SECTION 1

QFCI

Date: 27/05/11 JM

Exhibit Number: 508

TABLE OF CONTENTS

CONTROLLED COPY DISTRIBUTION

Copy Number	Position	Location
1	Storage Supervisor, Leslie Dam	SunWater – Leslie Dam
2	Service Manager/ EEC	SunWater – Toowoomba
3	Area Operations Manager	SunWater - Area Operations Centre – South - Toowoomba
4	Manager, Asset Management	SunWater, Brisbane
5	Director, Dam Safety (Water Supply), Water Industry Compliance	DERM (Dept of Environment and Resource Management), Brisbane
6	Counter Disaster Executive Officer – Southern Downs Regional Council	Warwick Shire Council
7	Emergency Services Chemical hazards & Emergency Management Unit	EMQ - Brisbane
8	District Disaster Coordinator (Warwick)	Police, Warwick Qld
9	Police (Warwick)	Police, Warwick Qld
10	Director Disaster Management Services, Emergency Management Queensland	State Disaster Coordination Centre - Department of Community Safety, Brisbane
Note: For Phone numbers and addresses of *'Controlled Copy Holders'* - See Section 3.		

DOCUMENT CONTROL SHEET

CONTROLLED COPY NUMBER: 4

AUTHORISATION:

Approved by: [redacted]
(Manager, Asset Management)

Date: Nov 10

ISSUE 2 of this EAP was prepared by Dam Safety Unit, IM, Brisbane.

REVISION STATUS:

Issue-Revision Number	Revision Description	Section	Revision Date
Issue 2-0	Substantial review of Leslie Dam Emergency Action Plan to reflect SunWater Management Structure and updated inundation maps.		JANUARY 08

Note: Future updates to the Notification and Emergency Communication List (Section 3) as required by the Regulator (See Dam Safety Condition Schedule – Section 10) shall be compiled by the relevant SunWater Area Operations Centres and saved in HB File 08-000388/001. Once updating has been finalised the Area Operations Manager/Service Manager shall notify the Senior Engineer Headworks (SEH) – Brisbane, and the SEH will approve and organise the printing and distribution of this updated information to the '*Controlled Copy Holders*' (see Section 3 for Phone numbers and addresses).

AMENDMENTS / SUGGESTIONS:

Suggestion Number	Description Note: Any suggestion or comment should be forwarded to Principal Engineer (Dam Safety), Brisbane.	Section	Suggestion Date
Issue 2-1 1A	Amendments to Sections 1, 2, 3, 5, and 10 Controlled Copy Sheet Update	1, P2	November '10

SECTION 2

SECTION 2

EMERGENCY EVALUATION PROCEDURE

Definition of Action

Action & Lead Roles	
ACTION 1 (See Fig.1) **DDO**	**Localised Incident / Near Miss** Generally, this Action will **not** escalate to an emergency. The incident is managed by routine procedures and existing resources available on site, and is locally contained with a short term impact (generally reported in the monthly Dam Surveillance Report).
ACTION 2 (See Fig.2) 1. DDO 2. EEC	**Emergency** May or may not result in the activation of the Crisis Management Plan. The incident requires a coordinated local response together with an overview, advice and action from an expert on subject matter, and who is usually located in the Brisbane Office. All Flood Events at or above Full Supply Level will require the Dam Duty Operator (DDO) to inform (by phone), the Emergency Event Coordinator (EEC) who will initiate the ACTION 2 emergency procedure.
ACTION 3 (See Fig.2 and Fig.3) 1. DDO 2. EEC 3. Dam Safety – Technical Advisor 4. Owner's Area Representative	**Crisis/Disaster** The incident may result in Critical or Catastrophic Consequences, and may be an escalation of an ACTION 2 emergency procedure (see Fig.2) or an incident which initially requires crisis management (see Fig.3). If a staff member at the Dam is made aware of an imminent dam failure he/she should inform the Dam Duty Operator who, following an inspection and evaluation of the dam will contact (by phone), the Emergency Event Coordinator. The EEC will then initiate ACTION 3 (see Fig.3) if there is a potential for Dam failure to occur. If this potential exists the incident requires significant diversion of management attention, time, energy and resources away from normal operation. Crisis Management Plan and Team **may** be activated.

Definition of Roles and Titles

SunWater Personnel:

* Only one person to be contacted

Role and Responsibilities	Current Position Title & *Order of Contact** (May be undertaken by one person or jointly between any of the following personnel depending on availability and/or Emergency Event Scenario)	Abbreviation
Owner's Area Representative • Follow standard SunWater protocols • Overall responsibility for water supply in the Area Operations Centre (AOC) • Delivering the Dam Safety Program in the AOC • Provide emergency management, dam safety training to the relevant staff • Arrange dam specific training and accreditation for relevant staff • Arrange training and a roster for EEC role and provide dedicated mobile phone for emergency contact • Arrange back-up officer for the EEC role • Provide funds for emergency management • Be prepared with appropriate training and make themselves available to assume EEC role at short notice • Make contacts as given in Action Flow Charts • Liaise with EEC (when not on roster on) • Liaise with SunWater Management • Local media liaison • Liaise with PEDS and MAM in Brisbane	1 Area Operations Manager 2 Service Manager	AOM SM
Owner's Representative/Technical Decision Maker • Follow standard SunWater protocols • Analyse the emergency event and provide expert technical advice • Discuss Emergency Scenario with Peers and other technical experts and make sound decisions to mitigate the risk	1 Principal Engineer Dam Safety 2 Senior Engineer Headworks 3 Chief Civil Engineer 4 Manager Asset Management 5 Environmental Manager	PEDS SEH CCE MAM EM
Flood Operation Centre (FOC) Duty Engineer • Extract data relative to the event from available sources • Utilise this data in predictive flood models and determine results from these models • Use these results in conjunction with data obtained from BOM and inform the predictions agreed with BOM to the EEC • Liaise with the PEDS and the EEC to update current flood situation and routing data	1 Flood Operations Engineer on roster 2 Senior Engineer Flood Operations 3 Chief Civil Engineer 4 Principal Engineer Dam Safety	FOE SEFO CCE PEDS

Role and Responsibilities	Current Position Title & *Order of Contact** (May be undertaken by one person or jointly between any of the following personnel depending on availability and/or Emergency Event Scenario)	Abbreviation
Flood Operation Centre (FOC) Coordinator • Coordinate flood operation teams • Liaise with SEFO, Duty Engineers, and Data Monitors • Decide if a flood is imminent and recommend modes of operation • Ensure team is trained	1 Principal Engineer Dam Safety 2 Manager, Asset Management 3 Senior Engineer Headworks	PEDS MAM SEH
Dam Safety Technical Advisor (For Action 2 with the possibility of dam failure) • Follow standard SunWater protocols • Analyse the emergency event and provide expert technical advice • Discuss Emergency Scenario with Peers and other technical experts and make sound decisions to mitigate the risk • Advise Area Operation Centres on dam safety issues • Issue warning on dam failure and advise on protective measures • Assume Dam Owner's Representative/Technical Decision Makers Role, when required • Liaise with SEH; BOM; FOC; EEC • Advise SunWater Management • Advise Corporate Relations Manager (CRM) • Liaise with Regulator as advised by GMIM and the CEO	1 Principal Engineer Dam Safety 2 Manager Asset Management 3 Chief Civil Engineer 4 Senior Engineer Headworks	PEDS MAM CCE SEH
Communicator – Public • Follow standard SunWater protocols • Analyse sensitive issues, discuss with the Owner and issue media releases • Handle public and customer comments and advise the owner	1 Corporate Relations Manager 2 Media Advisor	CRM MA
Owner • Follow standard SunWater protocols • Liaise with the communicators • Liaise with the Board, Dam Safety Regulator and Minister • Activate Crisis Management Plan and Crisis Management Team	1 General Manager Infrastructure Management 2 Chief Executive Officer	GMIM CEO

* Only one person to be contacted

Role and Responsibilities	Current Position Title & *Order of Contact** (May be undertaken by one person or jointly between any of the following personnel depending on availability and/or Emergency Event Scenario)	Abbreviation
Emergency Event Co-ordinator • Follow standard SunWater protocols • Liaise with the Dam Duty Officer and confirm Emergency Scenario • Liaise with the DDO, PEDS, MAM, FOC Duty Officer, Area Representative, Disaster Management Groups, and coordinate emergency action • Arrange notification as described in Action Flow Charts • Record notifications and observations	Varies – see Roster	EEC
Dam Duty Operator • Follow standard SunWater protocols • Follow training in EAP activation • Complete accreditation to operate and maintain relevant storage • Follow the procedures in the EAP • Make an initial assessment, liaise with the EEC and determine Emergency scenario • Arrange immediate site inspection and make informed assessment of the situation • Record notifications and observations • Implement preventative measures as directed by EEC or SM • Follow action sheets – section 5 for emergency scenario and complete the record sheets in section 6, finalise Emergency event report together with EEC • Arrange to send 'Alert Notification' under Action 3 – See Section 10 for copy of 'Alert Notification' (SIMON Procedure)	1 Storage Supervisor 2 Operator Maintainer	SS OM

External Agencies :

Role and Responsibilities	Current Position Title & *Order of Contact** (May be undertaken by one person or jointly between any of the following personnel depending on availability and/or Emergency Event Scenario)	Abbreviation
Police • Conduct emergency operations • Co-ordinate and support to SunWater during a declared emergency at the dam • Liaise with relevant organisations • Evacuation of persons, if required • Control of essential traffic • Security of specific area	District Disaster Co-ordinator Local Police	DDC
Disaster Management Personnel • (LGDMG) Decide what Resources are needed, when they are needed, and how best to supply such resources so as to minimise hardship and suffering • (LGDMG) Provision and control of council man power and equipment as required • (LGDMG) Provision of emergency accommodation • (CD & RS) Conduct emergency operations • (CD & RS) Point of contact for State Government response to emergency situation • (DDM) Co-ordination of District Response and provide management of, and coordinate whole of Government support to, disaster stricken communities • (CTLO) Identifies Areas of Concern during the preparation of disaster plans and provides advice during counter terrorism emergency events	1 Local Government Disaster Management Group 2 Counter Disaster and Rescue Services 3 District Disaster Manager 4 Counter Terrorism Liaison Officer	LGDMG CD&RS DDM CTLO
Dam Safety Regulator • Liaison with relevant Minister on necessary actions	Director Dam Safety	DDS

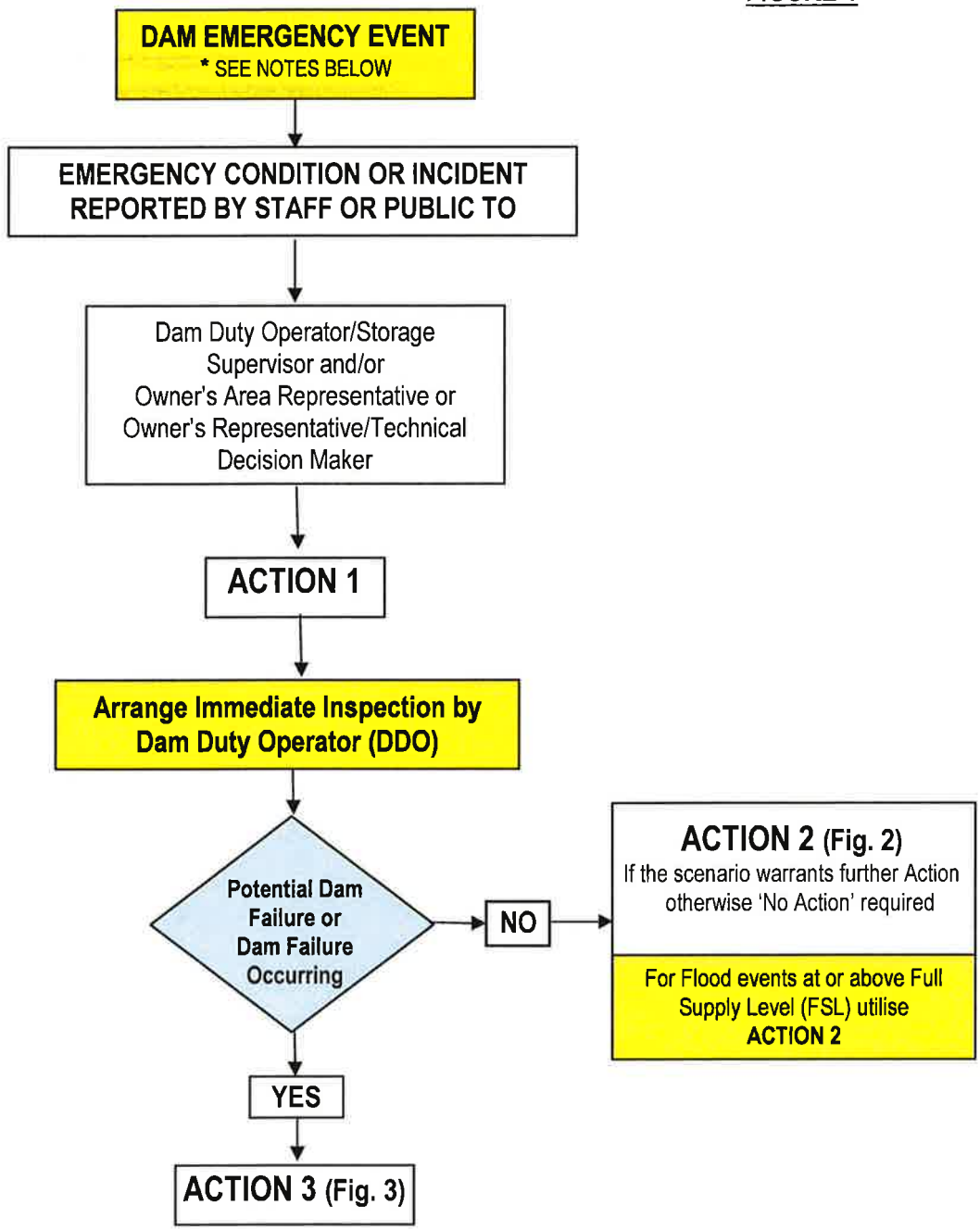
* Only one person to be contacted

NOTE: The above Table shows Roles (and Responsibilities) and Current Position Titles of personnel filling these Roles. To minimise changes to Sections of the EAP due to future potential changes to organisational structure and/or Position Titles and responsibilities, Roles have been utilised throughout the EAP and can be referenced to the responsible personnel indicated in the Table above.

For current contact details, see Section 3

EMERGENCY EVALUATION PROCEDURE – ACTION 1

FIGURE 1



NOTES:

1. All communication (advice) to be conducted in person, or via telephone.
2. The Procedure is intended to cover short term Emergency or Dam Safety Incident.
3. The Procedure is not intended for activation as a result/outcome of an extended analytical safety review of the dam.
4. Telephone numbers are available in the Notification & Emergency Communication List in Section 3.
5. For the Definition of Roles – See Page 2, Section 2

EMERGENCY EVALUATION PROCEDURE
ACTION 2

FIGURE 2

START

DAM DUTY OPERATOR (DDO)
Arrange an immediate inspection of the Dam if it has not been done already

DETERMINE SCENARIO

ADVISE the EEC (by telephone) and Adopt Emergency Event Operation

* See Note above

EMERGENCY EVENT COORDINATOR (EEC)
Initiates ACTION 2

ACTION 2

Possibility of Dam Failure?

NO

ADVISE

- AREA OPERATIONS CENTRE – Owner's Area Representative
- Disaster Management
- SUNWATER HEAD OFFICE – Owner's Representative/ Technical Decision Maker
- Flood Operation Centre (FOC) Coordinator
- Flood Operations Centre (FOC) Duty Engineer – ADVISE – Predictive model results in conjunction with BOM

LIAISES

- SUNWATER HEAD OFFICE – Owner → Dam Safety Regulator
- Communicator - Public → Obtain current information from **EEC**. For **Emergency scenarios** use Media Release Templates - See Section 10 **for** : Water Release/Spillway overflows; Water Quality; Mechanical/Structural Issue; Infrastructure Threat

Refer Section 5 (5.4) Action1 and Relevant Action Sheets for various other Scenarios
Record information in forms shown in Section 6
Above is applicable to personnel completing forms provided in EAP

Emergency Scenarios
See Section 5 (Action sheets)

See Section 6 (Record Forms)

- **Scenario 1** (Use Action 2) Inflow Floods at or above Full Supply Level
- **Scenario 2** (Use Action 2) Rapid Drawdown
- **Scenario 3** (Use Action 2) Sunny Day Failure Earthquake/Piping
- **Scenario 4** (Use Action 2) Reservoir Water Quality; Chemical Spills/ Toxic Conditions (including Algal Blooms) → Advise Owner's Representative/Technical Decision Maker
- **Scenario 5** (Use Action 2)
  - Terrorist Activity
  - Threats
  - Hoax
  - Other

  → Immediately Notify National Security Hot line See Sect 3 - Contact List and Police Communication Centre See Sect 3 - Contact List

Email/ Phone/ Fax

YES

ARRANGE Inspection of the Dam

CONSULT
Dam Safety Technical Advisor & Owner's Area Representative

DECIDE, IF

High Liklihood of Dam Failure?

YES → Dam Safety Technical Advisor → **ADVISE the EEC TO IMPLEMENT ACTION 3 (Fig. 3)**

NO → Dam Safety Technical Advisor → **INSPECT DAM**

Remedial Action Required?

YES → Dam Safety Technical Advisor → **ADVISE ACTION REQUIRED** → Owner → **ADVISE Dam Safety Regulator**

NO → **CONTINUE ROUTINE MONITORING AND INSPECTION**

NOTE -

* If communication between the EEC and the DDO (or Storage Supervisor) is lost during an emergency, the DDO is to be given the authority to assume the role and the responsibilities of the EEC and contact the necessary contacts as outlined above and in the **Scenario Action Sheets in Sect 5**.

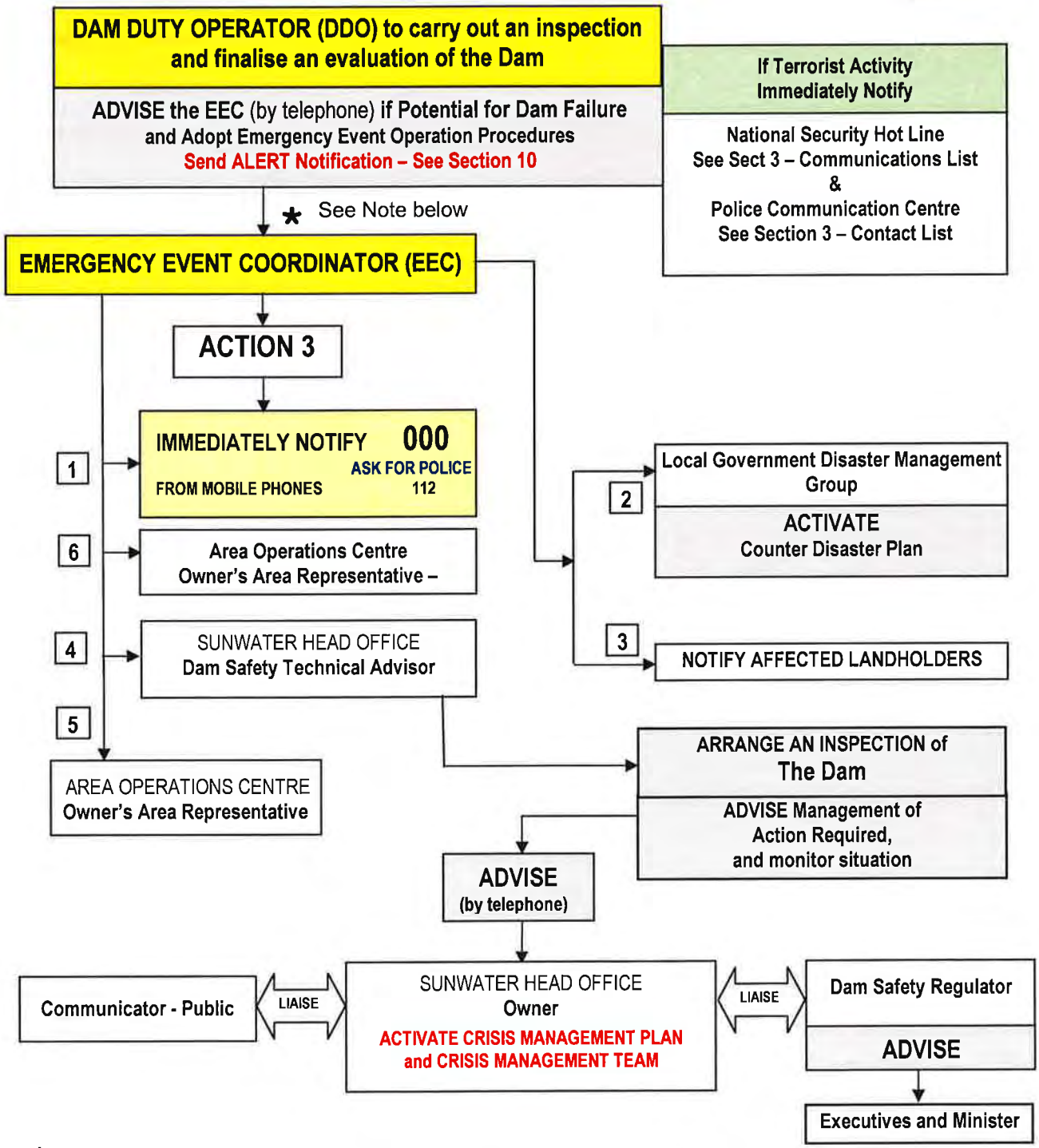
Telephone numbers are available in the Telephone Notification List in Section 3.

Definitions of Roles and Titles can be found in the Table on Page 2.

↔ Double arrows indicate communications back and forth between personnel

EMERGENCY EVALUATION PROCEDURE – ACTION 3
(For Potential Dam Failure)

FIGURE 3



* **NOTE –** If communication between the EEC and the DDO (or Storage Supervisor) is lost during an emergency, the DDO is to be given the authority to assume the role and the responsibilities of the EEC and make the necessary contacts as outlined above and in the **Scenario Action sheets in Sect 5.**

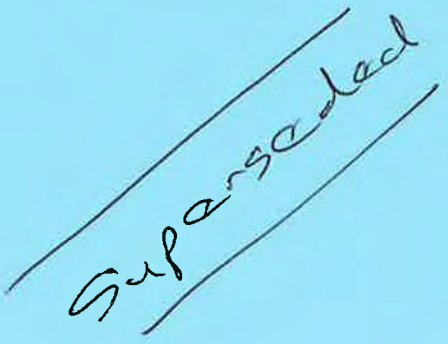
3 - Indicates order of phone contacts

Note: Telephone numbers are available in the Telephone Notification List in Section 3.

