

# ELEVENTH STATEMENT

OF

# JOHN VICTOR TIBALDI

## 1 FEBRUARY 2012

**QFCI**

Date:

2/2/12 JM

Exhibit Number:

1036

**IN THE MATTER OF  
THE QUEENSLAND FLOODS COMMISSION OF INQUIRY**

**A COMMISSION OF INQUIRY UNDER THE  
COMMISSIONS OF INQUIRY ACT 1950**

**AND PURSUANT TO  
COMMISSIONS OF INQUIRY ORDER (NO.1) 2011**

**ELEVENTH STATEMENT OF JOHN VICTOR TIBALDI**

On the 1<sup>st</sup> day of February 2012, I John Victor Tibaldi, of c/o- 240 Margaret Street, Brisbane in the State of Queensland, state on oath:

1. I am currently employed by the Queensland Bulk Water Supply Authority trading as Seqwater (**Seqwater**) as Principal Engineer, Dam Safety.
2. I make this statement in response to a Requirement dated 25 January 2012 issued by Justice Catherine E Holmes, Commissioner of Inquiry, pursuant to section 5(1)(d) of the *Commissions of Inquiry Act 1950* (Qld).

**General Overview**

3. I was heavily involved in the preparation of the Flood Event Report dated 2 March 2011, in consultation with the other engineers in the Flood Operations Centre. The report was prepared within a strict time limit in accordance with regulatory requirements.
4. I refer to the Commission's Requirement to provide a statement dated 25 January 2012, concerning four identified Parts. I wrote the original drafts of each of those Parts, namely:-
  - a. Executive Summary
  - b. Part 2 – Flood Event Summary
  - c. Part 10 – Flood Management Strategies and Manual Compliance
  - d. Part 19 – Report Conclusions
5. When I sat down to write the report, I recall having little clear recollection of the sequence of events over the 13 days of the flood and thinking about the many documents, model runs and numerical data files that I would need to examine. I had been on duty for less than one third of the event and only one fifth of the time from the event commencement to when Strategy W4 was applied.
6. The two experiences that still stand out to me and were clear in my mind at that time was my shock at seeing the Toowoomba and Grantham flooding on the television late on 10 January

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Filed on behalf of Queensland Bulk Water Supply Authority trading as Seqwater

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Signed

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Witness

and the decision to transition to Strategy W4 on 11 January and understanding the consequences as dam releases were increased from that point. As of today, I can recall very little else with clarity of the events of that part of the flood event in which I had direct involvements at the time, and would need to refer to records to inform myself what occurred.

7. I undertook the initial drafting of these four Parts of the Flood Event Report referred to over a period of some days. There came a time when I thought the draft was suitable for distribution to others. Initially this occurred with the distribution to the three other engineers. As part of this process, I can recall that I would receive oral comments from particular engineers in the Flood Operations Centre, some of which resulted in amendments to the draft. I have some recollection that I also received written comments, some of which may also have resulted in amendments to the draft
8. This process did not occur as a single occasion. Mr Malone and I were generally in the Flood Operations Centre all day whilst the report was being drafted. However, Mr Ruffini and Mr Ayre would visit the Flood Operations Centre only occasionally. They were busy with other commitments to their employers, being Sunwater and DERM respectively. When Mr Ayre and Mr Ruffini visited the room, I would take the opportunity to have them read draft material, if I thought it was in a suitable state to review.
9. I recall at a later stage there being two or three meetings where hard copies of the draft report were circulated to approximately 12 to 20 people. At these meetings, people made comments and suggestions in relation to the draft report. People at these meetings included :-
  - a. General Manager of Water Delivery, Jim Pruss, who is a member of the Seqwater Executive;
  - b. Seqwater's lawyers; and
  - c. representatives from Rowland Consulting;

Rowland Consulting is an organisation which provides assistance on things like grammar. Arising out of matters raised in these meetings, I recall that there were some changes made to the draft report.

**Drafts of any part of the Flood Event Report listed that were written by me**

10. In the early stages of drafting, I produced many working drafts for my personal review. I was in the habit of emailing these from the Flood Operations Centre email account to my Seqwater email account as a means of ensuring the drafts were not lost.
11. Annexure 1 to this statement includes 21 such drafts of sections of the Flood Event Report which I emailed to myself in this fashion. I obtained these drafts by searching my Seqwater email account. The drafts were prepared on or about the dates set out in the index to Annexure 1 to this statement. I obtained copies of these drafts on Monday of this week by sending the attachments from my Seqwater account to my home email address. At that time I did not obtain copies of the covering emails which showed the dates on which I had originally sent those attachments to my Seqwater email account. This afternoon, I requested Ms Brooke Foxover, who works at Seqwater, to send the covering emails to my solicitors. They were received this afternoon and in Annexure 1, I have placed each covering email in front of its corresponding attachment. I did this so that it is apparent when the original attachments were sent to my Seqwater account.

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Witness

- 12. In preparing those Parts of the Flood Event Report that I drafted, I looked at various source data available to me in the Flood Operations Centre.
- 13. Seqwater’s employee, Ms Chloe Cross, gathered records available in the Flood Operations Centre so that I could examine them and so they could be inserted as appendices to the Flood Event Report. I recall Ms Cross being present in the room for much of this time.
- 14. Other persons were present in the room from time to time including Mr Warren Shallcross, a SunWater employee.
- 15. Mr Malone was also generally present in the Flood Operations Centre at this time. Mr Malone provided me with numerical data for the purposes of my drafting process. In the early drafting process, Mr Malone provided the numerical data to me progressively.
- 16. In writing the report I looked at much of the data referred to above for the first time, as I was on annual leave for the first 60 hours of the flood event. I was in the Flood Operations Centre on official duty for only 96 hours of the total event time of 324 hours, and for only 24 hours of the 120 hour period from event commencement to the time that Strategy W4 was applied.
- 17. I completed the draft suitable for distribution primarily using the flood event data. However, I would expect that I would also have had some conversations with the other engineers at some stages. In carrying out this initial drafting process I do not now recall specific conversations I had with the other engineers.
- 18. Because a report on a flood event of this magnitude at Wivenhoe Dam had never previously been drafted, I also developed the format for the presentation of information for the Flood Event Summary.
- 19. In working through the drafting process, I wrote down initial thoughts and considerations to accept or reject as I examined and tested these matters against the available information. This process may well be reflected in the early working drafts. Overall, my aim was to make the final summary as factual as possible.

**Executive Summary**

- 20. In the 21 drafts in Annexure 1, I do not see a drafted Executive Summary. I believe that is because I did not commence drafting the Executive Summary until a later stage.
- 21. I can recall that the other three flood engineers read drafts of the Executive Summary on a number of occasions and made numerous suggestions relating to format and presentation. I discussed and considered these and I recall I made changes.
- 22. As set out in the General Overview section above, I attended meetings where a number of people were present and discussions took place about the draft. This included the Executive Summary. It may be the case that some amendment resulted to the Executive Summary as part of this process.

**Flood Event Summary**

- 23. The majority of the 21 documents in Annexure 1 to this statement represent the evolving draft of what became the Flood Event Summary. There is also at least one early draft of what became the Part on Flood Management Strategies and Manual Compliance, and I will refer to that particular document under this heading.

[Redacted Signature]

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24. I refer to Annexure 1 document A. This is the earliest draft of the Flood Event Summary that I retained. The headings were not from any pro forma document, but rather what I created. The time periods in the first column were periods I chose. As the drafting progressed, I made changes to dates and times referred to as I gathered more data and formed a view of matters that appeared relevant. At page 4, there is a heading in the second column “transition from strategy W1E to strategy W2 Wivenhoe Directives #1 - #4 Somerset Directives #1 - #3”. In the fourth column of the same page there is a heading “Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)”.
25. I believe I used Strategy W2 as a starting point in these early drafts because the flowchart on page 23 of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam (**the Manual**) requires transition from Strategy W1 to Strategy W2 in circumstances where the maximum flow at Lowood is likely to be less than 3500 m<sup>3</sup>/s and the maximum flow at Moggill was likely to be less than 4000 m<sup>3</sup>/s. This flowchart does not provide for transition directly from Strategy W1 to Strategy W3 in these circumstances.
26. Because of this flowchart, in the early stages of drafting an issue arose in relation to Strategy W2. The flowchart directs the use of Strategy W2 once the lake level exceeds EL 68.5 metres provided both the maximum flow at Lowood is likely to be less than 3500m<sup>3</sup>/s and the maximum flow at Moggill is likely to be less than 4000m<sup>3</sup>/s. Both of those conditions were satisfied during the January 2011 Flood Event when the lake level first exceeded EL 68.5 metres. Despite this, it appeared to me that Strategy W2 had not been implemented since the flow of water being released from the dam exceeded the maximum flow allowed by Strategy W2. It appeared to me that a transition had occurred from Strategy W1 directly to Strategy W3.
27. To illustrate this point, the Manual at page 27 provides as follows:

LOCATION	TARGET MAXIMUM FLOW IN THE BRISBANE RIVER
Lowood	The lesser of: <ul style="list-style-type: none"> <li>• the natural peak flow at Lowood excluding Wivenhoe Dam releases, and;</li> <li>• 3,500m<sup>3</sup>/s.</li> </ul>
Moggill	The lesser of: <ul style="list-style-type: none"> <li>• the natural peak flow at Moggill excluding Wivenhoe Dam releases, and;</li> <li>• 4,000m<sup>3</sup>/s.</li> </ul>

28. Based on the requirements for Strategy W2 set out above, the following table can be produced for the January 2011 Flood Event. The periods I use in the table commence at 8:00am on 8 January 2011 and then match the Flood Event Summary Section of the Flood Report.

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  .....  
 Signed Witness

<b>PERIOD DURING JANUARY 2011 FLOOD EVENT</b>	<b>RANGE OF ACTUAL RELEASES FROM WIVENHOE DAM DURING THE PERIOD (m<sup>3</sup>/s) #</b>	<b>CALCULATED PEAK FLOW AT LOWOOD EXCLUDING WIVENHOE DAM RELEASES (m<sup>3</sup>/s)+</b>	<b>CALCULATED PEAK FLOW AT MOGGILL EXCLUDING WIVENHOE DAM RELEASES (m<sup>3</sup>/s)+</b>	<b>RANGE OF ESTIMATED MAXIMUM ALLOWABLE RELEASES FROM WIVENHOE DAM DURING THE PERIOD IF OPERATING UNDER STRATEGY W2 (m<sup>3</sup>/s)+</b>
Saturday 08 Jan 2011 at 08:00 to Saturday 08 Jan 2011 at 14:00	927 to 1239	530	660	80 to 153
Saturday 08 Jan 2011 at 14:00 to Sunday 09 Jan 2011 at 01:00	1239 to 1240	530	770	186 to 261
Sunday 09 Jan 2011 at 01:00 to Sunday 09 Jan 2011 at 08:00	1240 to 1334	530	770	260 to 311
Sunday 09 Jan 2011 at 08:00 to Sunday 09 Jan 2011 at 14:00	1334 to 1386	530	770	311 to 348
Sunday 09 Jan 2011 at 14:00 to Sunday 09 Jan 2011 at 19:00	1386 to 1411	530	770	306 to 314
Sunday 09 Jan 2011 at 19:00 to Monday 10 Jan 2011 at 01:00	1411 to 1473	620	770	78 to 159
Monday 10 Jan 2011 at 01:00 to Monday 10 Jan 2011 at 09:00	1473 to 2015	630	820	0 to 58



Signed



Witness

<b>PERIOD DURING JANUARY 2011 FLOOD EVENT</b>	<b>RANGE OF ACTUAL RELEASES FROM WIVENHOE DAM DURING THE PERIOD (m<sup>3</sup>/s) #</b>	<b>CALCULATED PEAK FLOW AT LOWOOD EXCLUDING WIVENHOE DAM RELEASES (m<sup>3</sup>/s)+</b>	<b>CALCULATED PEAK FLOW AT MOGGILL EXCLUDING WIVENHOE DAM RELEASES (m<sup>3</sup>/s)+</b>	<b>RANGE OF ESTIMATED MAXIMUM ALLOWABLE RELEASES FROM WIVENHOE DAM DURING THE PERIOD IF OPERATING UNDER STRATEGY W2 (m<sup>3</sup>/s)+</b>
Monday 10 Jan 2011 at 09:00 to Monday 10 Jan 2011 at 15:00	2015 to 2087	780	1,090	14 to 55
Monday 10 Jan 2011 at 15:00 to Monday 10 Jan 2011 at 20:00	2087 to 2695	780	1,500	74 to 201
Monday 10 Jan 2011 at 20:00 To Tuesday 11 Jan 2011 at 04:00	2695 to 2726	780	1,500	0 to 74
Tuesday 11 Jan 2011 at 04:00 to Tuesday 11 Jan 2011 at 08:00	2726 to 2753	1750	1,500	45 to 88

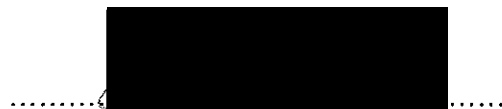
# Derived from Section 10 of the Flood Event Report.

+ Derived from Appendix A of the Flood Event Report.

29. Based on this table I believe that it is clear that Wivenhoe Dam was not being operated under Strategy W2 during these periods as the actual release rates from Wivenhoe Dam were well above the maximum allowable release rate for Strategy W2.
30. If Strategy W2 had been applied after 8:00am on 8 January 2011, then the Manual would have required that the outflow from Wivenhoe Dam would need to be reduced from 927 cumecs to around 100 cumecs. This did not occur.
31. At this time I was troubled by the fact that the flowchart in the Manual had not been followed. I felt this may have been a non-compliance with the Manual. Ultimately I decided it was not



Signed




Witness

a non-compliance with the intent of the Manual, because it would not have been sensible to adopt Strategy W2 at that time, as it would have significantly reduced the outflow from the Dam. I felt strongly that the Flood Event Report should be accurate. Accordingly, I made it clear in the draft Flood Event Summary what I believed the data indicated – that is, that a transition had occurred directly from Strategy W1 to Strategy W3 when the lake level first exceeded EL 68.5 metres. I believe that if I had left the reference in the Flood Event Report that there had been a transition from Strategy W1 to Strategy W2, this would have been incorrect.

32. I later referred the inconsistency associated with the flowchart on page 23 of the Manual to the Flood Commission of Inquiry in my statement dated 1 April 2011.
33. The only person I can now recall discussing this issue with was the Queensland Dam Safety Regulator, Mr Peter Allen. When discussing the issue, I can recall Mr Allen said words to the effect “just give us the facts John, and this is what you will be judged on”.
34. Email records show that between the time I changed the draft of the Flood Event Summary from showing a transition from Strategy W1 to Strategy W2 to showing a transition from Strategy W1 to Strategy W3, I wrote the first draft of what became Section 10 of the Flood Event Report which was the Compliance Summary. This draft contains my developing thoughts on the issue.
35. I refer to Annexure 1 documents O and P attached to emails dated 31 January 2011. Document O represents the early draft of flood management strategies and compliance Part, while document P represents an evolving draft flood event summary Part.
36. Going first to Annexure 1 document O, page 12, again I created the columns in this document and on the left hand side there are dates and times. On this page, on the left hand side, the date identified is 8 January 2011 and the time is 8:00am. There is reference in the second column to W2 and W3 and the statements contained in there represented the view I had formed based on the records I had reviewed. In forming this view I wish to point out that I was not present in the Flood Operations Centre at 8:00am on 8 January 2011 as I still was on annual leave. I certainly formed this view based on records, I do not now recall whether I also spoke specifically to Mr Ayre (who was on duty at 8:00am on 8 January 2011) about this matter.
37. I now refer to Annexure 1 document P. This document was emailed one minute after I had emailed Annexure 1 document O. I note that I also emailed a different document at 4:18pm. While I do not now specifically recall the matter, the timing of the emails indicate to me that I was working on a number of documents during that day. It is apparent in looking at these documents that I had not amended Annexure 1 document P in its entirety to accord with what was contained in Annexure 1 document O. In later drafts in Annexure 1, it can be seen that I continued that drafting process on this issue.
38. As I identified under the General Overview heading of this statement, once the draft was in what I regarded as a form suitable for review by the other engineers, I made it available to them for their review and comment. I believe that the draft provided for review would have contained my developed view on the transition from Strategy W1 to Strategy W3 on 8:00am on 8 January 2011.
39. I do not have a recollection of any of the other engineers disagreeing with my developed version of events on this issue.



Signed



Witness



40. I refer back to the General Overview section of this statement. I have set out the general process which was then engaged in as to further review and comments. It is likely that some amendments were made as part of this process.

#### **Flood Management Strategies and General Compliance**

41. I refer to Annexure 1. There only appears to be one early draft of this Part and that is at document O. I have discussed this document above.
42. Again, I showed a draft to the other engineers once I was satisfied the draft was in a form that could be distributed for review and comment. As with the Flood Event Summary, I believe that a draft of this Part given to the engineers would have had my developed view on the transition from Strategy W1 to Strategy W3 at 8:00am on 8 January 2011. I do not have a recollection that any of the other engineers disagreed with any aspect of this Part.
43. Also, the description under the heading General Observations as to how the draft was then sent to other people also applies to this Part. I do not have any recollections as to changes that may have been made.

#### **Report Conclusions**

44. I recall that I drafted this Part towards the end of the compilation period of the report.
45. As set out in the General Overview section above, I attended meetings where a number of people were present and discussions took place about the draft. This included the Report Conclusions. I recall that some amendment resulted as part of this process.

#### **Preparation of this Statement**

46. I have prepared this statement in a very short time amidst heavy work commitments. It may be that upon further reflection, there are other matters which I wish to address. In these circumstances, I may seek to deliver a supplementary statement to the extent that time permits.

**SWORN** by **JOHN VICTOR TIBALDI** on 1 February 2012 at Brisbane in the presence of:

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Deponent

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Solicitors

**IN THE MATTER OF  
THE QUEENSLAND FLOODS COMMISSION OF INQUIRY**

**A COMMISSION OF INQUIRY UNDER THE COMMISSIONS  
OF INQUIRY ACT 1950**

**AND PURSUANT TO COMMISSIONS OF INQUIRY ORDER  
(No. 1) 2011**

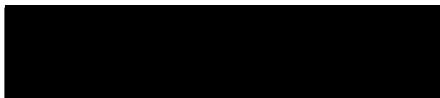
**ELEVENTH STATEMENT OF JOHN TIBALDI**

**INDEX TO ANNEXURES**

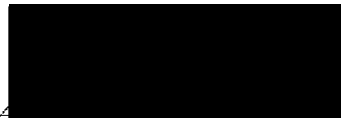
<b>Annexure No.</b>	<b>Description</b>
<b>JT-1</b>	Bundle of emails from John Tibaldi attaching draft sections of the January 2011 Flood Event Report
	<p>A. Email titled 'Decision Review 02' created 24 January 2011 at 2.17pm, together with attachment;</p> <p>B. Email titled 'Decision Review 03' created 24 January 2011 at 4.35pm, together with attachment;</p> <p>C. Further email titled 'Decision Review 03' created 25 January 2011 at 10.29am, together with attachment;</p> <p>D. Email titled 'Decision Review 04' created 25 January 2011 at 1.02pm, together with attachment;</p> <p>E. Email titled 'Decision Review 05' created 25 January 2011 at 4.37pm, together with attachment;</p> <p>F. Email titled 'Decision Review 06' created 27 January 2011 at 8.42am, together with attachment;</p> <p>G. Email titled 'JANUARY 2011 FLOOD EVENT REPORT – Draft Table of contents' created 27 January 2011 at 11.31am;</p> <p>H. Email titled 'Report Introduction 01' created 27 January 2011 at 1.12pm, together with attachment;</p> <p>I. Report titled 'Flood Event Summary 01' created 27 January 2011 at 1.14pm, together with attachment;</p> <p>J. Report titled 'Flood Event Summary 02' created 27 January 2011 at 4.24pm, together with attachment;</p> <p>K. Further report titled 'Flood Event Summary 02' created 28 January 2011 at 8.29am, together with attachment;</p> <p>L. Email titled 'Event Mobilisation and Staffing 02' created 28 January 2011 at 12.17pm, together with attachment;</p> <p>M. Email titled 'Flood Event Summary 03' created 28 January</p>

	<p>2011 at 3.41pm, together with attachment;</p> <p>N. Email titled 'Event Communication 01' created 31 January 2011 at 4.18pm, together with attachment;</p> <p>O. Email titled 'Flood MGt Strategies and Manual Compliance 01' created 31 January 2011 at 4.21pm, together with attachment;</p> <p>P. Email titled 'Flood Event Summary 05' created 31 January 2011 at 4.22pm, together with attachment;</p> <p>Q. Further email titled 'Flood Event Summary 05' created 1 February 2011 at 4.31pm, together with attachment;</p> <p>R. Email titled 'Flood Event Summary 06' created 2 February 2011 at 12.47pm, together with attachment;</p> <p>S. Email titled 'Flood Event Summary 07' created 2 February 2011 at 4.05pm, together with attachment;</p> <p>T. Further email titled 'Flood Event Summary 07' created 3 February 2011 at 10.12am, together with attachment;</p> <p>U. Untitled email created 5 February 2011, together with attachment.</p>
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Dated: 1<sup>st</sup> February 2012



Deponent



Witness

**Brooke Foxover**

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**From:** DutyEngineer [dutyseq [REDACTED]]  
**Sent:** Monday, 24 January 2011 2:17 PM  
**To:** John Tibaldi  
**Subject:** Decision Review -02.doc  
**Attachments:** @

**This message has been archived. View the original item**

-----Safe Stamp-----  
Your Anti-virus Service scanned this email. It is safe from known viruses.  
For more information regarding this service, please contact your service provider.

**Attachments:**

Decision Review -02.doc

(101 KB)

DATE/TIME	DIRECTIVE	DAM LEVELS	MODEL RESULTS	STRATEGY
<p>Commenced 06 Jan 2011 07:42</p> <p>Completed 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>Event Mobilisation, currently using Strategy W1A. 24/7 staffing of the Flood Operations Centre and dams to continue until official demobilisation announced.</li> </ul>	<p>Wivenhoe Dam 67.31</p> <p>Somerset Dam 99.34</p>	<ul style="list-style-type: none"> <li>Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>Significant inflows expected from Lockyer Creek into the Brisbane River and these inflows likely to impact on College's Crossing. (Estimate of Lockyer flows needed)</li> <li>Wivenhoe Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W1A</b> (Lake Level greater than 67.25, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>
<p>Commenced 07 Jan 2011 02:00</p> <p>Completed 07 Jan 2011 07:00</p>	<p><b>Strategy W1B</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam 67.52</p> <p>Somerset Dam 99.55</p>	<ul style="list-style-type: none"> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least six hours.</li> <li>Significant inflows expected from Lockyer Creek into the Brisbane River and these inflows likely to impact on Burton's Bridge, although there is uncertainty as to whether the Lockyer flows alone will be sufficient to inundate Burtons Bridge. (Estimate of Lockyer flows needed)</li> <li>Wivenhoe Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W1B</b> (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>

<p>Commenced 07 Jan 2011 07:00</p> <p>Completed 08 Jan 2011 08:30</p>	<p><b>Strategy W1C</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam 67.52</p> <p>Somerset Dam 99.55</p>	<ul style="list-style-type: none"> <li>Significant inflows expected from Lockyer Creek into the Brisbane River and these inflows likely to impact on Kholo Bridge, although there is uncertainty as to whether the Lockyer flows alone will be sufficient to inundate Kholo Bridge. (Estimate of Lockyer flows needed)</li> <li>Wivenhoe Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W1C</b> <b>(Lake Level greater than 67.75, maximum release 500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>
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<p>Commenced 07 Jan 2011 08:30</p> <p>Completed 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam 67.52</p> <p>Somerset Dam 99.79</p>	<ul style="list-style-type: none"> <li>Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge. (Estimate of Lockyer flows needed).</li> <li>Wivenhoe Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W1E</b> <b>(Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>
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<p>Commenced 07 Jan 2011 15:00</p> <p>Completed 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1E to Strategy W2</b> <b>Wivenhoe Directives #1 to #4.</b> <b>Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>• Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge. (Estimate of Lockyer flows needed).</li> <li>• Wivenhoe Lake level forecast to peak at ??</li> <li>• Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration initially on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 08 Jan 2011 14:00</p> <p>Completed 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at ??</li> <li>Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 09 Jan 2011 01:00</p> <p>Completed 09 Jan 2011 08:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>• No change to Somerset Dam gate settings over this period.</li> <li>• All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>• Wivenhoe Lake level forecast to peak at ??</li> <li>• Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 09 Jan 2011 08:00</p> <p>Completed 09 Jan 2011 14:00</p>	<p><b>Strategy W2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2</li> <li>• All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Wivenhoe Lake level forecast to peak at ??</li> <li>• Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>
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<p>Commenced 09 Jan 2011 14:00</p> <p>Completed 09 Jan 2011 19:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at ??</li> <li>Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>
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<p>Commenced 09 Jan 2011 19:00</p> <p>Completed 10 Jan 2011 01:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Wivenhoe Lake level forecast to peak at ??</li> <li>• Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified and the Mt Crosby Weir Bridge and Fernvale Bridge must be closed.</li> </ul>
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<p>Commenced 10 Jan 2011 01:00</p> <p>Completed 10 Jan 2011 09:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• The release rate was paused at 09:00 in an attempt to allow the Lockyer peak to pass Brisbane Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Wivenhoe Lake level forecast to peak at ??</li> <li>• Somerset Lake level forecast to peak at ??</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified and the Mt Crosby Weir Bridge and Fernvale Bridge must be closed.</li> </ul>

**Brooke Foxover**

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**From:** DutyEngineer [dutyseq [REDACTED]]  
**Sent:** Monday, 24 January 2011 4:35 PM  
**To:** John Tibaldi  
**Subject:** Decision Review -03.doc  
**Attachments:** @

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Decision Review -03.doc

(149 KB)

DATE/TIME	DIRECTIVE	DAM LEVELS	MODEL RESULTS	STRATEGY
<p>Commenced 06 Jan 2011 07:42</p> <p>Completed 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>Event Mobilisation, currently using Strategy W1A. 24/7 staffing of the Flood Operations Centre and dams to continue until official de-mobilisation announced.</li> </ul>	<p>Wivenhoe Dam 67.31</p> <p>Somerset Dam 99.34</p>	<ul style="list-style-type: none"> <li>Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until ??)</li> <li>Wivenhoe Lake level forecast to peak at 68.3.</li> <li>Somerset Lake level forecast to peak at 99.8.</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1A</b> <b>(Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>



<p>Commenced 07 Jan 2011 02:00</p> <p>Completed 07 Jan 2011 07:00</p>	<p><b>Strategy W1B</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam 67.52</p> <p>Somerset Dam 99.55</p>	<ul style="list-style-type: none"> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least six hours.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1B</b> <b>(Lake Level greater than 67.50, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>
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<p>Commenced 07 Jan 2011 07:00</p> <p>Completed 08 Jan 2011 08:30</p>	<p><b>Strategy W1C</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam 67.52</p> <p>Somerset Dam 99.55</p>	<ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1C</b> <b>(Lake Level greater than 67.75, maximum release 500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>
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<p>Commenced 07 Jan 2011 08:30</p> <p>Completed 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>• Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>• All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>• Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam 67.52</p> <p>Somerset Dam 99.79</p>	<ul style="list-style-type: none"> <li>• Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1E (Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>
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<p>Commenced 07 Jan 2011 15:00</p> <p>Completed 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1E to Strategy W2</b> <b>Wivenhoe Directives #1 to #4.</b> <b>Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>• Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration initially on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 08 Jan 2011 14:00</p> <p>Completed 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 09 Jan 2011 01:00</p> <p>Completed 09 Jan 2011 08:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 09 Jan 2011 08:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #7.</b> <b>Somerset Directives #4 to #5.</b></p>			<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50,</b> <b>maximum release 3500 cumecs)</b></p>
<p>Completed 09 Jan 2011 14:00</p>	<ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<ul style="list-style-type: none"> <li>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>

