seqwater

WATER FOR LIFE

WIVENHOE DAM

EMERGENCY ACTION PLAN

FOR USE BY STAFF OF

SEQWATER

AND

EMERGENCY RESPONSE PERSONNEL

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DISTRIBUTION, AUTHORISATION AND REVISION STATUS

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2	Seqwater	Principal Engineer Dam Safety	Ipswich
3	Seqwater	Storage Supervisor	Wivenhoe Dam
4	Seqwater	Operations Coordinator	Central
5	SunWater	Senior Flood Operations Engineer	Flood Operations Centre, Brisbane
6	DERM	Director Dam Safety	Brisbane
7	Department of Community Safety – State Disaster Coordination Centre	Duty Officer – Disaster Management Service	Brisbane
8	Somerset Regional Council	Local Disaster Response Coordinator	Esk
9	Ipswich City Council	Local Disaster Response Coordinator	Ipswich
10 – 13	Brisbane City Council	Local Disaster Response Coordinator	Brisbane
14	Queensland Police	District Disaster Coordinator	Ipswich
15	Queensland Police	District Disaster Coordinator	Brisbane

Revision Status

Rev No.	Date	Revision Description
0	October 2008	Original
1	August 2009	Revision 1
2	September 2010	Revised 2

TABLE OF CONTENTS

APPENDICES

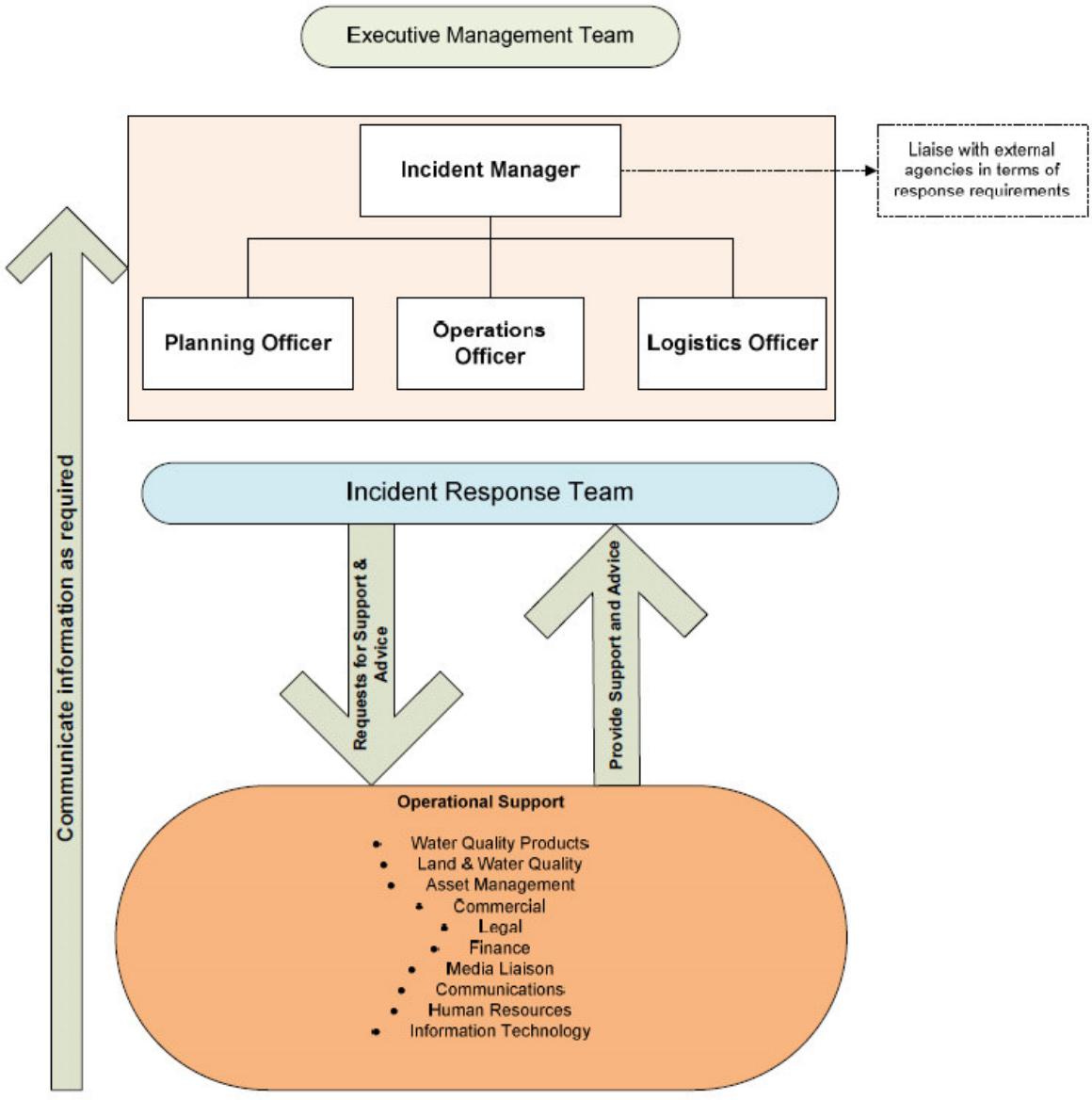
ABBREVIATIONS

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AMTD	Adopted Middle Thread Distance
BoM	Bureau of Meteorology
DCF	Dam Crest Flood
EAP	Emergency Action Plan
FSL	Full Supply Level
FOC	Flood Operations Centre, SunWater
GS	Gauging Station
IERP	Incident and Emergency Response Plan
ML	Megalitre
DERM	Department of Environment and Resource Management
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PMPDF	Probable Maximum Precipitation Design Flood

1 INTRODUCTION

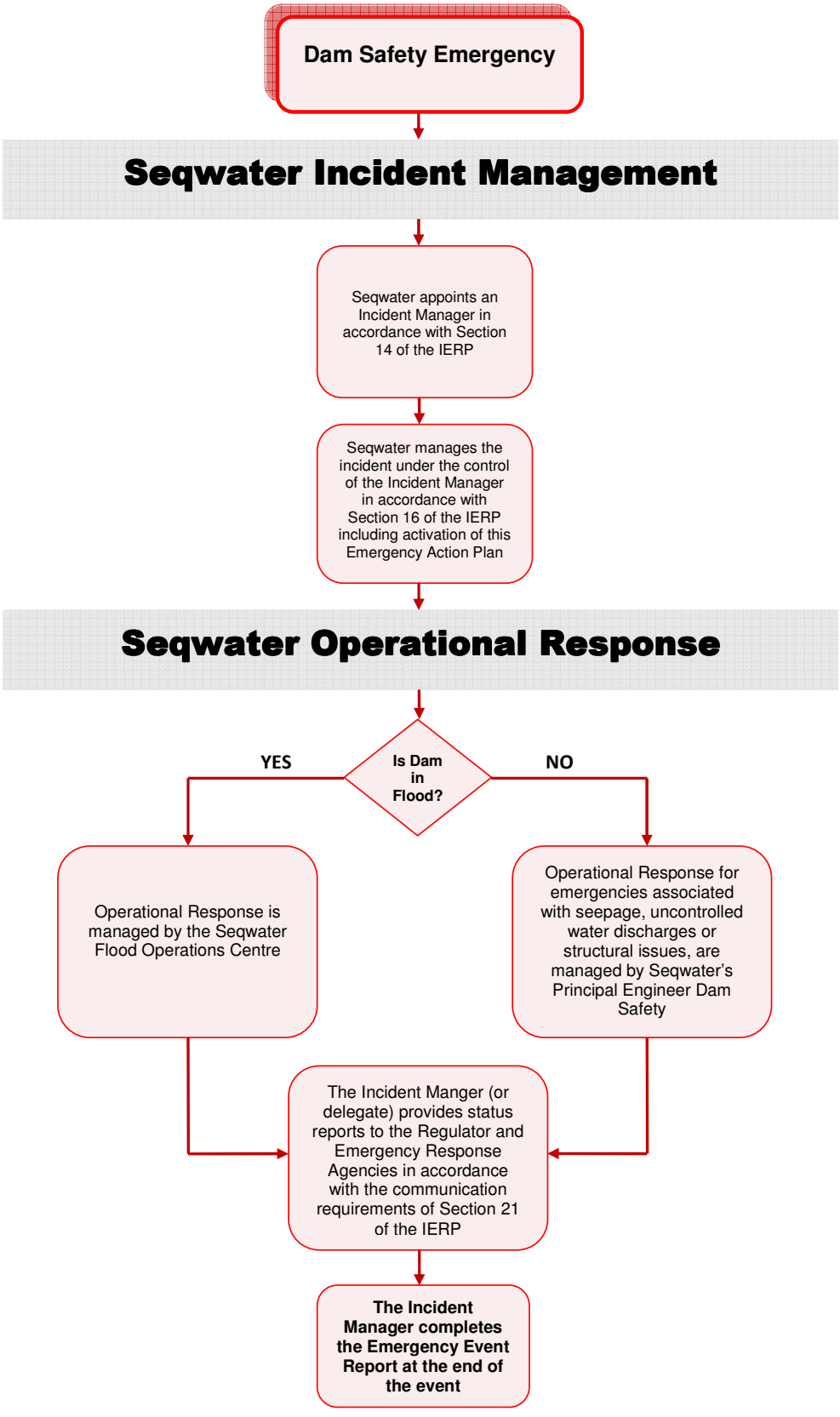
The Seqwater Incident and Emergency Response structure is a flexible team based structure that parallels the normal management regime. The team based structure is detailed in the diagram below.

Seqwater Incident and Emergency Response



This Emergency Action Plan (EAP) sits under the above structure and identifies emergency conditions that could endanger the integrity of the dam and prescribes procedures which should be followed by Seqwater staff in the event of such an emergency. A primary focus of these actions is to provide timely

warning to appropriate emergency response and management agencies, to allow these agencies to implement protection measures for downstream communities. The flowchart below summarises the actions that occur in an emergency situation.



Under the Seqwater Grid Emergency Response Plan, five incident levels have been implemented. These levels have been established to deal with varying degrees of incident severity and range from Level 1 where there are no significant impacts on other water grid participants and the incident can be managed using standard operating procedures and communication protocols, to Level 5 where state or federal government intervention would be expected. Definitions and general principals relating to these levels are detailed in Section 21 of the IERP.

2 AGENCIES AND RESPONSIBILITIES

The following table shows the agencies and personnel who have responsibilities under this Emergency Action Plan.

AGENCIES AND PERSONNEL	RESPONSIBILITIES
Seqwater	• Undertake emergency response at the dam. • Determine the area of potential impact from the Dam Safety Emergency. • Provide the relevant Disaster Response Agencies with timely notification of impending and actual emergencies, including details of the emergency and estimates of potential impacts downstream of the dam.
Seqwater Flood Operations Centre	• Coordinate dam safety emergency actions for Seqwater during a flood event.
Principal Engineer Dam Safety (Seqwater)	• Coordinate dam safety emergency actions for Seqwater outside a flood event, for dam safety emergencies involving actual or potential structural failures.
Land and Water Quality Manager (Seqwater)	• Coordinate dam safety emergency actions for Seqwater outside a flood event, for water quality emergencies.
Director Dam Safety (DERM)	• Provide regulatory input during a dam safety emergency.
Regional or City Council	• Exercise primary responsibility for disaster response and management within its boundaries, in accordance with the Queensland Disaster Management Act 2003. • Deploy all appropriate resources to contribute to response and recovery during the dam safety emergency, until its resources are fully committed. • Mobilise disaster response assistance from other relevant Disaster Response Agencies, as appropriate during the emergency.