EMERGENCY EVALUATION PROCEDURES

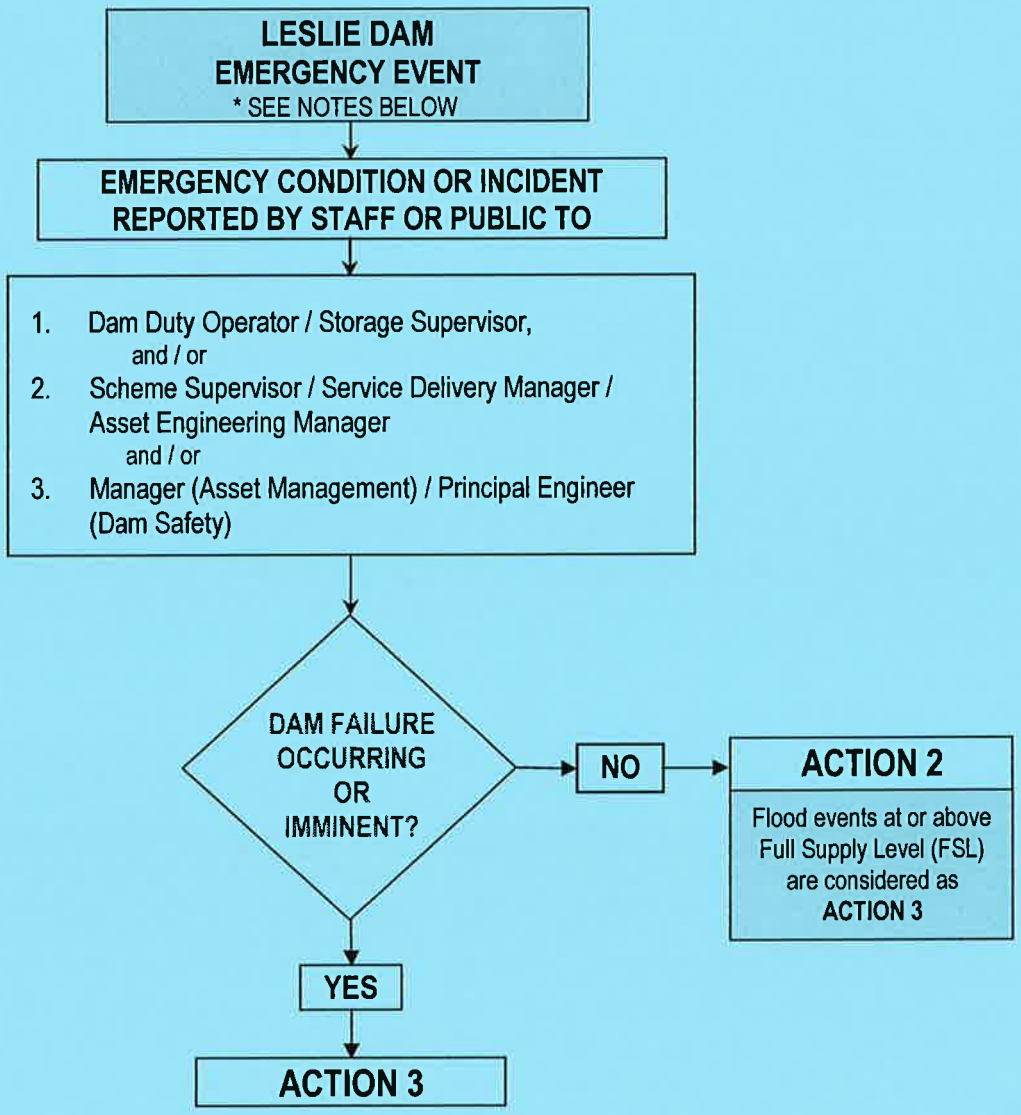
Incident Level Description

ACTION 1	**Localised Incidents / Near Miss** Will generally not escalate to an emergency Incident managed by routine procedures and existing site resources.
ACTION 2	**Emergency** May or may not result in activation of Crisis management Plan Required a coordinated local response together with overview, advice and action from subject matter expert in the Brisbane Office.
ACTION 3	**Crisis** Critical / Catastrophic Consequences. Significant diversion of management attention, time, energy and resources away from normal operation.



EMERGENCY EVALUATION PROCEDURE

FIGURE 1

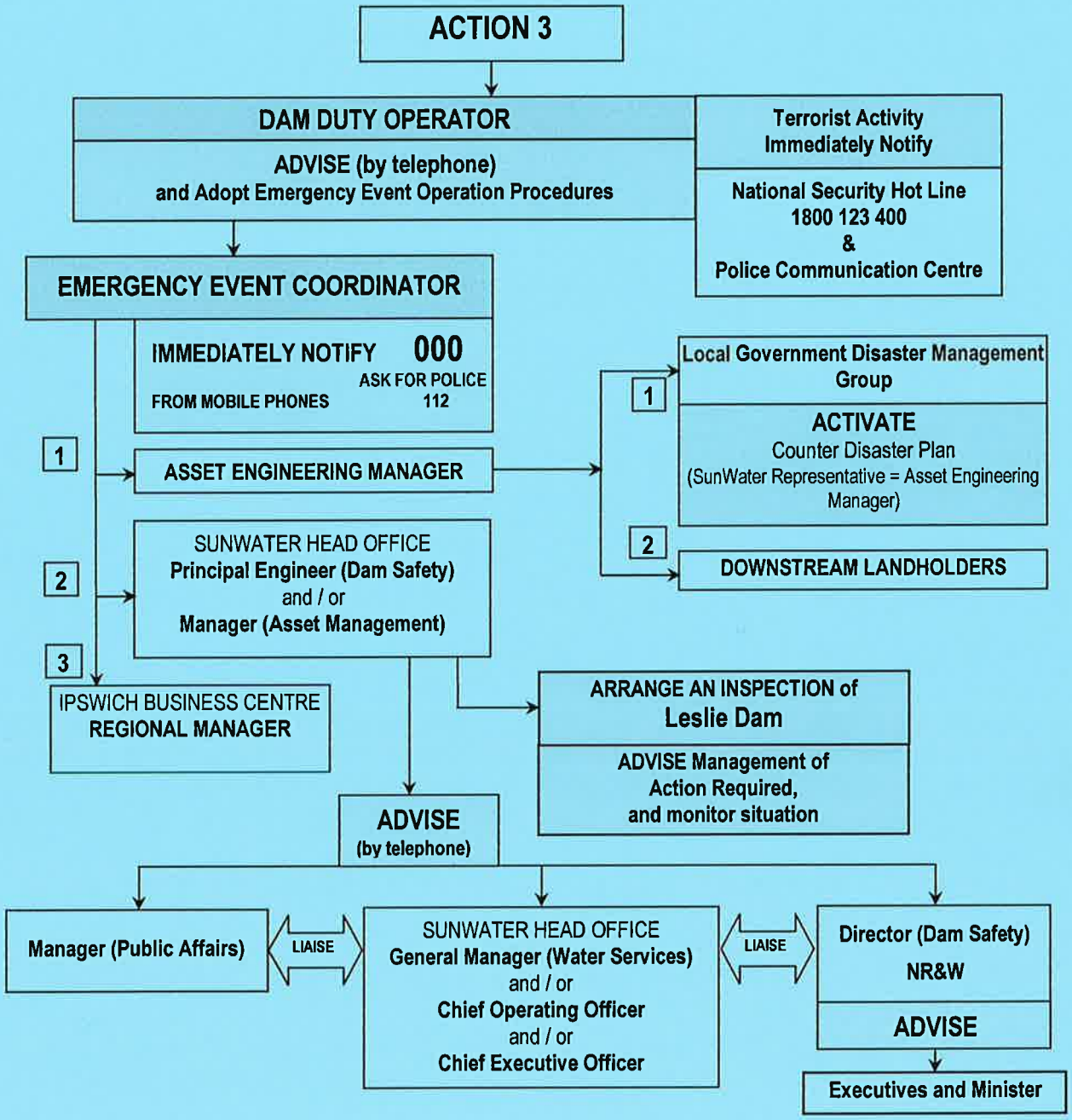


NOTES

1. **All communication (advise) to be conducted in person, or via telephone.**
2. **The Procedure is intended to cover short term Emergency or Dam Safety Incident.**
3. **The Procedure is not intended for activation as a result/outcome of an extended analytical safety review of the dam.**
4. **Telephone numbers are available in the Notification & Emergency Communication List in Section 3.**

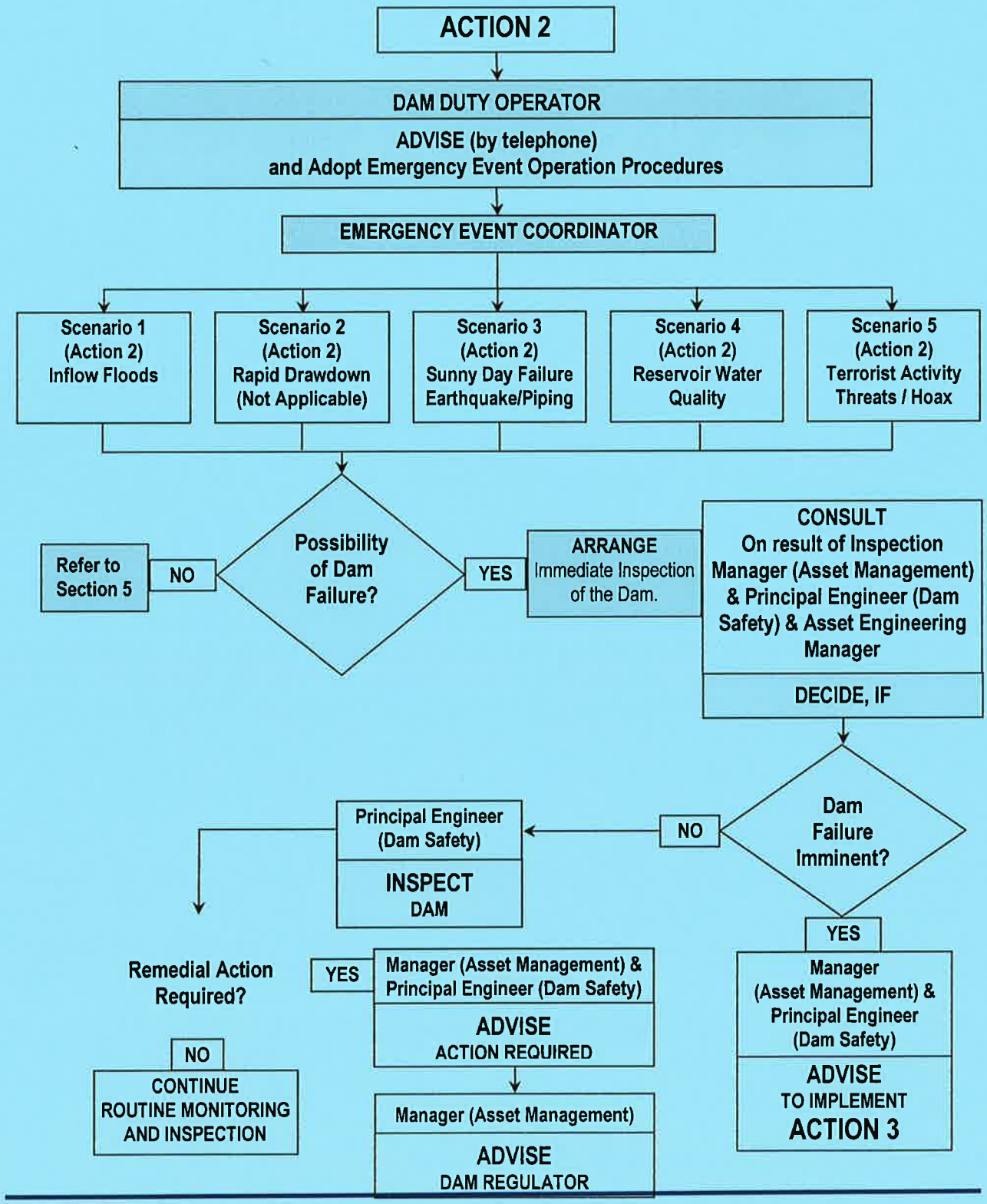
EMERGENCY EVALUATION PROCEDURE

FIGURE 2



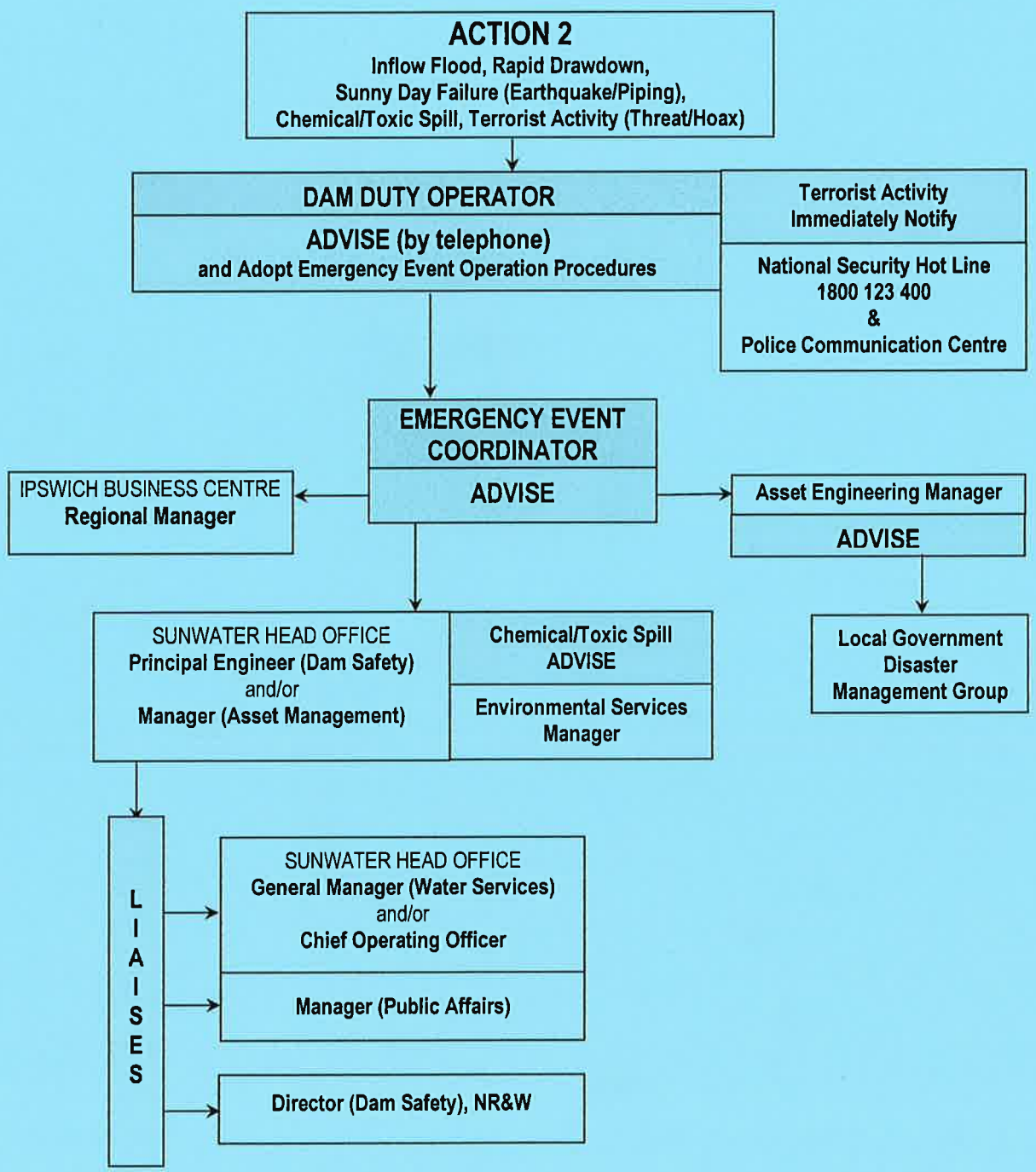
EMERGENCY EVALUATION PROCEDURE

FIGURE 3



EMERGENCY EVALUATION PROCEDURE

FIGURE 4



SECTION 3

NOTIFICATION & EMERGENCY COMMUNICATION LIST

Telephone and Radio Notification List and Emergency Communication List

and

List of Equipment available during an Emergency

(# 593466 in HB File 08-000388/001)

AUTHORISATION:

Approved by:		**Date:**	October 2010
	Senior Engineer Headworks (SEH)		

AMENDMENT STATUS:

Amendment Number	Description	Amendment Date
2F	Telephone Notification List Updated	OCTOBER '07
2G	Notification & Emergency Communication List Updated	January 2008
2H	Notification & Emergency Communication List update – Emergency Management Queensland	March 2008
2I	Telephone Notification List Update	October 2010

TELEPHONE & RADIO NOTIFICATION LIST

TITLE/NAME	Phone Business	Phone Mobile	Phone A/H	Fax	Controlled Copy Holder Addresses
Central Office Management (Brisbane)					
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Controlled EAP Copy Holders shown numbered (e.g. **2**) and shaded grey

Note: All contacts required by the EAP are expected, in the first instance, to be by voice (phone) with email only used to confirm or provide additional details

TITLE/NAME	Phone Business	Phone Mobile	Phone A/H	Fax	Controlled Copy Holder Addresses
Area Operations Centre – South (Toowoomba)					
[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
		Landline diverted to Duty EEC	Landline diverted to Duty EEC		
		[redacted]	[redacted]		
Department Environment Resource Management (DERM)					
	[redacted]		[redacted]	[redacted]	
		[redacted]			

Controlled EAP Copy Holders shown numbered (e.g. **2**) and shaded grey

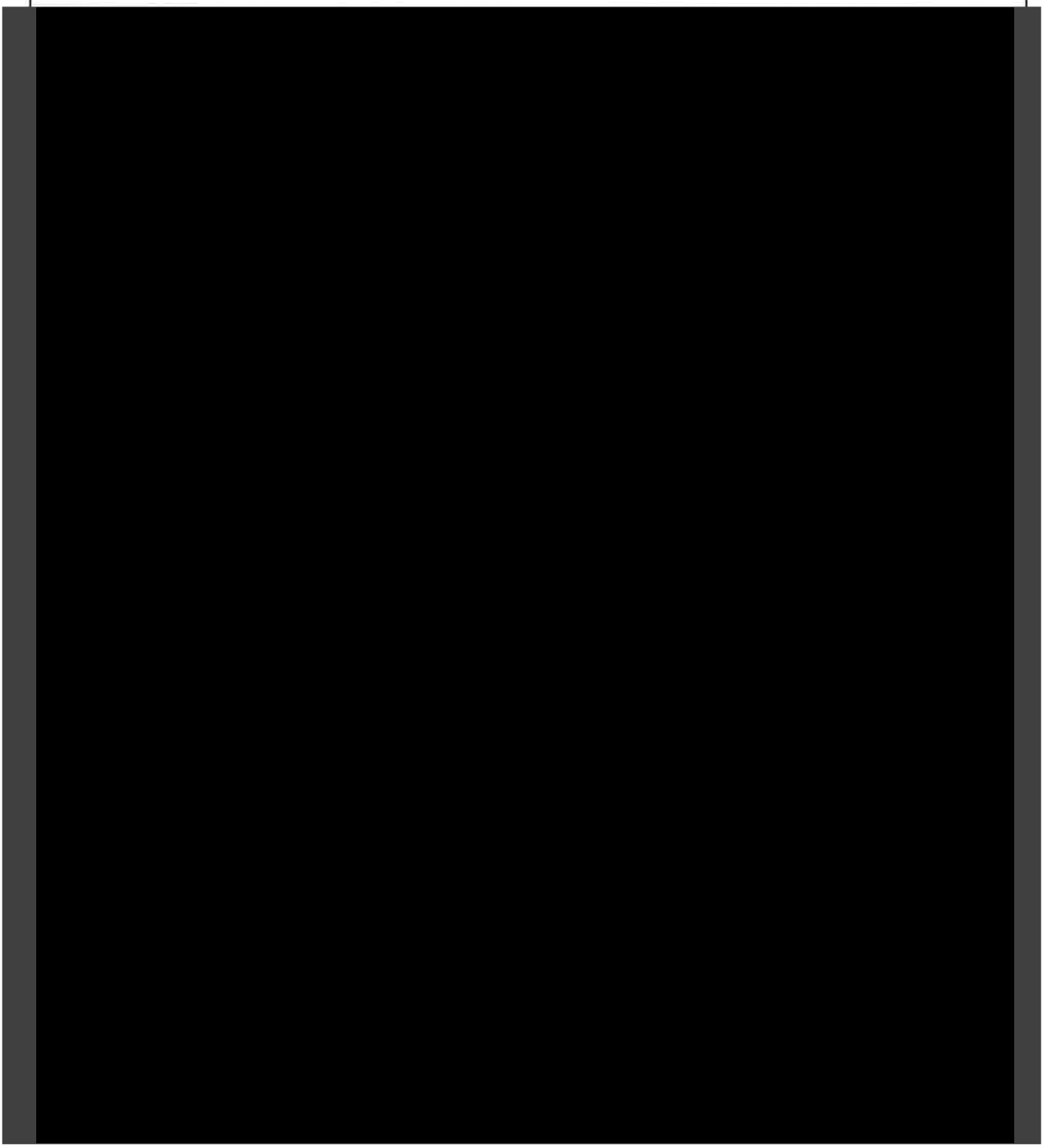
Note: All contacts required by the EAP are expected, in the first instance, to be by voice (phone) with email only used to confirm or provide additional details

TITLE/NAME	Phone Business	Phone Mobile	Phone A/H	Fax	Controlled Copy Holder Addresses
Counter Disaster Groups					
[redacted]	[redacted]				[redacted]
	13 22 96 (24 hrs)			[redacted]	
	[redacted]			[redacted]	
	[redacted]	[redacted]	[redacted]	[redacted]	
	000	112	000	-	
Police					
Police Communication Centre - [redacted]					
	[redacted]	[redacted]	[redacted]	[redacted]	
National Security Hotline					
1800 123 400					

Controlled EAP Copy Holders shown numbered (e.g. **2**) and shaded grey

Note: All contacts required by the EAP are expected, in the first instance, to be by voice (phone) with email only used to confirm or provide additional details

Stream Gauging Stations



EMERGENCY CONTACTS

Please note: there is a State Government Chemical Hazards and Emergency Unit, that have a **mobile spill response unit**.

