

**Ashleigh Harrold**

**From:** Peter Borrows  
**Sent:** Sunday, 16 January 2011 4:03 PM  
**To:** Rob Drury; John Tibaldi; Terry Malone; Paul Bird  
**Cc:** Peter Borrows  
**Subject:** FW: Fw: Ministerial Briefing Note January 17 2011 Final Draft for distribution.doc  
**Attachments:** Ministerial Briefing Note January 17 2011 Final Draft for distribution[1].doc; ATT03031.txt



Ministerial Briefing Note Janu...  
ATT03031.txt

Rob, as discussed with Peter A.

Regards, Peter.

Peter Borrows  
Chief Executive Officer  
Queensland Bulk Water Supply Authority trading as Seqwater

Ph (07) [redacted] | Fax (07) [redacted] | E pborrows@[redacted] Level 3, 240  
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-----Original Message-----

**From:** peter.allen@[redacted] [mailto:peter.allen@[redacted]]  
**Sent:** Sunday, 16 January 2011 4:01 PM  
**To:** threereillys@[redacted]; Jim Pruss; Rob Drury; John Tibaldi; Peter Borrows  
**Cc:** peter.allen@[redacted]  
**Subject:** Re: Fw: Ministerial Briefing Note January 17 2011 Final Draft for distribution.doc

Peter,

I have added few comments in the attachment.

Peter Allen

> Allen Peter <Peter.Allen@[redacted]> wrote:  
>  
>  
>

> ----- Original Message -----

> **From:** Peter Borrows <pborrows@[redacted]>  
> **To:** Allen Peter; Kathy Reilly <threereillys@[redacted]>; Jim Pruss  
> <jpruss@[redacted]>  
> **Cc:** Peter Borrows <pborrows@[redacted]>; John Tibaldi  
> <jtibaldi@[redacted]>; Rob Drury <rdrury@[redacted]>  
> **Sent:** Sun Jan 16 15:11:24 2011  
> **Subject:** Ministerial Briefing Note January 17 2011 Final Draft for  
> distribution.doc

> Peter and Bob.  
>  
>  
>

> For initial comment please. The attachment is being updated for a  
> couple of recent changes we have made and I'll send this soon. We are

**QFCI**  
Date: 5/2/12  
JM  
1068  
Exhibit Number:

# **Ministerial Briefing Note**

**17 January 2010**

**Flood Event January 2011**

## **1. BACKGROUND INFORMATION ON WIVENHOE DAM**

### **2. WIVENHOE DAM FLOOD MITIGATION AND FLOOD OPERATIONS**

- 2.1 What were the benefits provided by Wivenhoe Dam during the current event?
- 2.2 Why was Wivenhoe Dam only allowed to rise up to 191% and not 230%?
- 2.3 What is the role of the erodible fuse plug embankments?
- 2.4 Why weren't pre-emptive releases undertaken prior to the start of the flood event?
- 2.5 Is there a detailed record of the events associated with the current flood?

### **3. THE MANUAL OF OPERATIONAL PROCEDURES FOR FLOOD MITIGATION AT WIVENHOE DAM AND SOMERSET DAM**

- 3.1 What is the Manual of Flood Mitigation and how was it developed?
- 3.2 What is contained in the Manual?

## **4. REGULATORY CONTEXT**

## **5. COMPLIANCE WITH MANUAL**

## **6. SEQ WATER REPORT**

# 1 BACKGROUND INFORMATION ON WIVENHOE DAM

Wivenhoe Dam was completed in 1984 and has two main functions;

- A 1,165,000 ML storage providing an urban water supply for Brisbane;
- Flood mitigation in the Brisbane River by providing a dedicated flood storage volume of 1,450,000 ML (this flood storage was increased in 2005 to 1,966,000 ML with the dam at the point of failure).

In accordance with the Queensland Regulatory program for dam spillway upgrades, a further upgrade of Wivenhoe Dam is scheduled to occur prior to 2035.

Wivenhoe Dam is in excellent condition with four Comprehensive Dam Safety reviews undertaken in the last 14 years, the latest in 2010.