A list of agencies and personnel who may need to be contacted in the event of an emergency is included in Appendix A of this document. Once notification is made to a person within an agency on the list, it is the person's responsibility to notify other relevant persons within the agency. Generally attempts to contact an agency should be in the priority order outlined in the list. However discretion should be exercised if the gravity of the situation warrants.

3 DAM TECHNICAL DATA

WIVENHOE DAM	
Population at Risk	Sunny Day Failure: 244,000 Flood: >1,000 (not fully assessed)
Failure Impact Rating	2
Hazard Category	Extreme
Dam Owner	Seqwater
Name of Reservoir	Lake Wivenhoe
Year Complete	1984
Location	Approximately 5km upstream of Fernvale
Water Course	Brisbane River
Purpose	Town water and flood mitigation
Type of Construction	Zoned earth and rockfill embankment
Outlet Works	Radial gated spillway with supplementary fuse plug spillway
Catchment Area	7020km^2
FSL	67m AHD
Full Supply Capacity	1,165,238 ML
Surface Area at FSL	10,750ha
Main Dam Crest	79m AHD
Main Dam Embankment Length	2,300m
Maximum Height of Main Dam Embankment	50m
Width at Top of Main Dam Embankment	10.0m
Spillway Crest	57.0m AHD
Spillway Length	60m
Gates	5 radial gates 12m wide x 16.6 m high
Top of Closed Gate	EL 73.0m
Saddle Dam Crest	80.0m AHD
Saddle Dam Length	3 x total length of 518
Maximum Height of Saddle Dam Embankment	10.0m
Peak Water Level as a Result of PMF	Dam Overtopped
Spillway Capacity (including Fuse Plugs)	28,100m^3/s (EL 79.0m)
Maximum Discharge as a Result of PMF	37,400m^3/s
AEP of Spillway Capacity (including Fuse Plugs)	1 in 100,000 (EL 79.0m)
Regulator valves	1 x 1.5m cone dispersion valve
Mean annual pan evaporation	1,600mm (BOM estimate)
Mean annual rainfall	986mm
Hydroelectric Facilities	4.3 mw mini-hydro
Notable events (Post Dam)	1986, 1989 (x 2), 1999
Maximum Historic Storage Level	71.45m AHD Late April 1989

Comment	Besides being a major source of urban water supply, Wivenhoe Dam provides a significant flood mitigation capacity to protect the urban areas downstream of the dam. During periods of heavy rainfall, flood water is temporarily stored in Wivenhoe Dam and released at a controlled rate to minimise the impact of downstream flooding. The dam was built in conjunction with Splityard Creek Dam and water from Wivenhoe is pumped into Splityard Creek Dam where it is used to generate electricity during periods of high demand.

3.1 Critical Flood Levels

The dam is overtopped for the PMF event, and is unlikely to withstand being overtopped.

Dam Critical Stability Levels

Description	Level (m AHD)
Full Supply level	67.00
Fuse Plugs Fixed Crest	67.00
Gate Operation Trigger Level	67.25
Top of Closed Radial Gates	73.00
Minimum Land Resumption Level	75.00
Centre Fuse Plug Crest	75.70
Right Fuse Plug Crest	76.20
Left Fuse Plug Crest	76.70
Evaluation Design Level	77.00
Main Embankment Crest	79.00
Top of Wave Wall	79.90
Saddle Dam Embankment Crest	80.00

The spillway rating curves were used to route the inflow floods through the reservoir for various flood exceedence probabilities as shown below:

Dam Flood Routing Results

Event (AEP)	Peak Inflow (m^3/s)	Peak Outflow (m^3/s)	Peak Water Level (m)
1 in 200	83,00	2,800	73.0
1 in 6,000		12,250	75.8
1 in 22,500		21,800	76.9
1 in 65,000		32,850	78.4
1 in 100,000	43,300	35,000	79.0
PMF	49,000	37,500	> 79.0

4 EMERGENCY EVENTS AND ACTIONS

The following events define the triggers for initiation of the Emergency Action Plan. For flood events, formal reports to the Dam Safety Regulator are prepared in accordance with the Wivenhoe Dam Manual of Flood Operations. Formal reports are provided for all trigger events outside flood events.

- Reservoir Level approaching EL 67.0 with further rain forecast
- Increase in Seepage or New Area of Seepage
- Earthquake, Explosion, Structural Damage to Dam, Abnormal Instrumentation Readings or Major Electrical or Mechanical Failure
- Object Crashes into the Dam or Reservoir

Potential Damage or Indicators of Damage relevant to these triggers are shown in section 4.5.

4.1 Reservoir Level is approaching 67.0m and Further Rain is Forecast

STORAGE SUPERVISOR	FLOOD OPERATIONS CENTRE
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Notify Flood Operations Centre of dam status and rainfall. ◗ If the Flood Operations Centre cannot be contacted, notify the Principal Engineer, Dam Safety or the Dam Safety and Source Operations Manager.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Obtain and confirm forecast from BOM. ◗ Despatch appropriate staff to site if necessary. ◗ Advise the Dam Supervisor of dam monitoring actions.
◗ Monitor rainfall, lake levels and rates of rise of lake level. ◗ Record instrumentation readings as per Dam Standing Operating Procedures. ◗ Report damage and unusual observations to the Flood Operations Centre.	◗ Direct the overall operation of the dam in accordance with the Manual of Operational Procedures for Flood Releases from Wivenhoe Dam.
◗ Monitor the situation as directed by the Flood Operations Centre. If communication with Flood Operations is lost, continue monitoring and attempt to restore communications.	◗ Inform the persons of the event and the status of the dam in accordance with the Manual of Operational Procedures for Flood Releases from Wivenhoe Dam.
◗ Undertake actions as directed by the Flood Operations Centre. ◗ If communications with the Flood Operations Centre Fail operate the dam in accordance with the Wivenhoe Dam Flood Manual and attempt to restore communications.	◗ Direct visual gate observations at intervals generally not exceeding 30 minutes. ◗ Direct regular instrumentations readings and inspections.
◗ If lake level is < 67.0m, advise Flood Operations Centre.	◗ If lake level is < 67.0m and no more rain is forecast, advise Dam Supervisor to close incident.
◗ Complete Incident Log and Report.	◗ Complete Incident Log and Report.

4.2 Increase in Seepage or New Area of Seepage

STORAGE SUPERVISOR	PRINCIPAL ENGINEER, DAM SAFETY
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Notify the Principal Engineer, Dam Safety of the situation. ◗ If the Principal Engineer, Dam Safety cannot be contacted, notify the Dam Safety and Source Operations Manager or the Executive General Manager, Operations. ◗ Monitor the situation by measuring the rate of seepage flow and observe the clarity of the seepage flow, keeping notes and photographs for the Incident Log. ◗ Provided it is safe to do so, undertake inspections and instrumentation readings as directed by the Principal Engineer, Dam Safety.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: ○ Local Disaster Response Coordinator ○ CEO ○ Flood Operations Centre ○ Director, Dam Safety (DERM)
◗ Remain in contact with the Principal Engineer, Dam Safety and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: ○ Directing remedial works ○ Obtaining advice from specialist Dam Safety Consultants ○ Draining down the dam storage level ◗ If a potential dam failure is suspected, immediately inform the following persons: ○ Local Disaster Response Coordinator ○ CEO ○ Flood Operations Centre ○ Director, Dam Safety (DERM)
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.3 Earthquake, Explosion, Structural Damage To Dam, Abnormal Instrumentation Readings or Major Electrical or Mechanical Failure

STORAGE SUPERVISOR	PRINCIPAL ENGINEER, DAM SAFETY
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Notify the Principal Engineer, Dam Safety of the situation. ◗ If the Principal Engineer, Dam Safety cannot be contacted, notify the Dam Safety and Source Operations Manager or the Executive General Manager, Operations. ◗ Provided it is safe to do so, perform a Dam Safety Inspection including instrumentation and seepage measurements. ◗ Report damage and unusual observations to the Principal Engineer, Dam Safety.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: ○ Local Disaster Response Coordinator ○ CEO ○ Flood Operations Centre ○ Director, Dam Safety (DERM)
◗ Remain in contact with the Principal Engineer, Dam Safety and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: ○ Directing remedial works ○ Obtaining advice from specialist Dam Safety Consultants ○ Draining down the dam storage level ◗ If a potential dam failure is suspected, immediately inform the following persons: ○ Local Disaster Response Coordinator ○ CEO ○ Flood Operations Centre ○ Director, Dam Safety (DERM)
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.4 Object Crashes into the Dam or Reservoir

STORAGE SUPERVISOR	PRINCIPAL ENGINEER, DAM SAFETY
◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ On confirmation of the event, advise the Police or Ambulance if necessary by phoning 000. ◗ Notify the Principal Engineer, Dam Safety of the situation. ◗ If the Principal Engineer, Dam Safety cannot be contacted, notify the Dam Safety and Source Operations Manager or the Executive General Manager, Operations. ◗ Provided it is safe to do so, perform a Dam Safety Inspection, paying particular attention to the area where the object has crashed, including instrumentation and seepage measurements. ◗ Report damage and unusual observations to the Principal Engineer, Dam Safety from fuel or other substances. ◗ Monitor the situation, keeping notes and photographs for the Incident Log and the routine dam safety inspections.	◗ Commence filling out Incident Log and continue to fill out Log until incident is closed. ◗ Assemble and activate an Incident Management Team to investigate the incident. ◗ Inform the following persons of the event and the status of the dam: ○ Local Disaster Response Coordinator ○ CEO ○ Flood Operations Centre ○ Director, Dam Safety (DERM)
◗ Remain in contact with the Principal Engineer, Dam Safety and proceed as directed.	◗ Undertake site investigations and proceed with actions as appropriate. Such actions may include: ○ Directing remedial works ○ Obtaining advice from specialist Dam Safety Consultants ○ Draining down the dam storage level ◗ If a potential dam failure is suspected, immediately inform the following persons: ○ Local Disaster Response Coordinator ○ CEO ○ Flood Operations Centre ○ Director, Dam Safety (DERM)
◗ Complete Incident Log and Report.	◗ Once satisfied that the incident is resolved, stand down the incident team and close the incident. ◗ Complete Incident Log and Report.