Queensland Government
Department of Emergency Services

PHONE : 3247 8444

For advice on **chemicals**:

Chemical Hazards and Emergency Unit
http://www.emergency.qld.gov.au/chem

PHONE : 3247 8444

other Qld government chemical experts : 1800 803 788 referral service

If you are not sure as to how to treat **poisons** contact Queensland Health on

Poisoning

13 11 26

http://www.health.qld.gov.au/PoisonsInformationCentre/default.htm

http://www.dcs.qld.gov.au
Department of Community Safety

Emergency Management EMQ Queensland

Queensland Government State Disaster Management Group

The **State Disaster Management Group** is the principal organisation for disaster management throughout the State. This group is responsible for disaster mitigation and disaster planning and preparation at a state level and for conducting whole of Government response and recovery operations prior to, during and after a disaster impact. This includes accessing interstate and/or Commonwealth assistance when Local and State resources are exhausted or not available.

Emergency Management Queensland (EMQ), a division of the Department of Community Safety, provides the core policy and support staffing for the State Group. This includes the provision of disaster management training, management of the State Disaster Coordination centre, maintenance of the State Disaster Plan as well as training and equipment support to local volunteer SES units.

EMQ has regional staff across the State who assist Local Governments and State agencies in their counter disaster responsibilities.

PHONE: 3247 8943 (State Disaster Coordination Centre – 24 hr number)

Use of this number is to be restricted to emergency use only.

OR **EMQ Regional Duty Officer (Areas and Contact Numbers** shown on the map on the following page).

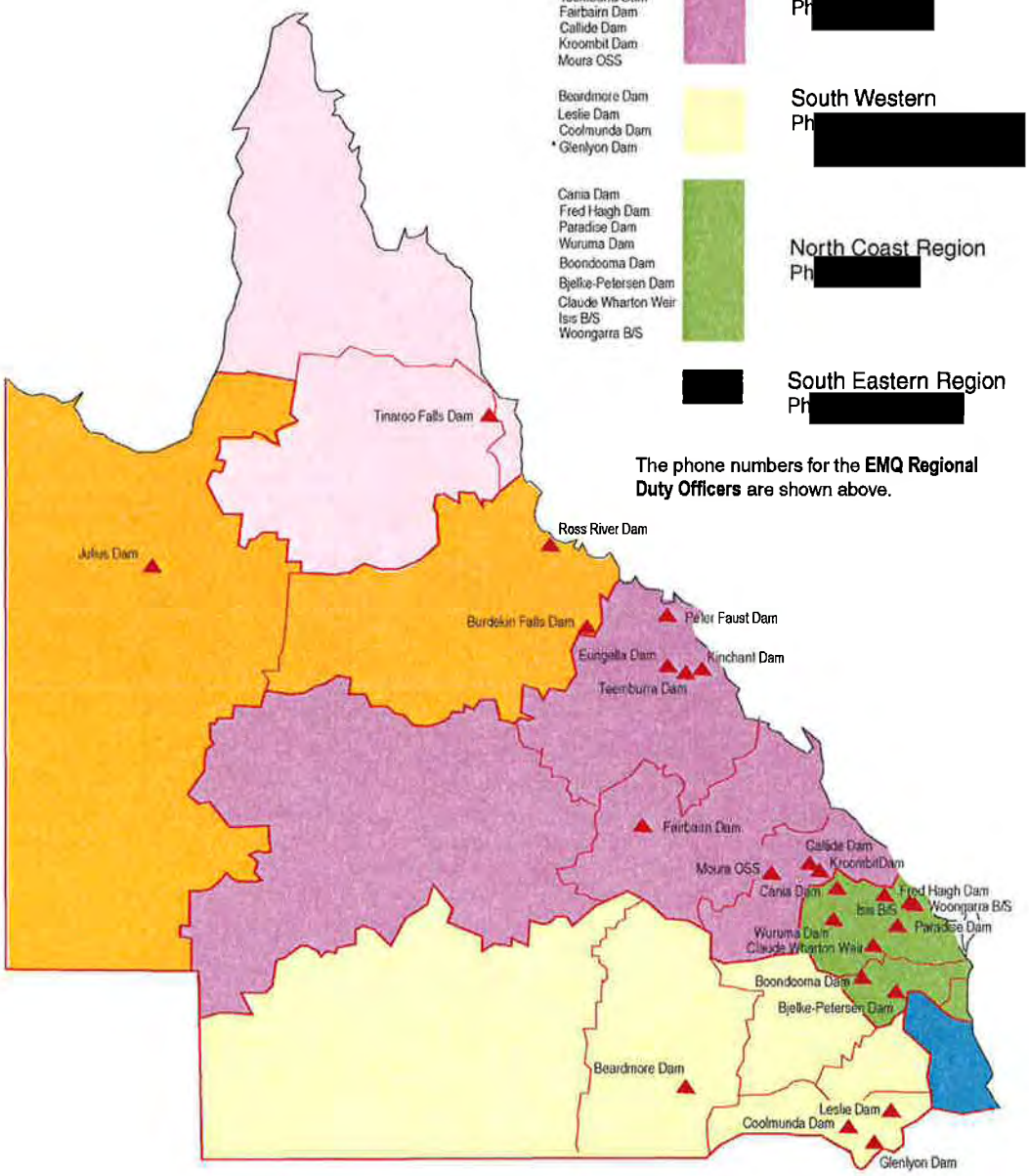
State Duty Officer – Brisbane: PHONE: 3364 3512

Communications Branch
Level 5 Police Headquarters – 200 Roma St Brisbane 4000

SES FLOOD STORM EMERGENCY 132 500

EMQ Boundaries

(and SunWater owned/ * managed infrastructure within the relevant boundary)



LIST OF EQUIPMENT AVAILABLE DURING AN EMERGENCY

Name of Equipment	No's	Owner	Contact Name	Contact Number	Depot
[redacted]					

SECTION 4

INTRODUCTION TO EAP & NOMINATION OF EEC

4.0 INTRODUCTION

4.1 Purpose

This Emergency Action Plan (EAP) defines responsibilities and procedures designed to identify conditions, including those which may endanger the Dam, in time to take remedial action and to notify the appropriate authorities, Emergency Agencies and Public Officials of possible, impending, or actual failure of the dam. The location (including Alternative Routes to the dam) and description of the dam are provided in Section 7 and Section 4 respectively.

The main purpose of the EAP is to ensure that a timely warning is provided to the appropriate authorities and Emergency Agencies in the event of a major incident impacting on the dam, and to provide relevant information for use in the emergency response to the situation.

The EAP identifies emergency condition scenarios at the dam (see Section 5), and describes procedures to be followed by SunWater staff to investigate those conditions and provide warning to appropriate authorities and emergency agencies, so that they can implement measures for protection of the downstream communities and properties if necessary. The EAP also provides direction to operating staff for handling unsafe or emergency conditions, so that the dam can be returned to a safe operating condition with minimal delay.

4.2 Classification Category

According to Queensland Dam Safety Management Guidelines 2002, the dam is classified with a 'Category 2' Failure Impact Rating, having a population in excess of 100 people at risk.

4.3 Role of Emergency Event Coordinator (EEC)

(See Section 2 and Section 5 Action sheets, for Duties and/or Responsibilities).

Emergency Event Coordinator (**EEC**) is a role created in all SunWater Area Operations Centres. The role will be activated during an emergency event (all hours) until the emergency is over. In the event of an emergency, the **EEC** will implement appropriate emergency procedures for which he/she has been trained. The process used to fill the **EEC** position for a rostered period is described below.

Process to Appoint the Emergency Event Coordinator (EEC):

The **Owner's Area Representative** shall:

- Identify and nominate staff members who will, for a period of time, assume the duties and responsibilities of the role of Emergency Event Coordinator (**EEC)** for their Area. (This role may also be undertaken by the Owner's Area Representative).
- Ensure there is an **EEC** roster, and have a dedicated mobile phone for the **EEC** role so that the EEC can be contacted at all times during an Emergency Event.
- Nominate, resource and train staff for the Emergency Event Coordinator **(EEC)** role as follows:
    - A roster (dependant on the availability of eligible staff), is to be developed for all nominated officers indicating the time of commencement and their rostered period.
    - The officers rostered for the **EEC** role should be familiar with the activation of the EAP document at all times and should attend and take part in EAP exercises conducted at the dams. These officers should be adequately trained to fulfil the requirements of the **EEC** position. (Desktop exercises will be undertaken during 5 yearly comprehensive Dam Safety inspections).
    - The Owner's Area Representative should also nominate an emergency backup officer for any unforeseen circumstance that could prevent the nominated **EEC** from performing any tasks during a rostered period, with or without notice.
    - A **Dedicated Mobile Phone** with an **emergency contact number** should be issued to the Area Operations Centre staff member assigned to the role of the **EEC** so that contact can be made at any point of time during an Emergency situation. This emergency mobile phone number for the **EEC** should be included in the EAP contacts list (Section 3 of EAP – Communications list). The rostered **EEC** is responsible for the dedicated mobile phone to be on hand and fully charged at all times during the roster period.

The above mobile phone is to be handed over to the next staff member on the roster once a nominated staff member has completed their duties as the **EEC**.

(Nomination of EEC is also outlined in SOP40 and/or Dam Safety Standards - DS05)

DAM DESCRIPTION SHEET

(Data obtained from *Dam Safety Review, June 1999*)

Dam Type	Mass Concrete Gravity Dam
Full Supply Level (FSL)	EL 472.41 m
Storage Capacity (at FSL)	106,250 ML
Storage Area (at FSL)	1,288 Ha
Dam Crest Level (DCL)	EL 473.63 m
Max. Height of Dam above Foundation	31 m (approx)
Length across Crest	399 m
Spillway Type	Radial gate controlled ogee crest
Spillway Crest Level	EL 466.31 m
Spillway – Top of Radial Gates	EL 472.83 m
Spillway Capacity (at DCF)	3,920 m^3/sec 338,688 MLD
Spillway Crest Width	109.118 m
Outlet Works	Two 915 mm
Outlet Control	Guard Valves and cone dispersion valves.
Saddle Dam Type	Earthfill with Riprap Facing
Saddle Dam Crest Level	EL 476 m
Saddle Dam Length	366 m
Saddle Dam Max. Height above Foundation	5.5 m

[1] All levels are to Australian Height Datum, AHD.
Conversion from State Datum is AHD_m = State Datum RL (in feet) x 0.3048 - 0.03 m.

INTRODUCTION TO EAP, RESPONSIBILITIES & DAM DESCRIPTION

4.1 INTRODUCTION TO EMERGENCY ACTION PLAN (EAP)

4.1.1 Purpose

This Plan defines responsibilities and procedures designed to identify conditions in time to take remedial action, including those which may endanger Leslie Dam, and to notify the appropriate authorities, Emergency Agencies and Public Officials of possible, impending, or actual failure of the dam. The location of the dam is provided in Section 7.

The main purpose of the Plan is to ensure that timely warning is provided to the appropriate Authorities and Emergency Agencies in the event of a major incident impacting on the dam, and to provide relevant information for use in the emergency response to the situation.

The Plan identifies emergency conditions at the dam, and describes procedures to be followed by SunWater staff to investigate those conditions and provide warning to appropriate authorities and emergency agencies, so that they can implement measures for protection of the downstream communities and properties if necessary. The Plan also provides direction to operating staff for handling unsafe or emergency conditions, so that the dam can be returned to a safe operating condition with minimal delay.

4.1.2 Classification Category

According to Queensland Dam Safety Management Guidelines 2002, Leslie Dam is classified with Category 2 Failure Impact Rating, having a population in excess of 100 people at risk.

4.1.3 Role of Emergency Event Coordinator (EEC)

Emergency Event Coordinator (EEC) is a role created in all SunWater Business Centres. The role will be activated during an emergency event (all hours) until the emergency is over. In the event of an emergency, the EEC will implement appropriate emergency procedures for which they have been trained.

Under normal operational conditions, the Asset Engineering Manager, Service Delivery Manager or Service Delivery Coordinator/Supervisor will perform this role. During an emergency condition any personnel trained for this role can serve as the Emergency Event Coordinator.

Superseded

4.2 RESPONSIBILITIES

Organisation	Responsible Position / (s)	General Responsibilities	Emergency Responsibilities
SunWater Business Centre	Regional Manager	• Overall responsibility for water supply in the Business Centre.	➢ Liaison with SunWater Management
	Service Delivery Manager/Coordinator	• Dam Management and Supervision. • **Provide Training for EEC**	➢ Local Media Liaison in conjunction with Manager (Public Affairs). ➢ Site management coordination.
	Emergency Event Coordinator (EEC)	• **See Section 4.3**	➢ **Liaison with the internal management of SunWater.**
	Asset Engineering Manager (AEM)	• Delivering of Dam Safety Program in the Business Centre. • **Provide Training for EEC**	➢ Liaison with Manager (Asset Management) and Principal Engineer (Dam Safety), in Brisbane. ➢ Liaison with EEC. ➢ Activation of Emergency Response.
	Dam Duty Operator	• Dam Maintenance, Surveillance and Operation	➢ Identification & notification of unsafe condition. ➢ Implement preventive measures as directed by EEC or AEM.
Head Office	Manager (Asset Management)	• Overall responsibility for safe operation & maintenance of SunWater infrastructure in Queensland.	➢ Advice SunWater Management ➢ Advise Dam Regulator ➢ Advice Manager (Public Affairs) ➢ Liaison with Management & Regulator
	Principal Engineer (Dam Safety)	• Formulation and implementation of Dam Safety Management Program & analysis of dam behaviour.	➢ Advise Business Centres on Dam Safety Issues ➢ Warning for dam failure and protective measures. ➢ Analysis of information & recommendations
	Manager (Public Affairs)	• Responsible for media relations, communications and public relations activities.	➢ Liaison with Management ➢ Liaison with Regulator ➢ Liaison with Business Centre ➢ Liaison with media

4.2 RESPONSIBILITIES (Cont'd)

Organisation	Responsible Position / (s)	General Responsibilities	Emergency Responsibilities
Police	District Disaster Coordinator	• Preparation of disaster plans and conduct of emergency operations.	➢ Co-ordinate & support to SunWater during a declared emergency at the dam.
	Local Police	• Liaison with relevant organisations.	➢ Evacuation of persons, if required. ➢ Control of essential traffic. ➢ Security of specific area.
State Counter Disaster Organisation	Counter Disaster & Rescue Services	• Liaises in the preparation of disaster plans and conduct emergency operations.	➢ Point of contact for State Government response to emergency situations.
	District Disaster Coordinator	• Preparation of district disaster management plans and coordinates district response.	➢ To provide and coordinate whole-of-government support to disaster stricken communities
	Local Government Disaster Management Group	• Preparation of local disaster management plans and coordinates local response. • Decide what resources are needed, when they are needed and how best to apply such resources so as to minimise hardship and suffering.	➢ Provision and control of Council man-power and equipment as required. ➢ Provision of emergency accommodation.
	Counter Terrorism Liaison Officer	• Identifies area of concern during the preparation of disaster plans.	
Dam Safety, NR&W	Director, Dam Safety	• Oversight of Dam Safety practice at all referable dams in Queensland	➢ Liaison with relevant Minister on necessary actions.

4.3 DAM DESCRIPTION SHEET

(Data obtained from *Dam Safety Review, June 1999*)

Dam Type	Mass Concrete Gravity Dam
Full Supply Level (FSL)	EL 472.41 m
Storage Capacity (at FSL)	106,250 ML
Storage Area (at FSL)	1,288 Ha
Dam Crest Level (DCL)	EL 473.63 m
Max. Height of Dam above Foundation	31 m (approx)
Length across Crest	399 m
Spillway Type	Radial gate controlled ogee crest
Spillway Crest Level	EL 466.31 m
Spillway – Top of Radial Gates	EL 472.83 m
Spillway Capacity (at DCF)	3,920 m^3/sec 338,688 MLD
Spillway Crest Width	109.118 m
Outlet Works	Two 915 mm
Outlet Control	Guard Valves and cone dispersion valves.
Saddle Dam Type	Earthfill with Riprap Facing
Saddle Dam Crest Level	EL 476 m
Saddle Dam Length	366 m
Saddle Dam Max. Height above Foundation	5.5 m

[1] All levels are to Australian Height Datum, AHD.
Conversion from State Datum is AHD_m = State Datum RL (in feet) x 0.3048 - 0.03 m.

SECTION 5

EMERGENCY IDENTIFICATION, EVALUATION AND ACTIONS

The dam has been designed to conform to the latest accepted design standards, so that its failure is highly unlikely. In order to maintain the dam in a safe condition and detect any emergency conditions as soon as it begins to develop or becomes apparent, the following is applicable to Leslie Dam.

5.1 Inspections

The following inspections are conducted at Leslie Dam:

- Routine Visual Inspection - Conducted Weekly
- Detailed Inspection - Conducted Annually
- Comprehensive Inspection - Conducted Five-yearly

5.2 Instrumentation and Monitoring

To confirm the structural behaviour and safety of the embankment the following Instrumentation was installed, and are monitored, at Leslie Dam.

The location of instrumentation and monitoring equipment are listed in Section 6C.

5.3 Emergency Identification

Five major possible emergencies have been identified at SunWater Dams, which are:

- Emergency Event due to extreme inflow floods overtopping the Dam.
- Emergency Event due to rapid drawdown of the reservoir.
- Emergency Event due to a rapidly deteriorating structural deficiency such as may be induced by an extreme earthquake or erosion of the foundations and abutments. (This is the so-called "**Sunny Day**" failure, i.e. not induced by an inflow flood).
- Emergency Event due to extreme changes in the chemical/toxic spill.
- Emergency Event due to a terrorist activity.

5.4 EVALUATION OF INCIDENTS

It is considered that **ACTION 1 – Localised Incident/Near Miss**, is to be locally contained, with a short-term impact (generally reported in the Monthly Dam Surveillance Report). Although each emergency condition will be evaluated and responded to individually, the action of most emergencies will be similar and follow procedures outlined below.

5.4.1 Flood Operation

All flood events, at or above Full Supply Level EL 472.41 m, will require the Dam Duty Operator to inform the Emergency Event Coordinator, who will further activate the following Emergency Evaluation Procedure **ACTION 2**

5.4.2 Imminent Dam Failure

At Leslie Dam, if a staff member observes evidence of an imminent dam failure, such as water flowing through a breach in the dam, he/she will inform the Dam Duty Officer and/or Emergency Event Coordinator, who will activate the following Emergency Evaluation Procedure **ACTION 3**

5.4.3 Unsafe or Unusual Conditions

If during a routine inspection, or at any other time, an unsafe or unusual condition is detected, the Leslie Dam staff will immediately notify the Dam Duty Officer and/or Scheme Supervisor, Pittsworth, who will advice the Principal Engineer (Dam Safety), and/or Manager (Asset Management), so that an evaluation of the situation can be carried out and a determination can be made on the condition of the dam.

If the Asset Engineering Manager, and/or Service Delivery Manager, following an inspection of the dam, and in consultation with Principal Engineer (Dam Safety), and/or Manager (Asset Management), determine that potential for the failure of the dam exists then he/she will activate the following Emergency Evaluation Procedure **ACTION 3**

If the unsafe or unusual condition will not lead to failure of the dam in the short term the Asset Engineering Manager, and/or Service Delivery Manager, will activate the following Emergency Evaluation Procedure **ACTION 2**

Scenario 1: Flood Operation

Under normal conditions, the operation of the storage is controlled by the on site Storage Supervisor (Dam Duty Operator), on advice from the Scheme Supervisor (Pittsworth).

During flood events, the dam will be continuously manned and will be controlled from the Ipswich Regional Centre. The head office at Brisbane will transmit any information received from the Bureau of Meteorology to the Ipswich Business Centre.

The Dam Duty Operator will keep the Emergency Event Coordinator informed of discharge through the spillway. The Emergency Event Coordinator will inform the Asset Engineering Manager, who will further keep the Local Government Disaster Management Group (LGDMG) informed of the discharge through the spillway. In particular, the following alerts will be sent to the District Disaster Coordinator and Counter Disaster & Rescue Services in Brisbane.

The flood emergency event will start after the storage level has reached Full Supply Level (EL 472.41 m). In all other cases, follow the Operation and Maintenance Manual and Standing Operating Procedures.

Water Level at Leslie Dam	**AEP**	**Flood Alert Level Colour Code**	**Discharge volume (MLD)**
Storage at Full Supply Level (EL 472.41 m)	**1:20 - 1:50**		0
Storage EL 473.03 m (Storage is 0.62 m above spillway crest)	**1:100**		255,744
Storage EL 473.18 m	**1:500**		307,584
Storage EL 473.61 m and approaching Dam Crest Level	**1:2000**		345,600 DCL = 473.83 m Storage at critical safety level

Scenario 1: Flood Operation NORMAL FLOOD OPERATION

Stage/Alert Level	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)	
NORMAL FLOOD OPERATION **Reservoir Level is at EL 471.91 m and approaching FSL, raining heavily** **AEP between 1:20 - 1:50**	**FOR RECORD: Use Sheets from Section 6 and 6A** • Notify the Standby Officer (who shall be available for duty for the duration of a flood or Emergency Event) • Monitor and record storage water level at 4 hourly intervals [redacted] • Contact the Asset Engineering Manager for information on rainfall and stream flow [redacted] • Record all communication • Log book entries as per SOP 12 & 22 • See note # below	• Coordinate with the Dam Duty Operator and ensure that the Standby Officer shall be available for duty for the duration of a flood or Emergency Event	• Advice the Dam Duty Operator of any inflow flood information obtained from the Bureau of Meteorology. (Page 7, Section 10) *www.bom.gov.au	**ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO (e.g. taking photographs/video, dam inspections, instrument readings)**
	When Storage Level reaches EL 472.41 (FSL) Siren will sound for 10 minutes **If any Gate failed to open on automatic control.** [redacted]			
	Table of Personnel to be notified			
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as requested** • Asset Engineering Manager	**Notify as often as requested**	

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

- **IMPORTANT**
  When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group, and Dam Duty Operator.

