*NB. Tsunami EA campaigns will be sent as Location Based Text Message ONLY*

**Message Severity**
- [ ] Emergency Warning*  
- [ ] Watch & Act  
- [ ] Advice

**Campaign Mode**
- [ ] Voice  
- [ ] SMS – Location Based  
- [ ] SMS – Service Address Based

**LDMG Advised?**
- [ ] YES  
- [ ] NO  
**DDC Advised?**
- [ ] YES  
- [ ] NO

**Threat Direction Required?**
- [ ] YES  
- [ ] NO  
**Note:** Can only be used for Emergency Warnings. Indicate direction on map.

### 1. EA Polygon Area:
- [ ] Map attached

#### 2. Spatial format:
- Use only these file extensions: 
  - ESRI: *.dbf, *.prj, *.shp, *.shx
  - GML: *.gml, *.xsd
  - KML: *
  - MapInfo TAB: *
  - MapInfo Mid/Mif: 
    - *dat, *jd, *.map, *.tab
    - *.MID, Sequence, *.mif

- Indicate the format used: 
  - For spatial data, is it supplied via: 
    - [ ] DMportal - specify filenames below
    - [ ] FTP - specify filenames below
  - Filename: [ ] Other (please specify)

#### 3. Handwrite (please use capitals for clarity) or Type Voice message (Ideally message should be less than 156 characters).

Flash Flood advice from Council. Areas in Kanimbla, Manunda and to the south within Moody Creek catchment are likely to experience rapidly rising water levels and inundation over the next five minutes, posing an immediate danger to residents. Potential for large flood wave exceeding zero point three metres high due to possible failure of Moody Creek Detention Basin. Warn neighbours. Move to higher ground now. Listen to local radio.

#### 4. Type or handwritten SMS below (maximum of 140 characters including spaces)

Flash Flood Advice from Council for Kanimbla and Manunda. Immediate threat to life/property. Warn others. Seek higher ground NOW. Listen to radio.

### For use by SDCC
- Authorising Officer Name:

### EA User Name:

**EA Guidelines and the Emergency Alert Request Form Template are available at:** www.disaster.qld.gov.au
APPENDIX N

CATEGORY 1 BASIN FAILURE (PIPING FAILURE IN Q20 EVENT) WARNING
POLYGON AND EMERGENCY ALERT MESSAGES
Emergency Action Plan for Moody Creek Detention Basins

FOR APPROVAL

#4840721
## APPENDIX 5: EMERGENCY ALERT REQUEST FORM

### Incident/Event:
Flash Flood - Cat 1 Moody Ck Detention Basin Failure

### Requesting Officer:
[Details redacted]

### Coordinator / Cairns Regional Council

### Prepared By:

### Event Type
- □ Cyclone  □ Flash Flood  □ Flood  □ Storm Surge  □ Tsunami
- □ Bushfire  □ Chemical Spill  □ Fire Incident  □ Smoke or Toxic Plume
- □ Other (please specify):

*N.B. Tsunami EA campaigns will be sent as Location Based Text Message ONLY*

### Message Severity
- □ Emergency Warning**  □ Watch & Act  □ Advice

**N.B. activates the SEWS

### Campaign Mode
- □ Voice  □ SMS – Location Based  □ SMS – Service Address Based

### LDMG Advised?
- □ YES  □ NO

### DDC Advised?
- □ YES  □ NO

### Threat Direction Required?
- □ YES  □ NO  Note: Can only be used for Emergency Warnings. Indicate direction on map

### 1. EA Polygon Area:
- □ Map attached

### 2. Spatial Format:
- Use only these file extensions:
  - *.dbf, *.prj, *.shp, *.shx
  - *.gml, *.xml
  - *.kml
  - *.shx, *.map, *.tab
  - *.dat, *.id, *.map, *.tab
  - *.MIDI Sequence, *.mif

- Indicate the format used: □

- For spatial data, it is supplied via:
  - DMportal - specify filenames below
  - FTP - specify filenames below

- Filename: □

- Email: □

- Other (please specify):

### 3. Handwrite (please use capitals for clarity) or Type Voice message (ideally message should be less than 450 characters).
Flash Flood advice from Council. Areas in Kanimbila, Manunda and to the south within Moody Creek catchment are likely to experience rapidly rising water levels and inundation over the next five minutes, posing an immediate danger to residents. Potential for large flood wave exceeding zero point three metres high due to possible failure of Moody Creek Detention Basin. Warn neighbours. Move to higher ground now. Listen to local radio.