<p>Commenced 09 Jan 2011 14:00</p> <p>Completed 09 Jan 2011 19:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition from primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>
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<p>Commenced 09 Jan 2011 19:00</p> <p>Completed 10 Jan 2011 01:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified and the Mt Crosby Weir Bridge and Fernvale Bridge must be closed.</li> </ul>
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<p>Commenced 10 Jan 2011 01:00</p> <p>Completed 10 Jan 2011 09:00</p>	<p><b>Strategy W3 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced 10 Jan 2011 09:00</p> <p>Completed 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced 10 Jan 2011 15:00</p> <p>Completed 10 Jan 2011 20:00</p>	<p><b>Strategy W3 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced 10 Jan 2011 20:00</p> <p>Completed 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This lead to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible.</li> </ul>
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<p>Commenced 11 Jan 2011 04:00</p> <p>Completed 11 Jan 2011 10:00</p>	<p><b>Transition from Strategy W3 to Strategy W4</b> <b>Wivenhoe Directive #12.</b> <b>Somerset Directives #6 to #7.</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced in the last 3 hours.</li> <li>At 10:00 a decision is made to transition to Strategy W4.</li> </ul>
<p>Commenced 11 Jan 2011 10:00</p> <p>Completed 11 Jan 2011 11:00</p>	<p><b>Strategy W4</b></p>			
<p>Go hour by hour from now on.</p>				


**Brooke Foxover**

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**From:** DutyEngineer [dutysecc@redacted]  
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DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MOD... RESULTS	STRATEGY
<p>Commenced 06 Jan 2011 07:42</p> <p>Completed 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>Event Mobilisation, currently using Strategy W1A. 24/7 staffing of the Flood Operations Centre and dams to continue until official de-mobilisation announced.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until ??)</li> <li>Wivenhoe Lake level forecast to peak at 68.3.</li> <li>Somerset Lake level forecast to peak at 99.8.</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1A</b> <b>(Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>

<p>Commenced 07 Jan 2011 02:00</p> <p>Completed 07 Jan 2011 07:00</p>	<p><b>Strategy W1B</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least six hours.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1B</b> <b>(Lake Level greater than 67.50, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>
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<p>Commenced 07 Jan 2011 07:00</p> <p>Completed 07 Jan 2011 09:00</p>	<p><b>Strategy W1C</b></p> <ul style="list-style-type: none"> <li>• Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1C</b> <b>(Lake Level greater than 67.75, maximum release 500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>
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<p>Commenced 07 Jan 2011 09:00</p> <p>Completed 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1E (Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>
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<p>Commenced 07 Jan 2011 15:00</p> <p>Completed 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1E to Strategy W2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration initially on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 08 Jan 2011 14:00</p> <p>Completed 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 09 Jan 2011 01:00</p> <p>Completed 09 Jan 2011 08:00</p>	<p><b>Strategy W2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>• No change to Somerset Dam gate settings over this period.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced 09 Jan 2011 08:00</p> <p>Completed 09 Jan 2011 14:00</p>	<p><b>Strategy W2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>
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<p>Commenced 09 Jan 2011 14:00</p> <p>Completed 09 Jan 2011 19:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>
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<p>Commenced 09 Jan 2011 19:00</p> <p>Completed 10 Jan 2011 01:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified and the Mt Crosby Weir Bridge and Fernvale Bridge must be closed.</li> </ul>
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<p>Commenced 10 Jan 2011 01:00</p> <p>Completed 10 Jan 2011 09:00</p>	<p><b>Strategy W3 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that , 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced 10 Jan 2011 09:00</p> <p>Completed 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced 10 Jan 2011 15:00</p> <p>Completed 10 Jan 2011 20:00</p>	<p><b>Strategy W3 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced 10 Jan 2011 20:00</p> <p>Completed 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>◦ Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>◦ No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>◦ Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>◦ Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>◦ During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This lead to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>◦ Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>◦ Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe ??mm;</li> <li>◦ Somerset ??mm;</li> <li>◦ Lockyer ??mm;</li> <li>◦ Bremer ??mm.</li> </ul> </li> <li>◦ Wivenhoe Lake level forecast to peak at .</li> <li>◦ Somerset Lake level forecast to peak at .</li> <li>◦ Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>◦ Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>◦ Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>◦ The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>◦ This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>◦ Model results show that a peak level in the dam close to 74.0 remains possible.</li> </ul>
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<p>Commenced 11 Jan 2011 04:00</p> <p>Completed 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4 Wivenhoe Directive #12. Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>• The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>• Extreme intense rainfall is experienced in relatively small areas of the Wivenhoe catchment during this period. (Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>• Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision.</li> </ul>
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<p>Commenced 11 Jan 2011 08:00</p> <p>Completed 11 Jan 2011 13:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall continues in relatively small areas of the Wivenhoe catchment during this period. (Much more words here) ). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> </ul>
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<p>Commenced 11 Jan 2011 13:00</p> <p>Completed 11 Jan 2011 18:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>
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<p>Commenced 11 Jan 2011 18:00</p> <p>Completed 11 Jan 2011 21:00</p>	<p><b>Strategy W4 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 3 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 3 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

**Brooke Foxover**

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(223 KB)

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODE... RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>Event Mobilisation, currently using Strategy W1A. 24/7 staffing of the Flood Operations Centre and dams to continue until official demobilisation announced.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until ??)</li> <li>Wivenhoe Lake level forecast to peak at 68.3.</li> <li>Somerset Lake level forecast to peak at 99.8.</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1A</b> (Lake Level greater than 67.25, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>

<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p><b>Strategy W1B</b></p> <ul style="list-style-type: none"> <li>• Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Lake level not expected to reach 67.75 (Strategy W1C) for at least six hours.</li> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1B</b> <b>(Lake Level greater than 67.50, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>
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<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p><b>Strategy W1C</b></p> <ul style="list-style-type: none"> <li>• Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1C (Lake Level greater than 67.75, maximum release 500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>
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<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>• Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>• All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>• Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W1E (Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>
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<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1E to Strategy W2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Significant inflows expected from Lockyer Creek into the Brisbane River and these will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration initially on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>• No change to Somerset Dam gate settings over this period.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> </ul>
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<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>
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<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>
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<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified and the Mt Crosby Weir Bridge and Fernvale Bridge must be closed.</li> </ul>
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<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that , 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>
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<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4 Wivenhoe Directive #12. Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Extreme intense rainfall is experienced in relatively small areas of the Wivenhoe catchment during this period. Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall continues in relatively small areas of the Wivenhoe catchment during this period. (Much more words here) ). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe ??mm;</li> <li>Somerset ??mm;</li> <li>Lockyer ??mm;</li> <li>Bremer ??mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at .</li> <li>Somerset Lake level forecast to peak at .</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at .</li> <li>• Somerset Lake level forecast to peak at .</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> <li>• Forecast rainfall estimated at</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>○ not increase the downstream flood peak;</li> <li>○ will not cause the water level in Wivenhoe Dam to rise and;</li> <li>○ will allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> </ul>
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<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>○ maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>
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<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>○ maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>
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**Brooke Foxover**

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**JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:                             <ul style="list-style-type: none"> <li>○ Wivenhoe 28mm;</li> <li>○ Somerset 21mm;</li> <li>○ Lockyer 23mm;</li> <li>○ Bremer 23mm.</li> </ul> </li> <li>• No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>○ Wivenhoe 29mm;</li> <li>○ Somerset 22mm;</li> <li>○ Lockyer 32mm;</li> <li>○ Bremer 32mm.</li> </ul> </li> <li>• Forecast rainfall is 25mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.</li> </ul>	<p><b>Strategy W1A</b> <b>(Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p><b>Strategy W1B</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 10mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ??.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> </ul>	<p><b>Strategy W1B</b> (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p><b>Strategy W1C</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ??.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> </ul>	<p><b>Strategy W1C</b> <b>(Lake Level greater than 67.75, maximum release 500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.1 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p><b>Strategy W1E</b> <b>(Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1E to Strategy W2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 3mm;</li> <li>○ Somerset 5mm;</li> <li>○ Lockyer 1mm;</li> <li>○ Bremer 1mm.</li> </ul> </li> <li>• Forecast rainfall is 40mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ??.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>• Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>• Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 8mm;</li> <li>○ Somerset 16mm;</li> <li>○ Lockyer 3mm;</li> <li>○ Bremer 2mm.</li> </ul> </li> <li>• Forecast rainfall is 40mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>• No change to Somerset Dam gate settings over this period.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 12mm;</li> <li>○ Somerset 36mm;</li> <li>○ Lockyer 1mm;</li> <li>○ Bremer 0mm.</li> </ul> </li> <li>• Forecast rainfall is 40mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #7.</b> <b>Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 34mm;</li> <li>○ Somerset 53mm;</li> <li>○ Lockyer 18mm;</li> <li>○ Bremer 15mm.</li> </ul> </li> <li>• Forecast rainfall is 50mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 69.9 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.6 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 71.7 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 24mm;</li> <li>○ Somerset 38mm;</li> <li>○ Lockyer 15mm;</li> <li>○ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.0 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguilar Highway.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 12mm;</li> <li>○ Somerset 30mm;</li> <li>○ Lockyer 12mm;</li> <li>○ Bremer 18mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.2 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>• At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 34mm;</li> <li>○ Somerset 31mm;</li> <li>○ Lockyer 27mm;</li> <li>○ Bremer 30mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ??.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>• Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>• Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>• During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>• Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 44mm;</li> <li>○ Somerset 22mm;</li> <li>○ Lockyer 12mm;</li> <li>○ Bremer 14mm.</li> </ul> </li> <li>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>• Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.5 (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>• Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4</b> <b>Wivenhoe Directive #12.</b> <b>Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>• The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>• Extreme intense rainfall is experienced in relatively small areas of the Wivenhoe catchment during this period. Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at ??,?? (excluding forecast) ??,?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ??,?? (excluding forecast) ??,?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??,?? (excluding forecast) ??,?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??,?? (excluding forecast) ??,?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>• Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision.</li> </ul>



<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall continues in relatively small areas of the Wivenhoe catchment during this period. (Much more words here) ). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>• The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>
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<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>○ not increase the downstream flood peak;</li> <li>○ will not cause the water level in Wivenhoe Dam to rise and;</li> <li>○ will allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> </ul>
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<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>○ maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>
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<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b>  <b>Wivenhoe Directives #35 to #62</b>  <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours. <ul style="list-style-type: none"> <li>○</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>○ maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>
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**Brooke Foxover**

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**From:** DutyEngineer [dutysec [REDACTED]]  
**Sent:** Thursday, 27 January 2011 8:42 AM  
**To:** John Tibaldi  
**Subject:** Decision Review -06.doc  
**Attachments:** @

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(262 KB)

## **SUMMARY OF JANUARY 2011 FLOOD EVENT**

The following series of tables provides a detailed summary of the January 2011 Flood Event. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.



**JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>• No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 28mm;</li> <li>○ Somerset 21mm;</li> <li>○ Lockyer 23mm;</li> <li>○ Bremer 23mm.</li> </ul> </li> <li>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 29mm;</li> <li>○ Somerset 22mm;</li> <li>○ Lockyer 32mm;</li> <li>○ Bremer 32mm.</li> </ul> </li> <li>• Forecast rainfall is 25mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.</li> </ul>	<p><b>Strategy W1A (Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p><b>Strategy W1B</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 10mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> </ul>	<p><b>Strategy W1B</b> <b>(Lake Level greater than 67.50, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p><b>Strategy W1C</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> </ul>	<p><b>Strategy W1C</b> <b>(Lake Level greater than 67.75, maximum release 500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.1 (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p><b>Strategy W1E</b> <b>(Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1E to Strategy W2</b> <b>Wivenhoe Directives #1 to #4.</b> <b>Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 3mm;</li> <li>○ Somerset 5mm;</li> <li>○ Lockyer 1mm;</li> <li>○ Bremer 1mm.</li> </ul> </li> <li>• Forecast rainfall is 40mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) ??.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>• No change to Somerset Dam gate settings over this period.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 12mm;</li> <li>○ Somerset 36mm;</li> <li>○ Lockyer 1mm;</li> <li>○ Bremer 0mm.</li> </ul> </li> <li>• Forecast rainfall is 40mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 34mm;</li> <li>○ Somerset 53mm;</li> <li>○ Lockyer 18mm;</li> <li>○ Bremer 15mm.</li> </ul> </li> <li>• Forecast rainfall is 50mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 69.9 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 100.6 (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 71.7 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 24mm;</li> <li>○ Somerset 38mm;</li> <li>○ Lockyer 15mm;</li> <li>○ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.0 (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguiar Highway.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 12mm;</li> <li>○ Somerset 30mm;</li> <li>○ Lockyer 12mm;</li> <li>○ Bremer 18mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ??.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.2 (excluding forecast) ??.?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>◦ Wivenhoe 4mm;</li> <li>◦ Somerset 8mm;</li> <li>◦ Lockyer 5mm;</li> <li>◦ Bremer 4mm.</li> </ul> </li> <li>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>• Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ??.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4 Wivenhoe Directive #12. Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>• The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>• Extreme intense rainfall is experienced in relatively small areas of the Wivenhoe catchment during this period. (Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>o Wivenhoe 33mm;</li> <li>o Wivenhoe Local 78mm;</li> <li>o Somerset 46mm;</li> <li>o Lockyer 54mm;</li> <li>o Bremer 16mm.</li> </ul> </li> <li>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>• Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.8 (excluding forecast) ?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> </ul>	<p><b>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>• Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall continues in relatively small areas of the Wivenhoe catchment during this period. (Much more words here) ). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 27mm;</li> <li>○ Wivenhoe Local 85mm;</li> <li>○ Somerset 86mm;</li> <li>○ Lockyer 47mm;</li> <li>○ Bremer 55mm.</li> </ul> </li> <li>• Forecast rainfall is 100mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ???.?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 15mm;</li> <li>○ Wivenhoe Local 35mm;</li> <li>○ Somerset 40mm;</li> <li>○ Lockyer 38mm;</li> <li>○ Bremer 40mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below).</li> <li>• Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 8mm;</li> <li>○ Wivenhoe Local 13mm;</li> <li>○ Somerset 19mm;</li> <li>○ Lockyer 9mm;</li> <li>○ Bremer 8mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at ??,?? (excluding forecast) ??,?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ??,?? (excluding forecast) ??,?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>• The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 1mm;</li> <li>○ Somerset 1mm;</li> <li>○ Lockyer 1mm;</li> <li>○ Bremer 1mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe ??mm;</li> <li>○ Somerset ??mm;</li> <li>○ Lockyer ??mm;</li> <li>○ Bremer ??mm.</li> </ul> </li> <li>• Forecast rainfall is ??mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>○ not increase the downstream flood peak;</li> <li>○ will not cause the water level in Wivenhoe Dam to rise and;</li> <li>○ will allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguiar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>○ Wivenhoe 2mm;</li> <li>○ Somerset 6mm;</li> <li>○ Lockyer 6mm;</li> <li>○ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>○ maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this six day period were:             <ul style="list-style-type: none"> <li>○ Wivenhoe 14mm;</li> <li>○ Somerset 7mm;</li> <li>○ Lockyer 7mm;</li> <li>○ Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:             <ul style="list-style-type: none"> <li>○ Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

## Brooke Foxover

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**From:** DutyEngineer [dutyse@...]  
**Sent:** Thursday, 27 January 2011 11:31 AM  
**To:** Rob Drury  
**Cc:** Terry Malone; Rob.ayre@...; John.Ruffini@...; John Tibaldi; Jim Pruss  
**Subject:** JANUARY 2011 FLOOD EVENT REPORT - Draft Table of contents

**This message has been archived. View the original item.**

A suggested draft "Table of Contents" for the report based on work undertaken by Rob Drury is shown below. This is likely to change as we progress with writing the report; however I believe that the basis proposed is sound.

### Executive Summary

### Introduction

### Flood Event Summary

### Flood Event Description

#### Event Mobilisation and Staffing

- Event Rainfall and Event Significance
- Dam Inflow and Flood Release Details
- Data Validity and Data Collection System Performance
- Flood Model Validity and Performance
- Flood Management Strategies and Manual Compliance
- Event Communication Processes

### Flood Event Review

- Review of data collection systems, practices and processes

- Review of Flood the Management Team Personnel and the support provided to the Flood Management Team during the event
- Review of Flood Modelling systems, practices and processes
- Review of Flood Manual Procedures and Strategies
- Review of Agency Interaction during the event

#### Flood Event Outcomes

- Conclusions
- Recommendations

#### Technical Appendices (numerous volumes)

- These will be used to allow validation of the technical data contained in the report and in some cases will be large "stand-alone" documents.

John Tibaldi

-----Safe Stamp-----  
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For more information regarding this service, please contact your service provider.

**Brooke Foxover**

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**From:** DutyEngineer [dutysec [REDACTED]]  
**Sent:** Thursday, 27 January 2011 1:12 PM  
**To:** John Tibaldi  
**Subject:** Report Introduction - 01.doc  
**Attachments:** @

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Your Anti-virus Service scanned this email. It is safe from known viruses.  
For more information regarding this service, please contact your service provider.

**Attachments:**

Report Introduction - 01.doc

(785 KB)



## 1 INTRODUCTION

### 1.1 Preface

Given their potential significant impact on downstream populations, it is imperative that Wivenhoe and Somerset Dams are operated during flood events in accordance with clearly defined and pre-determined procedures to minimise impacts to life and property. The current procedures used for this purpose are contained in Revision 7 of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam that was gazetted in January 2010. This manual is an approved Flood Mitigation Manual under the Queensland Water Supply (Safety and Reliability) Act 2008.

The Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam requires the owner of Wivenhoe and Somerset Dams (currently Seqwater) to prepare a report after each Flood Event impacting on the dams. A Flood Event is defined as a situation where either of the dams exceeds the dam's full supply level. The report must contain details of the procedures used during the Flood Event, the reasons therefore and other pertinent information. Seqwater must forward the report to the Director General of the Department of Environment and Resource Management within six weeks of the completion of the Flood Event. This document and its associated volumes comprises the required report relating to the Flood Event impacting on both Wivenhoe and Somerset dams that commenced on 6 January 2011 and concluded on 19 January 2011.

### 1.2 Meaning of Terms

In this Manual, save where a contrary definition appears -

**“Act”** means the *Water Supply (Safety and Reliability) Act 2008*;

**“AEP”** means annual exceedance probability, the probability of a specified event being exceeded in any year.

**“Agency”** includes a person, a local government and a department of state government within the meaning of the Acts Interpretation Act 1954;

**“AHD”** means Australian Height Datum;

**“Chairperson”** means the Chairperson of Seqwater;

**“Chief Executive”** means the Director General of the Department of Environment and Resource Management or nominated delegate;

**“Controlled Document”** means a document subject to managerial control over its contents, distribution and storage. It may have legal and contractual implications;

**“Dams”** means Wivenhoe Dam and Somerset Dam;

**“Dam Supervisor”** means the senior on-site officer at Wivenhoe or Somerset Dam as the case may be;

**“Duty Flood Operations Engineer”** means the Senior Flood Operations Engineer or Flood Operations Engineer rostered on duty to be in charge of Flood Operations at the dams;

**“EL”** means elevation in metres Australian Height Datum;

**“Flood Event”** is a situation where the Duty Flood Operations Engineer expects the water level in either of the Dams to exceed the Full Supply Level;

**“Flood Operations Centre”** means the Centre used during by Flood Operations Engineers to manage Flood Events;

**“Flood Operations Engineer”** means a person designated to direct flood operations at the dams in accordance with Section 2.4 of this Manual;

**“FSL” or “Full Supply Level”** means the level of the water surface when the reservoir is at maximum operating level, excluding periods of flood discharge;

**“Gauge”** when referred to in (m) means river level referenced to AHD, and when referred to in (m<sup>3</sup>/s) means flow rate in cubic metres per second;

**“Manual” or “Manual of Operational Procedures for Flood Events at Wivenhoe Dam and Somerset Dam”** means the current version (Revision 7) of this Manual;

**“Power Station”** means the Wivenhoe pumped storage hydro-electric power station associated with Wivenhoe Dam and Split-Yard Creek Dam;

**“Senior Flood Operations Engineer”** means a person designated in accordance with Section 2.3 of this Manual under whose general direction the procedures in this Manual must be carried out;

**“Seqwater”** means the Queensland Bulk Water Supply Authority trading as Seqwater.

### 1.3 Background

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

- 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;
- 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.

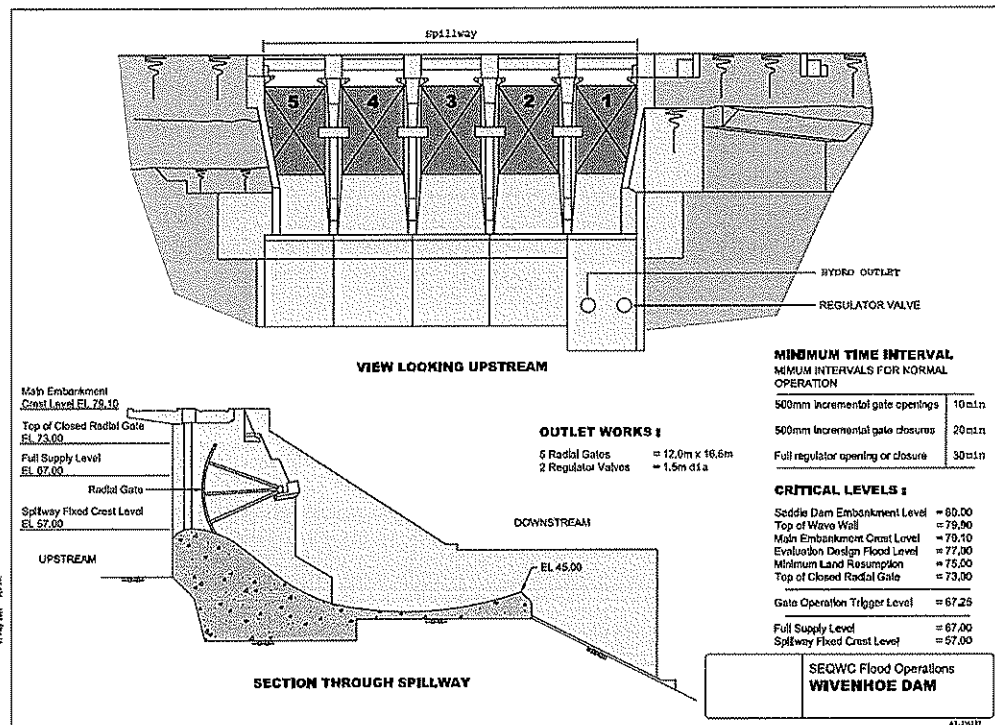
In meeting these objectives, the dams must be operated to account for the potential effects of closely spaced Flood Events. Accordingly, normal procedures require stored floodwaters to be emptied from the dams within seven days of the flood event peak passing through the dams. During Flood Events, Wivenhoe Dam and Somerset Dam are operated in conjunction so as to maximise the overall flood mitigation capabilities of the two dams.

## 1.4 Wivenhoe Dam

Wivenhoe Dam is capable of being operated in a number of ways to reduce flooding in the Brisbane River downstream of the dam, depending on the origin, magnitude and spatial extent of the flood. Maximum overall flood mitigation effect will be achieved by operating Wivenhoe Dam in conjunction with Somerset Dam.

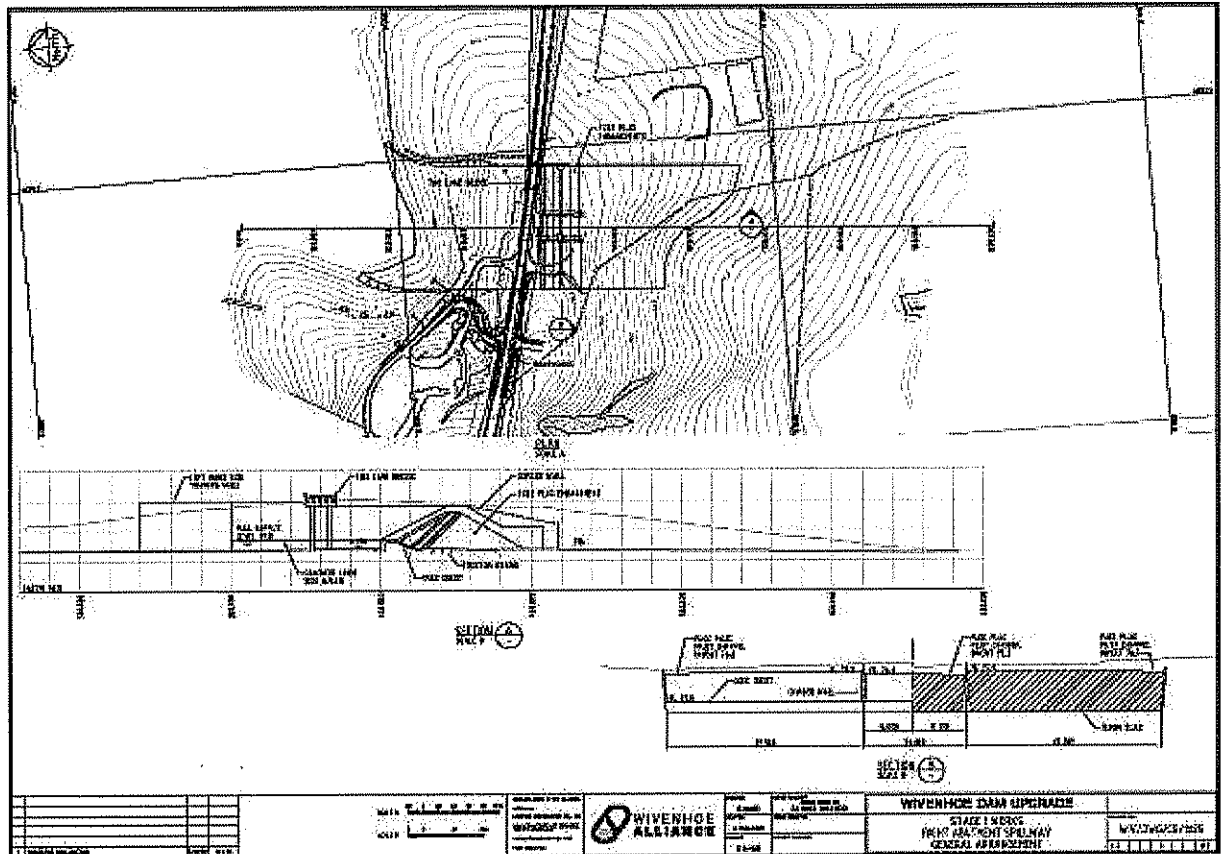
The reservoir volume above FSL of EL 67.0 is available as temporary flood storage. How much of the available flood storage compartment is utilised, will depend on the initial reservoir level below FSL, the magnitude of the flood being regulated and the procedures adopted.

Radial Gates and an Auxiliary Spillway are the primary infrastructure used to release water during flood events at Wivenhoe Dam. The arrangement of the Radial Gates is shown in the diagram below:



In addition to the five radial gates, the auxiliary spillway was constructed in 2005 as part of an upgrade to improve flood adequacy of this storage. The auxiliary spillway consists

of a three bay fuse plug spillway at the right abutment. In association with other works constructed at the dam, this gives the dam crest flood an AEP of approximately 1 in 100,000. The arrangement of the Auxiliary Spillway is shown in the diagram below.



