

TRIM reference: D/11/

Enquiry received:

Purpose: Wivenhoe Dam release

Ability of Wivenhoe and Somerset Dams to manage floods in the Brisbane River

- There are 4 major catchments that impact on flooding in Brisbane:
 - Upper Brisbane, on which Wivenhoe and Somerset are located
 - Lockyer
 - Bremmer
 - Local creeks.
- Wivenhoe and Somerset can only help manage the flood waters from the Upper Brisbane.
- The Upper Brisbane River comprises approximately 50% of the total Brisbane River catchment.
- The contribution of each of these individual catchments depends on when the rain falls.

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Impacts of Wivenhoe and Somerset dams

- Wivenhoe dam reduced the flood peak by up to 2.5 metres in the City and up to 5.5 metres at Moggill.
- Without Wivenhoe dam, up to 13,000 more houses would have been flooded. They prevented up to \$1.6 billion of damages.
- Without Wivenhoe dam, major flooding would have lasted for up to three days longer.
- Wivenhoe and Somerset dams controlled 2.6 million megalitres of floodwater. This is 1.1 million megalitres more than in 1974.
- The dams controlled these floodwaters, providing time for peak flows from the Lockyer and Bremer to pass.
- Total flow in the Brisbane River in the city in 1974 was 9,500 cubic metres per second.
- The estimated flow from this event would have been at least 13,000 cubic metres per second if Wivenhoe did not exist.

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Operation of Wivenhoe and Somerset dams

- The dams were operated strictly in accordance with the approved Operational Procedures.

- The Operational Procedures were reviewed by some of Australia's best water experts, including:
 - Professor Colin Apelt, Head of Department, Department of Civil Engineering, University of Queensland
 - Mr Eric Lesleighter, Principal Hydraulic Engineer and Chief Engineer Water Resources, Snowy Mountains Engineering Corporation.
- Professor Apelt is Chair of the Brisbane City Council flood taskforce.

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Rainfall forecasts

- There is a significant element of uncertainty in rainfall forecasting, even though the Bureau of Meteorology uses the best technology available, and highly-qualified and experienced experts.
- Dam operations were based on forecasts provided by the Bureau of Meteorology and observed rain on the ground.
- The rainfall during the critical period of this event significantly exceeded the Bureau of Meteorology forecasts.
- Rainfall during this critical period of the event was local and intense, resulting in difficulty in forecasting the extreme inflows that actually occurred.

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Pre-emptive releases

- The dam has been designed for both water supply and flood mitigation.
- Detailed Operational Procedures have been developed by leading water experts over many years, with a review as recently as 2009. The procedures are based on the current full supply level.
- Water was released from the dam on 20 of the 25 days leading up to this event.
- A total of 1,450 million megalitres of flood water was released between October 2010 and this event.
- These releases isolated some residents and inconvenienced many more.

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The clear decision making process in the Manual was set down since 1992. 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.

Deleted: and was reviewed in 2009 to reflect the installation of the Wivenhoe Spillway upgrade. That review included independent experts from the Bureau of Meteorology, Sunwater, Brisbane City Council and the Department of Environment and Resource Management.

- It is a manual which reflects safe operating practices based on detailed hydrological analysis and technical assessments of dam safety.

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Peak releases

- Outflows from Wivenhoe Dam peaked on Tuesday 11 January 2011 at 397,000 ML on that day.
- The impact of these releases was minimised by closing down releases quickly once inflows into the dam had peaked.
- The release rate was higher for three hours, but not sustained.
- These higher releases accounted for only part of the increase in river levels. The Bureau of Meteorology has stated that, even at their peak, outflows from Wivenhoe Dam contributed slightly more than half the flood arriving in Brisbane (Courier Mail, 14 January).

Large releases earlier

- Releasing large volumes of water over the weekend would have had major impacts on the rural communities of the Brisbane Valley. Bridges would have been cut and communities would have been isolated with little notice.
- Over the weekend, neither rainfall forecasts nor the rain on the ground indicated with certainty that urban areas would be impacted.

Increases to above 200% (level of fuse plugs)

- Wivenhoe Dam is not designed to overtop. If it did, the dam would fail and the resulting damage and loss of life would be at least 100 to 1,000 times greater than that currently being experienced.
- To ensure that this never occurs, the dam has been designed with fuse plugs that automatically open when it reaches more than 200% of full supply volume.
- Once opened, the rate of release through these plugs cannot be varied.
- The plugs continue to release water at this rate until the dam reaches full supply level.
- The fuse plugs would take four to six months of dry weather to repair, and severely restrict the capability to manage further flood events during this period.
- Flood operations are managed to ensure a buffer below 200% to allow for possibilities of further extensive inflows.

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Changes to dam operations

- The upgrade required to meet ANCOLD standards would have had no impact on this event. It will be completed for even bigger floods.
- Options to increase the full supply level have been investigated. Had they been implemented, these options would have reduced the flood compartment, resulting in higher releases earlier.