## **2 WIVENHOE DAM FLOOD MITIGATION AND FLOOD OPERATIONS**

### **2.1 What were the benefits provided by Wivenhoe Dam during the current event?**

The following graphs demonstrate the significant benefits of Wivenhoe Dam in mitigating the current flood event, with reductions in flood peak of up to 2.5 metres in the City area and up to 5.5 metres in the Moggill area further upstream.

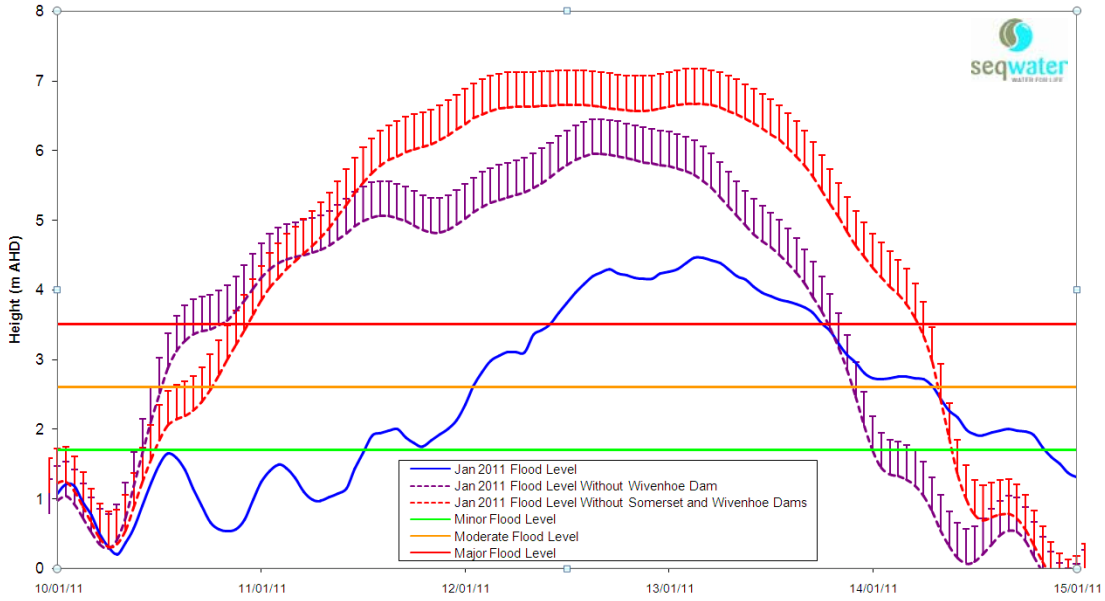
This equates to significant reduction in the potential for loss of life as well as saving in damages in the order of up to \$1.6 billion based on current damage curves. Up to 13,000 more properties would have been impacted by the event without the Dam. (Source: Flood Damage Tables provided to Seqwater by the Brisbane City Council).

The time at which flood levels remained elevated above major levels has also been reduced by up to 3 days by the dam. This has significant benefits to impact on the population of the city, property damage and the recovery operation.

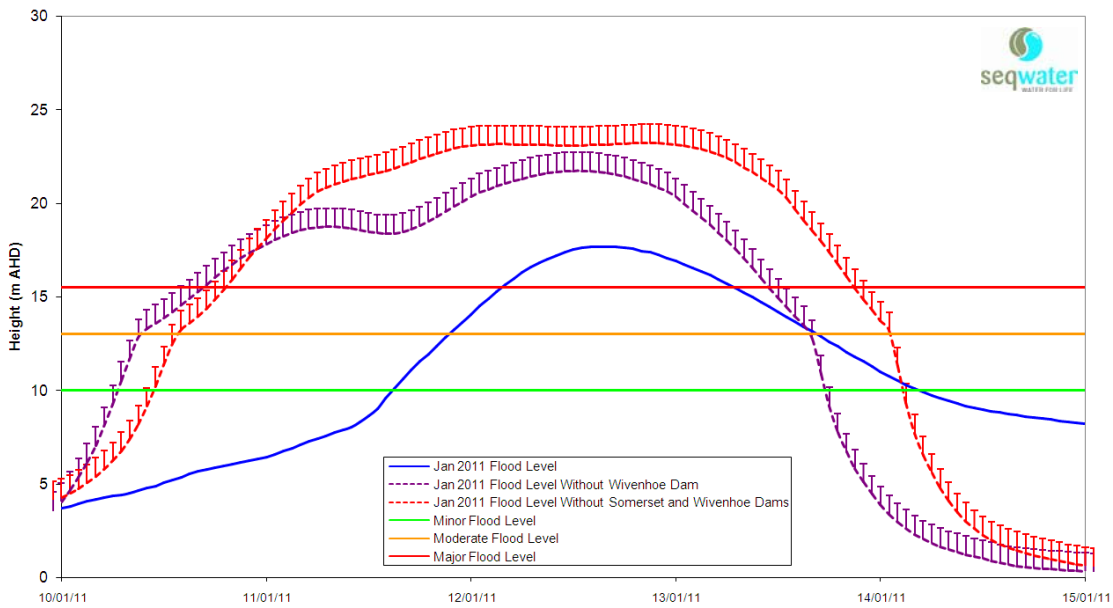
Depending on the nature of the event, the presence of Wivenhoe Dam could also potentially increase flood warning times to impacted areas. How these times may have been increased during the current event is presently difficult to quantify, but discussions will be held with BOM on this issue at a later date.