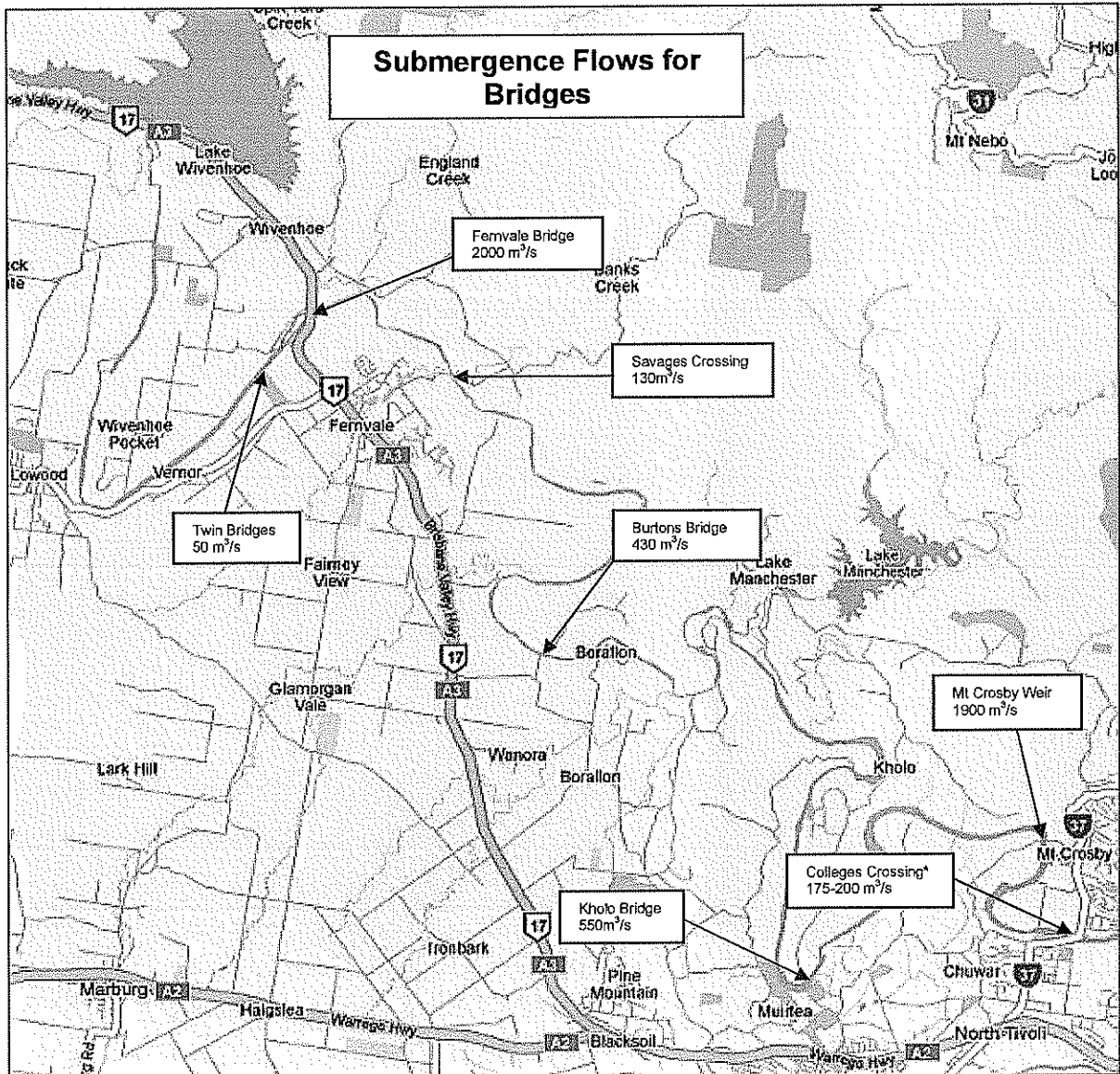
Once a Flood Event is declared, an assessment is to be made of the magnitude of the Flood Event, including:

- A prediction of the maximum storage levels in Wivenhoe and Somerset Dams.
- A prediction of the peak flow rate at the Lowood Gauge excluding Wivenhoe Dam releases.
- A prediction of the peak flow rate at the Moggill Gauge excluding Wivenhoe Dam releases.

The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25.

The strategies contained in the Manual for operating Wivenhoe Dam during Flood Events require a great deal of control over releases and knowledge of discharges into the Brisbane River from both Lockyer Creek and the Bremer River. When giving consideration to minimising disruption to rural life in the valleys of the Brisbane and Stanley Rivers, in general the releases from Wivenhoe Dam are controlled such that the combined flow from Lockyer Creek and Wivenhoe Dam is less than the limiting values to delay the submergence of particular bridges. The diagram below shows the location of

the impacted bridges and the approximate river flow rate at which they are closed to traffic.



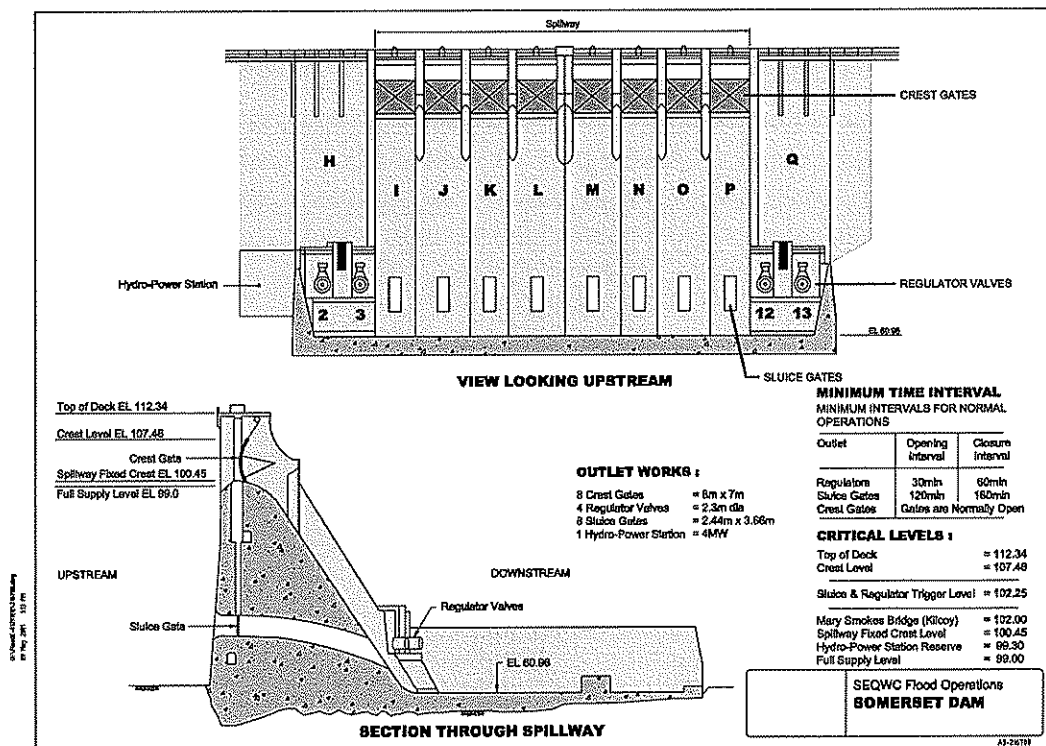
\* Note: Colleges Crossing is affected by tides

When giving consideration to providing optimum protection of urbanised areas from inundation, in general the releases from Wivenhoe Dam are controlled such that the combined flow from Lockyer Creek, Wivenhoe Dam and the Bremer River is either minimised or kept below the threshold level for urban damage.

When giving consideration to ensuring the structural safety of the dam, the releases from Wivenhoe Dam are controlled to ensure that the dam is not put at risk of failure.

## 1.5 Somerset Dam

Somerset Dam is capable of being operated in a number of ways to regulate Stanley River floods. Somerset Dam and Wivenhoe Dam are to be operated in conjunction to optimise the flood mitigation benefits downstream of Wivenhoe Dam. Radial Gates, Sluice Gates and Regulator Valves Radial Gates are the primary infrastructure used to release water during flood events at Somerset Dam. The arrangement of this infrastructure is shown in the diagram below:

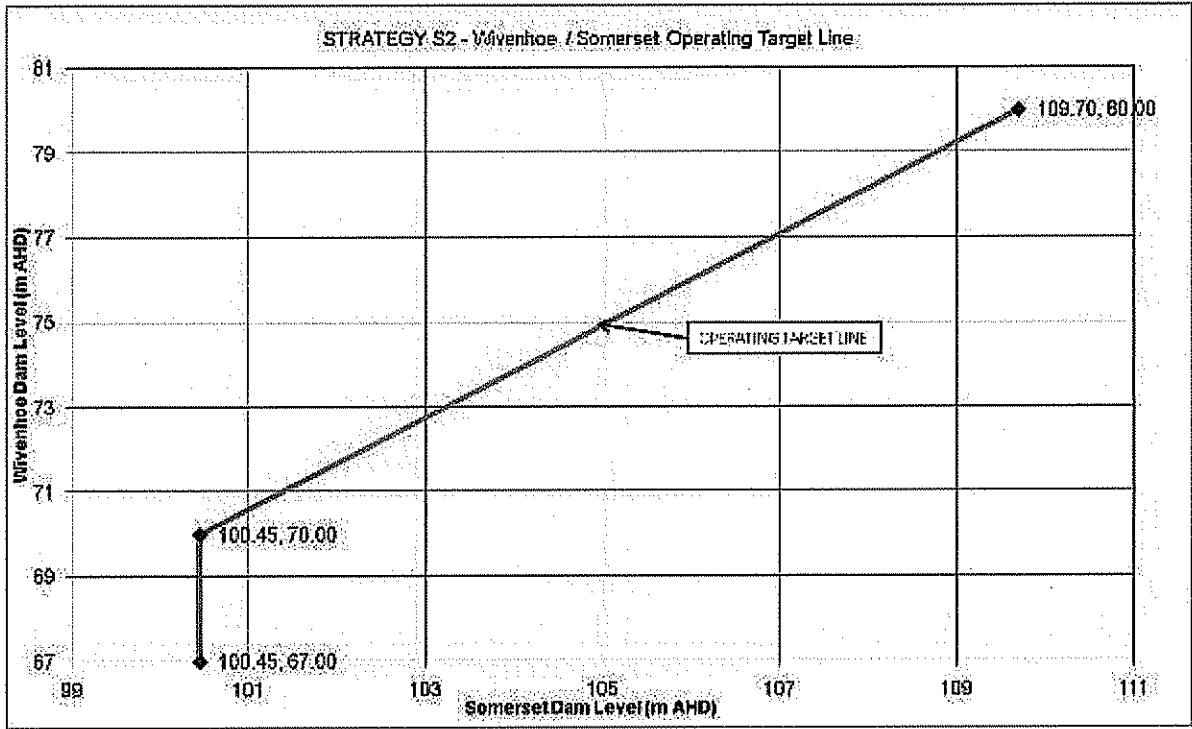


The intent of the strategies used when operating Somerset Dam during a flood event is to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams. To achieve this, a Wivenhoe/Somerset Operating Target Line is used to set a goal for balancing the use of the flood storage in each Dam.

The Wivenhoe/Somerset Operating Target Line was selected based on the following factors:

- Equal minimisation of flood level peaks in both dams in relation to their associated dam failure levels.
- Minimisation of flows in the Brisbane River downstream of Wivenhoe Dam.
- Consideration of the time needed at the onset of a Flood Event to properly assess the magnitude of the event and the likely impacts, so that the likely optimal strategy to maximise the Flood Mitigation benefits of the storages can be selected.

A diagram showing the operating target line is as follows.



## Brooke Foxover

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**From:** DutyEngineer [dutyseq [REDACTED]]  
**Sent:** Thursday, 27 January 2011 1:14 PM  
**To:** John Tibaldi  
**Subject:** Flood Event Summary - 01.doc  
**Attachments:** @

**This message has been archived. View the original item**

-----Safe Stamp-----  
Your Anti-virus Service scanned this email. It is safe from known viruses.  
For more information regarding this service, please contact your service provider.

**Attachments:**

Flood Event Summary - 01.doc

(269 KB)



## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event.

**JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A</b></p> <ul style="list-style-type: none"> <li>• No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:               <ul style="list-style-type: none"> <li>◦ Wivenhoe 28mm;</li> <li>◦ Somerset 21mm;</li> <li>◦ Lockyer 23mm;</li> <li>◦ Bremer 23mm.</li> </ul> </li> <li>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>◦ Wivenhoe 29mm;</li> <li>◦ Somerset 22mm;</li> <li>◦ Lockyer 32mm;</li> <li>◦ Bremer 32mm.</li> </ul> </li> <li>• Forecast rainfall is 25mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) ???.? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.? (excluding forecast) ???.? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.? (excluding forecast) ???.? (including forecast).</li> <li>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.</li> </ul>	<p><b>Strategy W1A</b> (Lake Level greater than 67.25, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p>Strategy W1B</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 10mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> </ul>	<p>Strategy W1B (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1C</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> </ul>	<p>Strategy W1C (Lake Level greater than 67.75, maximum release 500 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1E</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.1 (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p><b>Strategy W1E</b> (Lake Level greater than 68.25, maximum release 1900 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1E to Strategy W2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p><b>Strategy W2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ??.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #7.</b> <b>Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 69.9 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.6 (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (excluding forecast) ?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p>Transition from Strategy W2 to Strategy W3</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 71.7 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerseset 38mm;</li> <li>◦ Lockyer 15mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerseset Lake level forecast to peak at 103.0 (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguiar Highway.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.2 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p>	<p>Transition from Strategy W3 to Strategy W4 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.8 (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> </ul>
<p>Completed Tuesday 11 Jan 2011 08:00</p>	<p>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) is experienced in relatively small areas of the Wivenhoe catchment during this period. Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>			



JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4</b> <b>Wivenhoe Directive #12 to #14.</b> <b>Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues in relatively small areas of the Wivenhoe catchment during this period. (Much more words here)</li> <li>If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm.</li> </ul> </li> <li>Forecast rainfall is 100mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.0 (excluding forecast) ?? (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4</b> <b>(Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 15mm;</li> <li>◦ Wivenhoe Local 35mm;</li> <li>◦ Somerset 40mm;</li> <li>◦ Lockyer 38mm;</li> <li>◦ Bremer 40mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current.</li> <li>• Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 8mm;</li> <li>◦ Wivenhoe Local 13mm;</li> <li>◦ Somerset 19mm;</li> <li>◦ Lockyer 9mm;</li> <li>◦ Bremer 8mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4</b> <b>Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowwood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4</b> <b>(Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4</b> <b>Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somersset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somersset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somersset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somersset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4</b> <b>(Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguliar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this six day period were:                             <ul style="list-style-type: none"> <li>○ Wivenhoe 14mm;</li> <li>○ Somersset 7mm;</li> <li>○ Lockyer 7mm;</li> <li>○ Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:                             <ul style="list-style-type: none"> <li>○ Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>○ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>○ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>○ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

Brooke Foxover

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**From:** DutyEngineer [dutysec [REDACTED]]  
**Sent:** Thursday, 27 January 2011 4:24 PM  
**To:** John Tibaldi  
**Subject:** Flood Event Summary - 02.doc  
**Attachments:** @

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**Attachments:**

Flood Event Summary - 02.doc

(274 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event



**JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were: <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 29mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 32mm;</li> <li>Bremer 32mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.4 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.0 (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 380 cumecs (excluding forecast) 490 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 490 cumecs (excluding forecast) 640 cumecs (including forecast).</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.</li> </ul>	<p><b>Strategy W1A and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 10mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast).</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1C and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C due to Wivenhoe Lake Level exceeding 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast).</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> </ul>	<p>Strategy W1C and Strategy S2 (Lake Level greater than 67.75, maximum release 500 cumecs)</p> <ul style="list-style-type: none"> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1E and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by combined Lockyer Creek flows and local Brisbane River inflows downstream of Wivenhoe Dam alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.6 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.4 (excluding forecast) 100.8 (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 720 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1080 cumecs (including forecast).</li> <li>Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe Dam will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p><b>Strategy W1E and Strategy S2 (Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1E to Strategy W2; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 940 cumecs (including forecast).</li> <li>Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W2 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 69.2 (excluding forecast) 70.4 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.8 (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 940 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a very short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Sunday 09 Jan 2011 01:00  Completed Sunday 09 Jan 2011 08:00	<p>Strategy W2 Wivenhoe Directives #5 to #7.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a very short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W2</b> <b>Wivenhoe Directives #7.</b> <b>Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 69.9 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.6 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W2</b> <b>(Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Transition from Strategy W2 to Strategy W3</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 71.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 15mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.0 (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguliar Highway.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.2 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3</b> <b>Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> <b>(Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3</b></p> <ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3</b> (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p>Transition from Strategy W3 to Strategy W4 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) is experienced in relatively small areas of the Wivenhoe catchment during this period. (Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.8 (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p>Strategy W3 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>The target was to maintain a flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> <li>Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4</b> <b>Wivenhoe Directive #12 to #14.</b> <b>Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues in relatively small areas of the Wivenhoe catchment during this period. (Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 27mm;</li> <li>◦ Wivenhoe Local 85mm;</li> <li>◦ Somerset 86mm;</li> <li>◦ Lockyer 47mm;</li> <li>◦ Bremer 55mm.</li> </ul> </li> <li>• Forecast rainfall is 100mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4</b> <b>(Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p>Strategy W4 Wivenhoe Directive #12 to #14.</p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 15mm;</li> <li>◦ Wivenhoe Local 35mm;</li> <li>◦ Somerset 40mm;</li> <li>◦ Lockyer 38mm;</li> <li>◦ Bremer 40mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current.</li> <li>• Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 8mm;</li> <li>◦ Wivenhoe Local 13mm;</li> <li>◦ Somerset 19mm;</li> <li>◦ Lockyer 9mm;</li> <li>◦ Bremer 8mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4</b> <b>Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam.</li> </ul>	<p><b>Strategy W4</b> <b>(Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Wednesday 12 Jan 2011 08:00  Completed Thursday 13 Jan 2011 12:00	<p>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>• During this period, stored flood water in Somersset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somersset Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 14mm;</li> <li>◦ Somersset 7mm;</li> <li>◦ Lockyer 7mm;</li> <li>◦ Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>◦ Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>◦ Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>◦ Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>◦ Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

Brooke Foxover

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**From:** DutyEngineer [dutyse@...]  
**Sent:** Friday, 28 January 2011 8:29 AM  
**To:** John Tibaldi  
**Subject:** Flood Event Summary - 02.doc  
**Attachments:** @

**This message has been archived. View the original item**

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Your Anti-virus Service scanned this email. It is safe from known viruses.  
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**Attachments:**

Flood Event Summary - 02.doc

(316 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event.

**JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:                             <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 29mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 32mm;</li> <li>Bremer 32mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.4 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.0 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 380 cumecs (excluding forecast) 490 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 490 cumecs (excluding forecast) 640 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1A and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 10mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast).</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1C and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C due to Wivenhoe Lake Level exceeding 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast).</li> </ul>	<p>Strategy W1C and Strategy S2 (Lake Level greater than 67.75, maximum release 500 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1E and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by combined Lockyer Creek flows and local Brisbane River inflows downstream of Wivenhoe Dam alone.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.6 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.4 (excluding forecast) 100.8 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 720 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1080 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1E and Strategy S2 (Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe Dam will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Strategy is to endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1E to Strategy W2; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 940 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W2 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 850 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p>Strategy W2 and Strategy S2 Wivenhoe Directives #5 to #7.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 69.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W2 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 69.2 (excluding forecast) 70.4 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.8 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast).</li> </ul>	<p><b>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.</li> <li>Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p>Transition from Strategy W2 to Strategy W3; and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 1250 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1970 cumecs (including forecast).</li> </ul>	<p><b>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 15mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).</li> <li>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 620 cumecs (excluding forecast) 1290 cumecs (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 840 cumecs (excluding forecast) 2030 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods, at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguliar Highway.</li> <li>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.2 (excluding forecast) ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (including forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (including forecast) ?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.7 (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target maximum flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ??? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.8 (excluding forecast) ??? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??? (excluding forecast) ??? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ??? (excluding forecast) ??? (including forecast).</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> <li>Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm.</li> </ul> </li> <li>Forecast rainfall is 100mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.0 (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 15mm;</li> <li>◦ Wivenhoe Local 35mm;</li> <li>◦ Somerset 40mm;</li> <li>◦ Lockyer 38mm;</li> <li>◦ Bremer 40mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 8mm;</li> <li>◦ Wivenhoe Local 13mm;</li> <li>◦ Somerset 19mm;</li> <li>◦ Lockyer 9mm;</li> <li>◦ Bremer 8mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Tuesday 11 Jan 2011 21:00  Completed Wednesday 12 Jan 2011 08:00	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe..</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somersset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguliar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somerset 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

**Brooke Foxover**

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**From:** DutyEngineer [dutysec [REDACTED]]  
**Sent:** Friday, 28 January 2011 12:17 PM  
**To:** John Tibaldi  
**Subject:** Event Mobilisation and Staffing - 02.doc  
**Attachments:** @

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Event Mobilisation and Staffing - 02.doc

(177 KB)

## 2. EVENT MOBILISATION AND STAFFING

### 2.1 Catchment Conditions at Event Commencement

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

EVENT	EVENT START DATE	EVENT END DATE	VOLUME RELEASED (ML)
1	13/12/2010	16/12/2010	70,000
2	17/12/2010	24/12/2010	150,000
3	26/12/2010	02/01/2011	470,000

During these events, requests were received from Councils and residents either isolated or adversely impacted by bridge closures downstream of the dam to curtail releases as soon and as quickly as possible. This was a significant issue at the time due to the bridge closures that had occurred over the traditional Christmas/New Year holiday period, including the bridges closures on Christmas Day and New Year's Day.

The 2 January 2011 end date of the flood event prior to the event considered by this report (commenced on 6 January 2011), meant that any significant drain down of Wivenhoe and Somerset dams prior to the onset of this event was not possible without both major bridge inundation downstream of the dam and without exceeding minor flood levels in the lower Brisbane River. These actions could also not be justified by the Manual, particularly as Section 8.3 states the following in relation to Wivenhoe Dam:

**“ The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25.”**

Additionally, a flood event had been experienced in October 2010 that had resulted in a release of 750,000ML from Wivenhoe Dam. Accordingly drain down of the Dams below the dam full supply levels prior to the start of the first December event would also not have been possible without significant bridge inundation and without exceeding minor flood levels in the lower Brisbane River. Again, these actions could not be justified by the Manual, particularly when considering Section 8.3.

Due to the rainfall that had occurred in the dam catchments throughout December, the catchment conditions at the commencement of the event were close to saturated. The catchment was highly responsive, with Initial Losses estimated to be in the order of ??mm and continuing losses estimated to be in the order of ??mm/hour. The API at the commencement of the event was calculated at ??.

## **2.2 Event Mobilisation**

No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011, however in the 24 hours to 0800 on 6 January 2011, catchment average rainfalls totals were:

- Wivenhoe 28mm;
- Somerset 21mm;
- Lockyer 23mm;
- Bremer 23mm.

This rainfall was sufficient to trigger event mobilisation, and this occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2. Based on the rainfall occurring at that time and subsequent Model runs, the Wivenhoe Lake level was forecast to peak at EL 68.3m (excluding forecast) and EL 68.4m (including forecast); and the Somerset Lake level was forecast to peak at EL 99.7m (excluding forecast) EL 100.0m (including forecast).

Once mobilisation occurred the following actions were undertaken:

- Commencement of 24/7 staffing of the Flood Operations Centre by at least one Duty Flood Operations Engineer and at least one trained Technical Assistant (minimum two persons).
- Commencement of 24/7 staffing of the dams by at least two trained dam operators.
- The one absent Flood Operations Engineer was called back early from annual Christmas holidays to assist with the management of the event.

Staffing of both the Flood Operations Centre and the dams continued on this basis until event de-mobilisation occurred at 12:00 on Wednesday 19 January 2011. During critical periods all four Flood Operations Engineers were present in the Flood Operations Centre and actively involved in flood event decision making processes. These Engineers generally lived in the Flood Operations Centre building during the critical 96 hours of the event as did a number of the trained technical assistants.

## **2.3 Flood Centre Staffing**

Staffing of the Flood Operations Centre over the duration of the event was undertaken in accordance with the tables shown below. These tables are in accordance with the confirmed Event Roster, but do not reflect exactly the Flood Event Sign-On Sheets. This is because staff occasionally did not officially sign in and out when undertaking duties in the Centre, particularly those staff who were living in the building during the event and assisted in event management when not asleep or eating meals. Additionally, when staff entered the Centre during critical periods, the priority was with assisting in event management rather than administrative activities. However, this aspect of Flood Event administration requires some attention in future events and in future the presence of all staff in the Flood Operations Centre during an event will be accurately recorded.