Scenario 1: Flood Operation [STAGE 1]

Stage/Alert Level	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)	
STAGE 1 **Normal Flood Operation** **Reservoir Level is at FSL EL 472.41 m, and raining heavily** **(Siren has sounded for 10 minutes)**	**FOR RECORD: Use Sheets from Section 6 and 6A** • Monitor and record the rainfall and reservoir level daily or more frequently if the event warrants it, and fax the Flood Operation sheet to the EEC • Monitor regularly the foundation pressure gauge readings [redacted] • Contact the upstream landowners for information on rainfall and stream flow [redacted] • Photograph the spillway and the intake channel daily • Record all communication • Log book entries as per SOP 12 & 22 • See note # below	• Fax the flood operation sheet to all personnel listed in the table below • Advice the Dam Duty Operator of any inflow flood information obtained from the Bureau of Meteorology. (Page 7, Section 10) [redacted] • Monitor and record water level from gauge boards and relay information by hand held 2-way radio to standby control room. [redacted]	*www.bom.gov.au • Inform spillway discharge to all personnel listed in the table below	**ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO (e.g. taking photographs/video, dam inspections, instrument readings)**

Table of Personnel to be notified

Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)
Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as requested** • Asset Engineering Manager • Manager (Asset Management) • Principal Engineer (Dam Safety)	**Notify as often as requested** • Local Government Disaster Management Group.

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

• **IMPORTANT**
When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group, and Dam Duty Operator.

Scenario 1: Flood Operation [STAGE 2]

Stage/Alert Level	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)	
STAGE 2 **Reservoir Level Is at FSL EL 472.41 m, and rising to EL 473.24 m** **Discharge reaching 92,000 MLD** **DAM CREST LEVEL EL 473.63 m** **AEP between 1:50 - 1:700**	**FOR RECORD: Use Sheets from Section 6 and 6A** • Monitor and record the rainfall and reservoir level daily or more frequently if the event warrants it and fax the Flood Operation sheet to the EEC [redacted] • Place a "Road Closed "sign and flashing lights on the Warwick side of sandy ck crossing • Fuel up and park a 4X4 vehicle on the Warwick side of crossing • Check the seepage in the galleries and record the flow of V-notch weirs • Record all communication • Log book entries as per SOP 12 & 22 • See note # below	• Fax the flood operation sheet to all personnel listed in the table below • Advice the Dam Duty Operator of any inflow flood information obtained from the Bureau of Meteorology. (Page 7, Section 10) [redacted] • Monitor and record water level from gauge boards and relay information by hand held 2-way radio to standby control room. [redacted]	*www.bom.gov.au • Inform spillway discharge to all personnel listed in the table below	**ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO (e.g. taking photographs/video, dam inspections, instrument readings)**
	Table of Personnel to be notified			
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as requested** • Asset Engineering Manager • Manager, Asset Management • Principal Engineer (Dam Safety)	**Notify as often as requested** • Local Government Disaster Management Group • Warwick Police • Downstream Irrigators and Landholders	

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

• **IMPORTANT**
When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group, and Dam Duty Operator.

Scenario 1: Flood Operation [STAGE 3]

Stage/Alert Level	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)	
STAGE 3 Reservoir Level is at EL 473.24 m approaching DCL Discharge between 300,000 – 355,000 MLD Overtopping Imminent DCL= EL 473.63 m AEP between 1:800 - 1:2000	FOR RECORD: Use Sheets from Section 6 and 6A • Monitor and record the rainfall and reservoir level daily or more frequently if the event warrants it and fax the Flood Operation sheet to EEC [redacted] • Visually check the structure and abutments • Monitor regularly the foundation pressure gauge readings • Check the seepage in the galleries and record the flow of V-notch weirs • Photograph the spillway and the intake channel daily • Record all communication • Log book entries as per SOP 12 & 22 • See note # below	• Fax the flood operation sheet to all personnel listed in the table below • Advice the Dam Duty Operator of any inflow flood information obtained from the Bureau of Meteorology. (Section 10, page 7) [redacted] • Monitor and record water level from gauge boards and relay information by hand held 2-way radio to standby control room. [redacted]	*www.bom.gov.au • Inform spillway discharge to all personnel listed in the table below	ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO (e.g. taking photographs/video, dam inspections, instrument readings)
	Table of Personnel to be notified			
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as requested** • Asset Engineering Manager • Manager (Asset Management) • Principal Engineer (Dam Safety)	**Notify as often as requested** • Local Government Disaster Management Group	

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

• **IMPORTANT**
When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group and Dam Duty Operator.

Scenario 3A: 'Sunny Day' Failure, due to Earthquake

(Event due to a rapidly deteriorating structural deficiency such as may be induced by an extreme earthquake)

Stages	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)
STAGE 1 **Earthquake felt in the area** **Intensity less than 5 MM** (refer to Section 10 for Modified Mercalli Scale) **Use Page 1, Section 6C**	• Inspect the Embankment, Spillway Structure, and Abutments, and fax report to the EEC • Check for springs, deformation, erosion, and concrete damage.		Arrange an inspection of the dam and assess its condition
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as required** • Asset Engineering Manager	**Notify as often as required** • Principal Engineer (Dam Safety) • Manager (Asset Management)
STAGE 2 **Earthquake felt in the area** **Intensity greater than 5 MM** (refer to Section 10 for Modified Mercalli Scale) **Use Page 1, Section 6C**	• Immediately inspect the Embankment, Spillway Structure, and Abutments • Repeat the inspection every 12 hours	• If unstable condition is established, Implement **ACTION 2.** (Page 3, Section 2)	• If unstable condition is established, advise the Dam Duty Operator to lower reservoir level
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as required** • Asset Engineering Manager • Principal Engineer (Dam Safety)	**Notify as often as requested** • Executive Officer Local Disaster Management Group Warwick Shire
STAGE 3 **DAM FAILURE IS IMMINENT** **Water Level at Full Supply Level 472.41 m** **Use Page 1, Section 6C**	• Lower reservoir level • Photograph the damage from a safe point • Vacate the immediate vicinity of the dam	• Implement **ACTION 3.** (Section 2, page 2) • See note # below.	• Implement **ACTION 3.** (Page 2, Section 2)
	Notify as often as required • Standby Officer • Emergency Event Coordinator	**Notify as often as required** • All personnel listed in **ACTION 3.** (Page 2, Section 2)	**Notify as often as required** • All personnel listed in **ACTION 3.** (Page 2, Section 2)

FOR RECORD: Use Sheets from Section 6 and 6C

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

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

- **IMPORTANT**
  When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group and Dam Duty Operator.

Scenario 3B: 'Sunny Day' Failure, due to Piping

(Event due to a rapidly deteriorating structural deficiency such as may be induced by piping through the embankment, foundation or abutments)

Stages	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)
STAGE 1 **Increasing Leakage through the Embankment.** **Use Page 1, Section 6C**	• Monitor flows until a decreasing trend is observable or as directed by the EEC	• If rapidly increasing trend is observed initiate **ACTION 2** (Page 3, Section 2)	• Arrange an inspection of the dam and assess its condition
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as required** • Asset Engineering Manager	**Notify as often as required** • Principal Engineer (Dam Safety)
STAGE 2 **Large Increasing Flows through the Embankment with cloudy water** **Use Page 1, Section 6C**	• Monitor flows until a decreasing trend is observable or as directed by the EEC	• If piping condition is established, Implement **ACTION 2** (Page 3, Section 2)	• If piping condition is established, advise the Dam Duty Operator to lower reservoir level
	Notify as often as requested • Standby Officer • Emergency Event Coordinator	**Notify as often as required** • Principal Engineer (Dam Safety)	**Notify as often as requested** • Executive Officer Local Disaster Management Group Warwick Shire
STAGE 3 **DAM FAILURE IS IMMINENT DUE TO PIPING** **Water Level at Full Supply Level 472.41 m** **Use Page 1, Section 6C**	• Lower reservoir level. • Photograph the seepage and piping from a safe point • Vacate the immediate vicinity of the embankment and complete the event report	• Implement **ACTION 3** (Page 2, Section 2) • See note # below.	• Implement **ACTION 3** (Page 2, Section 2)
	Notify as often as required • Standby Officer • Emergency Event Coordinator	**Notify as often as required** • All personnel listed in **ACTION 3** (Page 2, Section 2)	**Notify as often as required** • All personnel listed in **ACTION 3** (Page 2, Section 2)

FOR RECORD: Use Sheets from Section 6 and 6D

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

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

• **IMPORTANT**
When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group, and Dam Duty Operator.

Scenario 4: Chemical / Toxic Spill

Stages	ACTION TO BE TAKEN BY: Dam Duty Operator (DDO)	Emergency Event Coordinator (EEC)	Asset Engineering Manager (AEM)	
STAGE 1 **Large amount of Chemical / Toxic Spill found in the reservoir/catchment** **Use Page 1, Section 6E**	FOR RECORD: Use Sheets from Section 6 and 6E • Sketch, measure, photograph and locate its position in the reservoir/catchment • Forward event report to EEC			ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO (e.g. taking photographs/video, dam inspections, instrument readings)
	Notify as often as required • Emergency Event Coordinator	**Notify as often as required** • Asset Engineering Manager	**Notify as often as required** • Environmental Services Manager Who will then make an assessment on whether to notify the Health Department in accordance with the Hazardous Algal Bloom Response plan (Page 9, Section 10)	
STAGE 2 **Large amount of Chemical / Toxic Spill found in the reservoir/catchment** **Use Page 1, Section 6E**	• Sketch, measure, photograph and locate its position in the reservoir/catchment [redacted] • Forward event report to EEC (see note # below)	• Inspect the reservoir and assess its water quality for water supply • Coordinate with the Environmental Services Manager, and the Health Department		
	Notify immediately • Mobile Spill Response Unit of the State Government Chemical Hazards and Emergency Unit • and **if it is a very large spill then** also notify the District Disaster Co-ordinator **Notify as often as requested** • Emergency Event Coordinator			

After the Event, an Emergency Event Report shall be jointly compiled by the Emergency Event Coordinator and Dam Duty Operator, and unedited copies to be forwarded to the Service Delivery Manager, and Manager (Asset Management), Brisbane.

- **IMPORTANT**
  When the storage level peaks and begins to fall at a constant rate, the **Asset Engineering Manager** shall notify the Local Government Disaster Management Group and Dam Duty Operator.

Scenario 5: Terrorist Activity

[redacted]

SECTION 6

EMERGENCY EVENT OPERATION RECORDING PROCEDURES

- **Emergency Event Recording Sheets**
  - Emergency Event Record ** (**Page 3, this Section**)
  - Record of Communication ** (**Page 4, this Section**)
  - Log of Events / Actions ** (**Page 5, this Section**)

** Note: These sheets must be completed for all Emergency Event Scenarios, and included in the Emergency Event Report.

- **Operating Procedure**
  - Flood Operation **(See Section 6A)**
- **Operating Procedure**
  - Rapid Drawdown (Not applicable at Leslie Dam)
- **Operating Procedure**
  - Sunny Day Failure (Earthquake) **(See Section 6C)**
  - Sunny Day Failure (Excessive Seepage → Piping) **(See Section 6D)**
- **Operating Procedure**
  - Chemical / Toxic Spill **(See Section 6E)**
- **Operating Procedure**
  - Terrorist Activity **(See Section 6F)**

Emergency Event Recording Sheets

- Emergency Event Record sheet
- Record of Communication sheet
- Log of Events / Action sheet

Note: These sheets must be completed for all Emergency Event Scenarios and be included in the Emergency Event Report

EMERGENCY EVENT RECORD

COMPLETE THIS COVER SHEET AND ATTACH RELEVANT RECORDING SHEETS FROM SECTION 6.

1. **NATURE OF THE EVENT** (circle the event)

Spillway discharge **Earthquake** **Piping** **Water Quality** **Terrorist Activity**

Commencing: Time ___:___ am/pm; Date ___/___/_____ **Finishing:** Time ___:___ am/pm; Date ___/___/_____

2. **DESCRIPTION OF THE EVENT**

Attach relevant sheets from Section 6.

3. **STATISTICS**

Total inflow	Megalitres
Total discharge	Megalitres
Capacity of Storage prior to inflow	%
Volume prior to inflow	Megalitres
Maximum inflow	MLD
Maximum discharge	MLD

4. **EVENT PROGRESS**

Attach copies of the Spillway Level versus Time Graph, the Record of Communication, the Log of Events / Actions, and Rainfall during a Flood Event. (Section 6A)

5. **GENERAL COMMENTS**

Include in this section any observations or comments regarding the Event, such as Equipment malfunctions, improved Reporting, Safety issues, or any suggestions which may improve monitoring of the Event

6. **DAMAGE REPORT**

Detail any damage to the Embankment, Spillway, Abutments or Stream bank in the downstream area of the Dam. ***Attach photos.***

Name:.....Signed:.....Designation:.....Date...../...../.....

LESLIE DAM - EMERGENCY ACTION PLAN
RECORD OF COMMUNICATION

DATE	TIME	CONTACT PERSON / TELEPHONE NO.	CALL IN / OUT	MESSAGE	RECORDED BY (INITIALS)

LESLIE DAM - EMERGENCY ACTION PLAN
LOG OF EVENTS / ACTIONS

DATE	TIME	EVENT / ACTION DESCRIPTION	RECORDED BY (INITIALS)

LESLIE DAM EAP — Flood Operation

Visual Inspection and Storage Report
Note: Refer to Page 2 for recording instructions **

Date: .....

	SUN	MON	TUE	WED	THU	FRI	SAT
Stored Water Level **FSL 472.41m**							
Tail Water Level (m)							
Daily Rainfall (mm) Morning 9am							
Evening 3pm							

NORMAL FLOOD OPERATION EL 471.91 m	STAGE 1 EL 472.41 m	STAGE 2 EL 472.41 – EL 473.24 m	STAGE 3 EL 473.24 - EL 473.63m
	Morning — Tick if Gates are Closed		
	Evening — Tick if Gates are Closed		

Visual Inspection	First Inspection	Second Inspection (+6 hrs)	Third Inspection (+12 hrs)
(Walk OR Drive at 10 km/hour. Write 'W' for walk and 'D' for Drive)			
Spillway Channel			
Erosion, damage to concrete structure			
Irrigation Control Structure			
Cracks, concrete deterioration			
Embankments			
Cracks, subsidence in pavement			
Upstream Face (Use binoculars)			
Settlement			
Displacement of riprap material			
Downstream face			
Subsidence, slides, erosion			
Sign of seepage			
Area Downstream of Dam			
Seepage from any location apart from seepage point			
Seepage			
Seepage water - Clear or Turbid (Tick for clear)			
Condition of river outlet		Discharge..... MLD	

Details of significant changes. New occurrences and issues warranting further attention

.....

.....

.....

.....

Inspecting Officer's initials			
Fax to (tick if faxed)		Asset Engineering Manager / Service Delivery Manager [redacted]	
		Principal Engineer (Dam Safety) [redacted]	

** INSTRUCTIONS FOR COMPLETING SHEET - Flood Operation

VISUAL INSPECTION

Frequency of visual inspection required is indicated by

STAGE 1 ONCE A DAY	STAGE 2 TWICE A DAY	STAGE 3 THRICE A DAY

Additional Inspections should be made

- When specifically requested

Show results of inspections as follows:-

- New Seepage point. **NEW**
- Significant increase (> 30%) or change in condition. **SG-INC**
- Slight increase (> 10%) or change in condition. **INC**
- NIL change of condition. **NIL**
- Slight decrease (< 10%) or change in condition. **DEC**

Significant Changes

Any changes which, in the opinion of the inspecting officer, are more than just slight changes must be advised to the Principal Engineer (Dam Safety). The degree of urgency of this advice varies with the nature of the issue.

[redacted]

TABLE 1

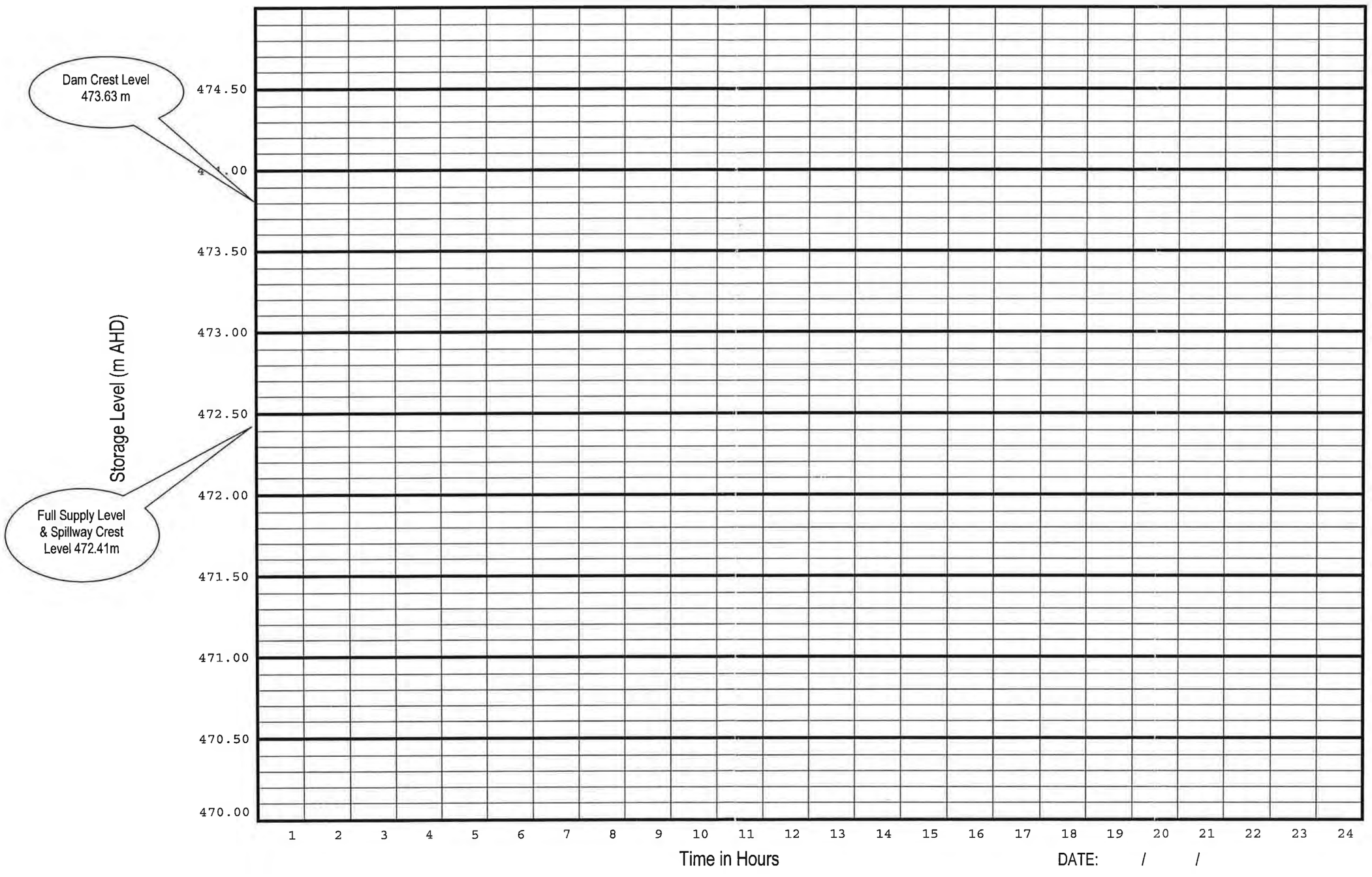
RECORD OF RAINFALL DURING A FLOOD COMMENCING AT ...../...../.....

Date	Time	Rainfall mm	Daily Total	Comments

TABLE 2

Date	Time	Storage Level	Storage Volume ML	Total Measured Inflow MLD	Gate Openings in metres							Total Release MLD	Tailwater gauge board height	Spillway Outlet Channel Performance
					1	2	3	4	5	6	7			

STORAGE LEVEL VERSUS TIME (LESLIE DAM)



LESLIE DAM EAP — Sunny Day Failure (Earthquake)

Visual Inspection and Storage Report
Note: Refer to Page 2 for recording instructions **

Date: .....

	SUN	MON	TUE	WED	THU	FRI	SAT
Stored Water Level **FSL 472.41m**							
Daily Rainfall (mm)							

Earthquake Intensity felt:.....MM **VISUAL INSPECTION**	First Inspection	Second Inspection (+12hrs)	Third Inspection (+24hrs)	Fourth Inspection (+36hrs)
Date				
Time				
(Walk OR Drive at 10 km/hour. Write 'W' for walk and 'D' for Drive)				
Embankment				
Crest				
Cracks, subsidence				
Upstream Face (Use binoculars or boat)				
Settlement or sink hole				
Downstream face				
Sloughing				
Subsidence, slides, erosion				
Area Downstream of Dam				
New Seepage				
Increase in Seepage:				
[redacted]				
Deterioration of valves				
Spillway				
Channel Erosion				
Damage to concrete				
[redacted]				
Cracks, concrete deterioration				

Details of significant changes. New occurrences and issues warranting further attention

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New Cracks or Movements: Sketch, measure, photograph, and locate if possible. Sketch on the Plan (see over)

Inspecting Officer's initials				
Fax to (tick if faxed)		Asset Engineering Manager / Service Delivery Manager [redacted]		
		Principal Engineer (Dam Safety) [redacted]		

** INSTRUCTIONS FOR COMPLETING SHEET - Sunny Day Failure (Earthquake)

VISUAL INSPECTION

Frequency of visual inspection required is indicated by

Earthquake Less than 5mm	Earthquake greater than 5mm
COMPLETE FIRST VISUAL INSPECTION ONLY	COMPLETE ALL VISUAL INSPECTIONS AND INSTRUMENTATION DATA AS WELL

Additional Inspections should be made, when:

- New cracks, settlements or sinkholes which requires further action
- When specifically requested

Show results of inspections as follow:-

- New Observation. **NEW**
- Significant increase (> 30%) or change in condition. **SG-INC**
- Slight increase (> 10%) or change in condition. **INC**
- NIL change of condition. **NIL**
- Slight decrease (< 10%) or change in condition. **DEC**

Significant Changes

Any changes which, in the opinion of the inspecting officer, are more than just slight changes must be advised to the Principal Engineer (Dam Safety). The degree of urgency of this advice varies with the nature of the issue.