4.5 Potential Damage or Indicators of Damage

Problem	General Characteristic	When and What to Check
Overtopping Imminent	Storage full and water level rising.	During periods of excessive rainfall – check reservoir levels.
Rapid increases or cloudy appearance of seepage	Seepage flow through storage embankment is cloudy and increasing (piping failure has started).	After detection of cloudy water look for source in embankment.
Seepage erosion or piping	Progressive internal erosion of the embankment or saddle dam or foundation to form an open conduit or pipe (piping failure).	During routine inspections or after unaccountable increases in seepage flows, look for an emission point.
Foundation Failure	Sliding, rotation, or settlement of part of or entire dam.	During routine inspection or immediately after earthquakes – inspect for evidence of foundation movement or displacement immediately adjacent to the dam.
Slide in downstream slope	Slide in the downstream face.	During routine inspection or following heavy periods of rainfall – look for cracks or scarps near the crest and bulges at the toe.
Flow slide	Collapse and flow of soil around the storage periphery.	During routine inspections, after heavy or long periods of rainfall. Especially in sedimentary or colluvial soils – look for material displacement around the storage rim.
New springs, seeps or boggy areas	Evidence of internal changes in seepage control (could be initial signs of piping failure).	During routine inspection, look for 'evergreen' spots, boggy ground or pools of water.
Gullying	No rock protection or vegetation cover on embankment batters or poor drainage.	During and after large rainfalls – inspect embankment and saddle dam batters for damage to rock protection or vegetation cover.
Increase in gallery seepage	Increase in the normal rate of gallery seepage.	After detection – check for differential movement or cracking in concrete components of spillway and retaining walls.
Landslide	Mass movement of soil or rock from slopes and valley walls around the storage.	During routine inspections or following earthquakes – look for material displacement.
Damage to structural concrete	Movement or cracking of structural concrete.	During routine inspections or when mechanical problems such as burst pipe occur – look for any movement or

Problem	General Characteristic	When and What to Check
		cracking of structural concrete.
Failure of appurtenant structures or operating equipment	Loss of ability to supply water or discharge floods safely.	After detecting an operational anomaly – identify and investigation cause.
Loss of storage contents	Excessive loss from the storage and / or occasionally increased seepage or increased groundwater levels near the storage.	During routine monitoring – look for environmental changes such as vegetation damage, salt scalds, etc
Toe erosion	Erosion of embankment toe by spillway discharge or diversion flows.	During and after large rainfalls – inspect embankment toe.
Wave erosion	Beaching or notching of the upstream face of the embankment by waves generated over long periods of strong wind.	During or after periods of strong wind – inspect upstream face of embankment and saddle dam.

APPENDIX A

CONTACT REGISTER

REGISTER – CONTACT LIST FOR EMERGENCIES & FLOOD INFORMATION – WIVENHOE DAM

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Mobile	After Hrs	Contacted By
Seqwater	Principal Engineer Dam Safety	1	1	John TIBALDI	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Dam Operations Manager	2	2	Robert DRURY	[redacted]	[redacted]	[redacted]	[redacted]	
	Flood Operations Engineer	3	3	Terry MALONE	[redacted]	[redacted]	[redacted]	[redacted]	
	Operations Coordinator Central	4	4	Jayam TENNAKOON	[redacted]		[redacted]	[redacted]	
	Executive General Manager, Water Delivery	5	5	Jim PRUSS	[redacted]		[redacted]		
	Chief Executive Officer	3	3	Peter BORROWS	[redacted]	[redacted]	[redacted]	[redacted]	
	Chairman	4	4	Phil HENNESSY			[redacted]		
	Storage Supervisor	1	1	Doug GRIGG	[redacted]	[redacted]	[redacted]	[redacted]	
	Standby Officer	2	2	Mathew O'REILLY	[redacted]	[redacted]	[redacted]	[redacted]	
	Hydrographic Staff	1	1	Carolyn ELLIS-MALLARD	[redacted]	[redacted]	[redacted]		
	Hydrographic Staff	2	2	Stewart NEILSEN	[redacted]	[redacted]	[redacted]		
Department of Environment and Resource Management	Director, Dam Safety	1	1	Peter ALLEN	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Dam Safety Engineer	2	2	Ron GUPPY	[redacted]	[redacted]	[redacted]	[redacted]	
Flood Operations Centre (operated by Sunwater)	Principal Engineer Dam Safety	1	1	John TIBALDI	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Flood Operations Engineer	2	2	Terry MALONE	[redacted]	[redacted]	[redacted]	[redacted]	
	Senior Flood Operations Engineer	3	3	Rob AYRE	[redacted]	[redacted]	[redacted]	[redacted]	
	Senior Flood Operations Engineer	4	4	John RUFFINI*	[redacted]	[redacted]	[redacted]	[redacted]	
	Flood Control Room (Operational)	5	5	General Phones	[redacted]	[redacted]	[redacted]		

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Mobile	After Hrs	Contacted By
Department of Community Safety – State Disaster Coordination Centre	Watch Desk Officer* (24 Hours)	1	1	Rostered	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
Somerset Regional Council	Local Disaster Response Coordinator	1	1	Tony JACOBS	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Local Disaster Response Coordinator	2	2	Andy BICKERTON (SES Controller)	[redacted]	[redacted]	[redacted]	[redacted]	
	Local Disaster Response Coordinator	3	3	Robert BAIN (CEO)	[redacted]	[redacted]	[redacted]	[redacted]	
Ipswich City Council	Local Disaster Response Coordinator	1	1	Tony TRACE	[redacted]	[redacted]	[redacted]		Seqwater/FCC
	Local Disaster Response Coordinator	2	2	Ross DRABBLE	[redacted]	[redacted]	[redacted]		
	Local Disaster Response Coordinator	3	3	Quentin UNDERWOOD	[redacted]	[redacted]	[redacted]		
	Local Disaster Response Coordinator	4	4	Tony DILEO	[redacted]	[redacted]	[redacted]		
	SES LOCAL Coordinator	5	5	Arie VANDE ENDE	[redacted]	[redacted]	[redacted]		
Brisbane City Council	Disaster Operations Manager	1	2	Chris LAVIN	[redacted]	[redacted]	[redacted]	[redacted]	Seqwater/FCC
	Flood Information Centre	2	3	Duty Officer	[redacted]	[redacted]		[redacted]	
	Disaster Management Duty Officer	NA	1	Duty Officer	[redacted]			[redacted]	
	Alternative Contact: Disaster Management Coordinator	1	2	Craig LOGAN	[redacted]	[redacted]	[redacted]	[redacted]	
Emergency Management Queensland	Regional Director, Brisbane District	1	1	Shane WOOD	[redacted]	[redacted]	[redacted]		Seqwater/FCC
	Area Director, Brisbane	1	1	Dave MAZZAFERRI	[redacted]	[redacted]	[redacted]		
Toogoolawah Ambulance	Officer in Charge	1	1	Shane SYPHER	[redacted]	[redacted]	[redacted]		Seqwater/FCC
Tarong Energy	Duty Officer	1	1		[redacted]		[redacted]		Seqwater/FCC
Police	District Disaster Coordinator Ipswich	1	1	Robbie GOODGER	[redacted]	[redacted]			Seqwater/FCC
	District Disaster Coordinator Brisbane	1	1	Scott TRAPPETT	[redacted]	[redacted]	[redacted]		
Bureau of Meteorology	Engineer in charge Flood Warning*	1	1		[redacted]	[redacted]			Seqwater/FCC
	Meteorologist in Charge (24 hours)	2	2		[redacted]	[redacted]			
Ambulance					000				Seqwater/FCC
Notes:	1. Contact with an agency is to be made via position with highest priority. That person contacted is then responsible to forward notification to other relevant persons with the agency. 2. Agencies to provide notification of updated contact details to John Tibaldi of Seqwater.								

APPENDIX B

DAM SAFETY EMERGENCY – ASSISTANCE TO SITE

If earth moving machinery or other assistance is required on site during a dam safety emergency at Wivenhoe Dam, the following contact register can be used to obtain assistance.

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Mobile
Somerset Regional Council	Local Disaster Response Coordinator	1	1	Tony JACOBS	[redacted]	[redacted]	[redacted]
	Local Disaster Response Coordinator	2	2	Andy BICKERTON (SES Controller)	[redacted]	[redacted]	[redacted]
	Local Disaster Response Coordinator	3	3	Robert BAIN (CEO)	[redacted]	[redacted]	[redacted]
Ipswich City Council	Local Disaster Response Coordinator	1	1	Tony TRACE	[redacted]	[redacted]	[redacted]
	Local Disaster Response Coordinator	2	2	Ross DRABBLE	[redacted]	[redacted]	[redacted]
	Local Disaster Response Coordinator	3	3	Quentin UNDERWOOD	[redacted]	[redacted]	[redacted]
	Local Disaster Response Coordinator	4	4	Tony DILEO	[redacted]	[redacted]	[redacted]
	SES LOCAL Coordinator	5	5	Arie VANDE ENDE	[redacted]	[redacted]	[redacted]

SOMERSET REGIONAL COUNCIL
Tender 737 - Wet Hire - Contacts List

Company	Contact Name	Phone No.	Fax No.	Mobile No.	E-mail
A & M Civil Contracting Pty Ltd	Albert	[redacted]	[redacted]	[redacted]	[redacted]
Bachmann Plant Hire Pty Ltd	Michael Harvey	[redacted]	[redacted]		[redacted]
Big Foot Diggin	Gordon or Linda	[redacted]	[redacted]	[redacted]	[redacted]
BJ & DP Grigor	Brad/Donna	[redacted]	[redacted]		[redacted]
Brisbane Valley Bobcat & Slashing	Garry	[redacted]	[redacted]	[redacted]	[redacted]
Brisbane Valley Hire & Sales	Maree or Barry	[redacted]	[redacted]	[redacted]	[redacted]
Carey Earthmoving	John	[redacted]	[redacted]		
DJ & PV Banditt	David or Pauline	[redacted]		[redacted]	[redacted]
GAT Haulage	Glen or Anita	[redacted]	[redacted]		[redacted]
Hecks Plant Hire	Shane			[redacted]	
John Harrison Logging & Earthmoving Contractors	Sue	[redacted]	[redacted]		[redacted]
Kammholz Sand & Gravel	Ev	[redacted]	[redacted]		
LE & SL Harrison	Leslie or Sharon	[redacted]	[redacted]		[redacted]
Lowood Backhoe Hire	Noel/Gaylene	[redacted]	[redacted]		[redacted]
Mt Cotton Truck Hire	Thomas	[redacted]	[redacted]		[redacted]
Scrub Tek	Darren or Samantha	[redacted]	[redacted]	[redacted]	[redacted]
Somerset Domestic Water	Chris or Veronica		[redacted]	[redacted]	[redacted]
Swans Bobcat Hire	Grant		[redacted]	[redacted]	
T & C Gault Grader Hire	Troy or Calli	[redacted]	[redacted]	[redacted]	[redacted]
Wilson Sand and Gravel	Allan or Tom	[redacted]	[redacted]	[redacted]	[redacted]

APPENDIX C

ROAD CLOSURE / PUBLIC NOTIFICATION ARRANGEMENTS DURING FLOOD EVENTS

Contact Procedure

Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work Ph	Fax	Mobile
Somerset Regional Council	Local Disaster Response Coordinator	1	1	Tony JACOBS	[redacted]	[redacted]	[redacted]
	Works Overseer	2	2	Rob BOURCHIER	[redacted]	[redacted]	
	SES Controller	3	3	Andy BICKERTON	[redacted]	[redacted]	[redacted]
	Chief Executive Officer	4	4	Robert BAIN	[redacted]	[redacted]	[redacted]