SHIFT START TIME	SHIFT FINISH TIME	DUTY ENGINEER/S	NOTES
Thu 06/01/2011 07:00	Thu 06/01/2011 19:00	Terry Malone	
Thu 06/01/2011 19:00	Fri 07/01/2011 07:00	Rob Ayre	
Fri 07/01/2011 07:00	Fri 07/01/2011 19:00	Terry Malone	
Fri 07/01/2011 19:00	Sat 08/01/2011 07:00	John Ruffini	
Sat 08/01/2011 07:00	Sat 08/01/2011 19:00	Rob Ayre	
Sat 08/01/2011 19:00	Sun 09/01/2011 07:00	John Tibaldi	
Sun 09/01/2011 07:00	Sun 09/01/2011 19:00	Terry Malone	A meeting of all four Duty Engineers was held at 15:30 to discuss strategy and the developing situation.
Sun 09/01/2011 19:00	Mon 10/01/2011 07:00	John Ruffini Rob Ayre	Terry Malone assisted until 22:00 on 09/01/2011.
Mon 10/01/2011 07:00	Mon 10/01/2011 19:00	Terry Malone John Tibaldi	Duty Engineer handovers at either end of this shift were composed of discussions involving all four Duty Engineers to discuss strategy and the developing situation.
Mon 10/01/2011 19:00	Tue 11/01/2011 07:00	John Ruffini Rob Ayre	Duty Engineer handovers at either end of this shift were composed of discussions involving all four Duty Engineers to discuss strategy and the developing situation.
Tue 11/01/2011 07:00	Tue 11/01/2011 19:00	Terry Malone John Tibaldi	Rob Ayre and John Ruffini assisted from 13:00 on 11/01/2011.
Tue 11/01/2011 19:00	Wed 12/01/2011 07:00	John Ruffini Rob Ayre	John Tibaldi and Terry Malone assisted until 23:00 on 09/01/2011.
Wed 12/01/2011 07:00	Wed 12/01/2011 19:00	Terry Malone John Tibaldi	Duty Engineer handovers at either end of this shift were composed of discussions involving all four Duty Engineers to discuss strategy.
Wed 12/01/2011 19:00	Thu 13/01/2011 07:00	John Ruffini Rob Ayre	
Thu 13/01/2011 07:00	Thu 13/01/2011 19:00	Terry Malone John Tibaldi	
Thu 13/01/2011 19:00	Fri 14/01/2011 07:00	Rob Ayre	
Fri 14/01/2011 07:00	Fri 14/01/2011 19:00	Terry Malone	
Fri 14/01/2011 19:00	Sat 15/01/2011 07:00	John Tibaldi	
Sat 15/01/2011 07:00	Sat 15/01/2011 19:00	Terry Malone	
Sat 15/01/2011 19:00	Sun 16/01/2011 07:00	John Ruffini	



Sun 16/01/2011 07:00	Sun 16/01/2011 19:00	Rob Ayre	
Sun 16/01/2011 19:00	Mon 17/01/2011 07:00	John Tibaldi	
Mon 17/01/2011 07:00	Mon 17/01/2011 19:00	John Ruffini	
Mon 17/01/2011 19:00	Tue 18/01/2011 07:00	Terry Malone	
Tue 18/01/2011 07:00	Tue 18/01/2011 19:00	Rob Ayre	
Tue 18/01/2011 19:00	Wed 19/01/2011 07:00	John Tibaldi	
Wed 19/01/2011 07:00	Wed 19/01/2011 14:00	Terry Malone	

SHIFT START TIME	SHIFT FINISH TIME	TECHNICAL ASSISTANTS	NOTES
Thu 06/01/2011 07:00	Thu 06/01/2011 19:00	Mark Tan	
Thu 06/01/2011 19:00	Fri 07/01/2011 07:00	Neville Ablitt	
Fri 07/01/2011 07:00	Fri 07/01/2011 19:00	Louw Van Blerk	
Fri 07/01/2011 19:00	Sat 08/01/2011 07:00	Mark Tan	
Sat 08/01/2011 07:00	Sat 08/01/2011 19:00	Al Navruk	
Sat 08/01/2011 19:00	Sun 09/01/2011 07:00	Kim Hang	
Sun 09/01/2011 07:00	Sun 09/01/2011 19:00	Neville Ablitt	
Sun 09/01/2011 19:00	Mon 10/01/2011 07:00	Bill Stephens	
Mon 10/01/2011 07:00	Mon 10/01/2011 19:00	Louw Van Blerk	
Mon 10/01/2011 19:00	Tue 11/01/2011 07:00	John West	
Tue 11/01/2011 07:00	Tue 11/01/2011 19:00	David Pokarier Kim Hang	John West assisted as needed as he was living in the building during this period.
Tue 11/01/2011 19:00	Wed 12/01/2011 07:00	Al Navruk John West	
Wed 12/01/2011 07:00	Wed 12/01/2011 19:00	Neville Ablitt Kim Hang	John West assisted as needed as he was living in the building during this period.
Wed 12/01/2011 19:00	Thu 13/01/2011 07:00	Mark Tan	
Thu 13/01/2011 07:00	Thu 13/01/2011 19:00	John West	
Thu 13/01/2011 19:00	Fri 14/01/2011 07:00	David Pokarier	
Fri 14/01/2011 07:00	Fri 14/01/2011 19:00	Neville Ablitt	

Fri 14/01/2011 19:00	Sat 15/01/2011 07:00	Kim Hang	
Sat 15/01/2011 07:00	Sat 15/01/2011 19:00	Al Navruk	
Sat 15/01/2011 19:00	Sun 16/01/2011 07:00	David Pokarier	
Sun 16/01/2011 07:00	Sun 16/01/2011 19:00	Bill Stephens	
Sun 16/01/2011 19:00	Mon 17/01/2011 07:00	Mark Tan	
Mon 17/01/2011 07:00	Mon 17/01/2011 19:00	Louw Van Blerk	
Mon 17/01/2011 19:00	Tue 18/01/2011 07:00	John West	
Tue 18/01/2011 07:00	Tue 18/01/2011 19:00	Ken Price	
Tue 18/01/2011 19:00	Wed 19/01/2011 07:00	Neville Ablitt	
Wed 19/01/2011 07:00	Wed 19/01/2011 14:00	Kim Hang	

SHIFT START TIME	SHIFT FINISH TIME	WIVENHOE DAM OPERATORS	SOMERSET DAM OPERATORS
Thu 06/01/2011 07:00	Thu 06/01/2011 19:00	Matthew O'Reilly Darren Varley	Agg Dagan Adam Weller
Thu 06/01/2011 19:00	Fri 07/01/2011 07:00	Doug Grigg Mark Granzien	Graham Francis Col Gillam
Fri 07/01/2011 07:00	Fri 07/01/2011 19:00	Matthew O'Reilly Darren Varley	Agg Dagan Adam Weller
Fri 07/01/2011 19:00	Sat 08/01/2011 07:00	Doug Grigg Mark Granzien	Graham Francis Dave Hesse
Sat 08/01/2011 07:00	Sat 08/01/2011 19:00	Matthew O'Reilly Russell Titmarsh	Agg Dagan Brent Billington
Sat 08/01/2011 19:00	Sun 09/01/2011 07:00	Doug Grigg Graham Keegan	Graham Francis Ray Ballinger
Sun 09/01/2011 07:00	Sun 09/01/2011 19:00	Matthew O'Reilly Russell Titmarsh	Agg Dagan Adam Weller
Sun 09/01/2011 19:00	Mon 10/01/2011 07:00	Doug Grigg Graham Keegan	Graham Francis Ray Ballinger
Mon 10/01/2011 07:00	Mon 10/01/2011 19:00	Matthew O'Reilly Russell Titmarsh	Agg Dagan Adam Weller
Mon 10/01/2011 19:00	Tue 11/01/2011 07:00	Doug Grigg Graham Keegan	Graham Francis Ray Ballinger
Tue 11/01/2011 07:00	Tue 11/01/2011 19:00	Matthew O'Reilly Russell Titmarsh Doug Grigg from 14:00	Agg Dagan Adam Weller
Tue 11/01/2011 19:00	Wed 12/01/2011 07:00	Doug Grigg Mark Granzien	Graham Francis Ray Ballinger
Wed 12/01/2011 07:00	Wed 12/01/2011 19:00	Matthew O'Reilly Russell Titmarsh	Agg Dagan Adam Weller
Wed 12/01/2011 19:00	Thu 13/01/2011 07:00	Doug Grigg Mark Granzien	Graham Francis Ray Ballinger
Thu 13/01/2011 07:00	Thu 13/01/2011 19:00	Matthew O'Reilly Russell Titmarsh	Agg Dagan Adam Weller
Thu 13/01/2011 19:00	Fri 14/01/2011 07:00	Doug Grigg Mark Granzien	Graham Francis Ray Ballinger

Fri 14/01/2011 07:00	Fri 14/01/2011 19:00	Matthew O'Reilly Darren Varley	Agg Dagan Adam Weller
Fri 14/01/2011 19:00	Sat 15/01/2011 07:00	Doug Grigg Col Gillam	Graham Francis Ray Ballinger
Sat 15/01/2011 07:00	Sat 15/01/2011 19:00	Matthew O'Reilly Darren Varley	Agg Dagan Adam Weller
Sat 15/01/2011 19:00	Sun 16/01/2011 07:00	Doug Grigg Col Gillam	Graham Francis Ray Ballinger
Sun 16/01/2011 07:00	Sun 16/01/2011 19:00	Matthew O'Reilly Darren Varley	Agg Dagan Adam Weller
Sun 16/01/2011 19:00	Mon 17/01/2011 07:00	Doug Grigg Col Gillam	Graham Francis Ray Ballinger
Mon 17/01/2011 07:00	Mon 17/01/2011 19:00	Matthew O'Reilly Mark Granzien	Drain Down Complete.
Mon 17/01/2011 19:00	Tue 18/01/2011 07:00	Doug Grigg Col Gillam	Drain Down Complete.
Tue 18/01/2011 07:00	Tue 18/01/2011 19:00	Matthew O'Reilly Mark Granzien	Drain Down Complete.
Tue 18/01/2011 19:00	Wed 19/01/2011 07:00	Doug Grigg Col Gillam	Drain Down Complete.
Wed 19/01/2011 07:00	Wed 19/01/2011 14:00	Matthew O'Reilly Graham Keegan	Drain Down Complete.

## 2.4 Qualifications of Staff on Duty

### Duty Engineers

The four duty engineers approved by the Chief Executive to direct the operations of Wivenhoe and Somerset Dams during flood events are:

Robert Ayre  
Terrence Malone  
John Ruffini  
John Tibaldi

These engineers all hold a current Certificate of Registration as a Registered Professional Engineer of Queensland and hold tertiary degrees in engineering. All engineers have demonstrated to the Chief Executive that they have:

- (1) Knowledge of design principles related to the structural, geotechnical and hydraulic design of large dams, and
- (2) At least a total of five years of suitable experience and demonstrated expertise in at least two of the following areas:
  - Investigation, design or construction of major dams;
  - Operation and maintenance of major dams;
  - Hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology;
  - Applied hydrology with particular reference to flood forecasting and/or flood forecasting systems.

Robert Ayre, Terrence Malone and John Ruffini are recognised as three of the most experienced and expert engineers available in relation to their knowledge of Brisbane River Flood Hydrology. John Tibaldi is probably the most experienced engineer in Queensland in relation to knowledge of the operation and maintenance of gated dams.

#### **TECHNICAL ASSISTANTS**

The nine technical assistants that assisted in the Flood Operations Centre during the event were:

Neville Ablitt  
Kim Hang  
Al Navruk  
David Pokarier  
Ken Price  
Bill Stephens  
Mark Tan  
Louw Van Blerk  
John West

All of these assistants have been trained in Flood Operations Centre duties.

#### **DAM OPERATORS**

The thirteen dam operators that operated Wivenhoe and Somerset dams during the event were:

Ray Ballinger  
Agg Dagan  
Brent Billington  
Graham Francis  
Col Gillam  
Mark Granzien  
Doug Grigg  
Dave Hesse  
Graham Keegan  
Matthew O'Reilly  
Darren Varley  
Russell Titmarsh  
Adam Weller

All of these assistants have been trained in Flood Operations Centre duties.

**Brooke Foxover**

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**From:** DutyEngineer [dutysec [REDACTED]]  
**Sent:** Friday, 28 January 2011 3:41 PM  
**To:** John Tibaldi  
**Subject:** Flood Event Summary - 03.doc  
**Attachments:** @

**This message has been archived. View the original item**

-----Safe Stamp-----  
Your Anti-virus Service scanned this email. It is safe from known viruses.  
For more information regarding this service, please contact your service provider.

**Attachments:**

Flood Event Summary - 03.doc

(322 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event.

**JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 25mm;</li> <li>○ Somerset 21mm;</li> <li>○ Lockyer 23mm;</li> <li>○ Bremer 23mm.</li> </ul> </li> <li>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were:               <ul style="list-style-type: none"> <li>○ Wivenhoe 28mm;</li> <li>○ Somerset 23mm;</li> <li>○ Lockyer 30mm;</li> <li>○ Bremer 31mm.</li> </ul> </li> <li>• Forecast rainfall is 25mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.4 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 99.7 (excluding forecast) 99.9 (including forecast).</li> <li>• Total dam inflow volume forecast is 224,000ML (excluding forecast) 287,000ML (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 560 cumecs (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 590 cumecs (excluding forecast) 750 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1A and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.</li> <li>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011. Lake level unlikely to exceed 68.5.</li> <li>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 07:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 58mm; Somerset 54mm; Lockyer 55mm; Bremer 58mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 5mm;</li> <li>Somerset 10mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 4mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.7 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) 100.2 (including forecast).</li> <li>Total dam inflow volume forecast is 236,000ML (excluding forecast) 370,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 480 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1040 cumecs (including forecast).</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 07:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1C and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1B to W1C due to Wivenhoe Lake Level exceeding 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.</p> <p>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 6mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 2mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.7 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) 100.2 (including forecast).</li> <li>Total dam inflow volume forecast is 236,000ML (excluding forecast) 370,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 480 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1040 cumecs (including forecast).</li> </ul>	<p>Strategy W1C and Strategy S2 (Lake Level greater than 67.75, maximum release 500 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.</li> <li>Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.</li> <li>Lake level may not exceed 68.5.</li> <li>Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Transition from Strategy W1 to W2; and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1 to W2 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5.</li> <li>Additionally, based on observed stream flows it becomes clear that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by combined Lockyer Creek flows and local Brisbane River inflows downstream of Wivenhoe Dam.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.</li> <li>Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 71mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.4 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.3 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 346,000ML (excluding forecast) 484,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 710 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1060 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1E and Strategy S2 (Lake Level greater than 68.25, maximum release 1900 cumecs)</b></p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Transition from Strategy W1 to W2 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5.</li> <li>Initial consideration on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p><b>Strategy W2 and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 420,000ML (excluding forecast) 662,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 950 cumecs (including forecast).</li> </ul>	<p><b>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W2 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 457,000ML (excluding forecast) 697,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 850 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W2 and Strategy S2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 112mm; Somerset 146mm; Lockyer 76mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).</li> <li>Total dam inflow volume forecast is 569,000ML (excluding forecast) 813,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast).</li> </ul>	<p><b>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> <li>Write about sit rep at 11:00am see Terry's note based on three day outlook.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p>Strategy W2 and Strategy S2 Wivenhoe Directives #7, Somerset Directives #4 to #5.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 70.0 (excluding forecast) 7.1.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.7 (excluding forecast) 101.1 (including forecast).</li> <li>Total dam inflow volume forecast is 804,000ML (excluding forecast) 1,109,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 690 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1230 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.</li> <li>Model results showing rapid rises in water level in the Dams provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p>Transition from Strategy W2 to Strategy W3; and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 208mm; Somerset 305mm; Lockyer 116mm; Bremer 96mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).</li> <li>Total dam inflow volume forecast is 1,273,000ML (excluding forecast) 1,712,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 1250 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1970 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 232mm; Somerset 343mm; Lockyer 131mm; Bremer 102mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 14mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).</li> <li>• Total dam inflow volume forecast is 1,468,000ML (excluding forecast) 1,922,000ML (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 620 cumecs (excluding forecast) 1290 cumecs (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 840 cumecs (excluding forecast) 2030 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguiar Highway.</li> <li>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.1 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,531,000ML (excluding forecast) 2,064,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 630 cumecs (excluding forecast) 1220 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1100 cumecs (excluding forecast) 2140 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow (see spreadsheet associated with Model Run 41).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 274mm; Somerset 407mm; Lockyer 169mm; Bremer 149mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.4 (excluding forecast) 103.7 (including forecast).</li> <li>Total dam inflow volume forecast is 1,708,000ML (excluding forecast) 2,161,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1590 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 2630 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 43).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 74.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,731,000ML (excluding forecast) 1,982,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1070 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 1930 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 24).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to close to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 323mm; Somerset 437mm; Lockyer 186mm; Bremer 167mm.</p>	<ul style="list-style-type: none"> <li>Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.</li> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 28).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p>	<p>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.</li> </ul>
<p>Completed Tuesday 11 Jan 2011 08:00</p>	<ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.8 (excluding forecast) ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ?? (including forecast) ?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ?? (including forecast) ?? (including forecast).</li> </ul>	<ul style="list-style-type: none"> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> <li>Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period): Wivenhoe 382mm; Somerset 570mm; Lockyer 287mm; Bremer 237mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm.</li> </ul> </li> <li>Forecast rainfall is 100mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ???.? (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.0 (excluding forecast) ???.? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</p> <ul style="list-style-type: none"> <li>Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.</li> <li>Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 15mm;</li> <li>Wivenhoe Local 35mm;</li> <li>Somerset 40mm;</li> <li>Lockyer 38mm;</li> <li>Bremer 40mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Wivenhoe Local 13mm;</li> <li>Somerset 19mm;</li> <li>Lockyer 9mm;</li> <li>Bremer 8mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 18'000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowwood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe..</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguliar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somerset 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

Brooke Foxover

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From: DutyEngineer [dutyseq@  
Sent: Monday, 31 January 2011 4:18 PM  
To: John Tibaldi  
Subject: Event Communication - 01.doc  
Attachments: @

This message has been archived. [View the original item](#)

-----Safe Stamp-----  
Your Anti-virus Service scanned this email. It is safe from known viruses.  
For more information regarding this service, please contact your service provider.

**Attachments:**

[Event Communication - 01.doc](#)

(70 KB)

## 8. EVENT COMMUNICATION

Queensland's disaster management arrangements, based on disaster management groups at local, district and state level, ensure the collaborative and effective coordination of information for all hazards.

Existing local, district and state disaster management and hazard-specific plans outline arrangements and structures for disaster management, or the hazard, and amongst other things, identify the need for coordination of public communications.

Following the Flood Event impacting on Wivenhoe and Somerset dams that occurred in October 2010, a protocol for communication arrangements between local, state and commonwealth agencies impacted by the release of floodwater from Wivenhoe and Somerset Dams was developed. This protocol outlines the arrangements for communication between these agencies during Flood Events. The agencies are:

- Brisbane City Council.
- Ipswich City Council.
- Somerset Regional Council.
- Seqwater.
- Water Grid Manager.
- Queensland Police Service.
- Department of Community Safety.
- Department of Environment and Resource Management.
- Department of Premier and Cabinet.
- Bureau of Meteorology.

The intent of the developed protocol is to ensure that consistent, harmonised information, based on an agreed single technical report, is communicated to the public in a way that contributes to resilient communities.

There are three stages in the process of communication as described by the protocol. These stages are:

- Monitoring and Assessment
- Briefing and Activation
- Public Communications

Details of the procedures required by the protocol within each of these three stages and how these procedures were followed during the January 2011 Flood Event are contained below.

### **Monitoring and Assessment**

Communications with the public on flood information, including floodwater releases from Wivenhoe Dam, are based on a continuous process of monitoring and technical assessment. The process is dynamic and evolves according to the event, but will normally contain the following steps:

- Routine monitoring of weather events and dam levels by relevant agencies via established systems and procedures;
- The Bureau of Meteorology (BoM) are the primary agency responsible for providing weather forecasts and warnings to the public.
- Councils monitor creek levels, local runoff and flash flooding within their areas of responsibility.
- Seqwater discusses and models implications of the inflows on the necessary floodwater release from Wivenhoe Dam and/or Somerset Dam. The floodwater release strategy is a balance between releasing the water quickly enough so that the flood storage capacity is available if another major rain event occurs, versus minimising downstream flooding impacts (human safety and property damage) from the releases.
- Seqwater calculates the floodwater releases according to the Manual of Flood Mitigation and provides this information to BoM and with the Councils. BoM undertakes modelling of the Brisbane River catchment and its river systems using this information.
- BoM participates in technical discussions with Seqwater, Brisbane City Council, Ipswich City Council and Somerset Regional Council as necessary, to share modelling results. The discussions aim to establish a technical agreement on the flood situation, on which public communications should be based.
- Councils with the necessary resources and expertise undertake modelling, form predictions, identify flood inundation areas and assess impacts for their communities, and regularly share this information with all relevant parties. Councils without the necessary resources and expertise will rely on information from other agencies to complete the impact assessment for their communities.

Any of the agencies may initiate the public communications process and engage with the disaster management arrangements as appropriate. The trigger points for commencing public communication of flooding information are defined according to an agency's responsibilities. During the January 2011 Flood Event, public communications were being undertaken almost continuously by Local, State and Commonwealth Agencies once it became apparent that public impacts were likely.

Agencies also have the ability to instigate teleconferences with other agencies involving relevant technical staff during a Flood Event. These teleconferences are used to discuss, clarify and agree modelling inputs and results from a technical sense. Such conferences occurred regularly during the January 2011 Flood Event, particularly between Seqwater and BoM..

Finally, in every case of floodwater release from Wivenhoe Dam, Seqwater coordinates the completion of the Technical Situation Report - TSR and provides the Report to the Water Grid Manager (according to their Emergency Response Plan) and to relevant local government agencies. Appendix F contains the Technical situation Reports issued during this event.

## **Briefing and Activation**

If public safety is considered to be at risk, consideration is given to the activation of the disaster management arrangements, if not already activated. During the January 2011 Flood event the following actions were undertaken.

- The Brisbane City, Ipswich City and Somerset Regional Councils activated their Local Disaster Management Groups (LDMGs);
- LDMGs informed the relevant District Disaster Coordinators of the situation (DDCs);
- The Queensland Police Service (QPS) initiated disaster management actions as provided for under the Disaster Management Act 2003;
- The SEQ Water Grid Manager alerted the Director-General (DG) of the Department of Community Safety (DCS), DG Department of Environment and Resource Management (DERM), and the Brisbane City, Ipswich City and Somerset Regional Councils.
- The DG DCS informed the DG of the Department of Premier and Cabinet (DPC) - the Chair of the State Disaster Management Group (SDMG) and activated the State Disaster Coordination Centre (SDCC). DG DCS also informed the Minister for Police, Corrective Services and Emergency Services.
- The DG DERM will inform the Minister for Natural Resources, Mines and Energy.
- The DG DPC will inform the Premier.
- The Crisis Communications Network, chaired by DPC, was activated at the direction of the SDMG Chair to coordinate public messaging from BoM, Seqwater, SEQ Water Grid Manager, QPS, relevant Councils and DCS.

## **Public Communications Issues**

Each agency has its own responsibilities to issue information commensurate with their role without prior approvals. During the January 2011 Flood Event, agencies shared information with other agencies and operated in a fully consultative process to ensure consistent public information.

The BoM, Local Governments and relevant State Government agencies maintained continual discussions to ensure that conflicting information was not released to the public at any time during the event. Genuine efforts were made to ensure consistency by basing public communications on technical reports. Inter-agency consultation did not cause delays in the issuance of public warnings.

Harmonised public communications messages were released from the following agencies as described below:

- **Bureau of Meteorology** - concentrating on Flood Warnings which are widely disseminated to the BoM website, agencies and the media. BoM also participated in media (radio, television, newspaper) interviews to provide factual information regarding observed and forecast weather conditions, rainfalls and water levels;
- **Local Governments / Local Disaster Management Groups** - concentrating on the effects of weather related events and safety for their local communities and residents, and the impacts on councils' assets. Local governments had primacy of public communications within their community.
- **Water Grid Manager** – the Water Grid Manager concentrated on the communication aspects of release timings and duration of effects as the State's lead communication agency on floodwater release. Seqwater operational staff ensured that technical information was communicated to the Water Grid Manager.

These communications were augmented by:

- **Queensland Police Service** - concentrating on specific community safety messaging during operations;
- **Department of Community Safety** - concentrating on general safety matters regarding flooding;
- **Department of Premier and Cabinet (extreme events only)** - concentrating on consistent messages to media and agencies concerned.

Information was released to the public as frequently as required throughout the event. Timings of media releases were guided by the frequency of technical reports and ranged in frequency from once a day to once an hour.

The Water Grid Communications Unit centrally track all communications and ensured that they were shared. The unit liaised with the following or their representatives over public safety messages:

- BoM;
- Seqwater;
- Councils' Media Directors;
- QPS Media Director; and
- DCS Media Director.

Generally, public and agency communications through the duration of the event worked well and occurred in accordance with the protocol for communication arrangements that was developed following the October 2010 Flood Event.



**Brooke Foxover**

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**From:** DutyEngineer [dutyseq@██████████]  
**Sent:** Monday, 31 January 2011 4:21 PM  
**To:** John Tibaldi  
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## 7. FLOOD MANAGEMENT STRATEGIES AND MANUAL COMPLIANCE

### 7.1 Wivenhoe Dam Flood Mitigation Strategies

Wivenhoe Dam is capable of being operated in a number of ways to reduce flooding in the Brisbane River downstream of the dam, depending on the origin, magnitude and spatial extent of the flood. Maximum overall flood mitigation effect will be achieved by operating Wivenhoe Dam in conjunction with Somerset Dam.

There are four strategies (W1 to W4) used when operating Wivenhoe Dam during a flood event. These strategies are based on the Flood Objectives of the Manual. These objectives, listed in descending order of importance, are as follows:

- 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;
- 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.

Within any strategy, consideration is always given to these objectives in this order, when making decisions on dam releases.

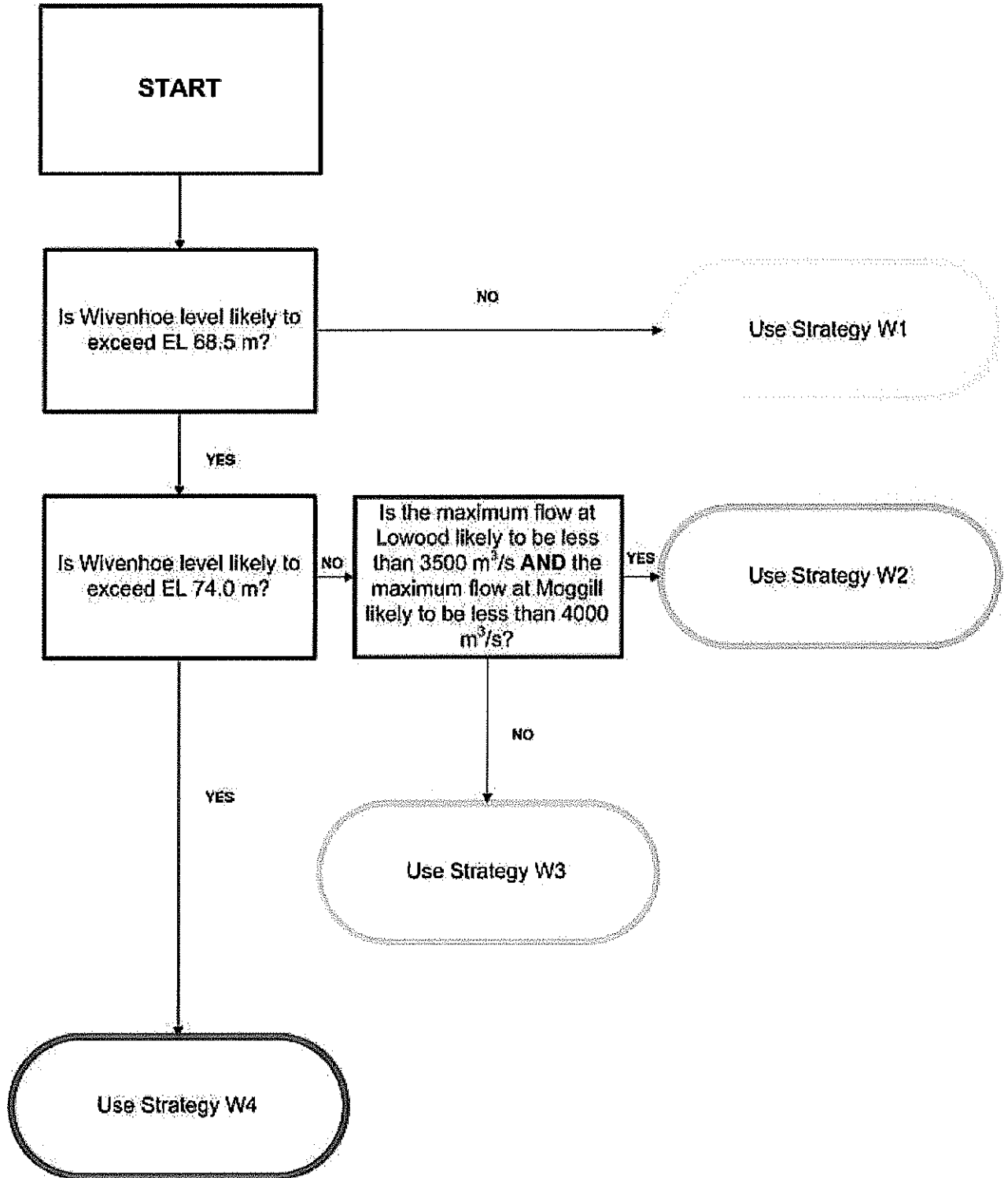
The strategy chosen at any point in time will depend on the actual levels in the dams and the following predictions, which are to be made using the best forecast rainfall and stream flow information available at the time:

- Maximum storage levels in Wivenhoe and Somerset Dams.
- Peak flow rate at the Lowood Gauge (excluding Wivenhoe Dam releases).
- Peak flow rate at the Moggill Gauge (excluding Wivenhoe Dam releases).

Strategies change during a flood event as forecasts change and rain is received in the catchments. It is not possible to predict the range of strategies that will be used during the course of a flood event at the commencement of the event. Strategies are changed in response to changing rainfall forecasts and stream flow conditions to maximise the flood mitigation benefits of the dams.

When determining dam outflows within all strategies, peak outflow should generally not exceed peak inflow. A flowchart showing how best to select the appropriate strategy to use at any point in time is shown below:

## WIVENHOE FLOOD STRATEGY FLOW CHART



Summary details of the four strategies (W1 to W4) used when operating Wivenhoe Dam during a flood event are contained below:

***Strategy W1 - The Primary Consideration is Minimising Disruption to Downstream Rural Life***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to be less than 68.50 m AHD</b></li> <li>• <b>Maximum release predicted to be less than 1,900 m<sup>3</sup>/s</b></li> <li>• <b>The primary consideration is minimising disruption to downstream rural life</b></li> </ul>
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The intent of Strategy W1 is to not to submerge the seven bridges between the dam and Moggill prematurely (see Appendix ??). The limiting condition for Strategy W1 is the submergence of Mt Crosby Weir Bridge that occurs at approximately 1,900 m<sup>3</sup>/s.

This strategy require a great deal of control over releases and knowledge of discharges from Lockyer Creek. In general, the releases from Wivenhoe Dam are controlled such that the combined flow from Lockyer Creek and Wivenhoe Dam is less than the limiting values to delay the submergence of a particular bridge.

***Strategy W2 - Strategy W2 is a Transition Strategy where the primary consideration changes from Minimising Impact to Downstream Rural Life to Protecting Urban Areas from Inundation.***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to be between 68.50 and 74.00 m AHD</b></li> <li>• <b>Maximum Release predicted to be less than 3,500 m<sup>3</sup>/s</b></li> <li>• <b>This is a transition strategy in which the primary consideration changes from minimising disruption to downstream rural life to protecting urban areas from inundation</b></li> <li>• <b>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance</b></li> </ul>
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The intent of Strategy W2 is limit the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill, while remaining within the upper limit of non-damaging floods at Lowood (3,500 m<sup>3</sup>/s).