[redacted]

FOUNDATION PRESSURE GAUGES (REQUIRED IF EARTHQUAKE IS GREATER THAN 5MM)				
	First Inspection	Second Inspection	Third Inspection	Fourth Inspection
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

SEEPAGE MEASUREMENT (REQUIRED IF EARTHQUAKE IS GREATER THAN 5MM)				
	First Inspection	Second Inspection	Third Inspection	Fourth Inspection
VN No. 1 mm				
VN No.2 mm				
VN No.3 mm				
VN No.4 mm				

LESLIE DAM EAP — Sunny Day Failure (Piping)

Visual Inspection and Storage Report
Note: Refer to Page 2 for recording instructions **

Date: .....

	SUN	MON	TUE	WED	THU	FRI	SAT
Stored Water Level **FSL 472.41m**							
Daily Rainfall (mm)							

VISUAL INSPECTION (Walk OR Drive at 10 km/hour. Write 'W' for walk and 'D' for Drive)	First Inspection	Second Inspection (+24hrs)	Third Inspection (+36hrs)	Fourth Inspection (+48hrs)
Date				
Time				
Location of Seepage				
Describe approximate location in words				
New Seepage point estimated flow				
Clear or Turbid (Tick for clear)				
Old Seepage point estimated flow				
Clear or Turbid (Tick for clear)				
Large increase of seepage (30% or more)				
Downstream face				
Subsidence, sloughing, erosion				
Embankment				
Signs of erosion, sand boils				
Seepage measurements				
Clear or Turbid (Tick for clear)				
VN 01 (mm)				
VN 02 (mm)				
VN 03 (mm)				
VN 04 (mm)				

Details of significant changes. New occurrences and issues warranting further attention, Source of seepage (if known)

.....

.....

.....

Sketch, locate, measure and photograph if possible. (sketch the problem area on the General Arrangement Plan)

Inspecting Officer's initials				

Fax to (tick if faxed)		Asset Engineering Manager / Service Delivery Manager [redacted]
		Principal Engineer (Dam Safety) [redacted]

** INSTRUCTIONS FOR COMPLETING SHEET - Sunny Day Failure (Piping)

VISUAL INSPECTION

Frequency of visual inspection required is indicated by

STAGE 1 ONCE A DAY	STAGE 2 TWICE A DAY	STAGE 3 AS DIRECTED

Additional Inspections should be made, when:

- New seepage which requires further action
- When specifically requested

Show results of inspections as follow:-

- New Seepage appeared. **NEW**
- Significant increase (> 30%) or change in condition. **SG-INC**
- Slight increase (> 10%) or change in condition. **INC**
- NIL change of condition. **NIL**
- Slight decrease (< 10%) or change in condition. **DEC**

Significant Changes

Any changes which, in the opinion of the inspecting officer, are more than just slight changes must be advised to the Principal Engineer (Dam Safety). The degree of urgency of this advice varies with the nature of the issue.

[redacted]

LESLIE DAM EAP — Chemical / Toxic Spill

Visual Inspection and Storage Report
Note: Refer to Page 2 for recording instructions **

Date: .....

	SUN	MON	TUE	WED	THU	FRI	SAT
Stored Water Level **FSL 472.41 m**							
Outlet discharge MLD							
Daily Rainfall (mm)							

VISUAL INSPECTION	First Inspection	Second Inspection (+24hrs)	Third Inspection (+48hrs)
Date			
Time			

Reservoir
Location of the chemical/toxic spill (provide as much detail as possible of the extent of the spill, and note changes over time, and areas threatened by the emergency):

Condition of spill			
Approx distance from dam wall			

Description of the Chemical/Toxic Spill

Location of Spill in the Reservoir/Catchment — OR DEFINE ITS LOCATION AS AN AMTD DISTANCE

Chemical Spill Management (tick if action taken)		DATE	TIME
1. [redacted]			
2.			
3. Source of spill located & isolated (if safe and possible)?			
4. Area isolated from public/staff access (if possible)?			

Details of significant changes. New occurrences and issues warranting further attention, Source of seepage (if known)

.....

.....

.....

.....

.....

Sketch, measure, photograph and locate if possible. Locate the position of Algal Bloom / Spill on a Plan (if available)

Inspecting Officer's initials				
Fax to (tick if faxed)		Asset Engineering Manager / Service Delivery Manager [redacted]		
		Principal Engineer (Dam Safety) [redacted]		

** INSTRUCTIONS FOR COMPLETING SHEET - Chemical/Toxic Spill

VISUAL INSPECTION

Frequency of visual inspection required is indicated by **ONCE A DAY**

Additional Inspections should be made, when

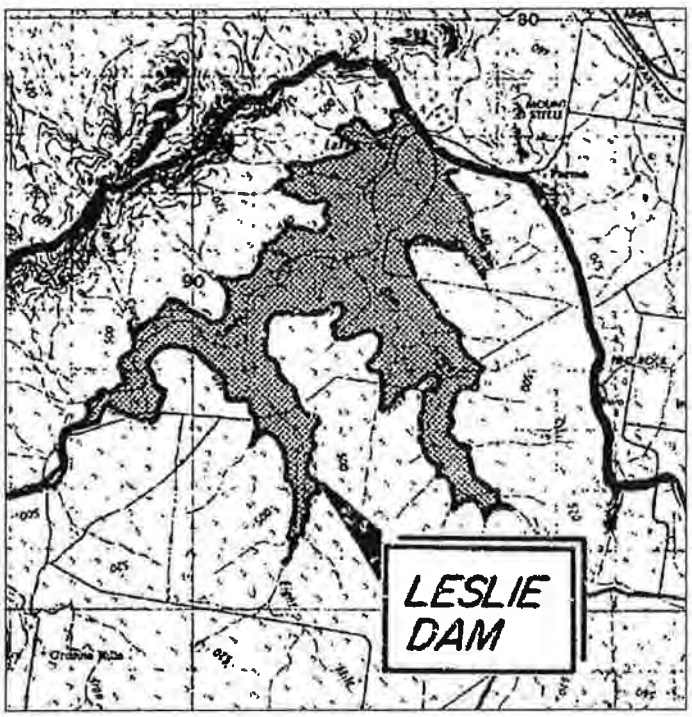
- Large developments of Algal Bloom are evident which require further action
- When specifically requested

Show results of inspections as follow:-

- New Seepage appeared **NEW**
- Significant increase (> 30%) or change in condition **SG-INC**
- Slight increase (> 10%) or change in condition. **INC**
- NIL change of condition. **NIL**
- Slight decrease (< 10%) or change in condition. **DEC**

Significant Changes

Any changes which, in the opinion of the inspecting officer, are more than just slight changes must be advised to the Principal Engineer (Dam Safety). The degree of urgency of this advice varies with the nature of the issue.



LESLIE DAM EAP — Terrorist Activity

Visual Inspection and Storage Report
Note: Refer to Page 2 for recording instructions **

Date: .....

	SUN	MON	TUE	WED	THU	FRI	SAT
Stored Water Level **FSL 472.41m**							
Daily Rainfall (mm)							

VISUAL INSPECTION	First Inspection	Interim Inspection (as directed)	Final Inspection (as directed)
Date			
Time			
(Walk OR Drive at 10 km/hour. Write 'W' for walk and 'D' for Drive)			
Embankment			
Crest			
Cracks, subsidence			
Upstream Face (Use binoculars or boat)			
Settlement or sink hole			
Displacement of riprap material			
Downstream face			
Sloughing			
Subsidence, slides, erosion			
Area Downstream of Dam			
New Seepage			
Increase in Seepage			
[redacted]			
Deterioration of valves			
Spillway			
Channel Erosion			
Damage to concrete			
[redacted]			
Cracks, concrete deterioration			

Details of significant changes. New occurrences and issues warranting further attention

.....

.....

.....

New Cracks or Movements: Sketch, measure, photograph, and locate if possible. Sketch on the Plan (see over)

Inspecting Officer's initials			

Fax to (tick if faxed)		Asset Engineering Manager / Service Delivery Manager [redacted]
		Principal Engineer (Dam Safety) [redacted]

** INSTRUCTIONS FOR COMPLETING SHEET - Terrorist Activity

VISUAL INSPECTION

[redacted]

SECTION 7

EMERGENCY ACCESS ROUTES & PREVENTATIVE ACTIONS

7.1 EMERGENCY ACCESS ROUTES

Alternative Access Routes and Locality Plan are shown on Page 2 and 3 of this Section.

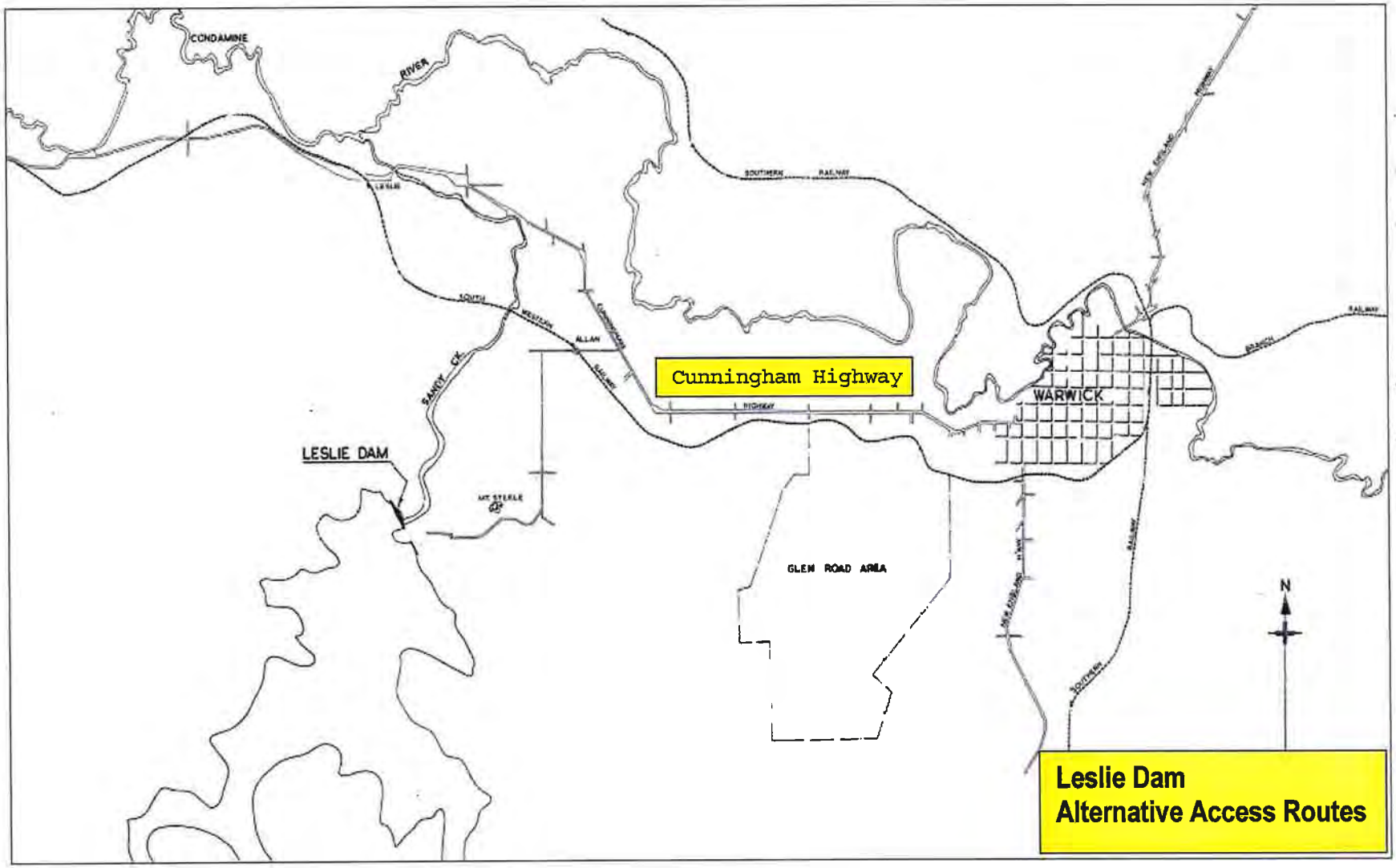
7.2 PREVENTATIVE ACTIONS

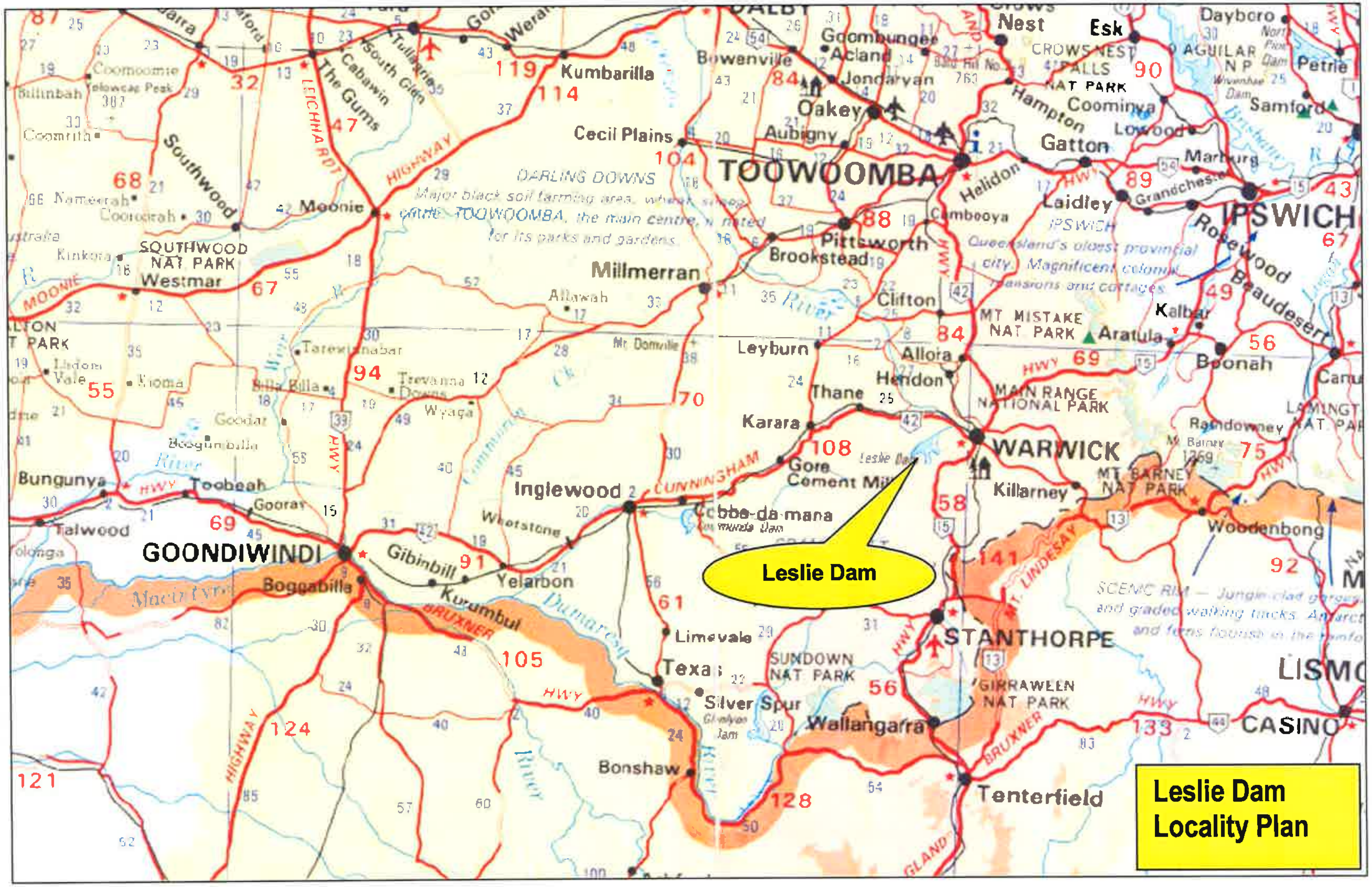
In the event of a rapidly deteriorating structural deficiency which is likely to threaten the security of the dam (for example due to internal erosion or following a major earthquake), the Dam Duty Operator or Standby Officer, having reported a potential emergency situation, should follow the preventive actions set out below:-

1. Ensure that a responsible person with portable communication is left in a safe position at the dam to monitor the emergency condition.
2. Restrict access to the dam area.
3. Liaise with Emergency Event Coordinator and the Asset Engineering Manager, who will liaise with Emergency Management Authorities.
4. If possible, document the emergency condition with photographs and or video camera.
5. Update Emergency Event Coordinator from time to time of any change in the emergency condition.
6. Do not take any unnecessary risks in undertaking the above actions.

Since the most likely scenario for a dam failure at Leslie Dam is from Sunny Day Failure, the stability may be increased by using available earth and rockfill material as a stabilising berm. A list of equipment (earthmoving), available during an emergency, is provided in Section 3.

It may become necessary during an emergency to lower the reservoir level of the dam to decrease seepage and/or loading on the structure, and to minimise the impact of any failure. This would only be an option where an emergency condition was identified in the early stages. Instructions for operation of the outlet works are given in Section 2.7 of the Operation and Maintenance Manual for the dam.


CONDAMINE
RIVER
SOUTHERN RAILWAY
SOUTH WESTERN
ALLAN
SANDY CK
Cunningham Highway
WARWICK
LESLIE DAM
MT STERLE
GLEN ROAD AREA
N
Leslie Dam
Alternative Access Routes


Leslie Dam
Locality Plan
Leslie Dam
TOOWOOMBA
WARWICK
STANTHORPE
GOONDIWINDI
IPSWICH
CASINO
Tenterfield
Inglewood
Millmerran
Cecil Plains
Kumbarilla
Leyburn
Clifton
Allora
Hendon
Thane
Karara
Gore
Cement Mill
Coolmunda Dam
Killarney
Wallangarra
Texas
Silver Spur
Limevale
Bonshaw
Yelarbon
Gibinbill
Kurumbul
Boggabilla
Toobeah
Bungunya
Talwood
Westmar
Southwood
Moonie
Oakey
Gatton
Laidley
Boonah
Beaudesert
Rosewood
Esk
Dayboro
Petrie
Samford
Marburg
Grandchester
Helidon
Cambooya
Pittsworth
Brookstead
Aubigny
Jondaryan
Goombungee
Acland
Bowenville
Woodenbong
Kalbar
Aratula
Rathdowney
Lowood
Coominya
Hampton
DARLING DOWNS
Major black soil farming area, wheat, sheep, cattle. TOOWOOMBA, the main centre, is noted for its parks and gardens.
SOUTHWOOD NAT PARK
MT MISTAKE NAT PARK
MAIN RANGE NATIONAL PARK
MT BARNEY NAT PARK
SUNDOWN NAT PARK
GIRRAWEEN NAT PARK
CROWS NEST FALLS NAT PARK
AGUILAR N P
CUNNINGHAM
LEICHHARDT
HIGHWAY
BRUXNER
MT LINDESAY
Dumaresq
Macintyre
River

SECTION 8

LOWERING STORAGE LEVEL

8.0 LOWERING THE STORAGE LEVEL

It may become necessary during an emergency to lower the Leslie Dam storage level to decrease seepage and/or loading on the structure to minimise the impact of any failure. This would only be an option when an emergency condition has been identified in its early stages.

8.1 Leslie Dam Constraints

There are two constraints that need to be considered when evaluating lowering of the storage level. These are:

1. Maximum possible releases from Leslie reservoir; and

2. Flooding impacts downstream.

8.1.1 Maximum possible releases from Leslie Dam

The release rate from the storage may be governed by the storage level at the time of drawdown. Leslie Dam has two possible mechanisms, which can be operated simultaneously. They are:

1. Spillway Sector Gates :	Top of the gate level EL 472.83 m Spillway Crest Level EL 466.31 m
2. Low Level Outlet	Invert Level EL 454.29 m

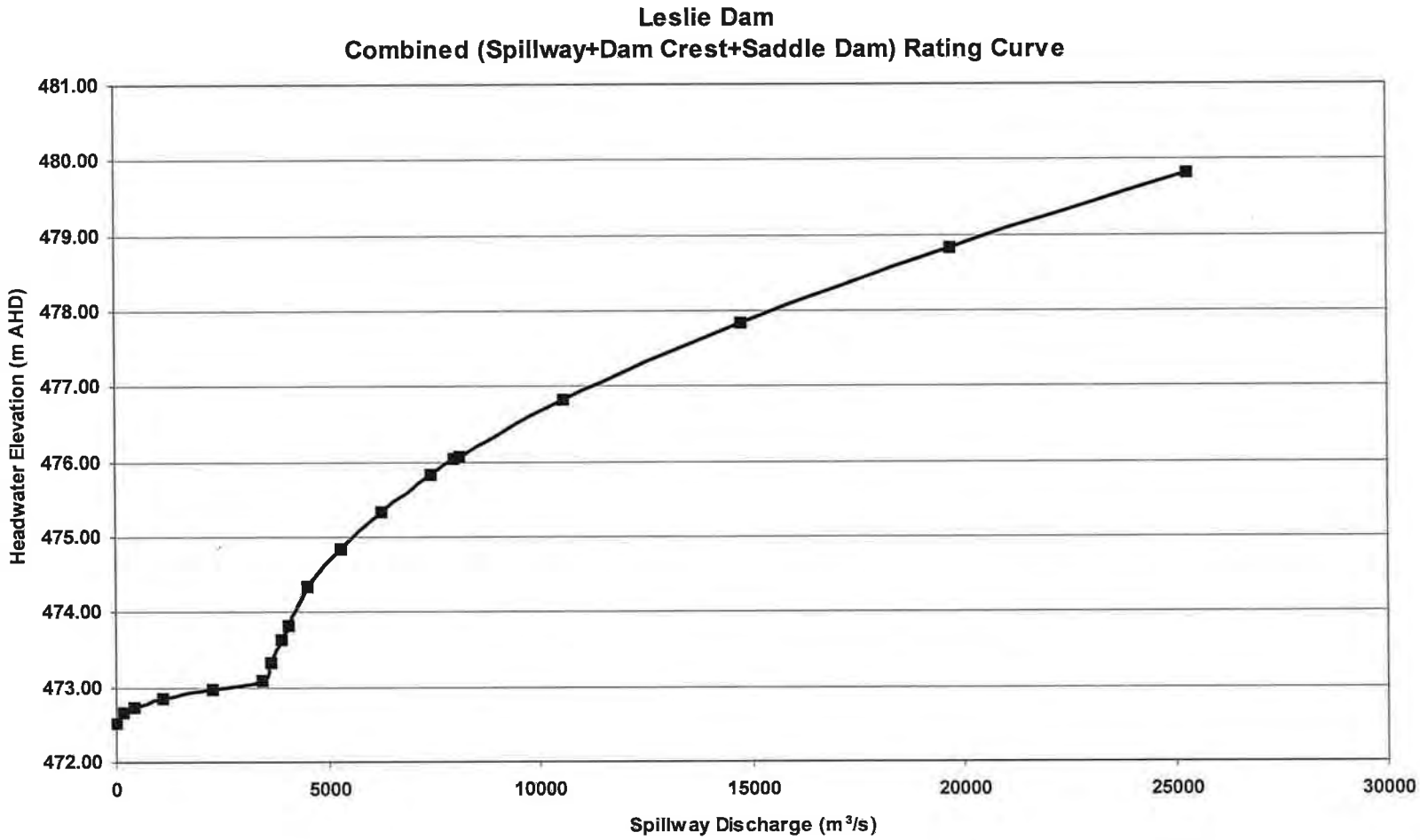
The following table indicates the total number of days required to dewater Leslie Dam from Full Supply Level using the available outlets. A spillway discharge curve is given on page 4.