APPENDIX D

MAPS AND PLANS

Locality Map

Alternative Routes Map

Aerial View of Dam Wall

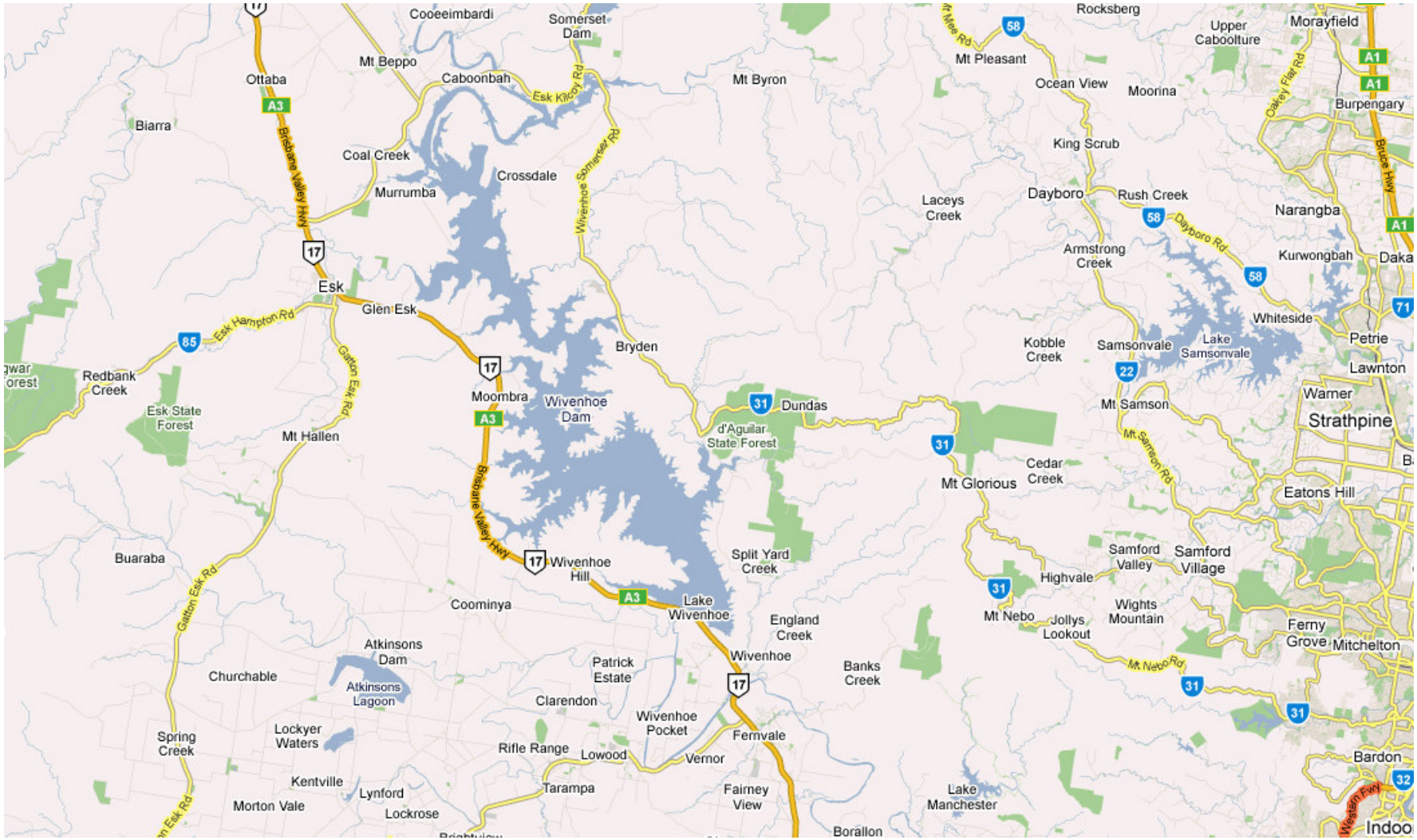
Brisbane River – Wivenhoe Dam to Mt Crosby

Bridges – Wivenhoe Dam

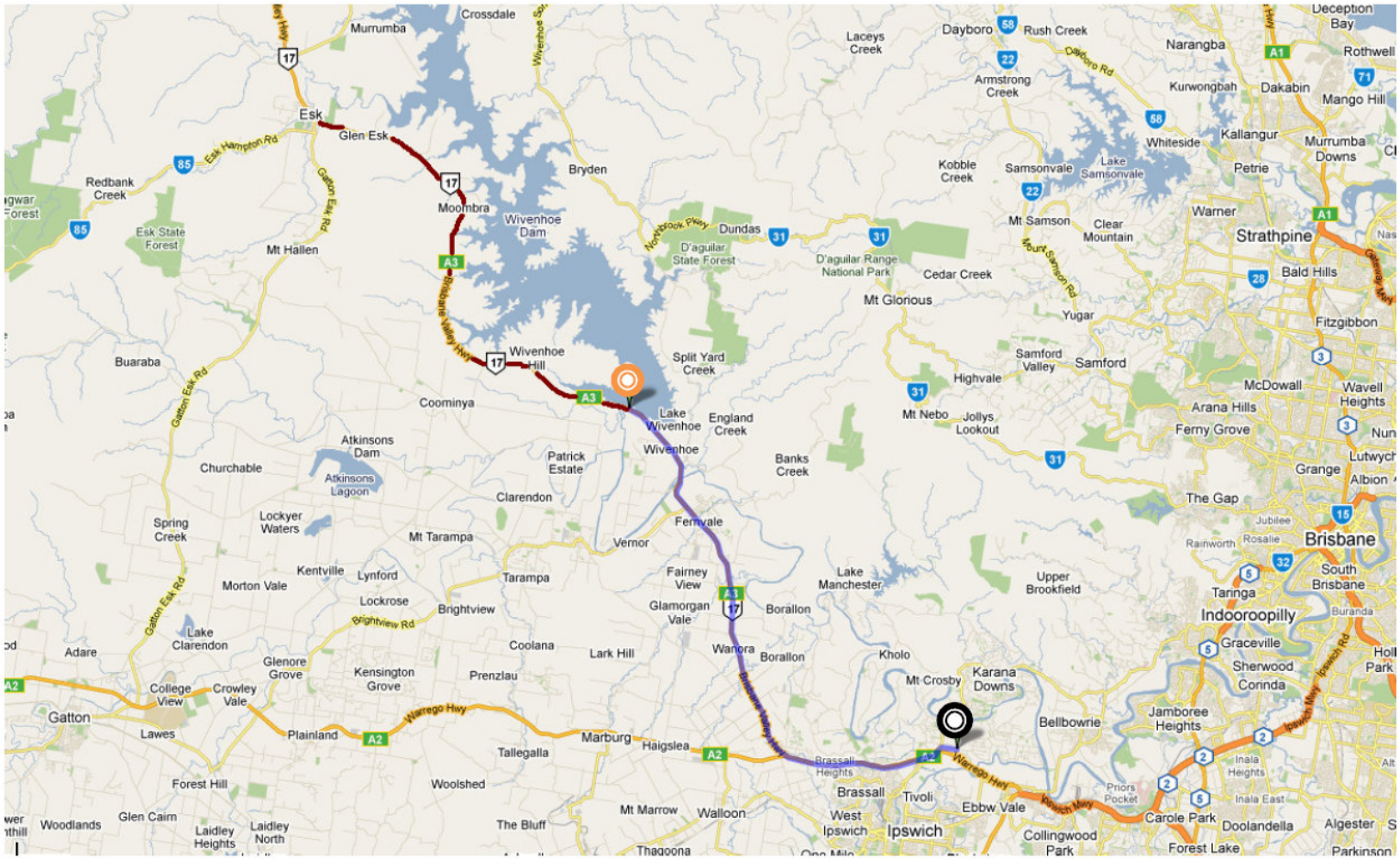
Spillway – General Arrangement

Spillway and Dam Works Layout

Spillway Section



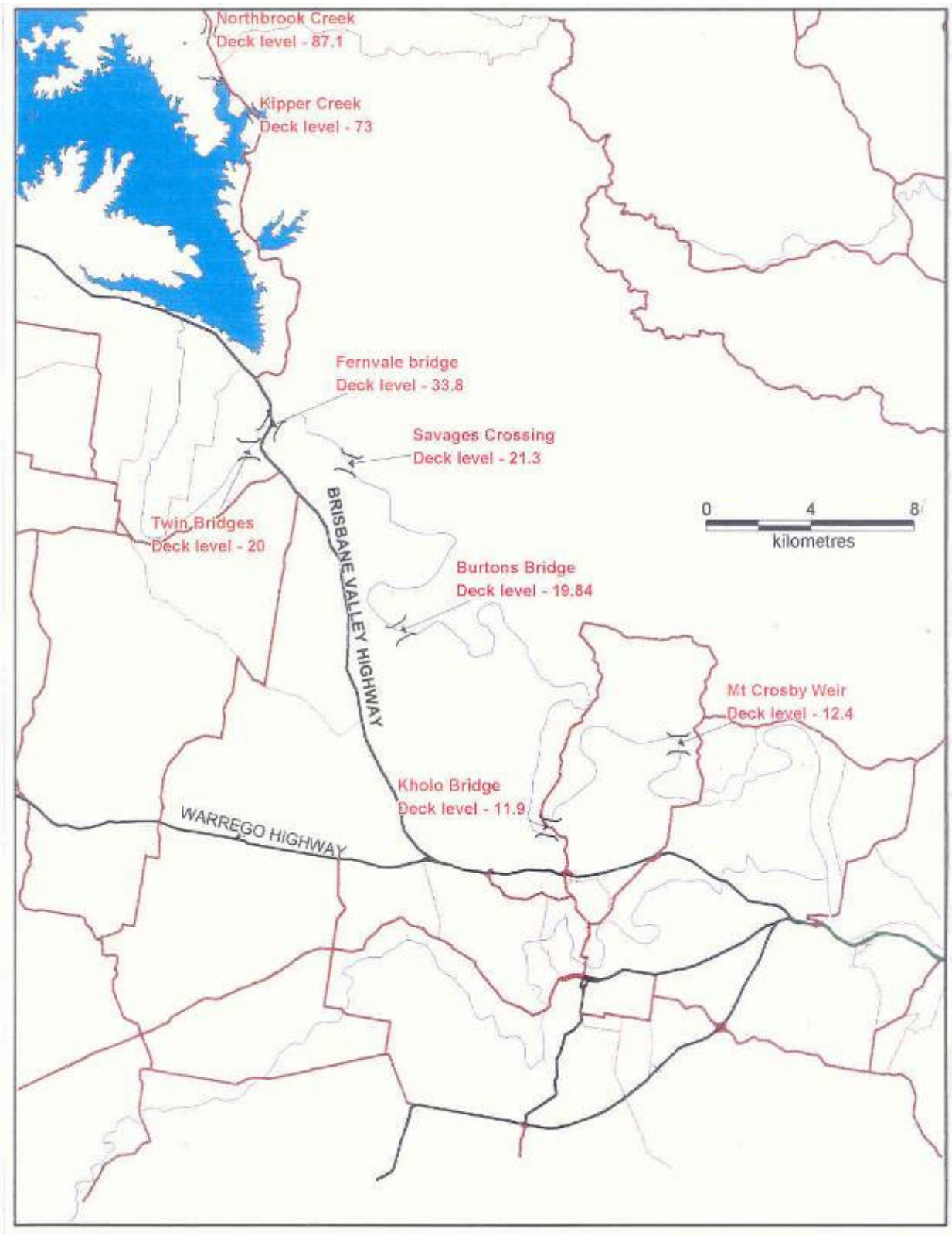
(Reference: http://maps.google.com.au/maps)