### 4. Type or handwrite SMS below (maximum of 160 characters including spaces)
Flash Flood Advice from Council for Kanimbila and Manunda. Immediate threat to life/property. Warn others. Seek higher ground NOW. Listen to radio.

---

For use by SDCC

Authorising Officer: Name:

EA User Name:

Manual Transmission: □

EMS Transmission: □

EMS Report ID:

---

*EA Guidelines and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au*
APPENDIX O

Remote Monitoring Station Details
Remote Monitoring Station Login Details

It is recommended that each user set up their own account, however if required, a general login is below.

<table>
<thead>
<tr>
<th>CCTV Access</th>
<th><a href="https://cairns.dataonline.net.au/login">https://cairns.dataonline.net.au/login</a></th>
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</thead>
<tbody>
<tr>
<td>Login Username</td>
<td>council123</td>
</tr>
<tr>
<td>Login Password</td>
<td>council123</td>
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</table>

<table>
<thead>
<tr>
<th>Monitoring Data Access</th>
<th><a href="https://www.dataonline.io/">https://www.dataonline.io/</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Login Username</td>
<td>council123</td>
</tr>
<tr>
<td>Login Password</td>
<td>council123</td>
</tr>
</tbody>
</table>

Example Monitoring Outputs (from Moody Creek Detention Basin 1)
APPENDIX P

Event Log and SITREP
## Event Log

<table>
<thead>
<tr>
<th>Serial</th>
<th>Time</th>
<th>From</th>
<th>To</th>
<th>Item / Event</th>
<th>Comments / Action</th>
</tr>
</thead>
<tbody>
<tr>
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*Record all major observations, decisions, actions, messages IN and OUT etc*
### Situation Report for Moody Creek Detention Basin Emergency

<table>
<thead>
<tr>
<th>Advice Number:</th>
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<tbody>
<tr>
<td>Date:</td>
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<tr>
<td>Time of issue:</td>
<td></td>
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<td>Sent by:</td>
<td></td>
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</table>

#### Current Water Levels

<table>
<thead>
<tr>
<th>Location</th>
<th>Level (m AHD)</th>
<th>Rate of Rise since last advice (m per hour)</th>
<th>Time of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moody Creek Detention Basin</td>
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</tbody>
</table>

#### Current Spillway Operation

<table>
<thead>
<tr>
<th>Location</th>
<th>Spillway Outflow Level (m AHD)</th>
<th>Spillway Outflow (m3 per second)</th>
<th>Time of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moody Creek Detention Basin</td>
<td></td>
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#### Rainfall

<table>
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<td>Element</td>
<td>Report</td>
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</tr>
<tr>
<td>Current Detention Basin Condition</td>
<td>Advise physical changes to detention basin wall including damage to the wall, spillway or outlet.</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>Describe the major occurrences/events in the reporting period, actions taken and resources deployed. Cross-ref to any other outputs submitted since the last SITREP if appropriate.</td>
<td></td>
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<tr>
<td>Intentions</td>
<td>Describe actions planned for the next reporting period including staffing and resources; and mid-longer-term intentions.</td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td>Highlight any issues that may impact on CRC achieving its desired outcomes; that may attract media attention; or that are likely to have major community consequences.</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Insert any administrative or other issues that need to be advised to CRC or its stakeholders.</td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>Include an overall assessment of the situation from CRC's perspective.</td>
<td></td>
</tr>
</tbody>
</table>