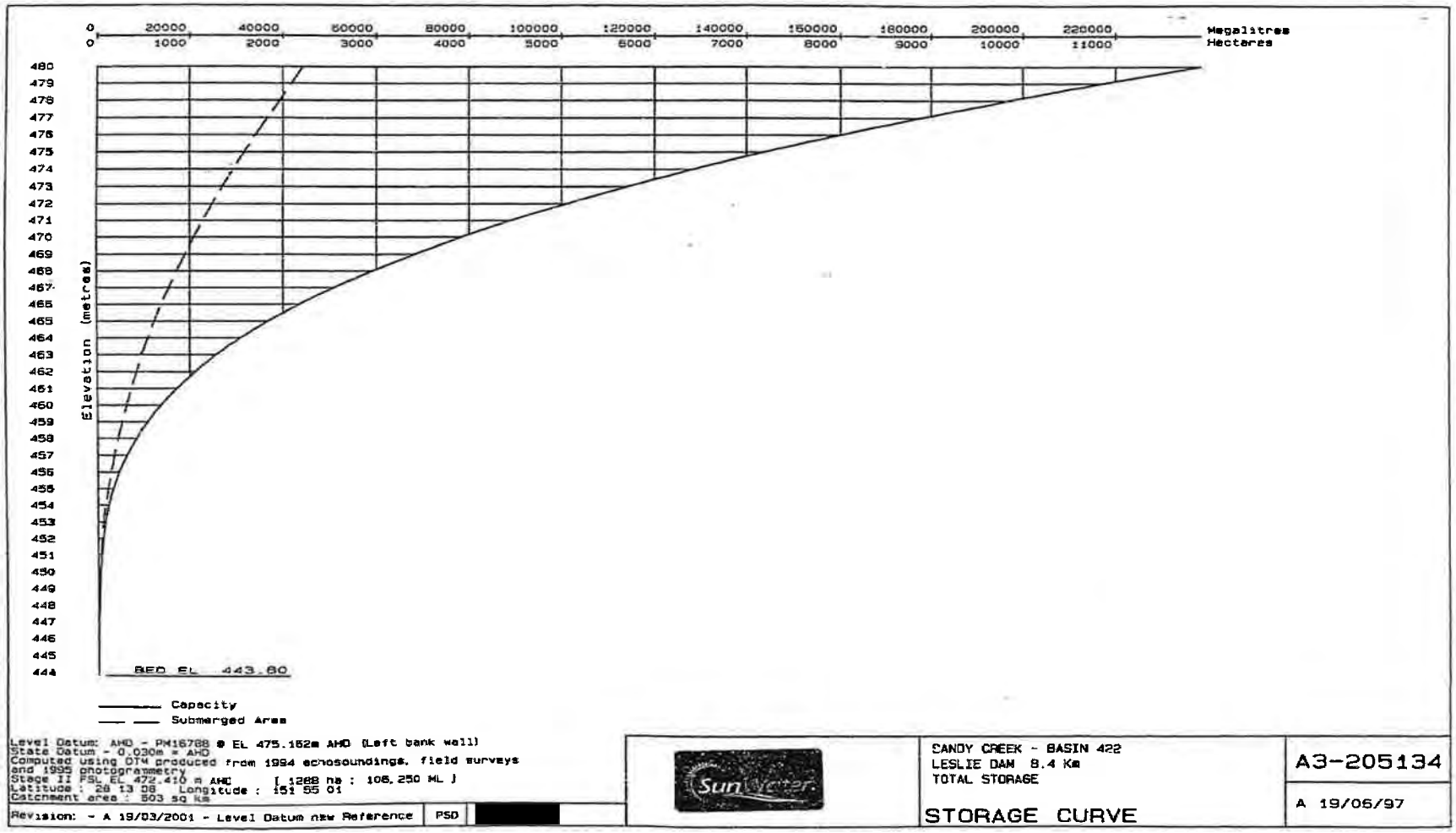
Dewatering Options	Inflow	Number of Days required to Lower the Reservoir level
a) Option 1 • (Spillway discharge) Option 2 • Both Low Level outlets (below spillway crest)	No Inflow	a)Option 1 To EL 466.31 m 9 Days b)Option2 To EL 454.29 m –More than 500 Days
b) Option 2 • (Spillway + Both Outlets)	Mean Average 240192 MLD AEP 1:100 yrs	Not Applicable Inflow > outflow

Spillway Discharge Rating Curve, Storage Capacity Curve & Data

and

Low Level Outlet Discharge Curve


Leslie Dam
Combined (Spillway+Dam Crest+Saddle Dam) Rating Curve
Headwater Elevation (m AHD)
481.00
480.00
479.00
478.00
477.00
476.00
475.00
474.00
473.00
472.00
0
5000
10000
15000
20000
25000
30000
Spillway Discharge (m³/s)


0 20000 40000 60000 80000 100000 120000 140000 160000 180000 200000 220000
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000
Megalitres
Hectares
Elevation (metres)
480 479 478 477 476 475 474 473 472 471 470 469 468 467 466 465 464 463 462 461 460 459 458 457 456 455 454 453 452 451 450 449 448 447 446 445 444
BED EL 443.80
Capacity
Submerged Area
Level Datum: AHD - PM16788 @ EL 475.162m AHD (Left bank wall)
State Datum - 0.030m = AHD
Computed using DTM produced from 1994 echosoundings, field surveys and 1995 photogrammetry
Stage II FSL EL 472.410 m AHD [1288 ha : 105,250 ML]
Latitude : 28 13 08 Longitude : 151 55 01
Catchment area : 503 sq km
Revision: - A 19/03/2001 - Level Datum new Reference
PSD
SUNWATER
SANDY CREEK - BASIN 422
LESLIE DAM 8.4 Km
TOTAL STORAGE
STORAGE CURVE
A3-205134
A 19/06/97

EL (M)	AREA (HA)	VOLUME (ML) TOTAL	COMM
480.00	2214	238367	
479.80	2190	233965	
479.60	2165	229613	
479.40	2140	225311	
479.20	2115	221057	
479.00	2090	216854	
478.80	2065	212700	
478.60	2040	208596	
478.40	2015	204542	
478.20	1989	200540	
478.00	1964	196588	
477.80	1939	192687	
477.60	1914	188836	
477.40	1889	185034	
477.20	1864	181283	
477.00	1837	177583	
476.80	1811	173937	
476.60	1784	170343	
476.40	1759	166801	
476.20	1734	163310	
476.00	1709	159868	
475.80	1684	156475	
475.60	1660	153133	
475.40	1635	149839	
475.20	1611	146595	
475.00	1588	143399	
474.80	1562	140251	
474.60	1539	137151	
474.40	1515	134098	
474.20	1492	131092	
474.00	1468	128132	
473.80	1444	125220	
473.60	1421	122358	
473.40	1398	119538	
473.20	1375	116765	
473.00	1353	114038	
472.80	1331	111355	
472.60	1309	108715	
472.40	1288	106118	
472.20	1267	103564	
472.00	1246	101051	
471.80	1226	98579	
471.60	1205	96149	
471.40	1185	93760	
471.20	1165	91410	
471.00	1146	89099	
470.80	1126	86829	
470.60	1106	84598	
470.40	1086	82408	
470.20	1066	80257	

EL (M)	AREA (HA)	VOLUME (ML) TOTAL	COMM
470.00	1046	78148	
469.80	1026	76074	
469.60	1008	74041	
469.40	989	72045	
469.20	971	70086	
469.00	952	68163	
468.80	935	66276	
468.60	917	64425	
468.40	900	62608	
468.20	883	60825	
468.00	866	59078	
467.80	849	57361	
467.60	833	55679	
467.40	816	54031	
467.20	800	52415	
467.00	782	50834	
466.80	765	49287	
466.60	748	47774	
466.40	732	46294	
466.20	716	44847	
466.00	700	43432	
465.80	684	42049	
465.60	669	40697	
465.40	654	39375	
465.20	639	38083	
465.00	624	38821	
464.80	610	35587	
464.60	595	34383	
464.40	581	33208	
464.20	567	32061	
464.00	552	30943	
463.80	538	29853	
463.60	524	28791	
463.40	511	27756	
463.20	498	26747	
463.00	485	25764	
462.80	472	24808	
462.60	460	23877	
462.40	448	22969	
462.20	436	22085	
462.00	424	21226	
461.80	412	20390	
461.60	400	19579	
461.40	389	18791	
461.20	378	18024	
461.00	368	17278	
460.80	357	16554	
460.60	347	15851	
460.40	337	15168	
460.20	327	14504	

EL (M)	AREA (HA)	VOLUME (ML) TOTAL	COMM
460.00	318	13860	
459.80	308	13234	
459.60	299	12627	
459.40	290	12037	
459.20	281	11467	
459.00	271	10915	
458.80	262	10382	
458.60	253	9867	
458.40	244	9370	
458.20	236	8890	
458.00	227	8428	
457.80	217	7985	
457.60	209	7559	
457.40	200	7150	
457.20	192	6758	
457.00	184	6381	
456.80	176	6021	
456.60	169	5676	
456.40	162	5345	
456.20	156	5027	
456.00	148	4723	
455.80	140	4436	
455.60	132	4163	
455.40	126	3905	
455.20	121	3658	
455.00	115	3420	
454.80	112	3192	
454.60	107	2974	
454.40	100	2766	
454.20	92	2574	
454.00	86	2396	
453.80	80	2231	
453.60	74	2077	
453.40	69	1934	
453.20	65	1800	
453.00	60	1676	
452.80	56	1559	
452.60	53	1451	
452.40	49	1349	
452.20	45	1254	
452.00	43	1165	
451.80	41	1081	
451.60	39	1002	
451.40	37	927	
451.20	35	856	
451.00	33	789	
450.80	31	725	
450.60	29	666	
450.40	27	609	
450.20	26	556	

EL (M)	AREA (HA)	VOLUME (ML) TOTAL	COMM
450.00	24	507	
449.80	22	460	
449.60	21	417	
449.40	20	377	
449.20	18	339	
449.00	17	303	
448.80	16	270	
448.60	15	239	
448.40	14	211	
448.20	13	184	
448.00	12	160	
447.80	11	138	
447.60	10	117	
447.40	9	99	
447.20	8	83	
447.00	7	69	
446.80	6	56	
446.80	5	46	
446.40	4	37	
446.20	4	29	
446.00	3	22	
445.80	3	16	
445.60	2	11	
445.40	2	7	
445.20	1	3	
445.00	1	1	
444.80	0	1	
444.60	0	0	
444.40	0	0	
444.20	0	0	
444.00	0	0	
443.80	0	0	

Level Datum: AHD - PM16788 @ EL 475.162m AHD (Left bank wall)
State Datum - 0.030m = AHD
Computed using DTM produced from 1994 echosoundings, field surveys and 1995 photogrammetry
Stage II FSL EL 472.410 m AHD [1280 ha ; 106,250 ML]
Latitude : 28 13 00 Longitude : 151 55 01
Catchment area : 503 sq km

Revision: - A 19/03/2001 - Level Datum new Reference | PSD

SunWater

SANDY CREEK - BASIN 422
LESLIE DAM 8.4 Km
TOTAL STORAGE

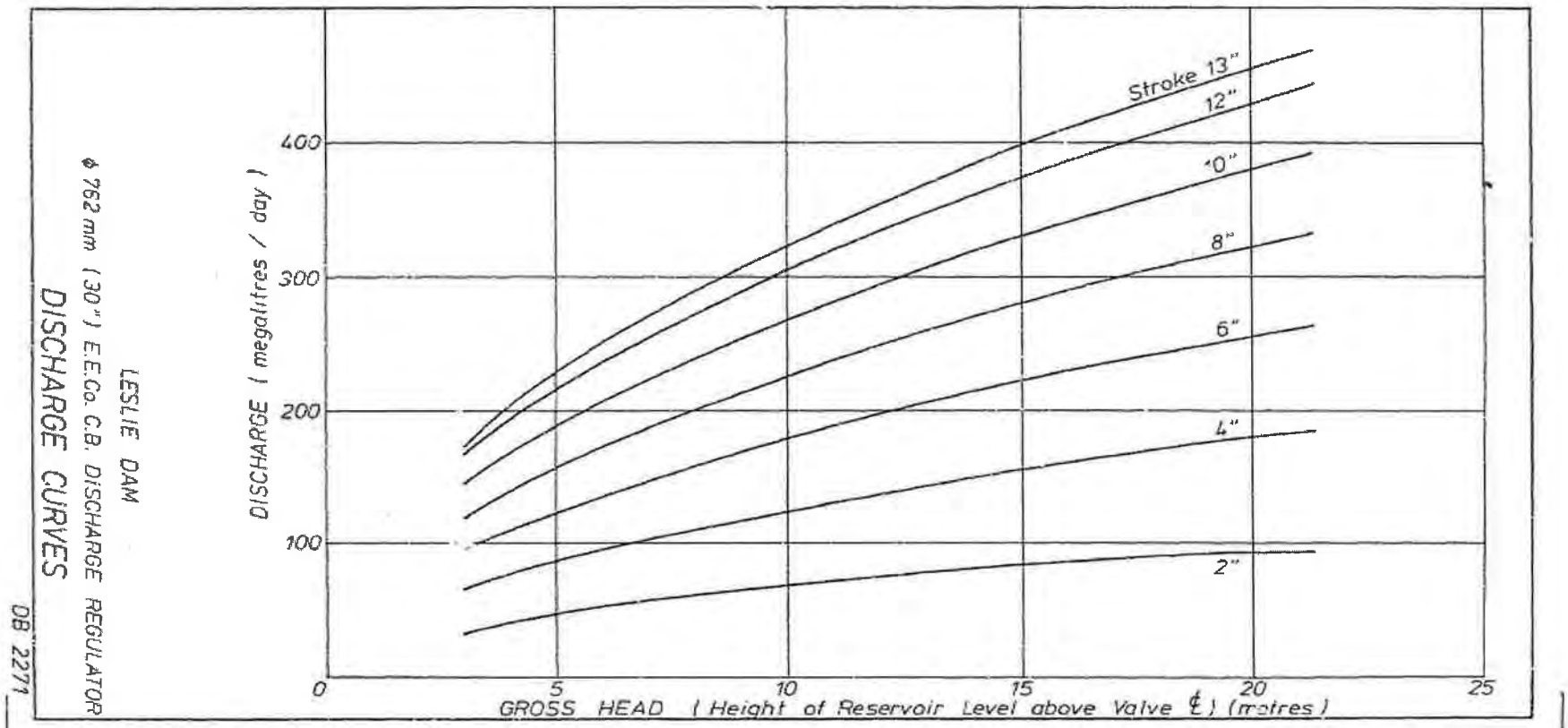
STORAGE DATA

A3-205135

A 19/06/97

205135A (tif)

LOW LEVEL OUTLET DISCHARGE CURVE



160599 (TIF)

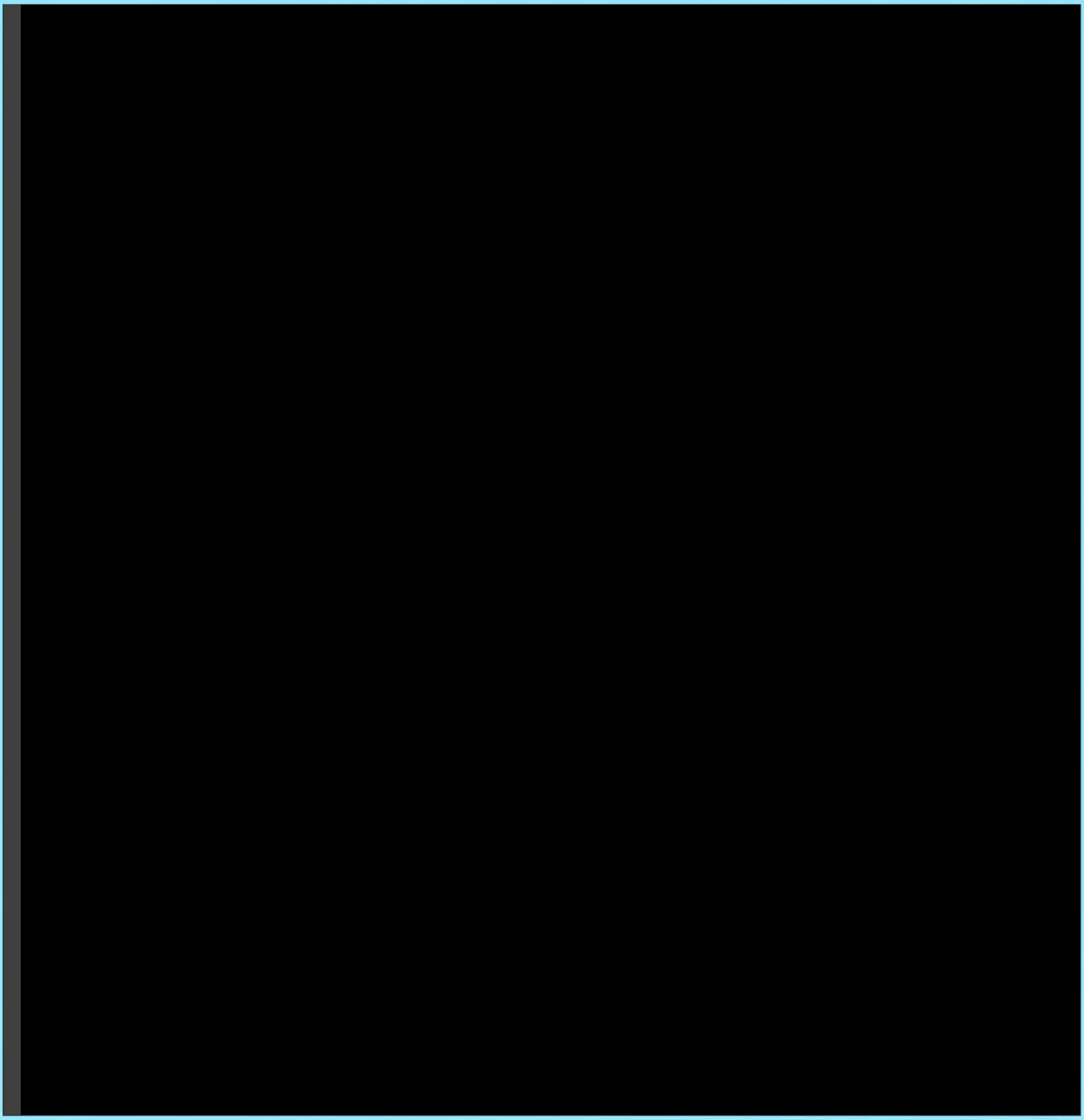
SECTION 9

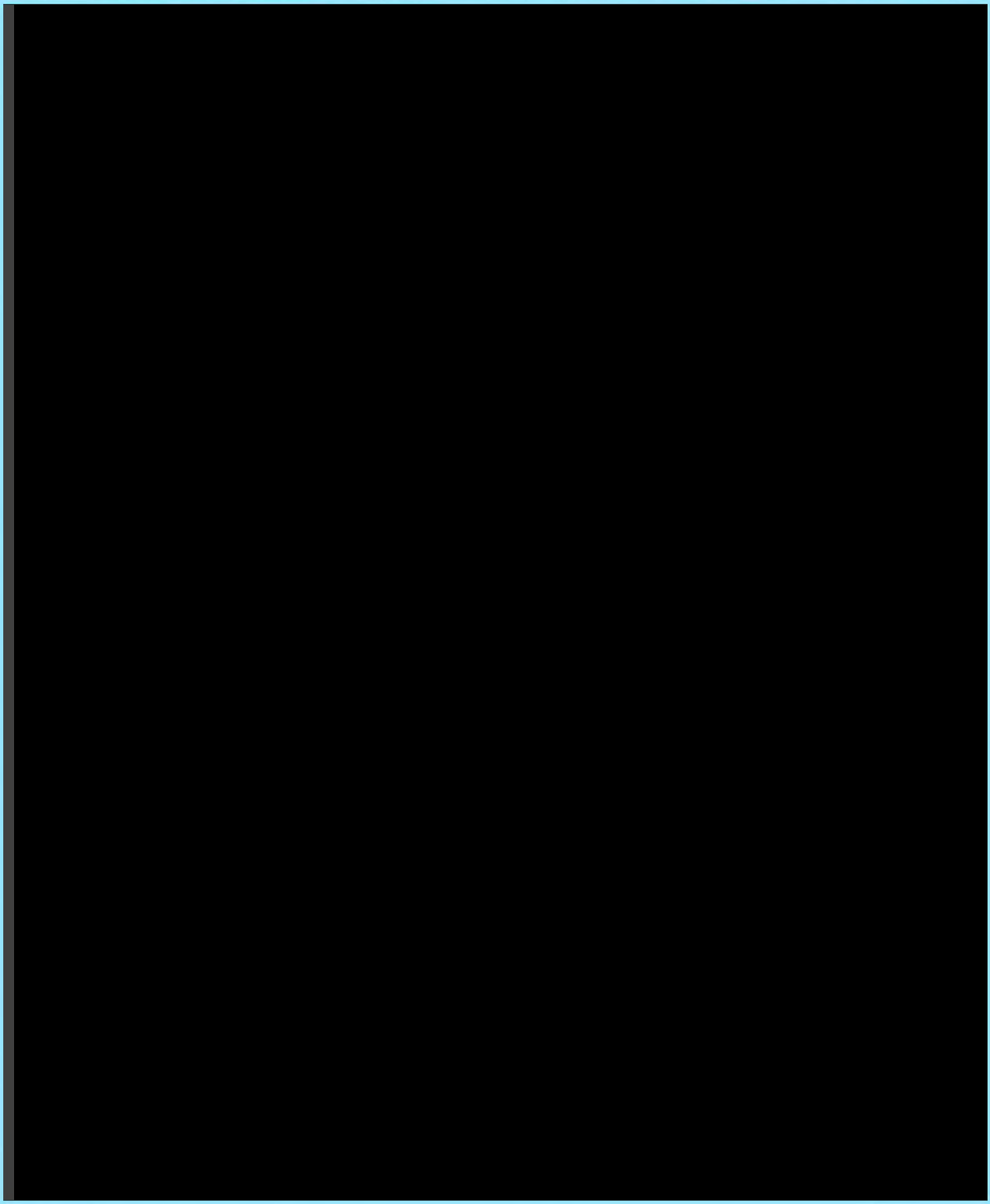
FLOOD IMPACTS DOWNSTREAM, RIVER CROSS-SECTIONS & INUNDATION MAPS

Flooding impacts downstream

The flooding impact of Leslie Dam releases may be assessed by the flooding effects at key locations along the Sandy Creek (Table 9.1). The Probable Maximum Precipitation with Dam Failure (PMPDF) scenario generates highest flood levels in Sandy Creek. Table 9.1 to 9.8 below shows the summarised information of the Dam Break Study conducted by SunWater in April 2003.