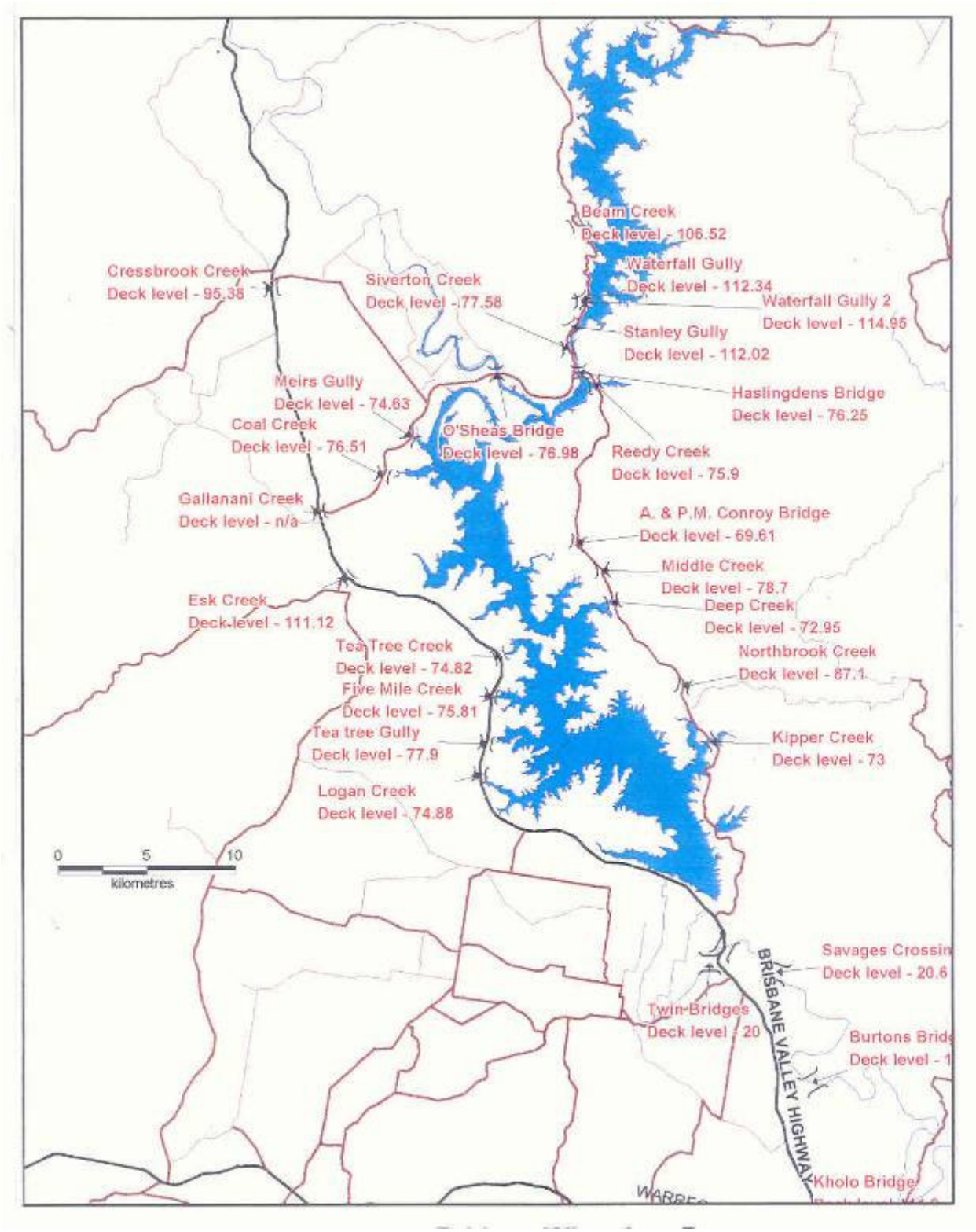
(Reference: http://maps.google.com.au/maps)

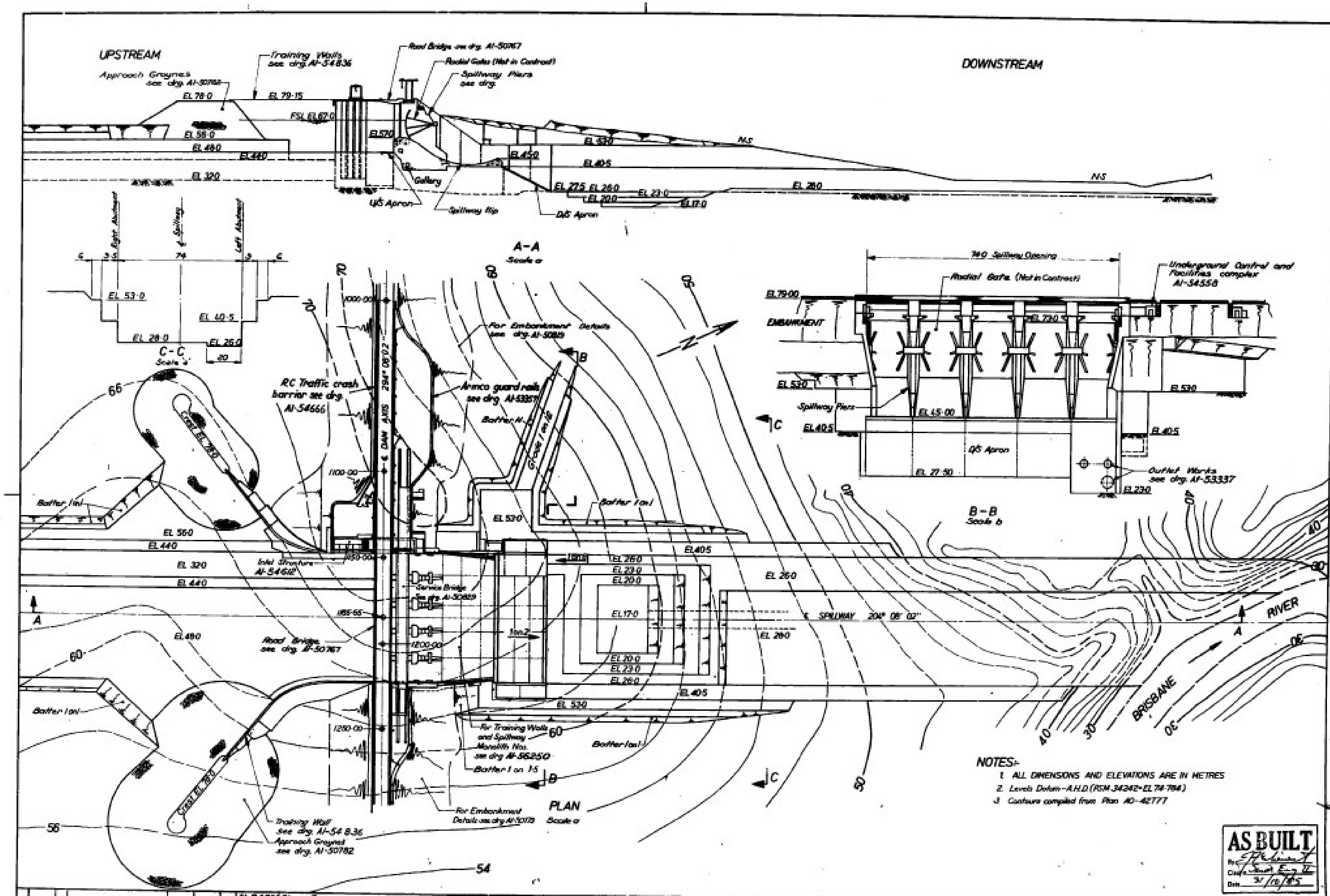
(Reference: http://maps.google.com.au/maps)

BRISBANE RIVER – WIVENHOE DAM TO MT CROSBY



BRIDGES – WIVENHOE DAM




A1-50771
UPSTREAM
DOWNSTREAM
Training Walls see drg. A1-54836
Road Bridge see drg. A1-50767
Radial Gates (Not in Contract)
Spillway Piers see drg.
Approach Groynes see drg. A1-50782
U/S Apron
Gallery
Spillway lip
D/S Apron
A–A
Scale a
C–C
Scale a
B–B
Scale b
74·0 Spillway Opening
Radial Gate (Not in Contract)
Underground Control and Facilities complex A1-54558
EMBANKMENT
Spillway Piers
D/S Apron
Outlet Works see drg. A1-53337
RC Traffic crash barrier see drg. A1-54666
Armco guard rails see drg. A1-53357
For Embankment Details see drg. A1-50820
Inlet Structure A1-54612
Service Bridge see drg. A1-50829
Road Bridge see drg. A1-50767
℄ DAM AXIS 294° 08' 02"
℄ SPILLWAY 204° 08' 02"
For Training Walls and Spillway Monolith Nos. see drg A1-56250
Batter 1 on 1·5
For Embankment Details see drg A1-50820
Training Wall see drg. A1-54 836
Approach Groynes see drg. A1-50782
PLAN
Scale a
BRISBANE RIVER
NOTES:-
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. Levels Datum - A.H.D (PSM 34242 = EL 74·784)
3. Contours compiled from Plan A0-42777
AS BUILT
Date 31/10/85

Date	Revision	Remarks	Ckd	Pad
Oct '85	C	As Built		
20-3-75	W	Tender to Working Drgs		
26-2-76	B	Groyne layout amended	M.J.C.	
13-10-76	A	D/S dissipator excavation amended		

Drawing Schedule

A1-54836	S'way Training Walls - Layout & Key to Monoliths
A1-50782	Approach Groynes - Arrgt & Details
A1-50767	Road Bridge - General Arrangement
A1-50829	Service Bridge - General Arrangement
A1-56250	S'way - Key to Working Drawings
A1-50796	Spillway - Third Stage Construction Excavation Details
A1-50820	Third Stage Const - Embankment Area Plan

Scale a 0 – 50 m (1:1000)
Scale b 0 10 20 30 (1 : 500)
(Scales Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design / Drafting / Recommended / Act. Chief Designing Engineer / Approved / Submitted / Senior Engineer Designs / Commissioner 14.6.78