***Strategy W3 – The primary consideration is Protecting Urban Areas from Inundation***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to be between 68.50 and 74.00 m AHD</b></li> <li>• <b>Maximum Release should not exceed 4,000 m<sup>3</sup>/s</b></li> <li>• <b>The primary consideration is protecting urban areas from inundation</b></li> <li>• <b>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance</b></li> </ul>
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The intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s, noting that 4000 m<sup>3</sup>/s at Moggill is the upper limit of non-damaging floods downstream. The combined peak river flow targets for Strategy W3 are shown in the following table. In relation to these targets, it should be noted that depending on natural flows from the Lockyer and Bremer catchments, it may not be possible to limit the flow at Moggill to below 4000 m<sup>3</sup>/s. In these instances, the flow at Moggill is to be kept as low as possible.

TIMING	TARGET MAXIMUM FLOW IN THE BRISBANE RIVER
Prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases).	The flow at Moggill is to be minimised.
After the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases).	The flow at Moggill is to be lowered to 4,000m <sup>3</sup> /s as soon as possible.

***Strategy W4 – The primary consideration is Protecting the Structural Safety of the Dam***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to exceed 74.00m AHD.</b></li> </ul>
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	<ul style="list-style-type: none"> <li>• <b>No limit on Maximum Release rate</b></li> <li>• <b>The primary consideration is protecting the structural safety of the dam</b></li> <li>• <b>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance</b></li> </ul>
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The intent of Strategy W4 is to ensure the safety of the dam while limiting downstream impacts as much as possible. This strategy normally comes into effect when the water level in Wivenhoe Dam reaches 74.0 m AHD. However the Senior Flood Operations Engineer may seek to invoke the discretionary powers of Section 2.8 if earlier commencement is able to prevent triggering of a fuse plug.

Under Strategy W4 the release rate is increased as the safety of the dam becomes the priority. Opening of the gates is to occur generally, until the storage level of Wivenhoe Dam begins to fall.

There are no restrictions on gate opening increments or gate operating frequency once the storage level exceeds 74.0 AHD, as the safety of the dam is of primary concern at these storage levels.

## 7.2 Somerset Dam Flood Mitigation Strategies

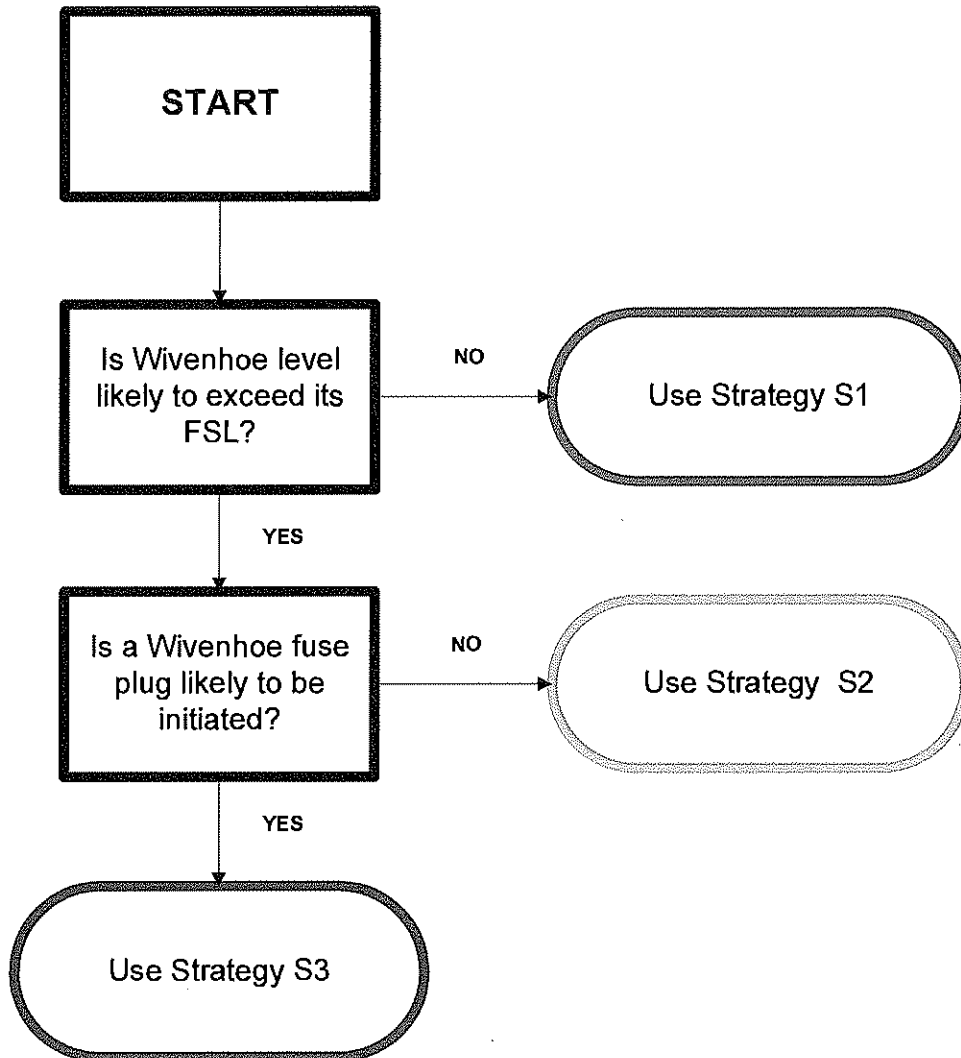
Somerset Dam is capable of being operated in a number of ways to regulate Stanley River floods. Somerset Dam and Wivenhoe Dam are to be operated in conjunction to optimise the flood mitigation benefits downstream of Wivenhoe Dam. Once a Flood Event is declared, all radial gates are to be fully opened and all sluice gates and regulator valves are to be fully closed. An assessment is to be made of the magnitude of the Flood Event, including a prediction of the maximum storage levels in Wivenhoe and Somerset Dams.

There are three strategies used when operating Somerset Dam during a flood event. These strategies are based on the objectives of the Manual. The strategy chosen at any point in time will depend on predictions of the maximum storage levels in Wivenhoe and Somerset Dams which are to be made using the best forecast rainfall and stream flow information available at the time.

Strategies are likely to change during a flood event as forecasts change and rain is received in the catchments. It is not possible to predict the range of strategies that will be used during the course of a flood event at the commencement of the event. Strategies are changed in response to changing rainfall forecasts and stream flow conditions to maximise the flood mitigation benefits of the dams.

A flowchart showing how best to select the appropriate strategy to use at any point in time is shown below:

## SOMERSET FLOOD STRATEGY FLOW CHART



Summary details of the three strategies (S1 to S3) used when operating Somerset Dam during a flood event are contained below:

### ***Strategy S1 – Minimising Impact on Rural Life Upstream***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• Somerset Dam Level expected to exceed EL 99.0 and Wivenhoe Dam not expected to reach EL 67.0 (FSL) during the course of the Flood Event</li> </ul>
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The intent of this strategy is to return the dam to full supply level while minimising the impact on rural life upstream of the dam. Consideration is also given to minimising the downstream environmental impacts from the release.

The crest gates at Somerset Dam are raised to enable uncontrolled discharge. The Regulator Valves and Sluice gates are to be used to maintain the level in Somerset dam below EL 102.0 (deck level of Mary Smokes Bridge). The release rate from Somerset dam is not to exceed the peak inflow into the dam.

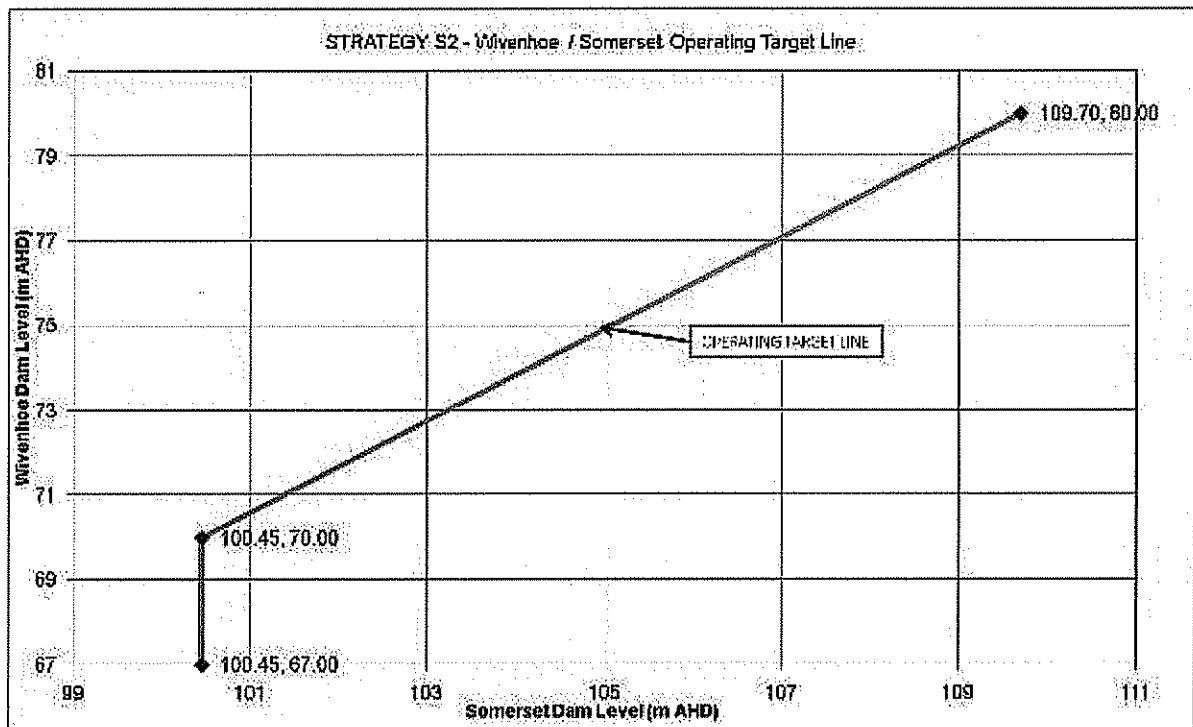
***Strategy S2 – Minimise Impacts below Wivenhoe Dam***

<b>Conditions</b>	<ul style="list-style-type: none"> <li><b>Somerset Dam Level expected to exceed EL 99.0 and Wivenhoe Dam level expected to exceed EL 67.0 (FSL) but not exceed EL 75.5 (fuse plug initiation) during the course of the Flood Event.</b></li> </ul>
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The intent of this strategy is to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams. The table below contains the operating conditions and actions for Strategy S2.

<b>CONDITION</b>	<b>ACTION</b>
Wivenhoe rising and Somerset level below EL 100.45.	The crest gates are raised to enable uncontrolled discharge. The low level regulators and sluices are generally kept closed.
Wivenhoe rising and Somerset level above EL 100.45.	The crest gates are raised to enable uncontrolled discharge. Operations are to target a correlation of water levels in Somerset Dam and Wivenhoe Dam as set out in the graph below. The operations target line shown on this graph is to generally be followed as the flood event progresses. The release rate from Somerset Dam is generally not to exceed the peak inflow into the dam.
Wivenhoe falling and Somerset level above EL 100.45.	The opening of the regulators and sluices generally should not cause Wivenhoe Dam to rise significantly. The release rate from Somerset Dam is generally not to exceed the peak inflow into the dam.
The Flood Event has emanated mainly from the Stanley River catchment without significant runoff in the Upper Brisbane River catchment	The crest gates at Somerset Dam are raised to enable uncontrolled discharge. The Regulator Valves and Sluice gates are to be used to maintain the level in Somerset dam below EL 102.0 (deck level of Mary Smokes Bridge). The release rate from Somerset Dam is generally not to exceed the peak inflow into the dam.





**Notes:**

- The Operating Target Line was selected following an optimisation study. The Target Line was selected based on the following factors:
  - Equal minimisation of flood level peaks in both dams in relation to their associated dam failure levels.
  - Minimisation of flows in the Brisbane River downstream of Wivenhoe Dam.
  - Consideration of the time needed at the onset of a Flood Event to properly assess the magnitude of the event and the likely impacts, so that the likely optimal strategy to maximise the Flood Mitigation benefits of the storages can be selected.
- The target point on the operating target line at any point in time is based on the maximum storage levels in Wivenhoe and Somerset Dams using the best forecast rainfall and stream flow information available at the time.
- Gate operations will enable the movement of the duty point towards the target line in a progressive manner. It will not necessarily be possible to adjust the duty point directly towards the target line in a single gate operation.

***Strategy S3 - Protect the Structural Safety of the Dam***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• Somerset Dam Level expected to exceed EL 99.0</li> </ul>
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**and Wivenhoe Dam level expected to exceed EL 75.5 (fuse plug initiation) during the course of the Flood Event.**

The intent of this strategy is to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams.

In addition to the operating protocols used in Strategy S2, to prevent fuse plug initiation, consideration can be given to temporary departure from the operating protocols contained in this strategy under the following conditions:

- The safety of Somerset Dam is the primary consideration and cannot be compromised.
- The peak level in Somerset dam cannot exceed EL 109.7.

### 7.3 Wivenhoe Dam – Manual Compliance

The following table summarises the Strategies that were used in the operation of Wivenhoe Dam during the January 2011 Flood Event and provides explanations of how the use of these strategies complies with the Manual.

PERIOD	STRATEGY	WIVENHOE LEVEL AND OUTFLOW CONDITIONS	MANUAL REQUIREMENTS
Commenced Thursday 06 Jan 2011 07:42	W1A	Lake Level between 67.25 m AHD and 67.50 m AHD. [Maximum Release 0 m <sup>3</sup> /s]	Lake Level between 67.25 m AHD and 67.50 m AHD. [Maximum Release 110 m <sup>3</sup> /s]
Completed Friday 07 Jan 2011 02:00		The strategy during this period was to maintain College's Crossing trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 m <sup>3</sup> /s. Because of the inflows into the Brisbane River from Lockyer Creek, no releases from the dam were made during this period.  College's Crossing remained trafficable during this period.	The Manual requirement is to endeavour to maintain College's Crossing trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 m <sup>3</sup> /s.

<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>W1B</p>	<p>Lake Level between 67.50 m AHD and 67.75 m AHD. [Maximum Release 0 m<sup>3</sup>/s]</p> <p>College's Crossing was inundated during this period.</p> <p>The strategy during this period was to maintain Burtons Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s. Because of the inflows into the Brisbane River from Lockyer Creek, no releases from the dam were made during this period.</p>	<p>Lake Level between 67.50 m AHD and 67.75 m AHD. [Maximum Release 380 m<sup>3</sup>/s]</p> <p>The Manual requirement is that once College's Crossing is closed to traffic, endeavour to maintain Burtons Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s.</p>
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p>W1C</p>	<p>Lake Level between 67.75 m AHD and 68.00 m AHD. [Maximum Release 0 m<sup>3</sup>/s]</p> <p>The strategy during this period was to maintain Burtons Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s and then once Burtons Bridge is closed to traffic, endeavour to maintain Kholo Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 m<sup>3</sup>/s.. Because of the inflows into the Brisbane River from Lockyer Creek, no releases from the dam were made during this period.</p> <p>Burtions Bridge was inundated near the end of this period.</p> <p>Kholo Bridge remained trafficable during this period.</p> <p>As well as being in accordance with the Manual, delaying the commencement of releases until 15:00 allowed bridges to be closed by the relevant authorities and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.</p>	<p>Lake Level between 67.50 m AHD and 67.75 m AHD. [Maximum Release 500 m<sup>3</sup>/s]</p> <p>The Manual requirement is to endeavour to maintain Burtons Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s.</p> <p>The Manual also requires that once Burtons Bridge is closed to traffic (occurred around 13:00 during this period) endeavour to maintain Kholo Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 m<sup>3</sup>/s.</p>

<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Friday 07 Jan 2011 22:00</p>	<p>W1D</p>	<p>Lake Level between 68.00 m AHD and 68.25 m AHD. [Maximum Release 421 m<sup>3</sup>/s]</p> <p>At the commencement of this period, it became apparent that Kholo Bridge would be inundated by natural Brisbane River flows (excluding Wivenhoe Dam releases) and this occurred at near the end of this period (middle of the night). Therefore the strategy was to close Kholo Bridge in daylight hours and then assume for the purposes of Strategy W1D that Kholo Bridge was closed to traffic.</p> <p>Accordingly, the strategy during this period was to maintain Mt Crosby Weir Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 m<sup>3</sup>/s.</p> <p>During this period, releases were increased to 421 cumecs, with radial gates opened continuously at Wivenhoe Dam during this period in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</p>	<p>Lake Level between 68.00 m AHD and 68.25 m AHD. [Maximum Release 1900 m<sup>3</sup>/s]</p> <p>The Manual requires that once Kholo Bridge is closed to traffic, endeavour to maintain Mt Crosby Weir Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 m<sup>3</sup>/s.</p>
<p>Commenced Friday 07 Jan 2011 22:00</p> <p>Completed Saturday 08 Jan 2011 08:00</p>	<p>W1E</p>	<p>Lake Level between 68.25 m AHD and 68.50 m AHD. [Maximum Release 953 m<sup>3</sup>/s]</p> <p>The strategy during this period was to maintain Mt Crosby Weir Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 m<sup>3</sup>/s.</p> <p>During this period, releases were increased to 953 cumecs, with radial gates opened continuously at Wivenhoe Dam during this period in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</p>	<p>Lake Level between 68.25 m AHD and 68.50 m AHD. [Maximum Release 1900 m<sup>3</sup>/s]</p> <p>The Manual requirement is to endeavour to maintain Mt Crosby Weir Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 m<sup>3</sup>/s.</p>

<p>Saturday 08 Jan 2011 08:00</p>	<p>W2</p>	<p>The lake level at this time was 68.52 and the release rate from the dam at this time was 940 cumecs.</p> <p>At this time it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. At this time the calculated naturally occurring peaks at Lowood and Moggill were 530 cumecs and 800 cumecs respectively, whereas the release rate from the dam at this time was 940 cumecs.</p> <p>Accordingly Strategy W3 was adopted for use at 08:00 on Saturday 8 January 2011.</p>	<p>Lake Level predicted to be between 68.50 and 74.00 m AHD [Maximum Release 3,500 m<sup>3</sup>/s]</p> <p>This is a transition strategy in which the primary consideration changes from minimising disruption to downstream rural life to protecting urban areas from inundation.</p> <p>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance.</p> <p>The intent of Strategy W2 is limit the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill, while remaining within the upper limit of non-damaging floods at Lowood (3,500 m<sup>3</sup>/s).</p>
<p>Commenced Friday 08 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p>W3</p>	<p>The lake level at the commencement of this period was 68.52 and the release rate from the dam at this time was 940 cumecs.</p> <p>The naturally occurring peak at Moggill was calculated to occur at</p>	<p>Lake Level predicted to be between 68.50 and 74.00 m AHD [Maximum Release 4,000 m<sup>3</sup>/s]</p> <p>The primary consideration is protecting urban areas from inundation.</p> <p>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance.</p>

**Brooke Foxover**

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**From:** DutyEngineer [dutysec [REDACTED]]  
**Sent:** Monday, 31 January 2011 4:22 PM  
**To:** John Tibaldi  
**Subject:** Flood Event Summary - 05.doc  
**Attachments:** @

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Flood Event Summary - 05.doc

(318 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 88% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event.

JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A and Strategy W1B; and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were: <ul style="list-style-type: none"> <li>Wivenhoe 25mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> <li>Transition from Strategy W1A to W1B once the Wivenhoe Lake Level exceeded 67.50.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 23mm;</li> <li>Lockyer 30mm;</li> <li>Bremer 31mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.4 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 99.9 (including forecast).</li> <li>Total dam inflow volume forecast is 224,000ML (excluding forecast) 287,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 560 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 590 cumecs (excluding forecast) 750 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1A and Strategy W1B; and Strategy S2</b> (Lake Level greater than 67.25, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until the morning of Friday 07 January 2011.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until Friday 7 January 2011. Lake level unlikely to exceed 68.5.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p><b>Strategy W1B and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> <li>Transition from Strategy W1B to W1C once the Wivenhoe Lake Level exceeds 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.75 over the 7 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.65 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 11mm;</li> <li>Somerset 15mm;</li> <li>Lockyer 4mm;</li> <li>Bremer 5mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.7 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.8 (excluding forecast) 100.2 (including forecast).</li> <li>Total dam inflow volume forecast is 236,000ML (excluding forecast) 370,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 480 cumecs (excluding forecast) 680 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1040 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1C and Strategy S2</b></p> <ul style="list-style-type: none"> <li>At around 9:00 it becomes apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Release commencement was delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation. The delay in releases was also in accordance with the Manual requirements of maintaining Burtons Bridge and Kholo Bridge trafficable when operating under Strategy W1C.</li> <li>Transition from Strategy W1C to Strategy W1D once the Wivenhoe Dam lake level exceeds 68.0</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 71mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.4 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.3 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 346,000ML (excluding forecast) 484,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 710 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1060 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1C</b> (Lake Level greater than 68.00, maximum release 1900 cumecs)</p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategies W1D and W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somersset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somersset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p><b>Transition from Strategy W1D to W1E to W3; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Transition from Strategy W1D to W1E once the Wivenhoe Dam level exceeds 68.25 (22:00 on 7 Jan 2011).</li> <li>Transition from Strategy W1E to W2 once it becomes apparent that the Wivenhoe Dam level exceeds 68.50 (08:00 on 8 Jan 2011). However it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. This is because the calculated naturally occurring peaks at Lowood and Moggill were 530 cumecs and 800 cumecs respectively, whereas the release rate from the dam was already 940 cumecs. Accordingly Strategy W2 was bypassed and Strategy W3 was adopted for use at 08:00 on Saturday 8 January 2011.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 420,000ML (excluding forecast) 662,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 950 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Transition from Strategy W1 to Strategy W3 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5 and Strategy W2 cannot be applied.</li> <li>Initial consideration for Strategy W3 on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable. This emphasis would be changed if further significant rainfall is experienced.</li> <li>Strategy W3 requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill. However this requirement was ignored as it would have resulted in a reduction in Wivenhoe Dam outflows.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W3 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 457,000ML (excluding forecast) 697,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 850 cumecs (including forecast).</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable. This emphasis would be changed if further significant rainfall is experienced.</li> <li>Strategy W3 requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill. However this requirement was ignored as it would have resulted in a reduction in Wivenhoe Dam outflows.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Sunday 09 Jan 2011 01:00  Completed Sunday 09 Jan 2011 08:00	<p>Strategy W2 and Strategy S2 Wivenhoe Directives #5 to #7.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 112mm; Somerset 146mm; Lockyer 76mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).</li> <li>Total dam inflow volume forecast is 569,000ML (excluding forecast) 813,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> <li>Write about sit rep at 11:00am see Terry's note based on three day outlook.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p>Strategy W2 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 70.0 (excluding forecast) 71.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.7 (excluding forecast) 101.1 (including forecast).</li> <li>Total dam inflow volume forecast is 804,000ML (excluding forecast) 1,109,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 690 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1230 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.</li> <li>Model results showing rapid rises in water level in the Dams provide justification to consider transitioning to Strategy W3 within the next 6 hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p>Transition from Strategy W2 to Strategy W3; and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 208mm; Somerset 305mm; Lockyer 116mm; Bremer 96mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).</li> <li>Total dam inflow volume forecast is 1,273,000ML (excluding forecast) 1,712,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 1250 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1970 cumecs (including forecast).</li> </ul>	<p>Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Decision is made to transition to Strategy W3 at 19:00.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 232mm; Somersets 343mm; Lockyer 131mm; Bremer 102mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>o Wivenhoe 24mm;</li> <li>o Somersets 38mm;</li> <li>o Lockyer 14mm;</li> <li>o Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).</li> <li>• Somersets Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).</li> <li>• Total dam inflow volume forecast is 1,468,000ML (excluding forecast) 1,922,000ML (including forecast).</li> <li>• Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 620 cumecs (excluding forecast) 1290 cumecs (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 840 cumecs (excluding forecast) 2030 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguilar Highway.</li> <li>• With dam levels under the Wivenhoe/Somersets Operations Target Line during this period, releases continued from Somersets Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.1 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,531,000ML (excluding forecast) 2,064,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 630 cumecs (excluding forecast) 1220 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1100 cumecs (excluding forecast) 2140 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow (see spreadsheet associated with Model Run 41).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 274mm; Somerset 407mm; Lockyer 169mm; Bremer 149mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.4 (excluding forecast) 103.7 (including forecast).</li> <li>Total dam inflow volume forecast is 1,708,000ML (excluding forecast) 2,161,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast). 1590 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 2630 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 43).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 74.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,731,000ML (excluding forecast) 1,982,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1070 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 1930 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 24).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to close to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows. Strategies would involve reducing outflows from Wivenhoe until the peak of this flash flood passed.</li> <li>During this period the plotted dam levels drifted just above the Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 323mm; Somerset 437mm; Lockyer 186mm; Bremer 167mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ???.?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 28).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely. Reference note to P Allen at 21 on 10/1.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Tuesday 11 Jan 2011 04:00	<p>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.5 (excluding forecast) 75.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.9 (excluding forecast) 104.2 (including forecast).</li> <li>Total dam inflow volume forecast is 2,210,000ML (excluding forecast) 2,246,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 1750 cumecs (excluding forecast) 2130 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 2360 cumecs (excluding forecast) 3060 cumecs (including forecast).</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> <li>Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours.</li> </ul>
Completed Tuesday 11 Jan 2011 08:00	<ul style="list-style-type: none"> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>			

**JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate greater than 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>The 10:00am situation report warns of the rapidly deteriorating situation.</li> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour. This increases the dam discharge from 2832 cumecs to 3992 cumecs. The threshold limit for urban damage has been exceeded.</li> <li>During this period sluice gate openings at Somerset Dam are closed off to limit rises in Wivenhoe in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period): Wivenhoe 382mm; Somerset 570mm; Lockyer 287mm; Bremer 237mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm.</li> </ul> </li> <li>Forecast rainfall is 100mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.0 (excluding forecast) ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe.</li> <li>Explain rain stopped, but model results a bit low.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current (issued at 17:00).</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. Significant damage to urban areas in Brisbane cannot be avoided.</li> <li>• No releases are made from Somerset Dam to limit increases in Wivenhoe Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 15mm;</li> <li>◦ Wivenhoe Local 35mm;</li> <li>◦ Somerset 40mm;</li> <li>◦ Lockyer 38mm;</li> <li>◦ Bremer 40mm.</li> </ul> </li> <li>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 8mm;</li> <li>◦ Wivenhoe Local 13mm;</li> <li>◦ Somerset 19mm;</li> <li>◦ Lockyer 9mm;</li> <li>◦ Bremer 8mm.</li> </ul> </li> <li>• Wivenhoe Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at ?? (excluding forecast) ?? (including forecast).</li> <li>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> <li>• Explain inflows low but model tweaked to match levels.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current (issued at 17:00), but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 398mm; Somerset 610mm; Lockyer 326mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 399mm; Somerset 613mm; Lockyer 328mm; Bremer 279mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 75.0 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 2,650,000ML (excluding forecast) 2,650,000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 401mm; Somerset 619mm; Lockyer 330mm; Bremer 280mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b>  <b>Wivenhoe Directives #35 to #62</b>  <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguiar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p> <p>Total rainfall since event commencement (including the current period):  Wivenhoe 415mm;  Somerset 626mm;  Lockyer 337mm;  Bremer 288mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somerset 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

**Brooke Foxover**

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**From:** DutyEngineer [dutyseq@██████████]  
**Sent:** Tuesday, 1 February 2011 4:31 PM  
**To:** John Tibaldi  
**Subject:** Flood Event Summary - 05.doc  
**Attachments:** @

**This message has been archived. View the original item**

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**Attachments:**

Flood Event Summary - 05.doc

(325 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 88% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event.

JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Thursday 06 Jan 2011 07:42	<ul style="list-style-type: none"> <li>Strategy W1A and Strategy W1B; and Strategy S2</li> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 23mm;</li> <li>Lockyer 30mm;</li> <li>Bremer 31mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.7 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.1 (including forecast).</li> <li>Total dam inflow volume forecast is 204,000ML (excluding forecast) 425,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 720 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 550 cumecs (excluding forecast) 960 cumecs (including forecast).</li> </ul>	<ul style="list-style-type: none"> <li>Strategy W1A and Strategy W1B; and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)</li> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until the morning of Friday 07 January 2011.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until Friday 7 January 2011. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>
Completed Friday 07 Jan 2011 02:00	<ul style="list-style-type: none"> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were: <ul style="list-style-type: none"> <li>Wivenhoe 25mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> <li>Transition from Strategy W1A to W1B once the Wivenhoe Lake Level exceeded 67.50.</li> </ul>			

**JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p><b>Strategy W1B and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> <li>Transition from Strategy W1B to W1C once the Wivenhoe Lake Level exceeds 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.75 over the 7 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.65 over the 7 hour period.</p> <p>Total rainfall since commencement (including the current period): Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 11mm;</li> <li>Somerset 15mm;</li> <li>Lockyer 4mm;</li> <li>Bremer 5mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.2 (including forecast).</li> <li>Total dam inflow volume forecast is 242,000ML (excluding forecast) 453,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 670 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 570 cumecs (excluding forecast) 970 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</b></p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1C and Strategy S2</b></p> <ul style="list-style-type: none"> <li>At around 9:00 it becomes apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Release commencement was delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation. The delay in releases was also in accordance with the Manual requirements of maintaining Burtons Bridge and Kholo Bridge trafficable when operating under Strategy W1C.</li> <li>Transition from Strategy W1C to Strategy W1D once the Wivenhoe Dam lake level exceeds 68.0</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 89mm; Somerset 90mm; Bremer 71mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.4 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.3 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 346,000ML (excluding forecast) 542,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 710 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 660 cumecs (excluding forecast) 1040 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1C</b> (Lake Level greater than 68.00, maximum release 1900 cumecs)</p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategies W1D and W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1D to W1E to W3; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Transition from Strategy W1D to W1E once the Wivenhoe Dam level exceeds 68.25 (22:00 on 7 Jan 2011).</li> <li>Transition from Strategy W1E to W2 once it becomes apparent that the Wivenhoe Dam level exceed 68.50 (08:00 on 8 Jan 2011). However it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. This is because the calculated naturally occurring peaks at Lowood and Moggill were 530 cumecs and 800 cumecs respectively, whereas the release rate from the dam was already 940 cumecs. Accordingly Strategy W2 was bypassed and Strategy W3 was adopted for use at 08:00 on Saturday 8 January 2011.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1239 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 420,000ML (excluding forecast) 675,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 940 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1480 cumecs (excluding forecast) 1540 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have inundated all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>The Strategy transitions from W1 to W3 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5 and Strategy W2 cannot be applied.</li> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore consideration during this period was given to minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1240 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 457,000ML (excluding forecast) 693,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 840 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1480 cumecs (excluding forecast) 1520 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1240 cumecs to 1334 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.56 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 112mm; Somerset 146mm; Lockyer 76mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).</li> <li>Total dam inflow volume forecast is 569,000ML (excluding forecast) 765,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 780 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1500 cumecs (excluding forecast) 1550 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels falling at both dams, consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1334 cumecs to 1386 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.56 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 6 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 70.0 (excluding forecast) 71.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.7 (excluding forecast) 101.1 (including forecast).</li> <li>Total dam inflow volume forecast is 804,000ML (excluding forecast) 1,035,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 690 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 1210 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1490 cumecs (excluding forecast) 1560 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration is given to transitioning the consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation.</li> <li>Model results also showing likely rises in water levels in the dams provides further justification to consider transitioning to Strategy W3 within the next 6 hours.</li> <li>Using the BOM interactive Model, a three day assessment shows the lower limit of three day forecast inflow to be similar to the October 2010 event, with the upper limit similar to the February 1999 event. Therefore, during this period consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Releases continued from both dams at a level that maintained Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1411 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> <li>Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to focus on protecting urban areas from inundation at 19:00.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 208mm; Somerset 305mm; Lockyer 116mm; Bremer 96mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).</li> <li>Total dam inflow volume forecast is 1,272,000ML (excluding forecast) 1,564,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 1940 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3300 cumecs (excluding forecast) 4400 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made at the end of this period no longer consider minimizing disruption to downstream rural life and to focus on protecting urban areas from inundation.</li> <li>Towards the end of this period, it was also starting to become apparent that Moggill was likely to experience a second naturally occurring peak on 10 January 2011 or later and that the Manual required the flow at Moggill to be minimized prior to this peak occurring. This requirement was competing with the need to protect urban areas by not allowing the Wivenhoe Dam level to reach a level that invoked Strategy W4. After considering these issues it was decided that the best course of action would be to increase releases as quickly as possible to near the limit of non-damaging flows at Moggill. However before this could occur, Councils needed to be advised, bridges needed to be closed and actions needed to be taken to prepare for rural communities for isolation and Brisbane for river flows approaching 3500 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake any necessary evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 232mm; Somerset 343mm; Lockyer 131mm; Bremer 102mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 14mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).</li> <li>• Total dam inflow volume forecast is 1,468,000ML (excluding forecast) 1,922,000ML (including forecast).</li> <li>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 620 cumecs (excluding forecast) 1290 cumecs (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 840 cumecs (excluding forecast) 2030 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation.</li> <li>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguliar Highway.</li> <li>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Monday 10 Jan 2011 01:00 Completed Monday 10 Jan 2011 09:00	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.1 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,531,000ML (excluding forecast) 2,064,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 630 cumecs (excluding forecast) 1220 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1100 cumecs (excluding forecast) 2140 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow (see spreadsheet associated with Model Run 41).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 274mm; Somerset 407mm; Lockyer 169mm; Bremer 149mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.4 (excluding forecast) 103.7 (including forecast).</li> <li>Total dam inflow volume forecast is 1,708,000ML (excluding forecast) 2,161,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1590 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 2630 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 43).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 74.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,731,000ML (excluding forecast) 1,982,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1070 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 1930 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation.</li> <li>A decision is made at 15:00 to attempt to remain within a target maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 24).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to close to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows. Strategies would involve reducing outflows from Wivenhoe until the peak of this flash flood passed.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 323mm; Somerset 437mm; Lockyer 186mm; Bremer 167mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ???.?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 28).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasingly unlikely. Reference note to P Allen at 21 on 10/1.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.5 (excluding forecast) 75.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.9 (excluding forecast) 104.2 (including forecast).</li> <li>Total dam inflow volume forecast is 2,210,000ML (excluding forecast) 2,246,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 1750 cumecs (excluding forecast) 2130 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 2360 cumecs (excluding forecast) 3060 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> <li>Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Tuesday 11 Jan 2011 08:00  Completed Tuesday 11 Jan 2011 13:00	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14, Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall (IFD curves indicate greater than 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>• The 10:00am situation report warns of the rapidly deteriorating situation.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour. This increases the dam discharge from 2832 cumecs to 3992 cumecs. The threshold limit for urban damage has been exceeded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off to limit rises in Wivenhoe in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period): Wivenhoe 382mm; Somerset 570mm; Lockyer 287mm; Bremer 237mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 27mm;</li> <li>◦ Wivenhoe Local 85mm;</li> <li>◦ Somerset 86mm;</li> <li>◦ Lockyer 47mm;</li> <li>◦ Bremer 55mm.</li> </ul> </li> <li>• Forecast rainfall is 100mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ???.?? (including forecast).</li> <li>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowwood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe.</li> <li>• Explain rain stopped, but model results a bit low.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current (issued at 17:00).</li> <li>Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. Significant damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam to limit increases in Wivenhoe Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 15mm;</li> <li>Wivenhoe Local 35mm;</li> <li>Somerset 40mm;</li> <li>Lockyer 38mm;</li> <li>Bremer 40mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Wivenhoe Local 13mm;</li> <li>Somerset 19mm;</li> <li>Lockyer 9mm;</li> <li>Bremer 8mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowwood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> <li>Explain inflows low but model tweaked to match levels.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current (issued at 17:00), but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 398mm; Somerset 610mm; Lockyer 326mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 399mm; Somerset 613mm; Lockyer 328mm; Bremer 279mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 75.0 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 2,650,000ML (excluding forecast) 2,650,000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 401mm; Somerset 619mm; Lockyer 330mm; Bremer 280mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguiar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 415mm; Somerset 626mm; Lockyer 337mm; Bremer 288mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somerset 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

Brooke Foxover

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From: DutyEngineer [dutyse [REDACTED]]  
Sent: Wednesday, 2 February 2011 12:47 PM  
To: John Tibaldi  
Subject: Flood Event Summary - 06.doc  
Attachments: @

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[Flood Event Summary - 06.doc](#)

(332 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 88% more than the comparable volume of inflow calculated from the January 1974 event.
- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more than the comparable peak inflow calculated from the January 1974 event.

JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Thursday 06 Jan 2011 07:42 Completed Friday 07 Jan 2011 02:00	<p>Strategy W1A and Strategy W1B; and Strategy S2</p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were: <ul style="list-style-type: none"> <li>Wivenhoe 25mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> <li>Transition from Strategy W1A to W1B once the Wivenhoe Lake Level exceeded 67.50.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p> <p>Total rainfall since event commencement (including the current period): Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 23mm;</li> <li>Lockyer 30mm;</li> <li>Bremer 31mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.7 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.1 (including forecast).</li> <li>Total dam inflow volume forecast is 204,000ML (excluding forecast) 425,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 720 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 550 cumecs (excluding forecast) 960 cumecs (including forecast).</li> </ul>	<p>Strategy W1A and Strategy W1B; and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until the morning of Friday 07 January 2011.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until Friday 7 January 2011. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> <li>Transition from Strategy W1B to W1C once the Wivenhoe Lake Level exceeds 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.75 over the 7 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.65 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 11mm;</li> <li>Somerset 15mm;</li> <li>Lockyer 4mm;</li> <li>Bremer 5mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.2 (including forecast).</li> <li>Total dam inflow volume forecast is 242,000ML (excluding forecast) 453,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 670 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 570 cumecs (excluding forecast) 970 cumecs (including forecast).</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1C and Strategy S2</b></p> <ul style="list-style-type: none"> <li>At around 9:00 it becomes apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Release commencement was delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation. The delay in releases was also in accordance with the Manual requirements of maintaining Burtons Bridge and Kholo Bridge trafficable when operating under Strategy W1C.</li> <li>Transition from Strategy W1C to Strategy W1D once the Wivenhoe Dam lake level exceeds 68.0</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 71mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.4 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.3 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 346,000ML (excluding forecast) 542,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 710 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 660 cumecs (excluding forecast) 1040 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1C</b> (Lake Level greater than 68.00, maximum release 1900 cumecs)</p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategies W1D and W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1D to W1E to W3; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Transition from Strategy W1D to W1E once the Wivenhoe Dam level exceeds 68.25 (22:00 on 7 Jan 2011).</li> <li>Transition from Strategy W1E to W2 once it becomes apparent that the Wivenhoe Dam level exceeds 68.50 (08:00 on 8 Jan 2011). However it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. This is because the calculated naturally occurring peaks at Lowood and Moggill were 530 cumecs and 800 cumecs respectively, whereas the release rate from the dam was already 940 cumecs. Accordingly Strategy W2 was bypassed and Strategy W3 was adopted for use at 08:00 on Saturday 8 January 2011.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1239 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 420,000ML (excluding forecast) 675,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 940 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1480 cumecs (excluding forecast) 1540 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have inundated all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>The Strategy transitions from W1 to W3 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5 and Strategy W2 cannot be applied.</li> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore consideration during this period was given to minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1240 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 457,000ML (excluding forecast) 693,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggjill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 840 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1480 cumecs (excluding forecast) 1520 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggjill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggjill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period.</li> </ul>



**JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1240 cumecs to 1334 cumecs.</li> <li>No change to Somersset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.56 over the 7 hour period.</p> <p>Somersset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 112mm; Somersset 146mm; Lockyer 76mm; Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somersset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.3 (including forecast).</li> <li>Somersset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).</li> <li>Total dam inflow volume forecast is 569,000ML (excluding forecast) 765,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 780 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1500 cumecs (excluding forecast) 1550 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels falling at both dams, consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somersset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somersset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somersset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somersset Dam catchment during this period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1334 cumecs to 1386 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.56 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall is 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 70.0 (excluding forecast) 71.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.7 (excluding forecast) 101.1 (including forecast).</li> <li>Total dam inflow volume forecast is 804,000ML (excluding forecast) 1,035,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 690 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 1210 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1490 cumecs (excluding forecast) 1560 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration is given to transitioning the consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation.</li> <li>Model results also showing likely rises in water levels in the dams provides further justification to consider transitioning to Strategy W3 within the next 6 hours.</li> <li>Using the BOM interactive Model, a three day assessment shows the lower limit of three day forecast inflow to be similar to the October 2010 event, with the upper limit similar to the February 1999 event. Therefore, during this period consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>During this period releases continued from both dams at a level that maintained Mt Crosby Weir Bridge and Fernvale Bridge trafficable. Gate settings were unchanged and the Wivenhoe discharge was 1411 cumecs.</li> <li>Due to rainfall on the ground and the modeled rapid lake level rises, a decision is made to transition to focus on protecting urban areas from inundation at 19:00.</li> <li>Councils and the Seqwater CEO were notified of the decision soon after 19:00. The ramifications of the decision were that the new estimated peak flow at Moggill of 3300 cumecs would impact properties and commence to cause damage in the urban areas of Brisbane. Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 cumecs, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>A decision is also made at 19:00, that because of the serious nature of the event, the Flood Operations Centre will be staffed with at least two Duty Engineers at all times until at least the peak of the event has occurred.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 208mm; Somerset 305mm; Lockyer 116mm; Bremer 96mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).</li> <li>Total dam inflow volume forecast is 1,272,000ML (excluding forecast) 1,564,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 1940 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3300 cumecs (excluding forecast) 4400 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made at the end of this period no longer consider minimizing disruption to downstream rural life and to focus on protecting urban areas from inundation.</li> <li>Towards the end of this period, it was also starting to become apparent that Moggill was likely to experience a second naturally occurring peak on 10 January 2011 or later and that the Manual required the flow at Moggill to be minimized prior to this peak occurring. This requirement was competing with the need to protect urban areas by not allowing the Wivenhoe Dam level to reach a level that invoked Strategy W4. After considering these issues it was decided that the best course of action would be to increase releases as quickly as possible to the limit of non-damaging flows at Moggill. However before this could occur, Councils needed to be advised, bridges needed to be closed and actions needed to be taken to prepare for rural communities for isolation and Brisbane for river flows approaching 3500 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm. The likely peak flow at Moggill of over 3000 cumecs was communicated to the Brisbane City Council and the Seqwater CEO.</li> <li>• Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 cumecs, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required time to prepare for the isolation of rural communities, the onset of urban damage in Brisbane and to undertake any necessary evacuations. Wivenhoe discharge is 1473 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.54 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 232mm; Somerset 343mm; Lockyer 131mm; Bremer 102mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 14mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).</li> <li>• Total dam inflow volume forecast is 1,468,000ML (excluding forecast) 1,731,000ML (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 820 cumecs (excluding forecast) 2000 cumecs (including forecast). This peak was calculated to occur at 16:00 on 10 January 2011.</li> <li>• Peak flow at Moggill (including Wivenhoe releases) estimated at 3240 cumecs (excluding forecast) 4480 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration was on protecting urban areas from inundation. However before releases are increased to and above the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• The Manual requires the flow at Moggill to be minimized prior to its naturally occurring peak and this requirement was balanced against the need to protect urban areas by releasing water from the dams in an attempt to keep the Wivenhoe Dam lake level below a level that will invoke Strategy W4. However the onset of increased releases did roughly coincide with the calculated naturally occurring peak at Moggill (based on a 16 hour travel time between the dam and Moggill).</li> <li>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>• Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 1473 cumecs to 2015 cumecs. All rural bridges below the dam are flooded.</li> <li>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following discussions with the Brisbane City Council that advised a flow of 3500 cumecs at Moggill will fully submerge 322 properties and impact on 7000 properties.</li> <li>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.54 to 103.08 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>o Wivenhoe 12mm;</li> <li>o Somerset 30mm;</li> <li>o Lockyer 12mm;</li> <li>o Bremer 18mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.5 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 103.1 (excluding forecast) 103.5 (including forecast).</li> <li>• Total dam inflow volume forecast is 1,531,000ML (excluding forecast) 1,768,000ML (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1090 cumecs (excluding forecast) 2090 cumecs (including forecast). This peak was calculated to occur at 16:00 on 10 January 2011.</li> <li>• Peak flow at Moggill (including Wivenhoe releases) estimated at 3420 cumecs (excluding forecast) 4680 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration on protecting urban areas from inundation and minimizing urban damage.</li> <li>• Due to advice received from the Brisbane City Council that a flow of 3500 cumecs at Moggill will fully submerge 322 properties and impact on 7000 properties, an attempt is made to remain within this flow</li> <li>• The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach was adopted. Advice received during the event from the Brisbane City Council that the upper limit of non-damaging floods was below the 4000 cumecs stated in the manual was noted and taken into account in the decision making processes.</li> <li>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2087 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and minimize urban damage.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.54 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 274mm; Somerset 407mm; Lockyer 169mm; Bremer 149mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.4 (excluding forecast) 103.7 (including forecast).</li> <li>Total dam inflow volume forecast is 1,708,000ML (excluding forecast) 1,959,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1500 cumecs (excluding forecast) 2570 cumecs (including forecast). This peak was calculated to occur at 20:00 on 10 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3910 cumecs (excluding forecast) 5180 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of around 4000 cumecs at Moggill.</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach continues to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>A target of 4000 cumecs at Moggill was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and minimize urban damage.</li> <li>Wivenhoe discharge is increased from 2087 cumecs to 2695 cumecs.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 74.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,731,000ML (excluding forecast) 1,734,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1500 cumecs (excluding forecast) 1840 cumecs (including forecast). This peak was calculated to occur at 20:00 on 10 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3980 cumecs (excluding forecast) 4470 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage.</li> <li>The target maximum flow at Moggill is now 4000 cumecs. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach continues to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>The reduced QPF provides justification to retain the target of 4000 cumecs at Moggill, with the Wivenhoe peak of 74.3 (including forecast) indicating that it may be possible to keep urban damage within tolerable limits. A discussion is held with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period without invoking Strategy W4 if the safety of the dam can be guaranteed and urban damage reduced. The Regulator agreed with this approach.</li> <li>The strategy continues to be not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.</li> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to close to 4000 cumecs.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows. Strategies would involve reducing outflows from Wivenhoe until the peak of this flash flood passed.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 323mm; Somerset 437mm; Lockyer 186mm; Bremer 167mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ???.?? (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) ???.?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at ???.?? (excluding forecast) ???.?? (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 28).</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely. Reference note to P Allen at 21 on 10/1.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm.</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.5 (excluding forecast) 75.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.9 (excluding forecast) 104.2 (including forecast).</li> <li>Total dam inflow volume forecast is 2,210,000ML (excluding forecast) 2,246,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 1750 cumecs (excluding forecast) 2130 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 2360 cumecs (excluding forecast) 3060 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.</li> <li>This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.</li> <li>Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.</li> <li>Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall (IFD curves indicate greater than 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.</li> <li>• Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.</li> <li>• The 10:00am situation report warns of the rapidly deteriorating situation.</li> <li>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour. This increases the dam discharge from 2832 cumecs to 3992 cumecs. The threshold limit for urban damage has been exceeded.</li> <li>• During this period sluice gate openings at Somerset Dam are closed off to limit rises in Wivenhoe in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period): Wivenhoe 382mm; Somerset 570mm; Lockyer 287mm; Bremer 237mm.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 27mm;</li> <li>◦ Wivenhoe Local 85mm;</li> <li>◦ Somerset 86mm;</li> <li>◦ Lockyer 47mm;</li> <li>◦ Bremer 55mm.</li> </ul> </li> <li>• Forecast rainfall is 100mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ???.?? (including forecast).</li> <li>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ???.?? (including forecast).</li> <li>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>• Once Strategy W4 is activated, the peak flows at Lowwood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>• The target was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe.</li> <li>• Explain rain stopped, but model results a bit low.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</b></p> <ul style="list-style-type: none"> <li>Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current (issued at 17:00).</li> <li>Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. Significant damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam to limit increases in Wivenhoe Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 15mm;</li> <li>Wivenhoe Local 35mm;</li> <li>Somerset 40mm;</li> <li>Lockyer 38mm;</li> <li>Bremer 40mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Wivenhoe Local 13mm;</li> <li>Somerset 19mm;</li> <li>Lockyer 9mm;</li> <li>Bremer 8mm.</li> </ul> </li> <li>Wivenhoe Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Somerset Lake level forecast to peak at ?? ?? (excluding forecast) ?? ?? (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> <li>Explain inflows low but model tweaked to match levels.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current (issued at 17:00), but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.</p> <p>Total rainfall since event commencement (including the current period): Wivenhoe 398mm; Somerset 610mm; Lockyer 326mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 399mm; Somerset 613mm; Lockyer 328mm; Bremer 279mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 75.0 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 2,650,000ML (excluding forecast) 2,650,000ML (including forecast).</li> <li>Once Strategy W4 is activated, the peak flows at Lowwood and Moggill are no longer relevant to flood release considerations.</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Wednesday 12 Jan 2011 08:00  Completed Thursday 13 Jan 2011 12:00	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 401 mm; Somerset 619 mm; Lockyer 330 mm; Bremer 280 mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 10mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b>  <b>Wivenhoe Directives #35 to #62</b>  <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 415mm;  Somerset 626mm;  Lockyer 337mm;  Bremer 288mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somerset 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank stumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

Brooke Foxover

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From: DutyEngineer [dutyseq [REDACTED]]  
Sent: Wednesday, 2 February 2011 4:05 PM  
To: John Tibaldi  
Subject: Flood Event Summary - 07.doc  
Attachments: @

**This message has been archived. View the original item.**

-----Safe Stamp-----  
Your Anti-virus Service scanned this email. It is safe from known viruses.  
For more information regarding this service, please contact your service provider.

**Attachments:**

Flood Event Summary - 07.doc

(339 KB)



## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following summary must be read in conjunction with the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam. The summary contains a series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period.
- Relevant background information from the period leading up to and during the period.
- Changes in dam conditions during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was large to rare, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual recurrence interval of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been estimated to have an annual recurrence interval of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is estimated to have occurred in order to reproduce the rapid storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 88% more than the comparable volume of inflow calculated from the January 1974 event.
- The inflow into Wivenhoe Dam experienced during this event is represented by a dual peaked hydrograph with the two peaks separated by 30 hours and both peaks estimated

to be in the order of 50% greater than the comparable peak inflow calculated from the January 1974 event.

Full details of the modeling results that are shown in the tables are contained in Appendix A. Other decision support tools that were used in conjunction with the modeling results included:

- The 24 hour Quantitative Precipitation Forecasts (QPF) for the dam catchments provided by BoM.
- The BoM weather radar available through the BoM website.
- BoM SILO Meteograms Forecast Rainfall.
- BoM Interactive Weather and Wave Forecast Rainfall Maps.
- BoM Water and the Land Forecast Rainfall.

Of these tools the QPF is considered the primary forecast tool as it is provided by BoM to give specific forecast information in relation to the dam catchment areas.