Table 9.1: Key Locations for the Leslie Dam Break Analysis

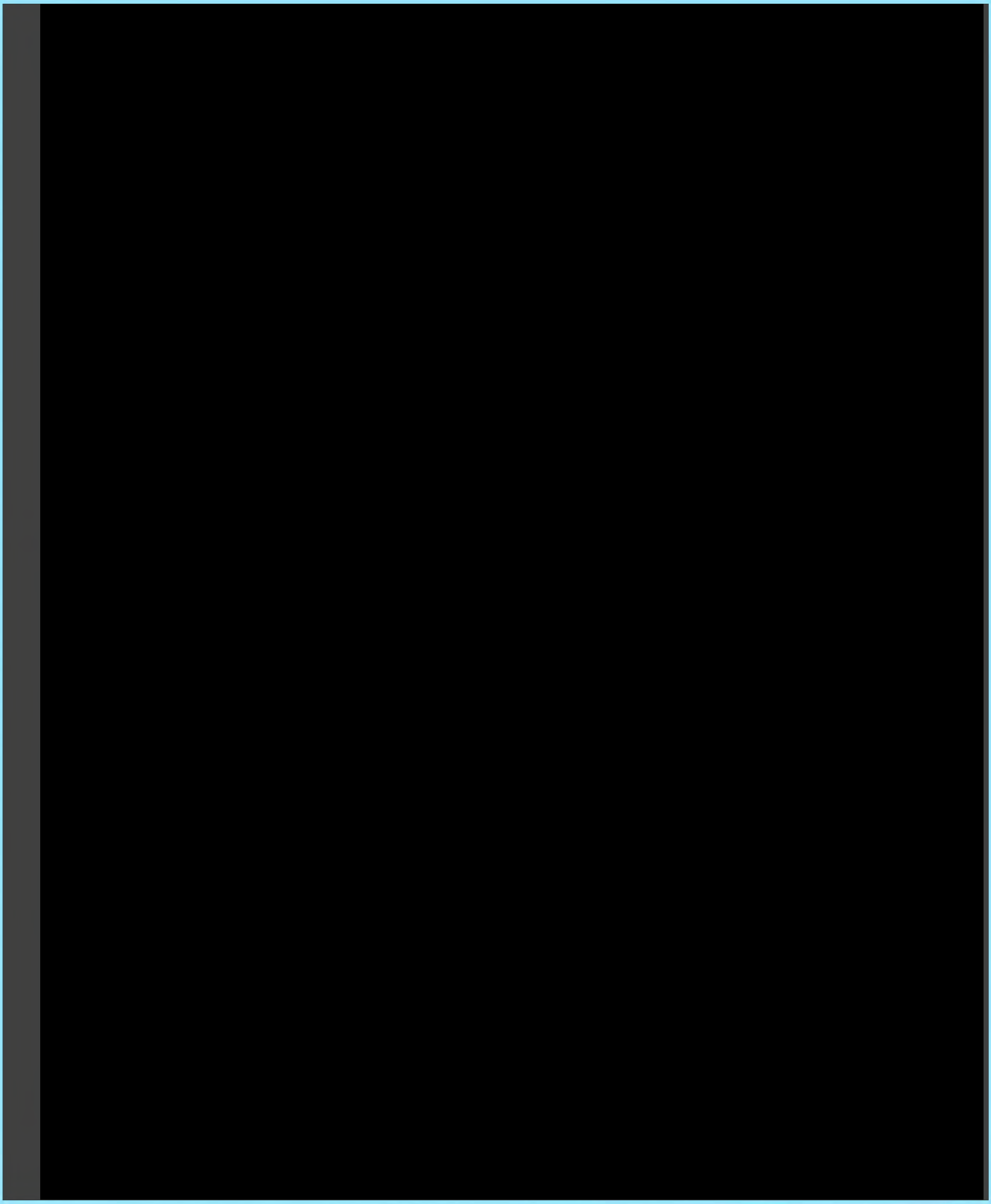




Elapsed time of flow from Dam

From the simulated dam break flood hydrographs, the elapsed time of flood wave at the key locations has been estimated. In Table 9.2 below, the estimated timings are summarised.

Table 9.2: Flood Timing at Key Locations



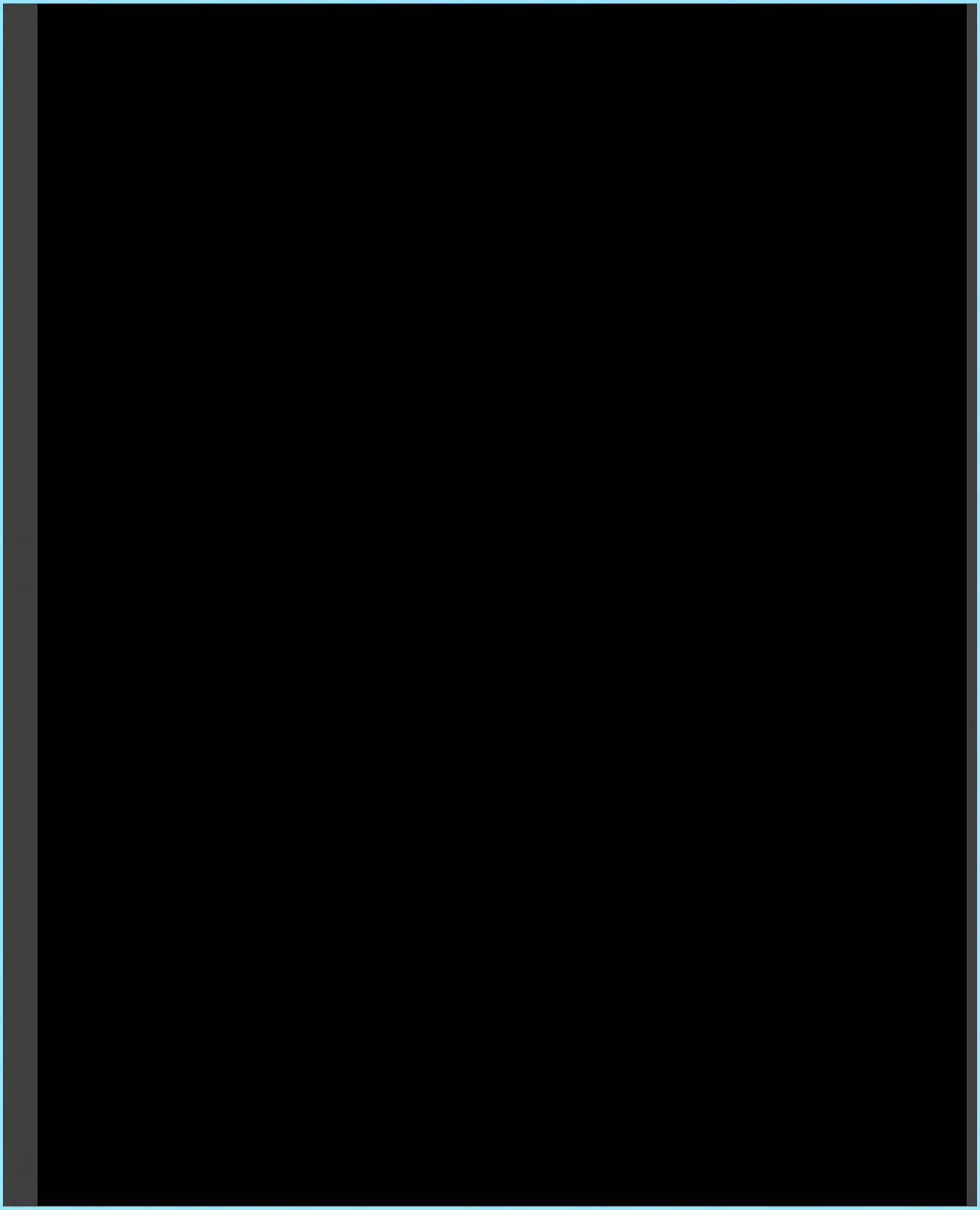


Table 9.3 Leslie Dam, Dambreak Study, Peak Mean Velocities

LOCATION	SDF of All Radial Gates	PMF "No Dam Failure"	PMF Partial Failure of 30% of Monoliths
Leslie Dam Access Rd. Bridge, Cross-section SS01, Sandy Creek AMTD 8.4 km	3.1 m/s	5.4 m/s	6.1 m/s
Cunningham Hwy. Bridge, Cross-Section SS05, Sandy Creek AMTD 4.2 km	2.1 m/s	3.1 m/s	3.4 m/s
O.O. Madsen Bridge, Helene St., Warwick, Cross-section SW06, Condamine River AMTD 1104.7 km	Base flow	1.0 m/s	1.0 m/s
McCahon Bridge, Victoria St., Warwick, Cross-section SW08, Condamine River AMTD 1102.5 km	Base flow	0.9 m/s	0.9 m/s
Affleck's Bridge, Toolburra Plains Rd., Cross-section SC07, Condamine River AMTD 1083.6 km	0.7 m/s	1.1 m/s	1.1 m/s
Wheatvale Plains Rd. Bridge, Wheatvale, Cross-section SC14, Condamine River AMTD1067.9 km,	1.0 m/s	1.1 m/s	1.1 m/s
Pratten Township, Cross-section SC29, Condamine River AMTD 1045.8 km	0.8 m/s	0.9 m/s	0.9 m/s

RIVER CROSS-SECTIONS & INUNDATION MAPS

Comprehensive hydrologic and hydraulic modelling has simulated flood inundation that would occur for the following scenarios.

(i) **"Failure due to flood"**:- The inflow of an extreme flood into the storage causes overtopping leading to erosion failure of abutment or foundations.

(ii) **"Sunny Dam Failure"**:- In which the dam fails under a normal inflow situation. Any flood inundation would result from water held in the storage.

River x-section at Leslie Dam Access Rd. Bridge, Cross-section SS01, Sandy Creek

River x-section at Cunningham Hwy. Bridge, Cross-Section SS05, Sandy Creek

River x-section at O.O. Madsen Bridge, Helene St., Warwick, Cross-section SW06, Condamine River

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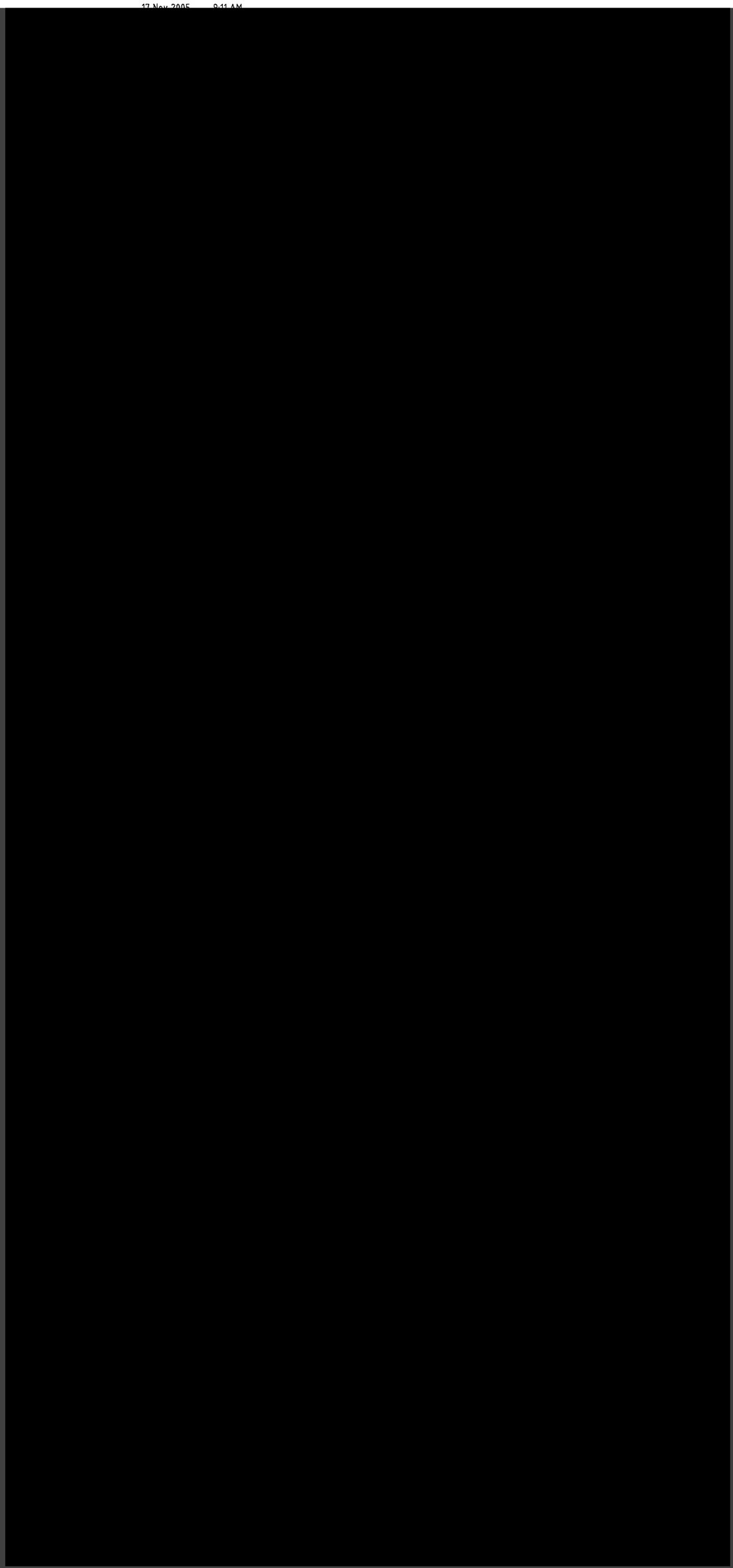

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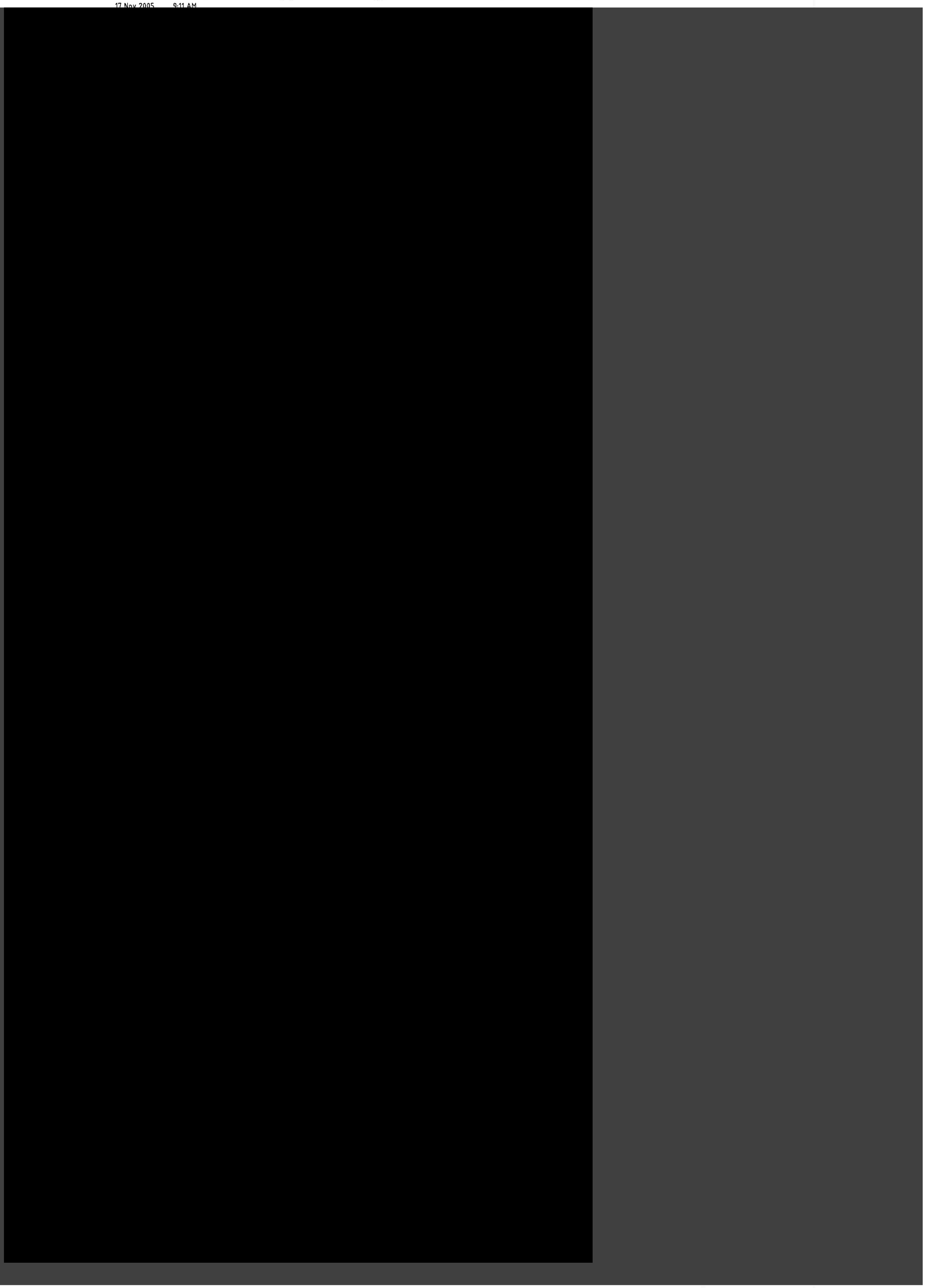

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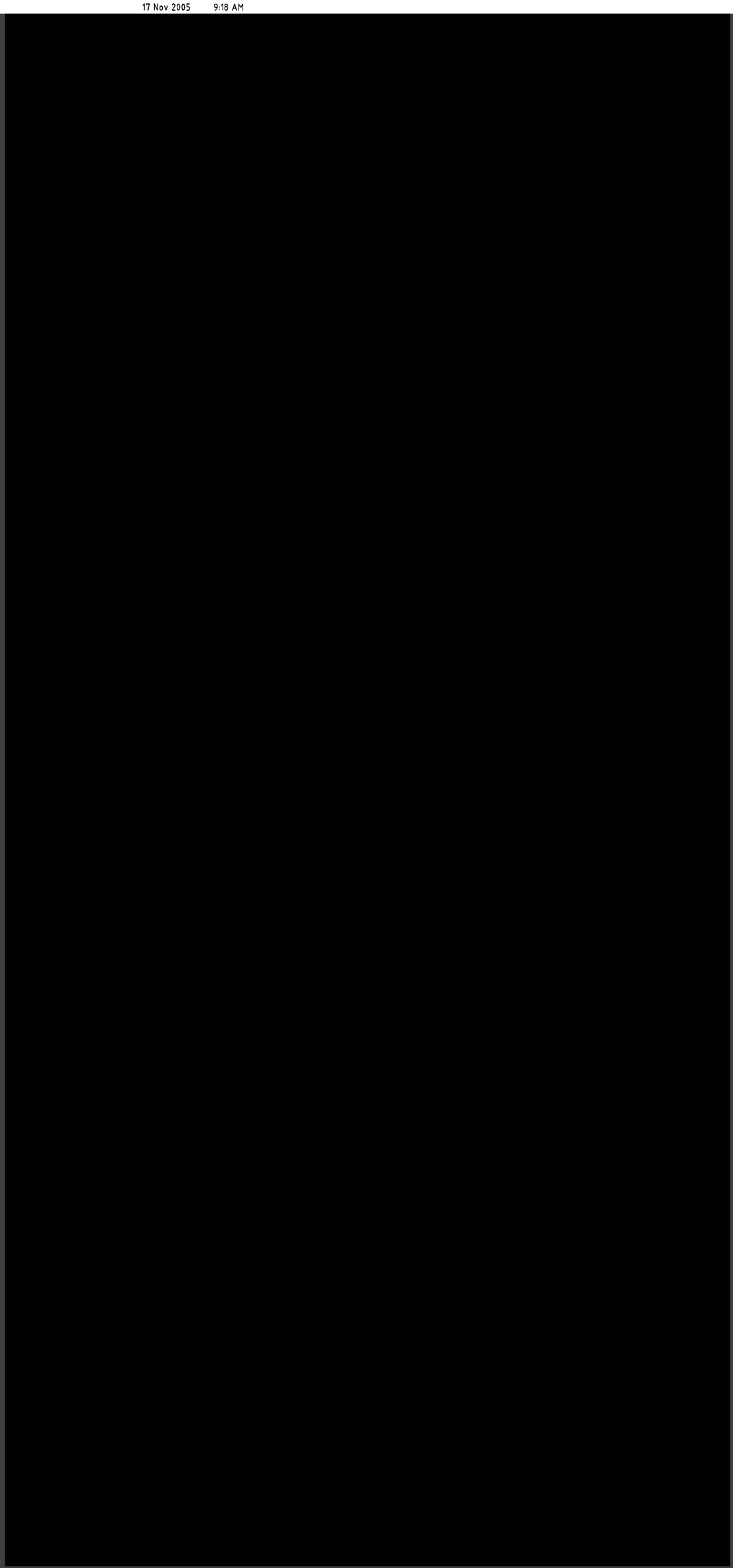