In addition, the strategy adopted to quickly close off releases once the peak in the dam had been reached and rain stopped falling certainly reduced the predicted flood peak by at least one metre in the lower Brisbane River area.

**JANUARY 2011 BRISBANE FLOOD  
Assessment of Flood Levels at Brisbane City**



**JANUARY 2011 BRISBANE FLOOD  
Assessment of Flood Levels at Moggill**



## 2.2 Why was Wivenhoe Dam only allowed to rise up to 191% and not 230%?

Wivenhoe Dam mitigates downstream flooding by storing incoming flood water during a rainfall event and releasing these waters at a reduced flow rate downstream to reduce flood impacts. The timing of the releases is also manipulated so that the aim is for outflows from the dams to impact on downstream areas only after the peak inflows from the downstream major tributaries have passed. However this aim cannot always be achieved in practice. This is because some large floods, such as the one currently being experienced, have the potential to overflow the dam's flood storage compartment. **Should this occur, the dam would fail and the resulting damage and loss of life would be at least 100 to 1000 times greater than that currently being experienced.**

Therefore the basis of all flood operation decision making is to ensure the dam never fails. This is the reason that the dam's flood storage compartment would never be intentionally fully filled as any additional inflows after this point would result in a dam failure.

**Comment [MSOffice1]:** The other issue is that you don't know what rain is yet to occur.

## 2.3 What is the role of the erodible fuse plug embankments?

Another factor that impacts on flood release decision making in large events are the levels at which the erodible fuse plugs are destroyed. The fuse plugs act as a safety valve to rapidly increase dam outflows if the structural safety of the dam is in danger. Loss of one or more fuse plugs severely limits the ability of the dam to mitigate the effects of future flood events that may occur prior to the fuse plug or plugs being reinstated. Reinstatement of a fuse plug following an event would take a minimum of 4 to 6 months and would require an extended period of relatively dry weather.

**Comment [MSOffice2]:** triggered?

## **2.4 Why weren't pre-emptive releases undertaken prior to the start of the flood event?**

In the 25 days leading up to the current event, three flood events impacting on Wivenhoe Dam were experienced, with gate releases being made on all but five of those days. The total outflow from these events was around 700,000ML.

During these events, requests were received from Councils and residents impacted by bridge closures downstream of the dam to curtail releases as soon and as quickly as possible. Additionally the 2 January end date of the flood event prior to the current event meant that significant drain down of the dam prior to the onset of the current event that commenced on 6 January 2011, was not possible without major bridge inundation downstream of the dam and without exceeding minor flood levels in the lower Brisbane River.

Additionally, a flood event was also experienced in October 2010 that resulted in a release of 750,000ML from the dam. Accordingly drain down below the dam full supply level prior to the start of the first December event would not have been possible without significant bridge inundation and without exceeding minor flood levels (as defined by BOM and BCC) in the lower Brisbane River.

Regardless, significant drain down prior to the current event would have had little impact on the peak level in Wivenhoe Dam as shown in the table below. The reason for this is that this total event inflow volume of 2,600,000 ML is well in excess of the useable flood storage combined with the available water supply storages shown in the table.