Co-ordinator General 16.6.78

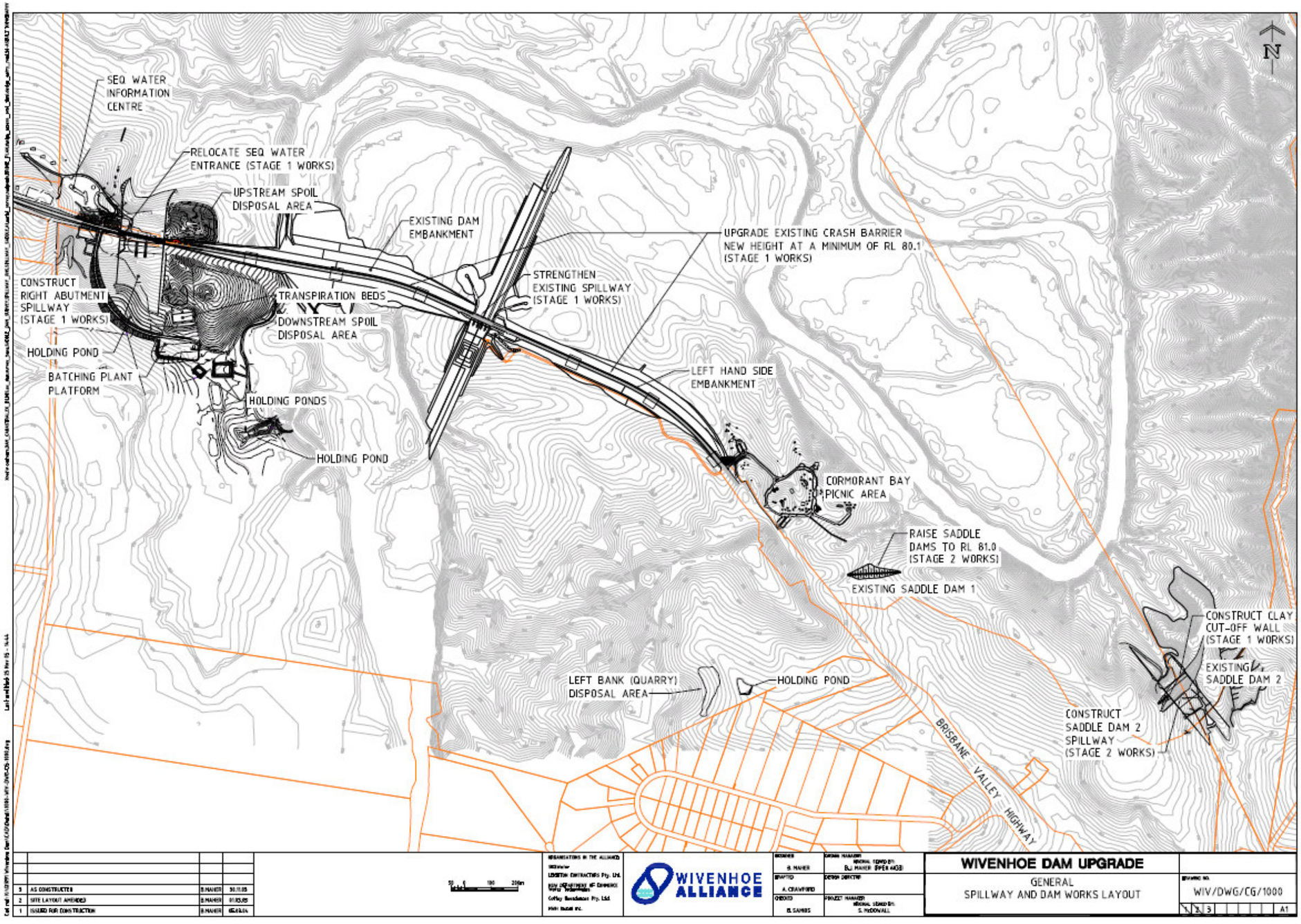
CO-ORDINATOR GENERAL'S DEPARTMENT

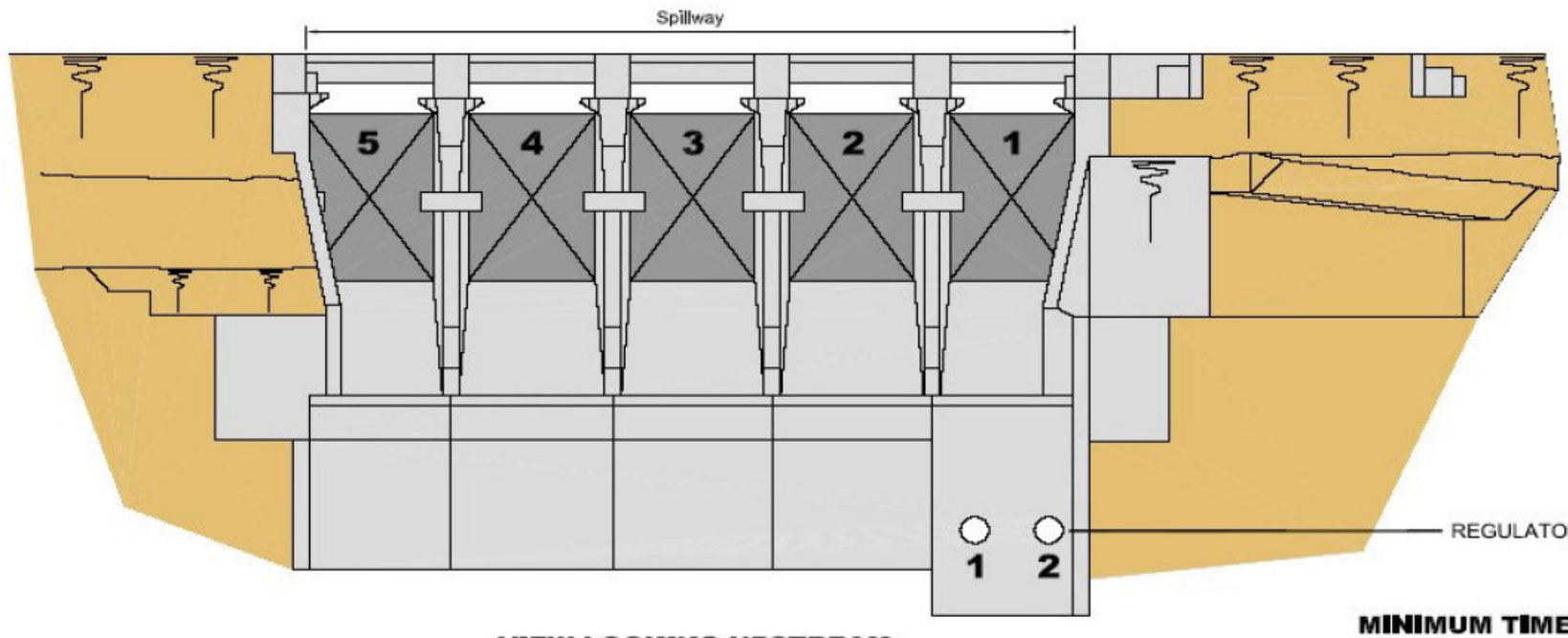
BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY

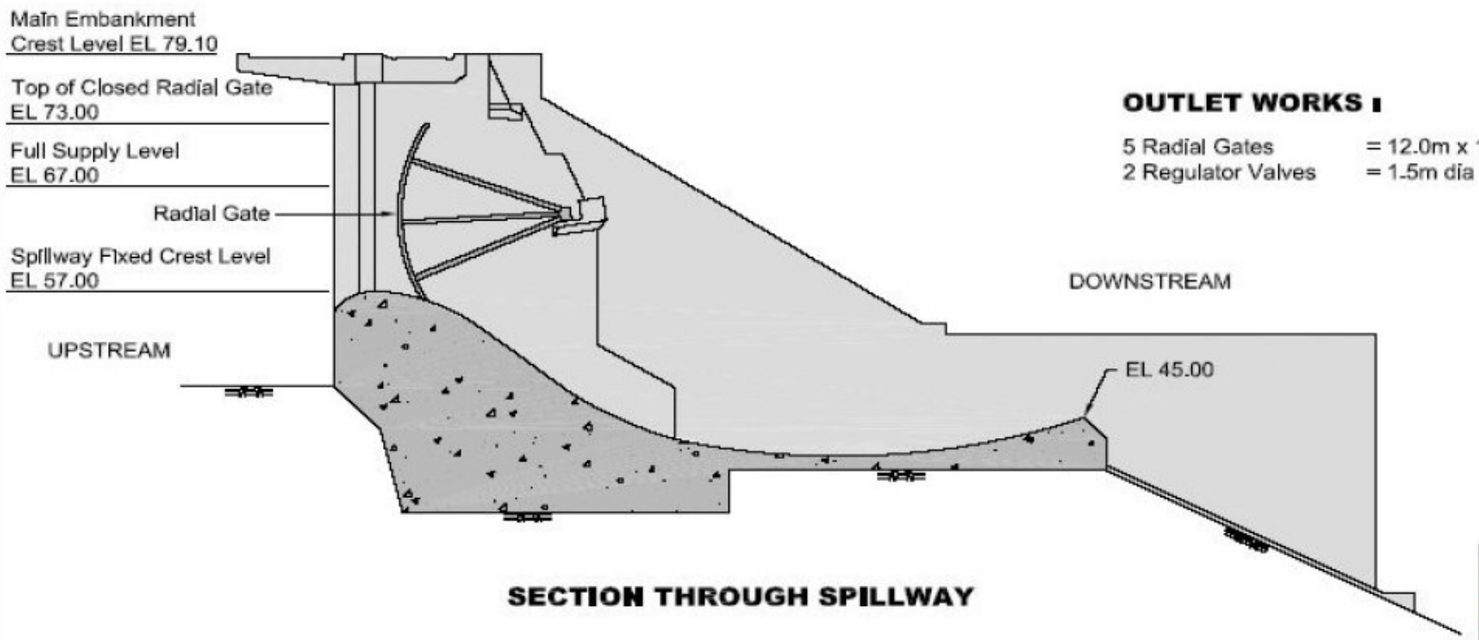
GENERAL ARRANGEMENT

16-6-78 A1-50771 A B W C


SEQ WATER INFORMATION CENTRE
RELOCATE SEQ WATER ENTRANCE (STAGE 1 WORKS)
UPSTREAM SPOIL DISPOSAL AREA
EXISTING DAM EMBANKMENT
UPGRADE EXISTING CRASH BARRIER NEW HEIGHT AT A MINIMUM OF RL 80.1 (STAGE 1 WORKS)
STRENGTHEN EXISTING SPILLWAY (STAGE 1 WORKS)
CONSTRUCT RIGHT ABUTMENT SPILLWAY (STAGE 1 WORKS)
TRANSPIRATION BEDS
DOWNSTREAM SPOIL DISPOSAL AREA
HOLDING POND
BATCHING PLANT PLATFORM
HOLDING PONDS
HOLDING POND
LEFT HAND SIDE EMBANKMENT
CORMORANT BAY PICNIC AREA
RAISE SADDLE DAMS TO RL 81.0 (STAGE 2 WORKS)
EXISTING SADDLE DAM 1
CONSTRUCT CLAY CUT-OFF WALL (STAGE 1 WORKS)
EXISTING SADDLE DAM 2
CONSTRUCT SADDLE DAM 2 SPILLWAY (STAGE 2 WORKS)
LEFT BANK (QUARRY) DISPOSAL AREA
HOLDING POND
BRISBANE VALLEY HIGHWAY
N
WIVENHOE ALLIANCE
WIVENHOE DAM UPGRADE
GENERAL
SPILLWAY AND DAM WORKS LAYOUT
WIV/DWG/CG/1000
A1