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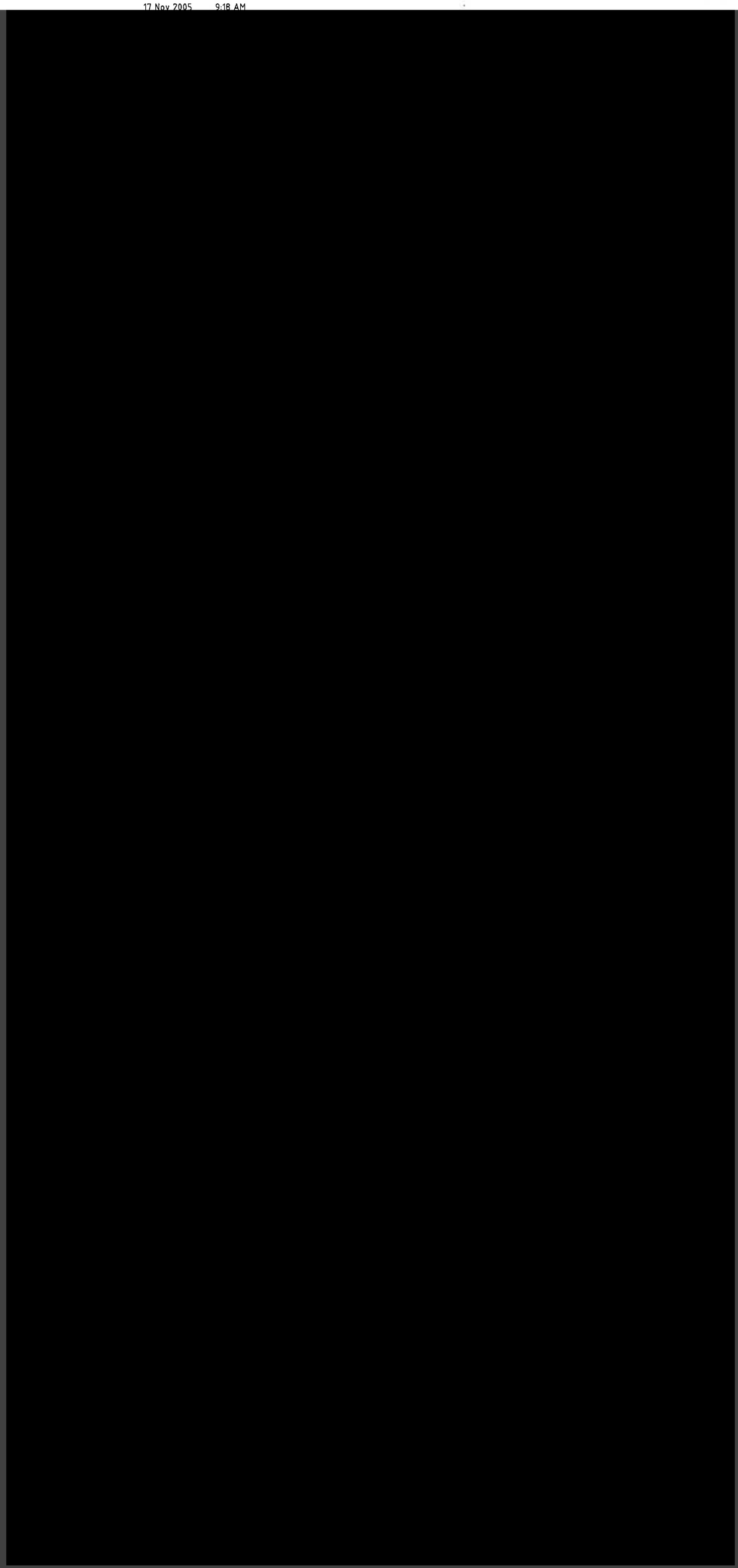

SECTION 10

DEFINITIONS & ANALYSIS

- Incident, Emergency Response, Crisis and Business Continuity Management Manual
- Flood Event Definitions and Abbreviations
- Earthquake Assessment (Modified Mercalli Scale)
- Queensland Disaster Management System
- Weather Information (Flood Warning)

INCIDENT, EMERGENCY RESPONSE, CRISIS AND BUSINESS CONTINUITY MANAGEMENT MANUAL

PURPOSE

The purpose of the Manual is to provide a description of the framework that SunWater applies in managing various levels of incidents, from locally managed incidents through to emergency, crisis and business continuity management. It includes:

- definitions for the terminology used in incident management
- a description of the documentation for the different levels of an Incident / Emergency / Crisis
- a roadmap of the different levels of incident within SunWater and how they are to be managed, including a description of the escalation process when an Emergency worsens to become a Crisis
- a description of the phases of management of the different levels of incident, and how these may interrelate.

The Incident/Near Miss Management Plan (IMP), Emergency Management Plan (EMP), Crisis Management Plan (CMP) and Business Continuity Plan (BCP) must be read in conjunction with the Manual.

FLOOD EVENT DEFINITIONS AND ABBREVIATIONS

DEFINITIONS

- **"DCF"** or
  "Dam Crest Flood" (Formerly IFF or Impending Failure Flood)
  The flood Event which when routed through the Reservoir just threatens failure of the Dam. The Reservoir is assumed to be initially at Full Storage Level
- **"PMF"** or
  "Probable Maximum Flood"
  The flood resulting from the Probable Maximum Precipitation, coupled with the worst flood producing catchments conditions that can be realistically expected in the prevailing meteorological conditions
- **"PMP"** or
  "Probable Maximum Precipitation"
  The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage system.
- **"SUNNY DAY FAILURE"**
  Unexpected failure of a dam not associated with flooding or natural disaster.

State of Emergency

As defined by the State Emergency and Rescue Management Act (1989)
OR As defined by the Dams Safety Act (1978)

ABBREVIATIONS

ANCOLD	Australian National Committee on Large Dams
DEMO	District Emergency Management Officer
DEOCON	District Emergency Operations Controller
DFL	Design Flood Level
DLWC	Department of Land and Water Conservation, NSW
DSU	Dam Safety Unit, Department of Land & Water Conservation, NSW
FSL	Full Supply Level
LEOCON	Local Emergency Operations Controller
MDBC	Murray Darling Basin Commission
MLD	Megalitres per Day
MRMW	Manager, River Murray Works
OIC	Officer-In-Charge, Hume Dam
SES	State Emergency Service
UHF	Ultra High Frequency
VHF	Very High Frequency
EL	Elevation Level
AEP	Annual Exceedence Probability
DCL	Dam Crest Level

EARTHQUAKE ASSESSMENT (MODIFIED MERCALLI SCALE)

MM 1 Not felt by humans, except in especially favourable circumstances, but birds and animals may be disturbed.
Reported mainly from the upper floors of buildings more than 10 storeys high.
Dizziness or nausea may be experienced.
Branches of trees, chandeliers, doors and other suspended systems of long natural period may be seen to move slowly.
Water in ponds, lakes reservoirs, etc. may be set into wave oscillation of short to long durations.

MM 2 Felt by a few persons at rest indoors, especially by those on upper floors or otherwise favourably placed.
The long-period effects listed under MM 1 may be more noticeable.

MM 3 Felt indoors, but not identified as an earthquake by everyone.
Vibration may be likened to passing of light traffic.
It may be possible to estimate the duration, but not the direction.
Hanging objects may swing slightly.
Standing motorcars may rock slightly.

MM 4 **Generally noticed indoors, but not outside.**
Very light sleepers may be wakened.
Vibration may be likened to the passing of heavy traffic, or to the jolt of a heavy object falling or striking the building.
Walls and frame of buildings are heard to creak.
Doors and windows rattle.
Glassware and crockery rattles.
Liquids in open vessels may be slightly disturbed.
Standing motorcars may rock, and the shock can be felt by their occupants.

MM 5 **Generally felt outside, and by almost everyone indoors.**
Most sleepers awakened. A few people frightened.
Direction of motion can be estimated.
Small unstable objects are displaced or upset.
Some glassware and crockery may be broken. Some windows cracked.
A few earthenware toilet fixtures cracked.
Hanging pictures move. Doors and shutters swing.
Pendulum clocks stop, start, or change rate.

MM 6 **Felt by all.**
People and animals alarmed.
Many run outside.
Difficulty experienced in walking steadily.
Some plaster cracks or falls. Isolated cases of chimney damage.
Windows, glassware, and crockery broken.
Objects fall from shelves, and pictures from walls.
Heavy furniture moved. Unstable furniture overturned.
Small church and school bells ring.
Trees and bushes shake, or are heard to rustle.
Loose material may dislodge from existing slips, talus slopes, or shingle slides.

MM 7 **General alarm.**
Difficulty experienced in standing.
Noticed by drivers of motorcars.
Trees and bushes strongly shaken. Large bells ring.
A few instances of damage to masonry.
Loose brickwork and tiles dislodged.
Unbraced parapets and architectural ornaments may fall.
Stone walls cracked. Weak chimneys broken, usually at the roof-line.
Domestic water tanks burst.
Concrete irrigation ditches damaged.
Waves seen on ponds and lakes.
Water made turbid by stirred-up mud.
Small slips, and caving-in of sand and gravel banks.

MM 8 **Alarm may approach panic.**
Steering of motorcars affected.
Masonry damaged, with partial collapse.
Chimneys, factory stacks, monuments, towers, and elevated tanks twisted or brought down.
Panel walls thrown out of frame structures.
Some brick veneers damaged.
Decayed wooden piles broken.
Frame houses not secured to the foundation may move.
Cracks appear on steep slopes and in wet ground.
Landslips in roadside cuttings and unsupported excavations.
Some branches may be broken off.
Changes in the flow or temperature of springs and wells may occur.
Small earthquake fountains.

MM 9 **General Panic.**
Masonry heavily damaged, sometimes collapsing completely.
Frame structures racked and distorted.
Damage to foundations general.
Frame houses not secured to the foundations shifted off.
Brick veneers fall and expose frames.
Cracking of the ground conspicuous.
Minor damage to paths and roadways.
Sand and mud ejected in alluviated areas, with the formation of earthquake fountains and sand craters.
Underground pipes broken.
Serious damage to reservoirs.

MM 10 **Most masonry structures destroyed, together with their foundations.**
Some well built wooden buildings and bridges seriously damaged.
Dams, dykes and embankments seriously damaged.
Railway lines slightly bent.
Concrete and asphalt roads and pavements badly cracked or thrown into waves.
Large landslides on river banks and steep coasts.
Sand and mud on beaches and flat land moved horizontally.
Large and spectacular sand and mud fountains.
Water from rivers, lakes, and canals thrown up on the banks.

Earthquake Effects

Earthquake Intensity

e effects of earthquake waves at a particular point is assigned using an intensity scale. This is an ..bitrary scale based on observations of phenomena such as:

- the type and extent of damage,
- whether sleeping people were woken,
- whether items fell from shelves,
- whether the event was felt or heard.

The most common intensity scale used in Australia is the 12-point Modified Mercalli (MMI) scale. On this scale, intensities up to 5 are felt but cause no damage, while intensities from 6 to 12 cause increasing amounts of damage.

Modified Mercalli Intensity (MMI) Scale	
1	Not felt. Recorded by seismographs.
2	Rarely felt, usually only on top floors of high buildings.
3	Felt indoors, like a passing light truck.
4	Windows, dishes, doors rattle. Like passing train.
5	Felt by all. Small objects upset.
6	Books off shelves. Trees shake. Isolated damage.
7	Difficult to stand. Many poor buildings damaged.
8	Significant damage. Branches broken from trees.
9	General panic. Serious damage. Ground cracking.
10	Most buildings destroyed. Rails bent slightly.
11	Rails bent greatly. Pipelines destroyed.
12	Near total damage. Objects thrown into the air.

Other intensity scales have been defined; the RF (Rossi-Forel) scale was introduced in the late 19th century, the JMA (Japan Meteorological Agency) scale is used in Japan and Taiwan; and the MSK and the more recent EMS (European Macroseismic Scale) are used in Europe. Most of these scales have twelve degrees of intensity which can be roughly (but not exactly) correlated between scales.

While all intensity scales are semi-qualitative they can be most useful for assessing historic earthquakes for which no seismic records exist.

Intensity Variability

An earthquake has a single magnitude, but intensity varies with distance. Maximum intensity normally occurs near the earthquake epicentre, with intensity values generally decreasing with distance.

Many factors affect surface ground motion, including topography and near-surface geology, especially soft surface sediments. These variations can be considerable, even over short distances. It is common) find intensities ranging by ±1 unit in a neighbourhood, and not unusual to find values ±2 or more.

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QUEENSLAND DISASTER MANAGEMENT SYSTEM

The Queensland Disaster Management System operates on three distinct levels. These are:

- Local Government
- Disaster District
- State Government

A fourth level, The Commonwealth, is also included in our Disaster Management System recognising that Queensland may need to seek Commonwealth support in times of disaster.

Each of these levels within the Queensland Disaster Management System has as its basis a committee structure supported by a disaster coordination centre. These committees and coordination centres are activated when required to manage and coordinate support for disaster stricken communities. When not activated, these committees meet to prepare for and practice their role within the Disaster Management System.

Figure 1 depicts the Queensland Disaster Management System including the link to the Commonwealth for National-level support when required.

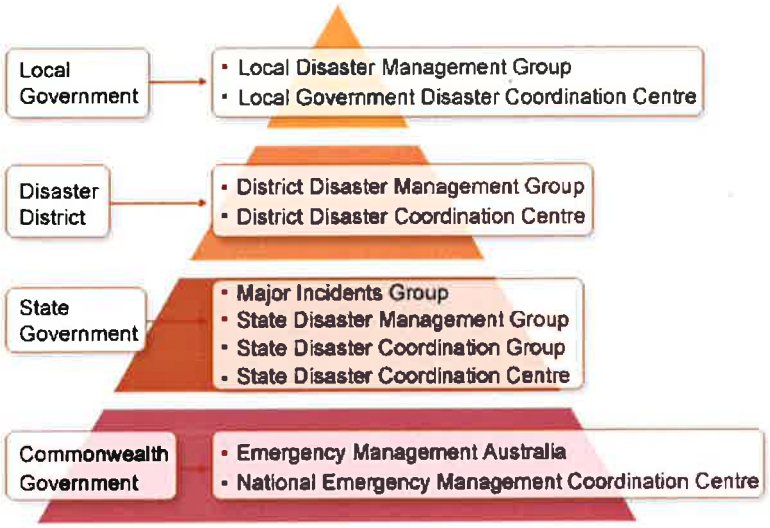


Figure 1 - The Queensland Disaster Management System

Description of the System

The Queensland Disaster Management System has three principal tiers that quickly provide both technical and tangible assistance to disaster stricken communities.

Management of a disaster at the community level is conducted by Local Government who are responsible for the implementation of their Local Disaster Management Plan. If Local Governments require additional resources to manage the event, they are able to request support from their Disaster District Coordinator. This allows for the rapid mobilisation of resources at a regional or district level. If Disaster Districts resources are inadequate or inappropriate, requests for assistance can be passed to State via the State Disaster Coordination Centre. Finally, when State resources are inadequate or inappropriate, support from the Commonwealth can be obtained via Emergency Management Australia (EMA).

Reference: http://www.disaster.qld.gov.au/about/

A brief summary of each of the key components of the Queensland Disaster Management System is set out below:

- **Local Disaster Management Group**. (formerly called Local Government Counter Disaster Committee). Local Disaster Management Groups (local groups) coordinate the response to a disaster at a local level. The Committees are usually chaired by the Mayor and the Local Government Chief Executive Officer is usually the Executive Officer of the committee. Local Government Counter Disaster Committees develop and maintain Counter Disaster Plans for their Shire. These Local Government Committees are best placed to decide what resources are needed, when they are needed and how best to apply such resources so as to minimise hardship and suffering. They play a key role in the Queensland Disaster Management System.

- **District Disaster Management Group** (formerly called Disaster District Control Group). There are 23 Disaster Districts in Queensland which are based on the Police Districts. The senior Police Officer in each district is designated as the Disaster District Coordinator who Chairs a Disaster District Control Group.These Disaster District Control Groups comprise representatives from regionally-based Queensland Government departments who are able to provide and coordinate whole-of-government support to disaster stricken communities. The Disaster Districts perform a 'middle'management function within the Disaster Management System by providing coordinated State Government support when requested by Local Governments.

- **The State Disaster Coordination Group (SDCG)** is the working body of the State Disaster Management Group (State Group) at State-level. SDCG members are designated liaison officers from each of the Departments represented on the State Group. This Group is the primary mechanism through which coordinated whole-of-government State-level support is provided to disaster-stricken communities.

- **The State Disaster Management Group**. The State Disaster Management Group (State Group) is established as the principal organisation under the new Act for the purposes of disaster management throughout the State. It replaces the State Counter-Disaster Organisation and its executive, the Central Control Group. In particular, the State Group is responsible for disaster mitigation and disaster planning and preparation at a State level and for coordinating whole-of-Government response and recovery operations prior to, during and after a disaster impact. This includes accessing interstate and/or Commonwealth assistance when local and State resources are exhausted or not available.

  The State Group comprises Chief Executive Officers (CEOs) from all Queensland Government Departments. The CEO of the Department of the Premier and Cabinet is the Chair, while the Executive Director of Counter Disaster and Rescue Services is the Executive Officer.

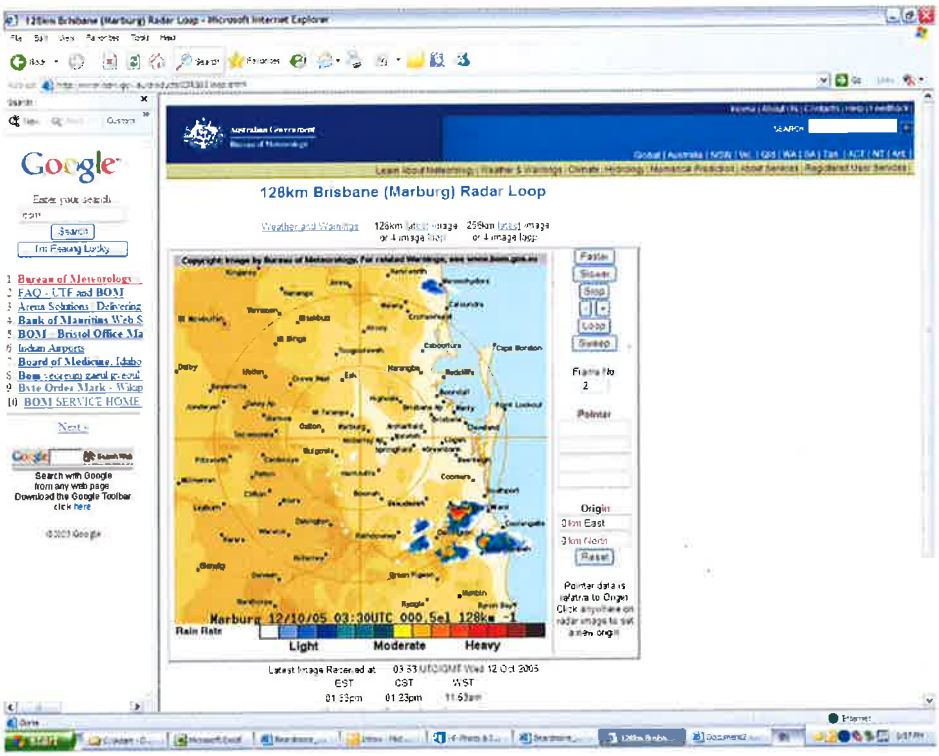
- **Major Incidents Group (MIG)**. The Queensland Government has established a MIG to provide high level Ministerial guidance and support in the event of a significant incident with major community consequences. Conceptually, membership of the MIG would be determined on an incident-by-incident basis and may include, but not be limited to:

  - Premier (Chair)
  - Treasurer
  - Attorney-General
  - Minister for Police
  - Minister for Emergency Services
  - Minister for Health

Reference: http://www.disaster.qld.gov.au/about/

WEATHER INFORMATION (FLOOD WARNING)

Using the Internet
http://www.bom.gov.au/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Moderate
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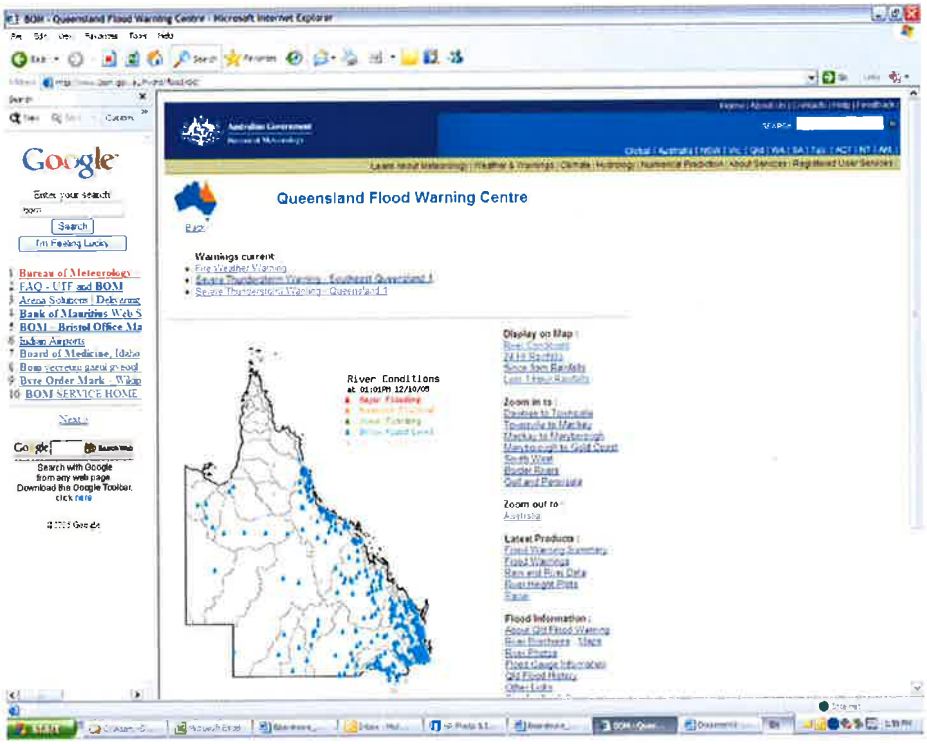
Queensland Flood Warning Centre
River Conditions
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