The specific impact on the Lower Brisbane River of these reduced dam levels requires the use of a complex hydraulic model. The results of this modelling would still contain a degree of uncertainty as illustrated by the difficulties in estimating the final flood peak in Brisbane during the event. This is because the rapid closure of the gates after peak inflow was achieved resulted in significant water level reductions downstream and this is difficult to model accurately.

JANUARY 2011 FLOOD			
Starting Level		Peak Height	Capacity
%	m AHD	m AHD	%
100	67.1	74.97	191
95	66.5	74.93	191
90	65.8	74.88	190
75	64.0	74.63	187
50	60.0	74.11	180

# It should be noted that the possible reductions shown above are based up a unique dual peaked flood hydrograph with a volume of about 2,600,000 ML which occurred during this event. A hydrograph with the same volume but a different distribution could result in a significantly lower reduction in peak water levels. Flood operations at the dam are also highly dependent upon the flood inflow volume and a slight variation in the flood volume could significantly reduce the benefits associated with draining down the dam prior to a flood event.

## 2.5 Is there a detailed record of the events associated with the current flood?

A preliminary report has been prepared and is attached to this briefing.



## **3 THE MANUAL OF FLOOD MITIGATION AT WIVENHOE DAM AND SOMERSET DAM**

### **3.1 What is the Manual of Flood Mitigation and how was it developed?**

The Manual of Flood Mitigation for Wivenhoe and Somerset dams in its current form was developed in 1992 during an extensive hydrological study of the Brisbane and Pine Rivers catchments by DPI, Water Resources. The final reports were subject to extensive internal review by the Water Resources Group before being reviewed by an independent review panel comprising Professor Colin Apelt, Head of Department, Department of Civil Engineering, University of Queensland and Mr Eric Lesleighter, Principal Hydraulic Engineer and Chief Engineer Water Resources, Snowy Mountains Engineering Corporation. Subsequently, the Manual was extensively reviewed during the Brisbane Valley Flood Damages Minimisation Study in 2006, with the latest comprehensive review of the Manual undertaken in 2009. Both of these reviews have included expert review panels comprising key stakeholders, with the most recent review involving representatives from DERM, BOM, BCC and SunWater.

The Manual of Flood Mitigation is prepared by Seqwater as the owner of the dam and approved and gazetted by the Chief Executive of DERM in accordance with the Water Supply Act 2008. The manual defines flood objectives procedures; roles and responsibilities; and staffing and operational requirements for flood events impacting on Wivenhoe and Somerset dams.

### **3.2 What is contained in the Manual?**

The primary objectives of the procedures contained in the Manual are, in order of importance:

- Ensure the structural safety of the dams;
- Provide optimum protection of urbanised areas from inundation;
- Minimise disruption to rural life in the valleys of the Brisbane and Stanley Rivers primarily, this involves minimising inundation of the seven bridges below the dam upstream of Moggill);
- Retain the storage at Full Supply Level at the conclusion of the Flood Event.

- Minimise impacts to riparian flora and fauna during the drain down phase of the Flood Event.

During an event, the operation of the dam transitions between the following four operating strategies depending of the circumstances at the time. These procedures associated with these strategies are explained in detail in the Manual.

- **Strategy W1** – Primary consideration is given to Minimising Disruption to Downstream Rural Life.
- **Strategy W2** – Transition Phase moving from Minimising Disruption to Protecting Downstream Urban Areas.
- **Strategy W3** – Primary consideration is to Protect of Urban Areas from Inundation.
- **Strategy W4** – Primary consideration is to protecting the structural safety of the Dam.

In addition to these strategies, historical records show that there is a significant probability of two or more flood producing storms occurring in the Brisbane River system within a short time of each other. Accordingly for each flood event, the aim is always to empty stored floodwaters within seven days after the flood peak has passed through the dams.

#### 4 REGULATORY CONTEXT (Provided by Peter Allen and unedited)

These are contained in the Flood Mitigation Manual (manual) approved under sections 370 to 374 of the *Water Supply (Safety and Reliability) Act 2008*. The Chief Executive Officer (CEO) of DERM (or his delegate) approves the manual, and the approval is notified in the Queensland Government Gazette. Approval can be for a period of up to five years, after which the approval needs to be renewed. There are no decision-making criteria specified in the Act for the CEO to take into account when approving the manual.