VIEW LOOKING UPSTREAM



SECTION THROUGH SPILLWAY

OUTLET WORKS :

5 Radial Gates	= 12.0m x 16.6m
2 Regulator Valves	= 1.5m dia

MINIMUM TIME INTERVAL

MIMUM INTERVALS FOR NORMAL OPERATION

500mm Incremental gate openings	10min
500mm Incremental gate closures	20min
Full regulator opening or closure	30min

CRITICAL LEVELS :

Saddle Dam Embankment Level	= 80.00
Top of Wave Wall	= 79.90
Main Embankment Crest Level	= 79.10
Evaluation Design Flood Level	= 77.00
Minimum Land Resumption	= 75.00
Top of Closed Radial Gate	= 73.00
Gate Operation Trigger Level	= 67.25
Full Supply Level	= 67.00
Spillway Fixed Crest Level	= 57.00

SunWater

SEQWC Flood Operations
WIVENHOE DAM

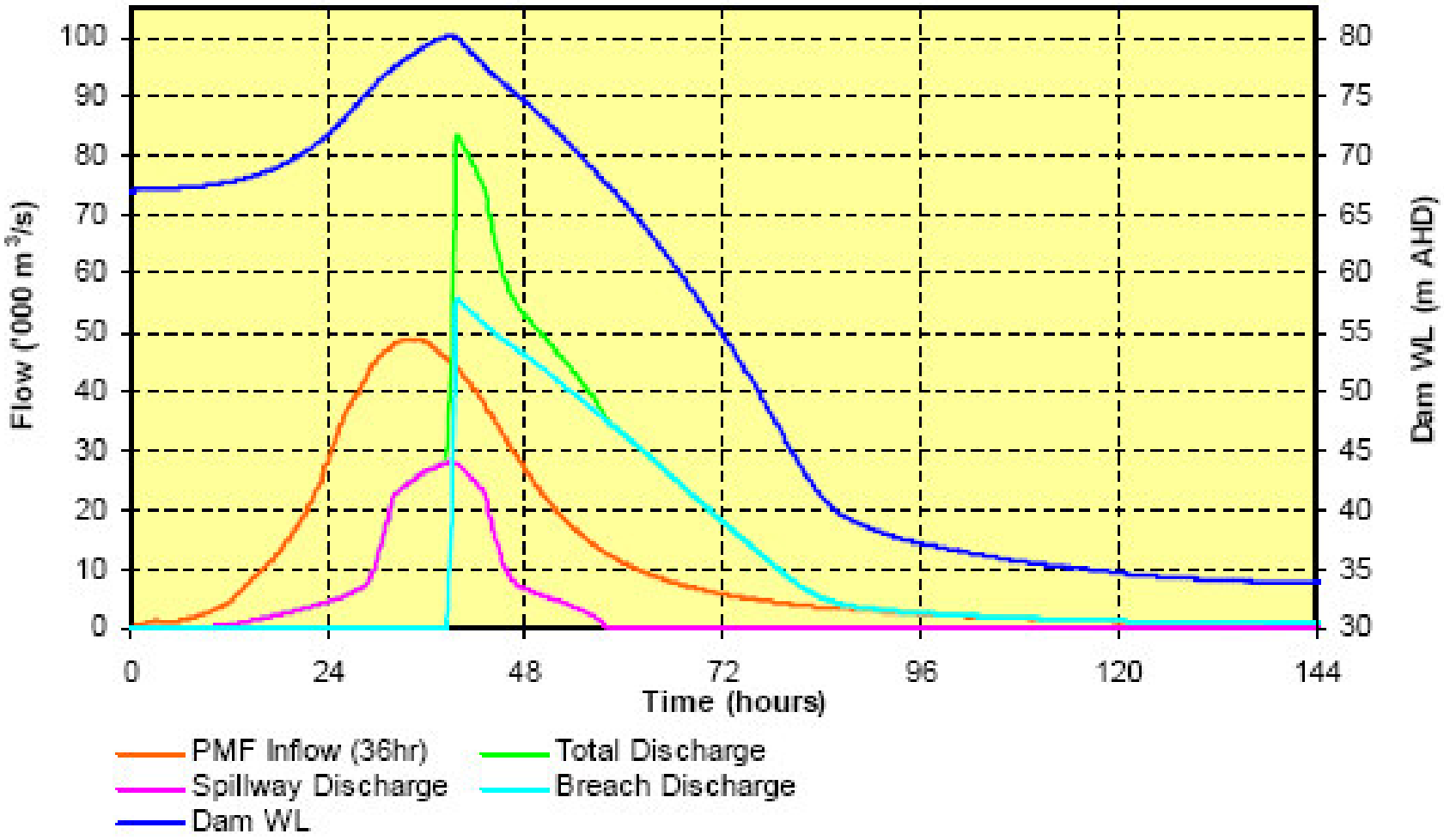
A3-216787

APPENDIX E

FLOOD INUNDATION MAPS AND DAM BREAK ANALYSIS

EMERGENCY EVACUATION

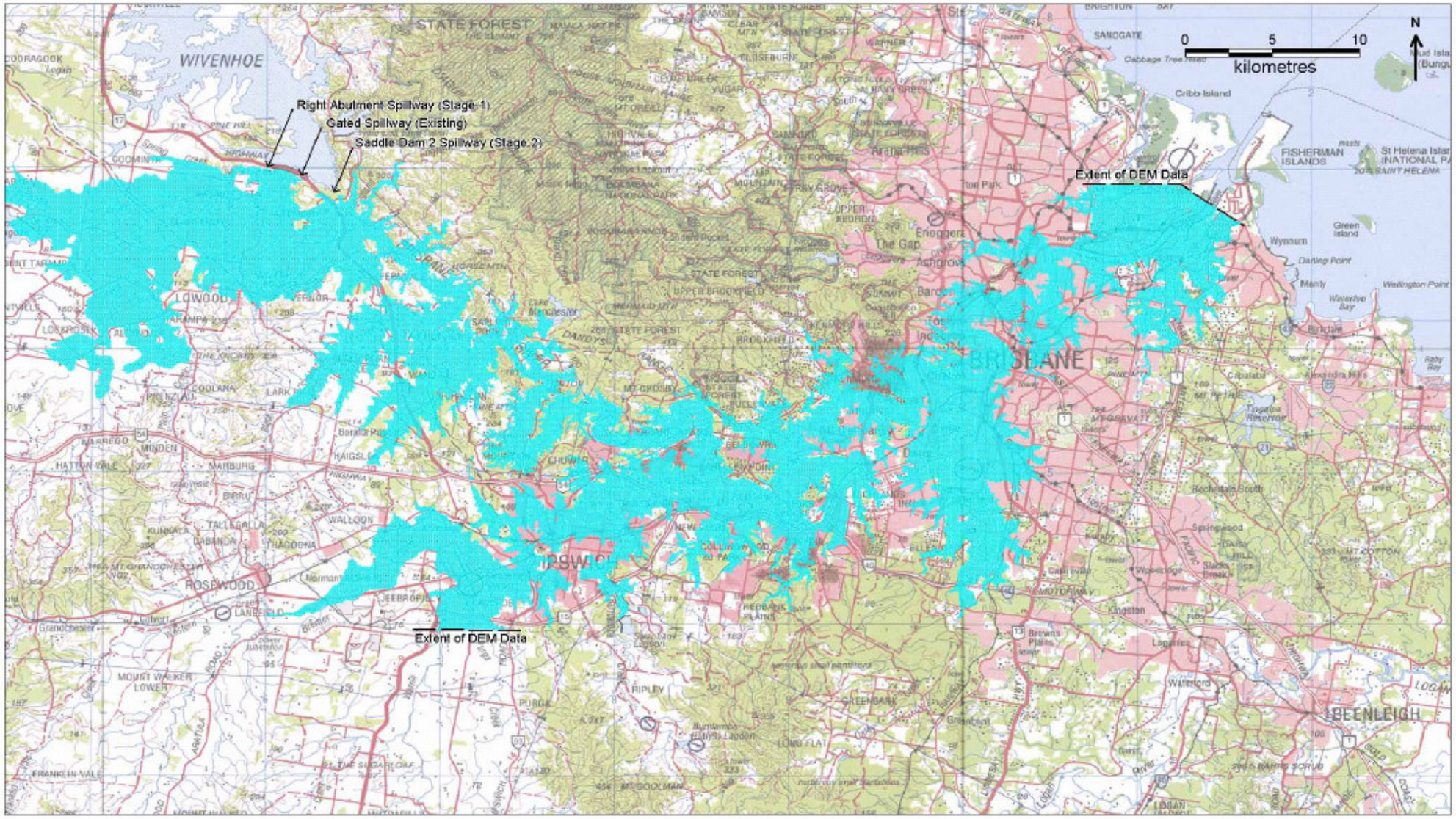
Where possible, emergency evacuation should always be carried out to the upper limit of flood levels shown on the inundation maps, due to the uncertainties associated with the flood development time and likely areas of inundation.



