

# Wivenhoe Dam Operation for Flood Mitigation

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## **Background**

The information used in this submission has been derived from two sources;

- the water levels in the Brisbane River obtained from the BoM web-site, and
- the seqwater Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam as released by the State Government.

The river levels that in the Brisbane River flood event of 11-13 January 2011 are plotted on the graph appended to this submission. The level gauge in Wivenhoe Dam is somewhat erratic in the critical period, but is assumed to give a reasonable indication of trends when smoothed.

Also appended is an enlarged graph of the Wivenhoe Dam level over the two days 11-12 January 2011.

I do not have access to seqwater's release records, but referring to the dam's capacity curve, the water levels indicate that:

- between 10:30am and 3pm on 11 January the net inflow to the dam averaged 4,300 cumecs, and
- between 3pm and 8:45pm on 11 January the net outflow from the dam averaged 3,000 cumecs.

Assuming that the operators were releasing 2,000 cumecs before 3pm, the total inflow to Wivenhoe was 6,300 cumecs.

Assuming the total inflow continued at a similar rate after 3pm, the discharge rate after 3pm was around 9,300 cumecs. The Maximum Available Discharge through the spillway bays and regulators is 9,000 to 9,500 cumecs in this water level range. Therefore it appears that the operator was making maximum possible releases for about 5¼ hours.

Unfortunately this augmented flow coincided with the flood peak at Savages Crossing. Thus, although Wivenhoe Dam had attenuated the flood flows prior to 3pm, at the critical time after 3pm the operation of Wivenhoe Dam added 3,000 cumecs to the flood peak.

## Comments

### Flood Mitigation Capacity

The Wivenhoe Dam publicity indicates that it has a flood mitigation capacity (above 67m) of 1,450,000 ML. In fact the one panel at the information centre showed a flood mitigation capacity of 2,000,000 ML. However the Operational Manual shows that the capacity:

- from 67m to 68.5m is used to minimise disruption to rural life,
- from 68.5m to 74m is used for flood mitigation, and
- from 74m to 80m is used as a dam safety buffer.

Thus the storage above water supply level of 67m is:

- 169,000 ML for rural life
- 742,000 ML for flood mitigation, and
- 1,056,000 for dam safety.

**The active flood mitigation capacity of 742,000 ML is actually just over half of the advertised value.**

### Potential Uncontrolled Discharge

After the flood event the seqwater spokesman announced that it was necessary to make the high rate discharge to avoid an uncontrolled discharge. However utilisation of the first fuse plug would have resulted in a discharge of less than 1,900 cumecs over the auxiliary spillway.

**Most would agree that an “uncontrolled discharge” of 1,900 cumecs is preferable to a “controlled discharge” of 9,000 cumecs.** In any case the discharge over the auxiliary spillway could have been offset by reducing the flow through the spillway bays.

### Compliance with Operational Manual

The operator’s spokesman has stated that they followed the Operational Manual. At 3pm on 11 January, the appropriate operating strategy was clearly W4B(i) – the lake level could exceed 75.5m but initiation of a fuse plug could be avoided by increasing the release rate. (Inflow was around 6,300 cumecs but a controlled release of 9,000 cumecs was possible.)

Strategy W4B(i) doesn’t have any restrictions or even guidance on releases, except the overriding consideration of dam safety. So the operator had no rules to break here.

However on the very next page of the Operational Manual section 8.5 Gate Closing Strategies begins with:

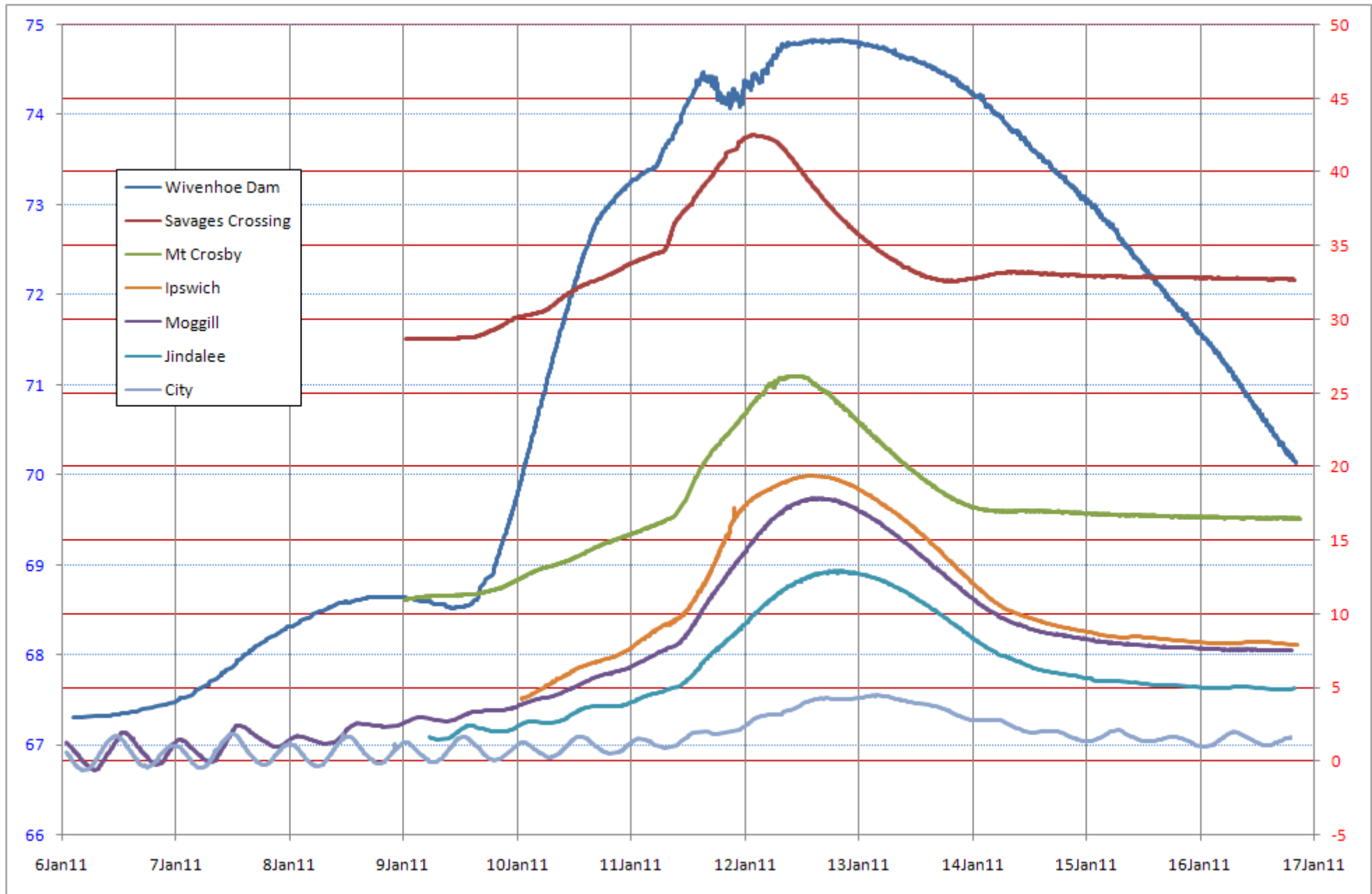
“gate closing commences when the level in Wivenhoe Dam begins to fall”.

**It is apparent that no significant gate closing occurred for 5¾ hours after the water level began to fall at 3pm on 11 January. This could be considered a departure from the Operational Manual – and a contribution to the flood peak.**

## **Suggestions**

1. Review the volume allocations of Wivenhoe Dam. For example if the dam is to provide maximum flood mitigation capacity for the infrequent major floods, it cannot also protect rural lifestyle for the frequent minor floods.
2. If flood mitigation is the aim, never release water faster than the inflow rate during a flood event. This runs the risk of flood augmentation rather than mitigation.
3. seqwater is not a disinterested expert. Post event modelling of operating scenarios should be undertaken by genuinely independent engineers. It is important that the potential to improve management in future events not be hampered by protective instincts.
4. Most people are aware of the limitations of weather forecasting. Operating decisions should be based on known information and limitations in order to remove the uncertainty from decision-making.

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# Wivenhoe Dam