The manual for the dams requires, amongst other matters:

1. Flood operations to be conducted in accordance with manual's provisions. (There is an approval process specified in the manual, if Seqwater considers a different flood release strategy is desirable to deal with a particular flood event. This was not used in the January 2011 flood event)
2. Flood operations to be under the control of CEO-approved engineers (who are highly qualified and experienced)
3. Annual reporting on the preparedness and status of the flood control system for flood operations, and the training of the personnel who manage the flood events.
4. Reporting on the flood operations during flood events.
5. Reviews after flood events such as the January 2011 event. For this flood event, the Queensland Government engaged Mr Brian Cooper, an independent consulting engineer, to review compliance with the manual. Mr Cooper concluded (Attachment??): "...The strategies in the Flood Mitigation Manual have been followed, allowing for the discretion given to make variations in order to maximise flood mitigation effects. The actions taken and decisions made during the Flood Event appear to have been prudent and appropriate in the context of the available knowledge available to these responsible for flood operations and the way events unfolded..." (p.3 of the final report or other appropriate reference??)

The manual is separate from a draft communication protocol (Insert name) between the Local, State and Commonwealth government agencies that are affected by the dams' flood operations. This protocol is not binding on the parties to it is not subject to regulatory approval/review.

Some DERM staff, because of their specialist skills, work in the Flood Operations Centre that Seqwater activates to manage such events. None of them are involved in any of the regulatory decisions concerning the dams or are members of the work unit (Office of the Water Supply Regulator) which undertakes the CEO's regulatory functions.

## 5 COMPLIANCE WITH THE MANUAL

(To be provided by Peter Allen)

I am unable to provide comment on this at this stage as I have not had access to the Logs etc. I do have some of the information but I will await the flood report before I can make this call. In the interim, I would recommend that the conclusions of Brian Cooper be cited.

## 6 SEQWATER REPORT

It is recommended that the process and content for reports required for this event be:

- In the short term, utilise this report attached to this briefing note as the basis for communications and discussion
- Prepare any Interim Reports as agreed to provide information and input as required.
- Seqwater prepare a Comprehensive Report as per the existing regulatory requirements of the Act and the gazetted manual and any requirements of the Dam Safety Regulator. This would be done within 6 weeks of the closure of the current event as per the manual. This timeframe is subject to any new mobilisation of the Flood Operations Centre. The Table of Contents would include:
  - Introduction
  - Flood Event Summary
  - Mobilisation and Staffing
  - Event Rainfall
  - Inflow and Release Details
  - Data Collection System Performance
  - Data Analysis Performance
  - Communication
    - Flood Management Strategies and Manual Compliance
    - Improvements in data collection systems, practices and processes.
    - improvements by interacting agencies
    - Review of factors impacting on the protection of urban areas
  - Recommendations & Conclusions
- The report would then be reviewed by the Dam Safety Regulator in conjunction with any peer review they require.
- Based on this review, a review of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam would occur utilising an expert panel of review including representatives of DERM, Seqwater, BoM, affected Local Governments and other stakeholders as necessary.

[The email from Bob Reilly](#)

[the review should cover:](#)

1. Were the provisions of the manual complied with?
2. What improvements to either facilities e.g stream gauges, or work practices, are desirable to improve Seqwater's ability to predict inflows into the dams.
3. Are improvements to either Seqwater's facilities or work practices desirable to improve Seqwater's ability to manage events? (Point 2 above could be a subset of this one) (For example, someone is sure to ask should we raise the dam to improve its flood storage capacity--while the reviewer could not complete such a task, he could comment on whether it is a possibility worth further investigation.) If so, what are they and their implications
4. Are changes to the facilities or work practices of other organisations desirable to improve Seqwater's abilities to manage these events? If so, what are they and their implications? (For example, would it be worth funding Brisbane River crossing upgrades so that floodwater could be released faster, while not adversely affecting access to properties--or maybe alternative strategies e.g. resupply operations could be put in place to achieve similar outcomes?)
5. Given the manual's order of priorities i.e protection of the dam etc, are any changes in the flood release strategies for either dam desirable? If so, what are they, and their implications.