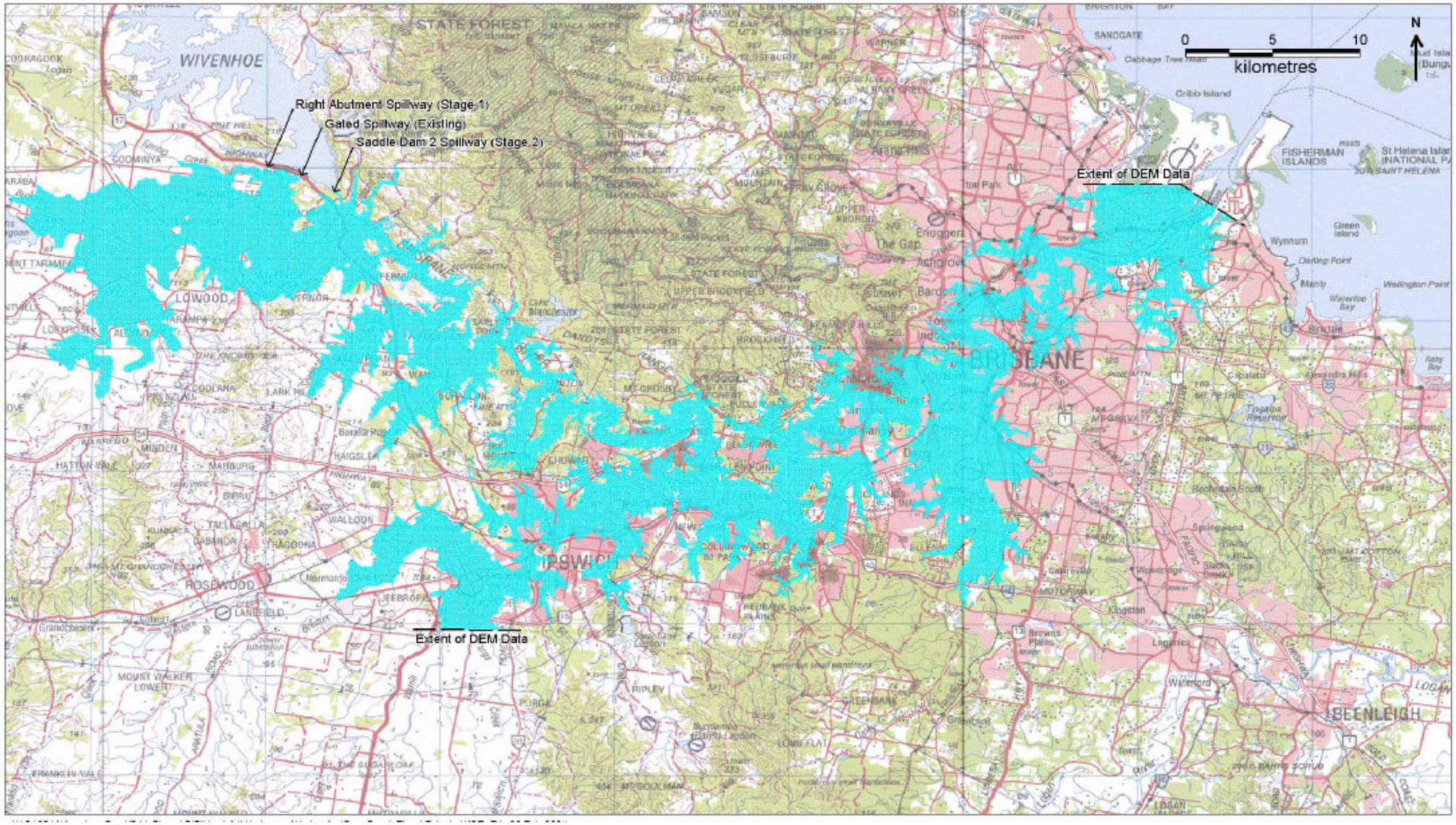
Wivenhoe Dam PMF Hydrographs

Comparison of Flood Peak Travel Time at Key Locations, Wivenhoe Dam PMF event

Location	**Original Dam**	**Existing Dam**	Stage 2	
	(Overtopping Failure)	(Overtopping Failure)	(Overtopping Failure)	(No Failure)
	(hours)	(hours)	(hours)	(hours)
Wivenhoe Dam	0.0	0.0	0.0	0.0
Savages Crossing	16.5	13.0	11.0	11.0
Mt Crosby Weir	20.0	16.5	14.5	14.5
Moggill Gauge	35.0	31.5	29.5	29.5
Port Office	40.5	37.0	35.0	35.0



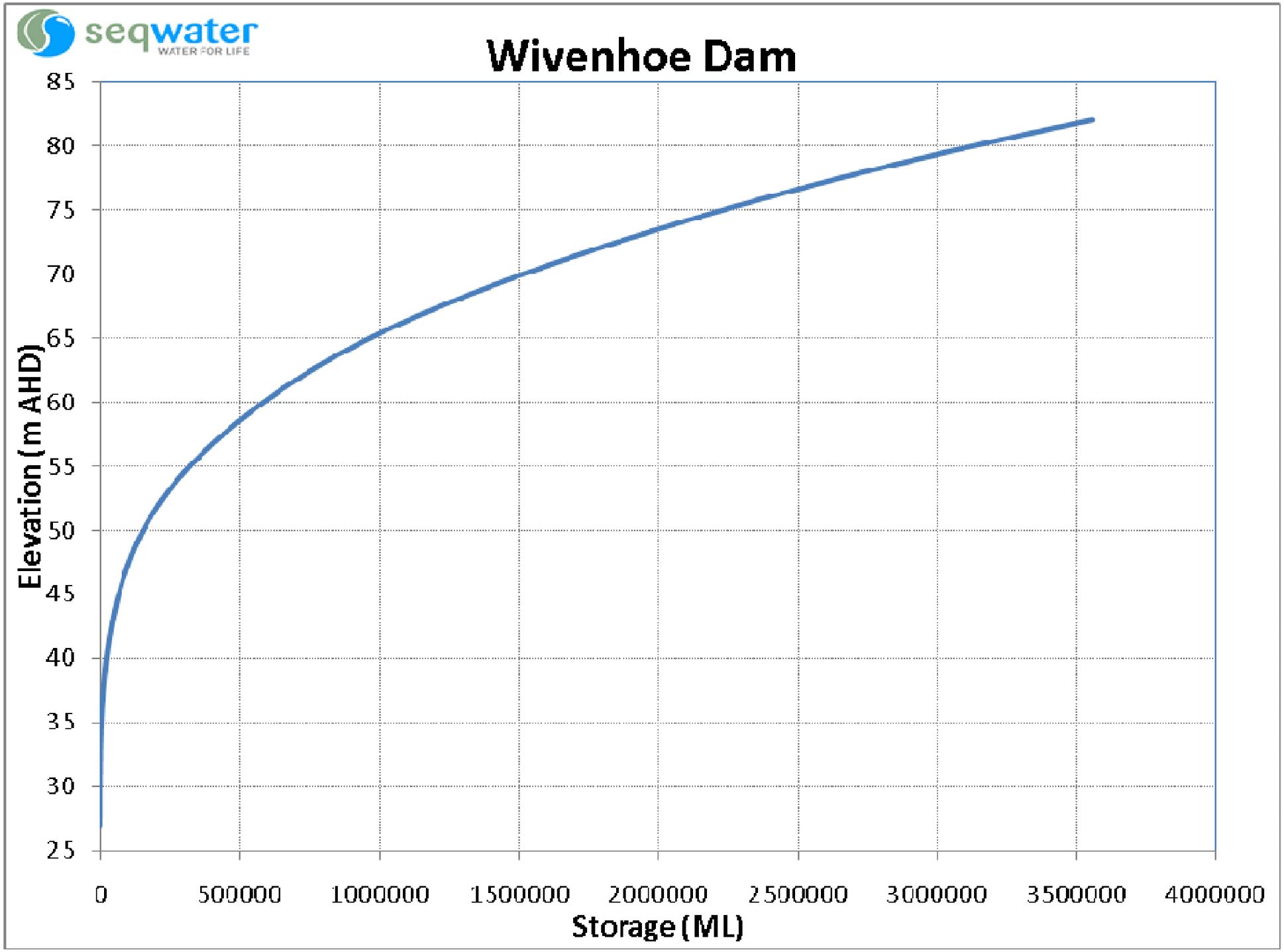
PMF Extent of Flooding, (Overtopping Failure)



PMF Extent of Flooding, Stage 2 (No Failure)

APPENDIX F

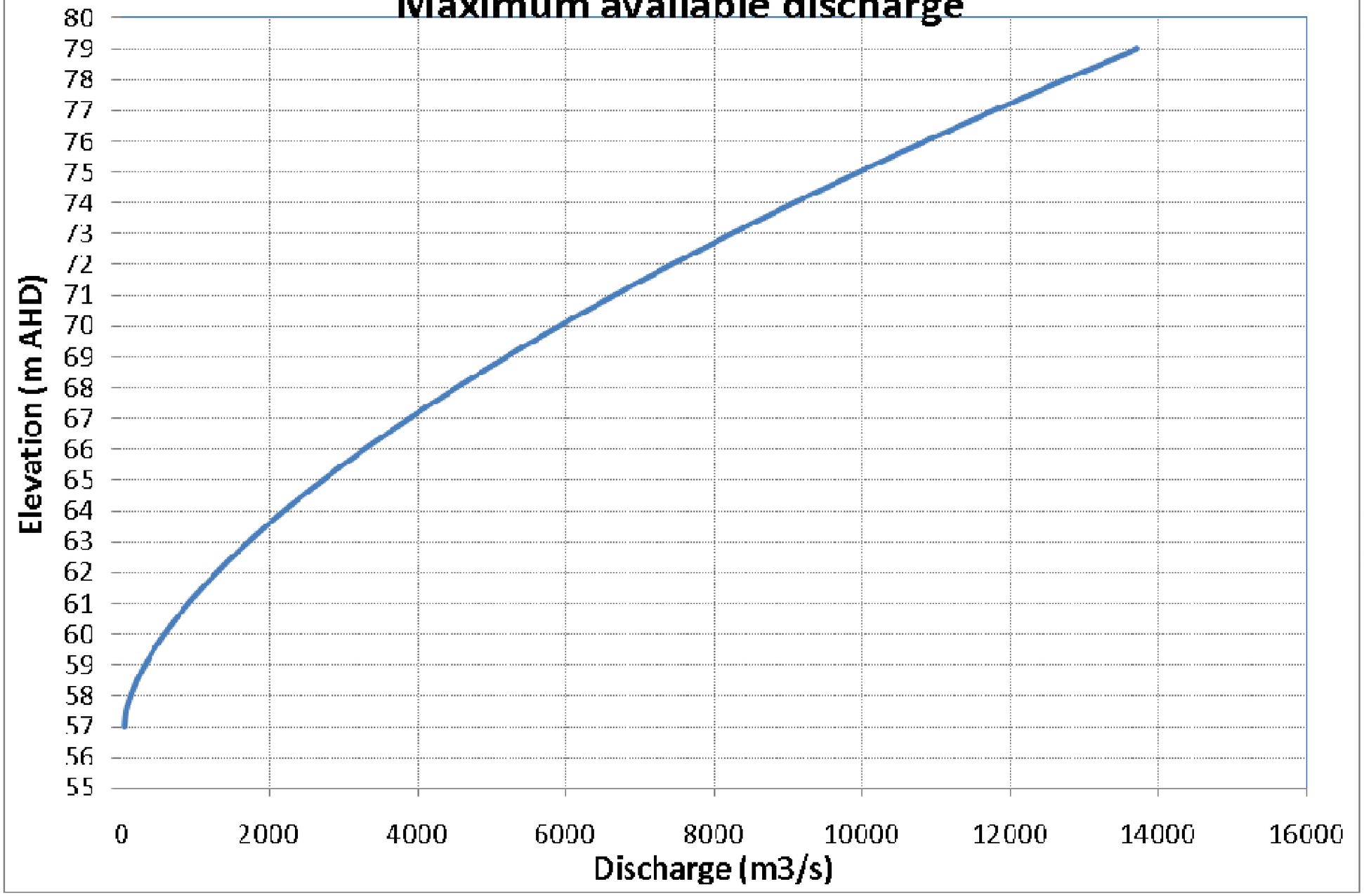
DISCHARGE AND STORAGE CURVES


seqwater
WATER FOR LIFE
Wivenhoe Dam
Elevation (m AHD)
85
80
75
70
65
60
55
50
45
40
35
30
25
0
500000
1000000
1500000
2000000
2500000
3000000
3500000
4000000
Storage (ML)

seqwater
WATER FOR LIFE

Wivenhoe Dam

Maximum available discharge



APPENDIX G

INSPECTION AND REPORTING FORMS

Incident Management – Incident Log

The purpose of the Incident Log is to record all decisions, actions, direction and other pertinent information. It is important for all personnel involved in managing / responding to the incident to record information in the event that it is required as part of a post incident review or some other investigation.

Incident Name: ..... **Incident Manager:** .....

Date	Time	Item	Recorded by