DRAFT - TIMES & NUMBERS ARE NOT VERIFIED

JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A and Strategy W1B; and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were: <ul style="list-style-type: none"> <li>Wivenhoe 25mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> <li>Transition from Strategy W1A to W1B once the Wivenhoe Lake Level exceeded 67.50.</li> </ul>	<p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 23mm;</li> <li>Lockyer 30mm;</li> <li>Bremer 34mm.</li> </ul> </li> <li>Forecast rainfall is 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.7 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.1 (including forecast).</li> <li>Total dam inflow volume forecast is 204,000ML (excluding forecast) 343,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 720 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 550 cumecs (excluding forecast) 960 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1A and Strategy W1B; and Strategy S2</b> (Lake Level greater than 67.25, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing until the morning of Friday 07 January 2011.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until Friday 7 January 2011. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> <li>Transition from Strategy W1B to W1C once the Wivenhoe Lake Level exceeds 67.75.</li> </ul>	<p>Wivenhoe Dam level rises from 67.52 to 67.75 over the 7 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.65 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 64mm, Somerset 60mm, Lockyer 57mm, Bremer 60mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 11mm,</li> <li>Somerset 15mm,</li> <li>Lockyer 4mm,</li> <li>Bremer 5mm.</li> </ul> </li> <li>Forecast rainfalls 25mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.2 (including forecast).</li> <li>Total dam inflow volume forecast is 242,000ML (excluding forecast) 380,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 670 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 570 cumecs (excluding forecast) 970 cumecs (including forecast).</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1C and Strategy S2</b></p> <ul style="list-style-type: none"> <li>At around 9:00 it becomes apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Release commencement was delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation. The delay in releases was also in accordance with the Manual requirements of maintaining Burton's Bridge and Kholo Bridge trafficable when operating under Strategy W1C.</li> <li>Transition from Strategy W1C to Strategy W1D once the Wivenhoe Dam lake level exceeds 68.0</li> </ul>	<p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 74mm;</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfalls in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.4 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.3 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 346,000ML (excluding forecast) 483,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 710 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 660 cumecs (excluding forecast) 1040 cumecs (including forecast).</li> </ul>	<p><b>Strategy W1C</b> (Lake level greater than 68.00, maximum release 1900 cumecs)</p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategies W1D and W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1D to W1E to W3; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Transition from Strategy W1D to W1E once the Wivenhoe Dam level exceeds 68.25 (22:00 on 7 Jan 2011).</li> <li>Transition from Strategy W1E to W2 once it becomes apparent that the Wivenhoe Dam level exceeds 68.50 (08:00 on 8 Jan 2011). However it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. This is because the calculated naturally occurring peaks at Lowood and Moggill were 530 cumecs and 800 cumecs respectively, whereas the release rate from the dam was already 940 cumecs. Accordingly Strategy W2 was bypassed and Strategy W3 was adopted for use at 08:00 on Saturday 8 January 2011.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1239 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm;</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 420,000ML (excluding forecast) 662,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 940 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1480 cumecs (excluding forecast) 1540 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have inundated all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>The Strategy transitions from W1 to W3 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5 and Strategy W2 cannot be applied.</li> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore consideration during this period was given to minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W3 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1240 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 160mm, Somerset 111mm, Lockyer 75mm, Bremer 75mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm;</li> </ul> </li> <li>Forecast rainfalls 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 68.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).</li> <li>Total dam inflow volume forecast is 457,000ML (excluding forecast) 697,000ML (including forecast).</li> <li>Peak flow at Lowwood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 840 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1480 cumecs (excluding forecast) 1520 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p>Strategy W3 and Strategy S2 Wivenhoe Directives #5 to #7.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1240 cumecs to 1334 cumecs.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level falls from 68.63 to 68.56 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 112mm Somerset 146mm, Lockyer 76mm, Bremer 76mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 56mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall is 40mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).</li> <li>Total dam inflow volume forecast is 569,000ML (excluding forecast) 814,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (including forecast) 530 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 780 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1500 cumecs (excluding forecast) 1550 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 cumecs as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels falling at both dams, consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p>Strategy W3 and Strategy S2 Wivenhoe Directives #7, Somerset Directives #4 to #5.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1334 cumecs to 1386 cumecs.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises very slightly from 68.56 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 146mm, Somerset 199mm, Lockyer 94mm, Bremer 90mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfalls 50mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 70.0 (excluding forecast) 71.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 100.7 (excluding forecast) 101.1 (including forecast).</li> <li>Total dam inflow volume forecast is 804,000ML (excluding forecast) 1,108,000ML (including forecast).</li> <li>Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 690 cumecs (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 1210 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Predicted peak Wivenhoe Dam outflow was 1490 cumecs (excluding forecast) 1560 cumecs (including forecast). This is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration is given to transitioning the consideration to minimizing disruption to downstream rural life to protecting urban areas from inundation.</li> <li>Model results also showing likely rises in water levels in the dams provides further justification to consider transitioning to Strategy W3 within the next 6 hours.</li> <li>Using the BOM interactive Model, a three day assessment shows the lower limit of three day forecast inflow to be similar to the October 2010 event, with the upper limit similar to the February 1999 event. Therefore, during this period consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p>Strategy W3 and Strategy S2</p> <ul style="list-style-type: none"> <li>During this period releases continued from both dams at a level that maintained Mt Crosby Weir Bridge and Fernvale Bridge trafficable. Gate settings were unchanged and the Wivenhoe discharge was 1411 cumecs.</li> <li>Due to rainfall on the ground and the modeled rapid lake level rises, a decision is made to transition to focus on protecting urban areas from inundation at 19:00.</li> <li>Councils and the Seqwater CEO were notified of the decision soon after 19:00. The ramifications of the decision were that the new estimated peak flow at Moggill of 3300 cumecs would impact properties and commence to cause damage in the urban areas of Brisbane. Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 cumecs, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>A decision is also made at 19:00, that because of the serious nature of the event, the Flood Operations Centre will be staffed with at least two Duty Engineers at all times until at least the peak of the event has occurred.</li> </ul>	<p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 208mm Somerset 305mm Lockyer 116mm Bremer 96mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).</li> <li>Total dam inflow volume forecast is 1,272,000ML (excluding forecast) 1,712,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 770 cumecs (excluding forecast) 1940 cumecs (including forecast). This peak was calculated to already have occurred at 05:00 on 8 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3300 cumecs (excluding forecast) 4400 cumecs (including forecast).</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made at the end of this period no longer consider minimizing disruption to downstream rural life and to focus on protecting urban areas from inundation.</li> <li>Towards the end of this period, it was also starting to become apparent that Moggill was likely to experience a second naturally occurring peak on 10 January 2011 or later and that the Manual required the flow at Moggill to be minimized prior to this peak occurring. This requirement was competing with the need to protect urban areas by not allowing the Wivenhoe Dam level to reach a level that invoked Strategy W4. After considering these issues it was decided that the best course of action would be to increase releases as quickly as possible to the limit of non-damaging flows at Moggill. However before this could occur, Councils needed to be advised, bridges needed to be closed and actions needed to be taken to prepare for rural communities for isolation and Brisbane for river flows approaching 3500 cumecs.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somersset Dam.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm. The likely peak flow at Moggill of over 3000 cumecs was communicated to the Brisbane City Council and the Seqwater CEO.</li> <li>• Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 cumecs, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required time to prepare for the isolation of rural communities, the onset of urban damage in Brisbane and to undertake any necessary evacuations. Wivenhoe discharge is 1473 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.54 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 232mm Somerset 343mm Lockyer 131mm Bremer 102mm</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 14mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall is 65mm in the next 24 hours.</li> <li>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).</li> <li>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).</li> <li>• Total dam inflow volume forecast is 1,468,000ML (excluding forecast) 1,922,000ML (including forecast).</li> <li>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 820 cumecs (excluding forecast) 2000 cumecs (including forecast). This peak was calculated to occur at 16:00 on 10 January 2011.</li> <li>• Peak flow at Moggill (including Wivenhoe releases) estimated at 3240 cumecs (excluding forecast) 4480 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>• Consideration was on protecting urban areas from inundation. However before releases are increased to and above the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• The Manual requires the flow at Moggill to be minimized prior to its naturally occurring peak and this requirement was balanced against the need to protect urban areas by releasing water from the dams in an attempt to keep the Wivenhoe Dam lake level below a level that will invoke Strategy W4. However the onset of increased releases did roughly coincide with the calculated naturally occurring peak at Moggill (based on a 16 hour travel time between the dam and Moggill).</li> <li>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1473 cumecs to 2015 cumecs. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following discussions with the Brisbane City Council that advised a flow of 3500 cumecs at Moggill will fully submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.54 to 103.08 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 244mm Somerset 373mm, Lockyer 143mm, Bremer 120mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall is 65mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.5 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.1 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,531,000ML (excluding forecast) 1,985,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1090 cumecs (excluding forecast) 2090 cumecs (including forecast). This peak was calculated to occur at 16:00 on 10 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3420 cumecs (excluding forecast) 4680 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage.</li> <li>Due to advice received from the Brisbane City Council that a flow of 3500 cumecs at Moggill will fully submerge 322 properties and impact on 7000 properties, an attempt is made to remain within this flow</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach was adopted. Advice received during the event from the Brisbane City Council that the upper limit of non-damaging floods was below the 4000 cumecs stated in the manual was noted and taken into account in the decision making processes.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2087 cumecs. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and minimize urban damage.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 71.56 to 72.54 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 274mm Somerset 407mm Lockyer 169mm Bremer 149mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours.</li> <li>Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.4 (excluding forecast) 103.7 (including forecast).</li> <li>Total dam inflow volume forecast is 1,708,000ML (excluding forecast) 2,162,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1500 cumecs (excluding forecast) 2570 cumecs (including forecast). This peak was calculated to occur at 20:00 on 10 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3910 cumecs (excluding forecast) 5180 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage.</li> <li>A decision is made at 15:00 to attempt to remain within a target flow of around 4000 cumecs at Moggill.</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach continues to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
Commenced Monday 10 Jan 2011 15:00	<p>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> </ul>	<p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage.</li> </ul>
Completed Monday 10 Jan 2011 20:00	<ul style="list-style-type: none"> <li>A target of 4000 cumecs at Moggill was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and minimize urban damage.</li> <li>Wivenhoe discharge is increased from 2087 cumecs to 2695 cumecs.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 279mm Somerset 416mm Lockyer 174mm Bremer 153mm</p>	<ul style="list-style-type: none"> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) 74.3 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.5 (including forecast).</li> <li>Total dam inflow volume forecast is 1,731,000ML (excluding forecast) 1,982,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1500 cumecs (including forecast) 1840 cumecs (including forecast). This peak was calculated to occur at 20:00 on 10 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 3980 cumecs (excluding forecast) 4470 cumecs (including forecast).</li> </ul>	<ul style="list-style-type: none"> <li>The target maximum flow at Moggill is now 4000 cumecs. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach continues to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.</li> <li>The reduced QPF provides justification to retain the target of 4000 cumecs at Moggill, with the Wivenhoe peak of 74.3 (including forecast) indicating that it may be possible to keep urban damage within tolerable limits. A discussion is held with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period without invoking Strategy W4 if the safety of the dam can be guaranteed and urban damage reduced. The Regulator agreed with this approach.</li> <li>The strategy continues to be not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt restrict Brisbane River flows at Moggill to close to 4000 cumecs. No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2726 cumecs.</li> <li>A target of 4000 cumecs is set at Moggill in accordance with the Manual. According to the Manual, the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs. However BCC damage tables indicated this would still impact 5325 properties and cause damage in excess of \$47M.</li> <li>Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows. Strategies would involve reducing outflows from Wivenhoe until the peak of this flash flood passed and these strategies were not adopted.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> </ul>	<p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 323mm Somerset 437mm Lockyer 186mm Bremer 167mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfalls 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.1 (excluding forecast) 74.9 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.7 (including forecast).</li> <li>Total dam inflow volume forecast is 2,016,000ML (excluding forecast) 2,267,000ML (including forecast).</li> <li>Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1500 cumecs (excluding forecast) 1810 cumecs (including forecast). This peak was calculated to occur at 20:00 on 10 January 2011.</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 4040 cumecs (excluding forecast) 4540 cumecs (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage. The target maximum flow at Moggill remains at 4000 cumecs. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 cumecs and this approach continues to be followed.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible, although with continued rainfall, the strategy is now being reviewed on an hour by hour basis. The discussion at 21:00 with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period without invoking Strategy W4 (provided the safety of the dam can be guaranteed) is also being considered carefully in view of the continued rainfall.</li> </ul>

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JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 20				
DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p><b>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate that this rainfall exceeded 1 in 500 year intensities) is experienced on lake area during this period. If the centroid of this rainfall was located east or south, it may have been possible to avoid transition to Strategy W4.</li> <li>Because this extreme intense rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam. Accordingly at 08:00 a decision is made to transition to Strategy W4. Significant urban damage can now not be avoided. The Dam Safety Regulator, Seqwater CEO and the Councils are advised of this development.</li> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 356mm Somerset 483mm Lockyer 240mm Bremer 183mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 78mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 16mm</li> </ul> </li> <li>Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.</li> <li>Wivenhoe Lake level forecast to peak at 74.5 (excluding forecast) 75.1 (including forecast).</li> <li>Somerset Lake level forecast to peak at 103.9 (excluding forecast) 104.2 (including forecast).</li> <li>Total dam inflow volume forecast is 2,210,000ML (excluding forecast) 2,460,000ML (including forecast).</li> <li>Peak flow at Moggill (including Wivenhoe releases) estimated at 5870 cumecs (excluding forecast).</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>At 08:00, model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator, Seqwater CEO and the Councils are advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided due to the extreme intense rainfall (IFD curves indicate that this rainfall exceeded 1 in 500 year intensities) that is experienced on and close to the Wivenhoe Dam lake area during this period</li> <li>With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> </ul>

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JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</b></p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (IFD curves indicate <b>greater than 1 in 500 year intensities</b>) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located east or south, it may have been possible to avoid transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam. Once Strategy W4 is invoked, the Manual requires the opening of gates in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall. Accordingly gates are opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour. This increases the dam discharge from 2753 cumecs to 4250 cumecs. The threshold limit for urban damage has been exceeded and the lake level continues to rise.</li> <li>During this period sluice gate openings at Somerset Dam are closed off to limit rises in Wivenhoe in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.83 over the 5 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 382mm Somerset 570mm Lockyer 287mm Bremer 287mm</p>	<p>Catchment average rainfalls over this period were:</p> <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm.</li> </ul> <p>Forecast rainfall is 100mm in the next 24 hours.</p> <p>A portion of the extreme intense rainfall in the dam catchment was falling outside of rain gauges (e.g. on the dam lake area) and this resulted in difficulties in the model being able to accurately predict lake level rises. Accordingly gauge board readings were obtained every 30 minutes during this period.</p> <p>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 76.2 (including forecast).</p> <p>Somerset Lake level forecast to peak at 104.8 (excluding forecast) 105.7 (including forecast).</p> <p>Total dam inflow volume forecast is 2,506,000ML (excluding forecast) 3,123,000ML (including forecast).</p> <p>Peak flow at Moggill (including Wivenhoe releases) estimated at 9180 cumecs (excluding forecast).</p>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The strategy was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 13:00. During this period, a Dam Operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</p> <ul style="list-style-type: none"> <li>Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current (issued at 17:00). The QPF issued at 16:00 is for a catchment average rainfall of 75mm over the next 24 hours.</li> <li>Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with Strategy W4 and the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 4250 cumecs to 7464 cumecs. Significant damage to urban areas in Brisbane cannot be avoided.</li> <li>No releases are made from Somerset Dam to limit increases in Wivenhoe Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.83 to 104.60 over the 6 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 15mm;</li> <li>Wivenhoe Local 35mm;</li> <li>Somerset 40mm;</li> <li>Lockyer 38mm;</li> <li>Bremer 40mm.</li> </ul> </li> <li>Forecast rainfalls 75mm in the next 24 hours (issued at 16:00) and a severe weather warning for potential intense rainfall in the dam catchments remains current. However, catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Wivenhoe Local 13mm;</li> <li>Somerset 19mm;</li> <li>Lockyer 9mm;</li> <li>Bremer 8mm.</li> </ul> </li> <li>A portion of the extreme intense rainfall in the dam catchment has fallen outside of rain gauges (e.g. on the dam lake area) and this resulted in difficulties in the model being able to accurately predict lake level rises.</li> <li>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.2 (excluding forecast) 105.9 (including forecast).</li> <li>Total dam inflow volume forecast is 2,659,000ML (excluding forecast) 3,289,000ML (including forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The strategy was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The lake level in both dams continued to rise during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 19:00 on 11 January 2011.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7458 cumecs.</li> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current (issued at 17:00), but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention of the minimum gate opening settings required under Strategy W4, however it is made in an attempt to minimize urban damage in Brisbane which is an objective that must be considered under Strategy S4.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.60 to 104.78 over the 2 hour period.</p> <p>Total rainfall since commencement (including the current period):</p> <p>Wivenhoe 398mm; Somerset 610mm; Lockyer 326mm; Bremer 278mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.</li> <li>Apparition of the extreme intense rainfall in the dam catchment has fallen outside of rain gauges (e.g. on the dam lake area) and this continued to result in difficulties in the model being able to accurately predict lake level behaviour.</li> <li>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 75.2 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.2 (excluding forecast) 105.9 (including forecast).</li> <li>Total dam inflow volume forecast is 2,659,000ML (excluding forecast) 3,282,000ML (including forecast).</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at around 20:00 on 11 January 2011.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention of the minimum gate opening settings required under Strategy W4, however it is made in an attempt to minimize urban damage in Brisbane which is an objective that must be considered under this Strategy.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 746 cumecs to 2547 cumecs. All rural bridges below the dam remain flooded and significant damage to urban areas in Brisbane has not been avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 399mm Somerset 613mm Lockyer 328mm Bremer 279mm</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfalls 10mm in the next 24 hours (issued Wednesday morning).</li> <li>Wivenhoe Lake level forecast to peak at 75.0 (excluding forecast) 75.0 (including forecast).</li> <li>Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).</li> <li>Total dam inflow volume forecast is 2,650,000ML (excluding forecast) 2,650,000ML (including forecast).</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall. Because the lake level was falling slightly, a decision was made to reduce releases from Wivenhoe Dam as quickly and to as low a level as possible, to minimize urban damage in Brisbane.</li> <li>It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam would: <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 20**

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p><b>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2534 cumecs. All rural bridges below the dam remain flooded.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 401mm; Somerset 619mm; Lockyer 380mm; Bremer 280mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfalls 40mm in the next 24 hours.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:                             <ul style="list-style-type: none"> <li>Causing no increases in river levels below the dam (except where they were unavoidable due to tidal influences.</li> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 20

DATE/TIME	BACKGROUND	DAM LEVELS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled to ensure that at no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somersets Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguiar Highway as soon as possible.</li> </ul>	<p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somersets Dam level falls from 103.96 to 99.00 over the 6 day period.</p> <p>Total rainfall since event commencement (including the current period):</p> <p>Wivenhoe 415mm; Somersets 626mm; Lockyer 337mm; Bremer 288mm.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somersets 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm;</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <p>During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:</p> <ul style="list-style-type: none"> <li>Causing no increases in river levels below the dam (except where they were unavoidable due to tidal influences).</li> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul>

Brooke Foxover

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From: DutyEngineer [dutysec [REDACTED]]  
Sent: Thursday, 3 February 2011 10:12 AM  
To: John Tibaldi  
Subject: Flood Event Summary - 07.doc  
Attachments: @

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Your Anti-virus Service scanned this email. It is safe from known viruses.  
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**Attachments:**

Flood Event Summary - 07.doc

(354 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following summary must be read in conjunction with the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam. The summary contains a series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period.
- Relevant background information from the period leading up to and during the period.
- Changes in dam conditions during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extremely large and rare, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual recurrence interval of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been estimated to have an annual recurrence interval of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is estimated to have occurred in order to reproduce the rapid storage level rises experienced at Wivenhoe Dam during this period.
- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 88% more than the comparable volume of inflow calculated from the January 1974 event.
- The inflow into Wivenhoe Dam experienced during this event is represented by a dual peaked hydrograph with the two peaks separated by 30 hours and both peaks estimated



to be in the order of 50% greater than the comparable peak inflow calculated from the January 1974 event.

Full details of the modeling results that are shown in the tables are contained in Appendix A. Other decision support tools that were used in conjunction with the modeling results included:

- The 24 hour Quantitative Precipitation Forecasts (QPF) for the dam catchments provided by BoM.
- The BoM weather radar available through the BoM website.
- BoM SILO Meteograms Forecast Rainfall.
- BoM Interactive Weather and Wave Forecast Rainfall Maps.
- BoM Water and the Land Forecast Rainfall.

Of these tools the QPF is considered the primary forecast tool as it is provided by BoM to give specific forecast information in relation to the dam catchment areas.

DRAFT - TIMES & NUMBERS ARE NOT VERIFIED

JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p>Strategy W1A and Strategy W1B; and Strategy S2</p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:                             <ul style="list-style-type: none"> <li>Wivenhoe 25mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> <li>Transition from Strategy W1A to W1B once the Wivenhoe Lake Level exceeded 67.50.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p> <p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 23mm;</li> <li>Lockyer 30mm;</li> <li>Bremer 31mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 25mm.</li> <li>Estimated peak Wivenhoe level is: 68.2 (excluding forecast); 68.7 (including forecast).</li> <li>Estimated peak Somerset level is: 99.7 (excluding forecast); 100.1 (including forecast).</li> <li>Estimated total dam inflow is: 204,000ML (excluding forecast); 343,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 470 m<sup>3</sup>/s (excluding forecast); 720 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 550 m<sup>3</sup>/s (excluding forecast); 960 m<sup>3</sup>/s (including forecast).</li> </ul>	<p>Strategy W1A and Strategy W1B; and Strategy S2 (Lake Level greater than 67.25, maximum release 110 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 m<sup>3</sup>/s, but these flows will not inundate Colleges Crossing until the morning of Friday 07 January 2011.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until Friday 7 January 2011. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 m<sup>3</sup>/s.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A. Low level releases continued from the Mini-Hydro at this time and at various stages during the event. However these releases (in the order of 13 m<sup>3</sup>/s) have low relative significance and are not referred to specifically in the remainder of this summary document.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level sluices were kept closed. Some regulator releases continued from December as part of previous event drain down, (in the order of 30 m<sup>3</sup>/s) but these were shut down at 18:00.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> <li>Transition from Strategy W1B to W1C once the Wivenhoe Lake Level exceeds 67.75.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm.</p> <p>Wivenhoe Dam level rises from 67.52 to 67.75 over the 7 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.65 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 11mm;</li> <li>Somerset 15mm;</li> <li>Lockyer 4mm;</li> <li>Bremer 5mm;</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 25mm.</li> <li>Estimated peak Wivenhoe level is: 68.2 (excluding forecast); 68.5 (including forecast).</li> <li>Estimated peak Somerset level is: 99.7 (excluding forecast); 100.2 (including forecast).</li> <li>Estimated total dam inflow is: 242,000ML (excluding forecast); 380,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 470 m<sup>3</sup>/s (excluding forecast); 670 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 570 m<sup>3</sup>/s (excluding forecast); 970 m<sup>3</sup>/s (including forecast).</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 m<sup>3</sup>/s, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1C and Strategy S2</b></p> <ul style="list-style-type: none"> <li>At around 9:00 it becomes apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Release commencement was delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation. The delay in releases was also in accordance with the Manual requirements of maintaining Burton's Bridge and Kholo Bridge trafficable when operating under Strategy W1C.</li> <li>Transition from Strategy W1C to Strategy W1D once the Wivenhoe Dam lake level exceeds 68.0</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 71mm.</p> <p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 25mm.</li> <li>Estimated peak Wivenhoe level is: 68.4 (excluding forecast); 68.9 (including forecast).</li> <li>Estimated peak Somerset level is: 100.3 (excluding forecast); 100.6 (including forecast).</li> <li>Estimated total dam inflow is: 346,000ML (excluding forecast); 483,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 710 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 660 m<sup>3</sup>/s (excluding forecast); 1040 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W1C</b> (Lake Level greater than 68.00, maximum release 1900 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategies W1D and W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1D to W1E to W3; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Transition from Strategy W1D to W1E once the Wivenhoe Dam level exceeds 68.25 (22:00 on 7 Jan 2011).</li> <li>Transition from Strategy W1E to W2 once it becomes apparent that the Wivenhoe Dam level will exceed 68.50 (08:00 on 8 Jan 2011). However it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. This is because the calculated naturally occurring peaks at Lowood and Moggill were 530 m<sup>3</sup>/s and 800 m<sup>3</sup>/s respectively, whereas the release rate from the dam was already 940 m<sup>3</sup>/s. Accordingly Strategy W2 was bypassed and Strategy W3 was adopted for use at 08:00 on Saturday 8 January 2011.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1239 m<sup>3</sup>/s. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm.</p> <p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 40mm.</li> <li>Estimated peak Wivenhoe level is: 68.7 (excluding forecast); 69.4 (including forecast).</li> <li>Estimated peak Somerset level is: 100.5 (excluding forecast); 100.6 (including forecast).</li> <li>Estimated total dam inflow is: 420,000ML (excluding forecast); 662,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 530 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 550 m<sup>3</sup>/s (excluding forecast); 960 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1480 m<sup>3</sup>/s (excluding forecast); 1540 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have inundated all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>The Strategy transitions from W1 to W3 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5 and Strategy W2 cannot be applied.</li> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 m<sup>3</sup>/s as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore consideration during this period was given to minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operating Target Line in accordance with Strategy S2.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W3 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to ensure Mt Crosby Weir Bridge and Fernvale Bridge remain trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1240 m<sup>3</sup>/s. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm.</p> <p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 40mm.</li> <li>Estimated peak Wivenhoe level is: 68.7 (excluding forecast); 69.9 (including forecast).</li> <li>Estimated peak Somerset level is: 100.5 (excluding forecast); 100.6 (including forecast).</li> <li>Estimated total dam inflow is: 457,000ML (excluding forecast); 697,000ML (including forecast).</li> <li>Estimated peak flow at Lowwood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 530 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 840 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1480 m<sup>3</sup>/s (excluding forecast); 1520 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 m<sup>3</sup>/s as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operating Target Line requiring sluice re-opening within a short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p>Strategy W3 and Strategy S2 Wivenhoe Directives #5 to #7.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1240 m<sup>3</sup>/s to 1334 m<sup>3</sup>/s.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 112mm; Somerset 146mm; Lockyer 76mm; Bremer 75mm.</p> <p>Wivenhoe Dam level falls from 68.63 to 68.56 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 40mm.</li> <li>Estimated peak Wivenhoe level is: 68.7 (excluding forecast); 69.3 (including forecast).</li> <li>Estimated peak Somerset level is: 100.5 (excluding forecast); 101.0 (including forecast).</li> <li>Estimated total dam inflow is: 569,000ML (excluding forecast); 814,000ML (including forecast).</li> <li>Estimated peak flow at Lowwood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 530 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 780 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1500 m<sup>3</sup>/s (excluding forecast); 1550 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 m<sup>3</sup>/s as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels falling at both dams, consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operating Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> </ul>

**JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 20**

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1334 m<sup>3</sup>/s to 1386 m<sup>3</sup>/s.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operating Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm.</p> <p>Wivenhoe Dam level rises very slightly from 68.56 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 50mm.</li> <li>Estimated peak Wivenhoe level is: 70.0 (excluding forecast); 74.3 (including forecast).</li> <li>Estimated peak Somerset level is: 109.7 (excluding forecast); 101.1 (including forecast).</li> <li>Estimated total dam inflow is: 804,000ML (excluding forecast); 1,108,000ML (including forecast).</li> <li>Estimated peak flow at Lowwood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 690 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 1210 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1490 m<sup>3</sup>/s (excluding forecast); 1560 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration is given to transitioning the consideration to minimizing disruption to downstream rural life to protecting urban areas from inundation.</li> <li>Model results also showing likely rises in water levels in the dams provides further justification to consider transitioning to Strategy W3 within the next 6 hours.</li> <li>Using the BOM rainfall forecasts, a three day assessment showed the lower limit of three day forecast inflow to be similar to the October 2010 event, with the upper limit similar to the February 1999 event. Therefore, during this period consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line at the end of this period, releases continued from Somerset Dam.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>During this period releases continued from both dams at a level that maintained Mt Crosby Weir Bridge and Fernvale Bridge trafficable. Gate settings were unchanged and the Wivenhoe discharge was 1411 m<sup>3</sup>/s.</li> <li>Due to rainfall on the ground and the modeled rapid lake level rises, a decision is made to transition to focus on protecting urban areas from inundation at 19:00.</li> <li>Councils and the Seqwater CEO were notified of the decision soon after 19:00. The ramifications of the decision were that the new estimated peak flow at Moggill of 3300 m<sup>3</sup>/s would impact properties and commence to cause damage to urban areas below Moggill. Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 m<sup>3</sup>/s, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>A decision is also made at 19:00, that because of the serious nature of the event, the Flood Operations Centre will be staffed with at least two Duty Engineers at all times until at least the peak of the event has occurred.</li> </ul>	<p>Total rainfall since commencement:                      Wivenhoe 208mm;                      Somerset 305mm;                      Lockyer 116mm;                      Bremer 96mm.</p> <p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 65mm.</li> <li>Estimated peak Wivenhoe level is: 72.1 (excluding forecast); 73.9 (including forecast).</li> <li>Estimated peak Somerset level is: 102.3 (excluding forecast); 103.0 (including forecast).</li> <li>Estimated total dam inflow is: 1,272,000ML (excluding forecast); 1,712,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 1940 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3300 m<sup>3</sup>/s (excluding forecast); 4400 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made at the end of this period no longer consider minimizing disruption to downstream rural life and to focus on protecting urban areas from inundation.</li> <li>Towards the end of this period, it was becoming apparent that Moggill was likely to experience a second naturally occurring peak on 10 January 2011 or later and that the Manual required the flow at Moggill to be minimized prior to this peak occurring. This requirement was competing with the need to protect urban areas by not allowing the Wivenhoe Dam level to reach a level that invoked Strategy W4. After considering these issues it was decided that the best course of action would be to increase releases as quickly as possible to the limit of non-damaging flows at Moggill. However before this could occur, Councils needed to be advised, bridges needed to be closed and actions needed to be taken to prepare for rural communities for isolation and urban areas below Moggill for river flows approaching 3500 m<sup>3</sup>/s.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Council and Agency notifications commenced at 7:00pm. The likely peak flow at Moggill of over 3000 m<sup>3</sup>/s was communicated to the Brisbane City Council and the Seqwater CEO.</li> <li>Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 m<sup>3</sup>/s, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required time to prepare for the isolation of rural communities, the onset of urban damage below Moggill and to undertake any necessary evacuations. Wivenhoe discharge is 1473 m<sup>3</sup>/s. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement:</p> <ul style="list-style-type: none"> <li>Wivenhoe 232mm;</li> <li>Somerset 343mm;</li> <li>Lockyer 131mm;</li> <li>Bremer 102mm.</li> </ul> <p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.54 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 38mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 65mm.</li> <li>Estimated peak Wivenhoe level is: 72.9 (excluding forecast); 74.7 (including forecast).</li> <li>Estimated peak Somerset level is: 102.9 (excluding forecast); 103.4 (including forecast).</li> <li>Estimated total dam inflow is: 1,468,000ML (excluding forecast); 1,922,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 8240 m<sup>3</sup>/s (excluding forecast); 2000 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 16:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3240 m<sup>3</sup>/s (excluding forecast); 4480 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation. However before releases are increased to and above the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>The Manual requires the flow at Moggill to be minimized prior to its naturally occurring peak and this requirement was balanced against the need to protect urban areas by releasing water from the dams in an attempt to keep the Wivenhoe Dam lake level below a level that will invoke Strategy W4. However the onset of increased releases did roughly coincide with the calculated naturally occurring peak at Moggill (based on a 16 hour travel time between the dam and Moggill).</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1473 m<sup>3</sup>/s to 2015 m<sup>3</sup>/s. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Moggill and to restrict Brisbane River flows at Moggill to 3500 m<sup>3</sup>/s. This was done following discussions with the Brisbane City Council that advised a flow of 3500 m<sup>3</sup>/s at Moggill will fully submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotted under the Wivenhoe/Somerset Operating Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm.</p> <p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.54 to 103.08 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 65mm.</li> <li>Estimated peak Wivenhoe level is: 72.9 (excluding forecast); 74.5 (including forecast).</li> <li>Estimated peak Somerset level is: 103.1 (excluding forecast); 103.5 (including forecast).</li> <li>Estimated total dam inflow is: 1,531,000ML (excluding forecast); 1,985,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1090 m<sup>3</sup>/s (excluding forecast); 2090 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 16:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3420 m<sup>3</sup>/s (excluding forecast); 4680 m<sup>3</sup>/s (including forecast).</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation and minimizing urban damage.</li> <li>Due to advice received from the Brisbane City Council that a flow of 3500 m<sup>3</sup>/s at Moggill will fully submerge 322 properties and impact on 7000 properties, an attempt was made to remain below this flow</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach was adopted. Advice received during the event from the Brisbane City Council that the upper limit of non-damaging floods was below the 4000 m<sup>3</sup>/s stated in the manual was noted and taken into account in the decision making processes.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2087 m<sup>3</sup>/s. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 m<sup>3</sup>/s was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 m<sup>3</sup>/s was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and minimize urban damage.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operating Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 274mm; Somerset 407mm; Lockyer 169mm; Bremer 149mm.</p> <p>Wivenhoe Dam level rises from 71.56 to 72.54 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 75mm.</li> <li>Estimated peak Wivenhoe level is: 73.6 (excluding forecast); 75.2 (including forecast).</li> <li>Estimated peak Somerset level is: 103.4 (excluding forecast); 103.7 (including forecast).</li> <li>Estimated total dam inflow is: 1,708,000ML (excluding forecast); 2,162,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1500 m<sup>3</sup>/s (excluding forecast); 2570 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 20:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3910 m<sup>3</sup>/s (excluding forecast); 5180 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation and minimizing urban damage.</li> <li>A decision was made at 15:00 to attempt to remain below a target flow of around 4000 m<sup>3</sup>/s at Moggill.</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach continued to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>A target of 4000 m<sup>3</sup>/s at Moggill was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and minimize urban damage.</li> <li>Wivenhoe discharge is increased from 2087 m<sup>3</sup>/s to 2695 m<sup>3</sup>/s.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Moggill and to restrict Brisbane River flows at Moggill to 4000 m<sup>3</sup>/s.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotted under the Wivenhoe/Somerset Operating Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm.</p> <p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 38mm, with isolated falls to 100mm.</li> <li>Estimated peak Wivenhoe level is: 73.6 (excluding forecast); 74.3 (including forecast).</li> <li>Estimated peak Somerset level is: 103.5 (excluding forecast); 103.5 (including forecast).</li> <li>Estimated total dam inflow is: 1,731,000ML (excluding forecast); 1,982,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1500 m<sup>3</sup>/s (excluding forecast); 1840 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 20:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3980 m<sup>3</sup>/s (excluding forecast); 4470 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation and minimizing urban damage.</li> <li>The target maximum flow at Moggill was now 4000 m<sup>3</sup>/s. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach continued to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>The reduced rainfall forecast provides justification to retain the target of 4000 m<sup>3</sup>/s at Moggill, with the Wivenhoe peak of 74.3 (including forecast) indicating that it may be possible to keep urban damage within tolerable limits. A discussion is held with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period (maximum 12 hours) without invoking Strategy W4 if the safety of the dam can be guaranteed and urban damage reduced. The Regulator agreed with this approach.</li> <li>The strategy continues to be not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to restrict flows at Moggill to close to 4000 m<sup>3</sup>/s. No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2726 m<sup>3</sup>/s.</li> <li>A target flow of 4000 m<sup>3</sup>/s is set at Moggill in accordance with the Manual (the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s). However BCC damage tables indicate this would still impact 5325 properties and cause damage in excess of \$47M.</li> <li>Initial advice on a significant flash flood originating in Lockyer headwaters received at 17:32, with details received at 20:00. Considerations were undertaken during this period to develop strategies to manage these potential flows, but because any strategy would involve significantly reducing outflows from Wivenhoe, the strategies were not adopted.</li> <li>During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operating Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement:                      Wivenhoe 323mm;                      Somerset 437mm;                      Lockyer 186mm;                      Bremer 167mm.</p> <p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 38mm, with isolated falls to 100mm.</li> <li>Estimated peak Wivenhoe level is: 74.1 (excluding forecast); 74.9 (including forecast).</li> <li>Estimated peak Somerset level is: 103.5 (excluding forecast); 103.7 (including forecast).</li> <li>Estimated total dam inflow is: 2,016,000ML (excluding forecast); 2,267,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1500 m<sup>3</sup>/s (excluding forecast); 1810 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 20:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 4040 m<sup>3</sup>/s (excluding forecast); 4540 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>Consideration on protecting urban areas from inundation and minimizing urban damage. The target maximum flow at Moggill remains at 4000 m<sup>3</sup>/s. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach continues to be followed.</li> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operating Target Line during this period, a decision is made to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible, although with continued rainfall, the strategy is now being reviewed on an hour by hour basis. The discussion at 21:00 with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period without invoking Strategy W4 (provided the safety of the dam can be guaranteed) is also being considered carefully in view of the continued rainfall.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>• Extreme intense rainfall (estimated to exceed <b>1 in 500 year intensities</b>) commenced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located east or south, it may have been possible to avoid transition to Strategy W4.</li> <li>• Because the extreme intense rainfall was occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to prevent a situation arising during which the safety of the dam is put at risk. Accordingly at 08:00 a decision is made to transition to Strategy W4. Significant urban damage can now not be avoided. The Dam Safety Regulator, Seqwater CEO and the Councils are advised of this development.</li> <li>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 m<sup>3</sup>/s.</li> <li>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operating Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm.</p> <p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 33mm;</li> <li>◦ Wivenhoe Local 78mm;</li> <li>◦ Somerset 46mm;</li> <li>◦ Lockyer 54mm;</li> <li>◦ Bremer 46mm</li> </ul> </li> <li>• Forecast rainfall in the next 24 hours is 38mm, with isolated falls to 100mm.</li> <li>• Estimated peak Wivenhoe level is: 74.5 (excluding forecast); 75.1 (including forecast).</li> <li>• Estimated peak Somerset level is: 103.9 (excluding forecast); 104.2 (including forecast).</li> <li>• Estimated total dam inflow is: 2,210,000ML (excluding forecast); 2,460,000ML (including forecast).</li> <li>• Estimated peak flow at Moggill including Wivenhoe releases is: 5870 m<sup>3</sup>/s (excluding forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>• At 08:00, model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator, Seqwater CEO and the Councils are advised of this decision. It was now apparent that significant urban damage resulting from releases from Wivenhoe Dam could not be avoided due to the extreme intense rainfall (estimated to exceed <b>1 in 500 year intensities</b>) that commenced on and close to the Wivenhoe Dam lake area during this period</li> <li>• With dam levels moving above the Wivenhoe/Somerset Operating Target Line during this period releases from Somerset Dam were progressively closed down to limit further rises in Wivenhoe (sluices closed down at hourly intervals in accordance with the Manual).</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (estimated to exceed <b>1 in 500 year intensities</b>) continued on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located east or south, it may have been possible to avoid transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam. Once Strategy W4 is invoked, the Manual requires the opening of gates in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall. Accordingly gates are opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres-of opening per hour. This increases the dam discharge from 2753 m<sup>3</sup>/s to 4250 m<sup>3</sup>/s. The threshold limit for urban damage has been exceeded and the lake level continues to rise.</li> <li>During this period sluice gate openings at Somerset Dam are closed off to limit rises in Wivenhoe in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 382mm; Somerset 570mm; Lockyer 287mm; Bremer 237mm.</p> <p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.83 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm;</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 100mm.</li> <li>A portion of the extreme intense rainfall in the dam catchment was falling in an un-gauged area (e.g. on the dam lake area) and this resulted in difficulties in the model being able to accurately predict lake level rises. Accordingly, during this period dam operations at Wivenhoe commenced taking gauge board readings every 30 minutes during this period and relaying this information to the Flood Operations Centre by telephone.</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 76.2 (including forecast).</li> <li>Estimated peak Somerset level is: 104.8 (excluding forecast); 105.7 (including forecast).</li> <li>Estimated total dam inflow is: 2,506,000ML (excluding forecast); 3,123,000ML (including forecast).</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 9180 m<sup>3</sup>/s (excluding forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The strategy was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 13:00. During this period, a Dam Operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and flood operations decisions were commenced to be made on a half hourly basis once the gauge board readings from Wivenhoe Dam were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period releases from Somerset Dam are closed down (all sluices closed at 10:00) to limit further rises in Wivenhoe.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</p> <ul style="list-style-type: none"> <li>Extreme lake level rises in Wivenhoe Dam continue during this period. The QPF issued at 16:00 is for a catchment average rainfall of 75mm over the next 24 hours.</li> <li>Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with Strategy W4 and the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 4250 m<sup>3</sup>/s to 7464 m<sup>3</sup>/s. Significant damage to urban areas below Moggill cannot be avoided.</li> <li>No releases are made from Somerset Dam to limit increases in Wivenhoe Dam in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p> <p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.83 to 104.60 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 15mm;</li> <li>Wivenhoe Local 35mm;</li> <li>Somerset 40mm;</li> <li>Lockyer 38mm;</li> <li>Bremer 40mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 75mm (issued at 16:00). However, catchment average rainfalls for the 24 hour period commencing at 16:00 were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Wivenhoe Local 13mm;</li> <li>Somerset 19mm;</li> <li>Lockyer 9mm;</li> <li>Bremer 8mm.</li> </ul> </li> <li>A portion of the extreme intense rainfall in the dam catchment had fallen in an un-gauged area (e.g. on the dam lake area) and this resulted in difficulties in the model being able to accurately predict lake level rises.</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 75.2 (including forecast).</li> <li>Estimated peak Somerset level is: 105.2 (excluding forecast); 105.9 (including forecast).</li> <li>Estimated total dam inflow is: 2,659,000ML (excluding forecast); 3,289,000ML (including forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The strategy was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The lake level in both dams continued to rise during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 19:00 on 11 January 2011 at 74.97m AHD.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7458 m<sup>3</sup>/s.</li> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A decision to commence closing down the gates as quickly as possible to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention of the minimum gate opening settings required under Strategy W4; however it is made in an attempt to minimize urban damage below Moggill which is an objective that must be considered under Strategy W4. Gates would have been re-opened if further lake level rises were experienced.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 398mm; Somerset 610mm; Lockyer 326mm; Bremer 278mm.</p> <p>During this 2 hour period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.60 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 75mm.</li> <li>A portion of the extreme intense rainfall in the dam catchment had fallen in an un-gauged area (e.g. on the dam lake area) and this continued to result in difficulties in the model being able to accurately predict lake level behaviour.</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 75.2 (including forecast).</li> <li>Estimated peak Somerset level is: 105.2 (excluding forecast); 105.9 (including forecast).</li> <li>Estimated total dam inflow is: 2,659,000ML (excluding forecast); 3,289,000ML (including forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 19:00 on 11 January 2011 at 74.97m AHD.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p><b>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</b></p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The decision to close off the release in this way is potentially in contravention of the minimum gate opening settings required under Strategy W4; however it is made in an attempt to minimize urban damage below Moggill which is an objective that must be considered under this Strategy.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 m<sup>3</sup>/s to 2547 m<sup>3</sup>/s. All rural bridges below the dam remain flooded and significant damage to urban areas below Moggill has not been avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 399mm; Somerset 61.3mm; Lockyer 328mm; Bremer 279mm.</p> <p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 10mm (issued Wednesday morning).</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 75.0 (including forecast).</li> <li>Estimated peak Somerset level is: 105.1 (excluding forecast); 105.1 (including forecast).</li> <li>Estimated total dam inflow is: 2,650,000ML (excluding forecast); 2,650,000ML (including forecast).</li> </ul>	<p><b>Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)</b></p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall. Because the lake level was falling slightly, a decision was made to reduce releases from Wivenhoe Dam as quickly and to as low a level as possible, to minimize urban damage below Moggill.</li> <li>It was calculated that reducing to a discharge of 2547 m<sup>3</sup>/s from Wivenhoe Dam would:                             <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p>Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.</p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2534 m<sup>3</sup>/s. All rural bridges below the dam remain flooded.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operating Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguliar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operating Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 401mm; Somerset 619mm; Lockyer 330mm; Bremer 280mm.</p> <p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 10mm.</li> </ul>	<p><b>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</b></p> <ul style="list-style-type: none"> <li>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</li> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within 7 days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:                             <ul style="list-style-type: none"> <li>Causing no renewed increases in river levels below the dam (except where they were unavoidable due to tidal influences).</li> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

DRAFT - TIMBERS & NUMBERS AREA

JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 20					
DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY	
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b> <b>Wivenhoe Directives #35 to #62</b> <b>Somersets Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subsides. Downstream impacts are controlled to ensure that at no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somersets Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 415mm; Somerset 626mm; Lockyer 337mm; Bremer 288mm.</p> <p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somersets Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somersets 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <ul style="list-style-type: none"> <li>During this period the target was to release stored floodwaters from the dam within 7 days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included: <ul style="list-style-type: none"> <li>Causing no renewed increases in river levels below the dam (except where they were unavoidable due to tidal influences.</li> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>	

DRAFT - TIMBERS & NUMBERS AREA

Brooke Foxover

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From: DutyEngineer [dutyseq [REDACTED]]  
Sent: Saturday, 5 February 2011 1:02 PM  
To: John Tibaldi  
Attachments: @

This message has been archived. [View the original item](#)

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Your Anti-virus Service scanned this email. It is safe from known viruses.  
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02 - Flood Event Summary.doc

(405 KB)

## 2 SUMMARY OF JANUARY 2011 FLOOD EVENT

The following summary must be read in conjunction with the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam. The summary contains a series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening or closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period.
- Relevant background information from the period leading up to and during the period.
- Changes in dam conditions during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Full details of the modeling results that are shown in the tables are contained in Appendix A. Other decision support tools that were used in conjunction with the modeling results included:

- The 24 hour Quantitative Precipitation Forecasts (QPF) for the dam catchments provided by BoM.
- The BoM weather radar available through the BoM website.
- BoM SILO Meteograms Forecast Rainfall.
- BoM Interactive Weather and Wave Forecast Rainfall Maps.
- BoM Water and the Land Forecast Rainfall.

Of these tools the QPF is considered the primary forecast tool as it is provided by BoM to give specific forecast information in relation to the dam catchment areas.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extremely large and rare, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual recurrence interval of between 1 in 500 years and 1 in 1000 years.
- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been estimated to have an annual

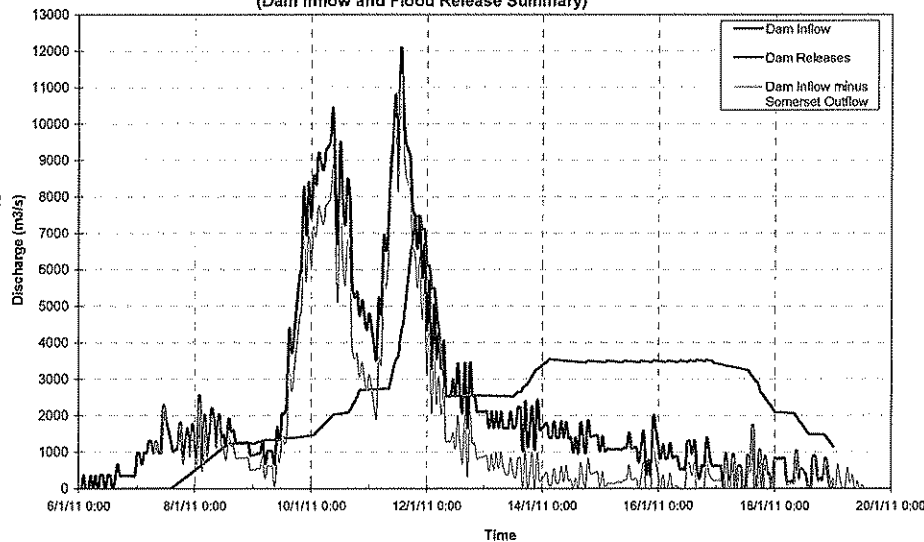
recurrence interval of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is estimated to have occurred in order to reproduce the rapid storage level rises experienced at Wivenhoe Dam during this period.

- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 88% more than the comparable volume of inflow calculated from the January 1974 event.
- The water flow into Wivenhoe Dam experienced during this event is represented by a dual peaked hydrograph with the two peaks separated by 30 hours and the maximum flow rate at both peaks estimated to be in the order of 50% greater than the comparable flow rate calculated from the January 1974 event.

Certainly Wivenhoe Dam provided clear and greatly significant flood mitigation benefits during the event, with some relevant statistics being:

- The following graph demonstrates the significant benefits of Wivenhoe Dam in mitigating the current flood event. Just below the dam, the maximum hourly flow rate in the Brisbane River was reduced by 38% and the maximum three hourly flow rate was reduced by 30%.
- If the above reductions are translated to reductions in flood peak height downstream of Wivenhoe Dam, flood peak height reductions of up to 2.5 metres in the City area, up to 4.0 metres in the Jindalee area and up to 5.5 metres in the Moggill area can be estimated.
- The projected reductions in the flood peak height equates to significant reductions 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 (Source: Flood Damage Tables provided to Seqwater by the Brisbane City Council).
- Additionally, based on the above figures, up to 13,000 more properties would have been impacted by the event without Wivenhoe Dam. (Source: Flood Damage Tables provided to Seqwater by the Brisbane City Council).

Wivenhoe Dam - January 2011 Flood Event  
(Dam Inflow and Flood Release Summary)





JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 06 Jan 2011 07:42</p> <p>Completed Friday 07 Jan 2011 02:00</p>	<p><b>Strategy W1A and Strategy W1B; and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.</li> <li>Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011 were:                             <ul style="list-style-type: none"> <li>Wivenhoe 25mm;</li> <li>Somerset 21mm;</li> <li>Lockyer 23mm;</li> <li>Bremer 23mm.</li> </ul> </li> <li>Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.</li> <li>Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.</li> <li>Duty Engineer called back early from annual Christmas holidays to assist with the management of the event.</li> <li>Transition from Strategy W1A to W1B once the Wivenhoe Lake Level exceeded 67.50.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm.</p> <p>Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.</p> <p>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over the period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 28mm;</li> <li>Somerset 23mm;</li> <li>Lockyer 30mm;</li> <li>Bremer 31mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 25mm.</li> <li>Estimated peak Wivenhoe level is:                             <ul style="list-style-type: none"> <li>68.2 (excluding forecast);</li> <li>68.7 (including forecast).</li> </ul> </li> <li>Estimated peak Somerset level is:                             <ul style="list-style-type: none"> <li>99.7 (excluding forecast);</li> <li>100.1 (including forecast).</li> </ul> </li> <li>Estimated total dam inflow is:                             <ul style="list-style-type: none"> <li>204,000ML (excluding forecast);</li> <li>343,000ML (including forecast).</li> </ul> </li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is:                             <ul style="list-style-type: none"> <li>470 m<sup>3</sup>/s (excluding forecast);</li> <li>720 m<sup>3</sup>/s (including forecast).</li> </ul> </li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is:                             <ul style="list-style-type: none"> <li>550 m<sup>3</sup>/s (excluding forecast);</li> <li>960 m<sup>3</sup>/s (including forecast).</li> </ul> </li> </ul>	<p><b>Strategy W1A and Strategy W1B; and Strategy S2</b> (Lake Level greater than 67.25, maximum release 110 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 m<sup>3</sup>/s, but these flows will not inundate Colleges Crossing until the morning of Friday 07 January 2011.</li> <li>Lake level not expected to reach 67.50 (Strategy W1B) until Friday 7 January 2011. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 m<sup>3</sup>/s.</li> <li>Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A. Low level releases continued from the Mini-Hydro at this time and at various stages during the event. However these releases (in the order of 13 m<sup>3</sup>/s) have low relative significance and are not referred to specifically in the remainder of this summary document.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level sluices were kept closed. Some regulator releases continued from December as part of previous event drain down, (in the order of 30 m<sup>3</sup>/s) but these were shut down at 18:00.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 02:00</p> <p>Completed Friday 07 Jan 2011 09:00</p>	<p>Strategy W1B and Strategy S2</p> <ul style="list-style-type: none"> <li>Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50.</li> <li>Transition from Strategy W1B to W1C once the Wivenhoe Lake Level exceeds 67.75.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm.</p> <p>Wivenhoe Dam level rises from 67.52 to 67.75 over the 7 hour period.</p> <p>Somerset Dam level rises from 99.55 to 99.65 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 11mm;</li> <li>Somerset 15mm;</li> <li>Lockyer 4mm;</li> <li>Bremer 5mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 25mm.</li> <li>Estimated peak Wivenhoe level is: 68.2 (excluding forecast); 68.5 (including forecast).</li> <li>Estimated peak Somerset level is: 99.7 (excluding forecast); 100.2 (including forecast).</li> <li>Estimated total dam inflow is: 242,000ML (excluding forecast); 380,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 470 m<sup>3</sup>/s (excluding forecast); 670 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 570 m<sup>3</sup>/s (excluding forecast); 970 m<sup>3</sup>/s (including forecast).</li> </ul>	<p>Strategy W1B and Strategy S2 (Lake level greater than 67.50, maximum release 110 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 m<sup>3</sup>/s, but these flows may not be sufficient to inundate Burtons Bridge.</li> <li>Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.</li> <li>Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s.</li> <li>Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 09:00</p> <p>Completed Friday 07 Jan 2011 15:00</p>	<p><b>Strategy W1C and Strategy S2</b></p> <ul style="list-style-type: none"> <li>At around 9:00 it becomes apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Release commencement was delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation. The delay in releases was also in accordance with the Manual requirements of maintaining Burtons Bridge and Kholo Bridge trafficable when operating under Strategy W1C.</li> <li>Transition from Strategy W1C to Strategy W1D once the Wivenhoe Dam lake level exceeds 68.0</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 71mm.</p> <p>Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.</p> <p>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 24mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 14mm;</li> <li>Bremer 12mm;</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 25mm.</li> <li>Estimated peak Wivenhoe level is: 68.4 (excluding forecast); 68.9 (including forecast).</li> <li>Estimated peak Somerset level is: 100.3 (excluding forecast); 100.6 (including forecast).</li> <li>Estimated total dam inflow is: 346,000ML (excluding forecast); 483,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 710 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 660 m<sup>3</sup>/s (excluding forecast); 1040 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W1C</b> (Lake level greater than 68.00, maximum release 1900 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategies W1D and W1E.</li> <li>In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Friday 07 Jan 2011 15:00</p> <p>Completed Saturday 08 Jan 2011 14:00</p>	<p>Transition from Strategy W1D to W1E to W3; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.</p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Transition from Strategy W1D to W1E once the Wivenhoe Dam level exceeds 68.25 (22:00 on 7 Jan 2011).</li> <li>Transition from Strategy W1E to W2 once it becomes apparent that the Wivenhoe Dam level will exceed 68.50 (08:00 on 8 Jan 2011). However it was not possible to meet the intent of Strategy W2 by limiting the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill. This is because the calculated naturally occurring peaks at Lowood and Moggill were 530 m<sup>3</sup>/s and 800 m<sup>3</sup>/s respectively, whereas the release rate from the dam was already 940 m<sup>3</sup>/s. Accordingly Strategy W2 was bypassed and Strategy W3 was adopted for use at 06:00 on Saturday 8 January 2011.</li> <li>At 14:00 on 08 January 2011, Wivenhoe discharge is 1239 m<sup>3</sup>/s. All rural bridges below the dam, with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm.</p> <p>Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.</p> <p>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over the period were: <ul style="list-style-type: none"> <li>Wivenhoe 3mm;</li> <li>Somerset 5mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall for the next 24 hours is 40mm.</li> <li>Estimated peak Wivenhoe level is: 68.7 (excluding forecast); 69 (including forecast).</li> <li>Estimated peak Somerset level is: 100.5 (excluding forecast); 100.6 (including forecast).</li> <li>Estimated total dam inflow is: 420,000ML (excluding forecast); 662,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 530 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 550 m<sup>3</sup>/s (excluding forecast); 960 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1480 m<sup>3</sup>/s (excluding forecast); 1540 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Inflows from Lockyer Creek into the Brisbane River have inundated all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>The Strategy transitions from W1 to W3 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5 and Strategy W2 cannot be applied.</li> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 m<sup>3</sup>/s as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore consideration during this period was given to minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Due to rainfall on the ground, it was apparent that the Somerset Dam level would exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operating Target Line in accordance with Strategy S2.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Saturday 08 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 01:00</p>	<p>Strategy W3 and Strategy S2</p> <ul style="list-style-type: none"> <li>Releases maintained from both dams to ensure Mt Crosby Weir Bridge and Fernvale Bridge remain trafficable.</li> <li>No change to gate settings over this period. Wivenhoe discharge is 1240 m<sup>3</sup>/s. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm.</p> <p>Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.</p> <p>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 8mm;</li> <li>Somerset 16mm;</li> <li>Lockyer 3mm;</li> <li>Bremer 2mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 40mm.</li> <li>Estimated peak Wivenhoe level is: 68.7 (excluding forecast); 69.9 (including forecast).</li> <li>Estimated peak Somerset level is: 100.5 (excluding forecast); 100.6 (including forecast).</li> <li>Estimated total dam inflow is: 457,000ML (excluding forecast); 697,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 530 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 840 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1480 m<sup>3</sup>/s (excluding forecast); 1520 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 m<sup>3</sup>/s as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operating Target Line requiring sluice re-opening within a short period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 01:00</p> <p>Completed Sunday 09 Jan 2011 08:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #5 to #7.</b></p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1240 m<sup>3</sup>/s to 1334 m<sup>3</sup>/s.</li> <li>No change to Somerset Dam gate settings over this period.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement:                      Wivenhoe 112mm;                      Somerset 146mm;                      Lockyer 76mm;                      Bremer 75mm.</p> <p>Wivenhoe Dam level falls from 68.63 to 68.56 over the 7 hour period.</p> <p>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 36mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 0mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 40mm.</li> <li>Estimated peak Wivenhoe level is: 68.7 (excluding forecast); 69.3 (including forecast).</li> <li>Estimated peak Somerset level is: 100.5 (excluding forecast); 101.0 (including forecast).</li> <li>Estimated total dam inflow is: 569,000ML (excluding forecast); 814,000ML (including forecast).</li> <li>Estimated peak flow at Lowwood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 530 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 780 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1500 m<sup>3</sup>/s (excluding forecast); 1550 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>Strategy W3 requires the flow at Moggill to be lowered to 4000 m<sup>3</sup>/s as soon as possible after the naturally occurring peak at Moggill (excluding Wivenhoe releases). This was already achieved.</li> <li>Strategy W3 also requires consideration of lower level Manual objectives. Therefore with lake levels falling at both dams, consideration during this period remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operating Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 08:00</p> <p>Completed Sunday 09 Jan 2011 14:00</p>	<p>Strategy W3 and Strategy S2 Wivenhoe Directives #7, Somerset Directives #4 to #5.</p> <ul style="list-style-type: none"> <li>Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>Wivenhoe discharge increased from 1334 m<sup>3</sup>/s to 1386 m<sup>3</sup>/s.</li> <li>Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operating Target Line in accordance with Strategy S2.</li> <li>All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm.</p> <p>Wivenhoe Dam level rises very slightly from 68.56 to 68.58 over the 6 hour period.</p> <p>Somerset Dam level rises from 100.28 to 100.47 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 53mm;</li> <li>Lockyer 18mm;</li> <li>Bremer 15mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 50mm.</li> <li>Estimated peak Wivenhoe level is: 70.0 (excluding forecast); 71.3 (including forecast).</li> <li>Estimated peak Somerset level is: 100.7 (excluding forecast); 101.1 (including forecast).</li> <li>Estimated total dam inflow is: 804,000ML (excluding forecast); 1,108,000ML (including forecast).</li> <li>Estimated peak flow at Lowood excluding Wivenhoe releases is: 530 m<sup>3</sup>/s (excluding forecast); 690 m<sup>3</sup>/s (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 1210 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak Wivenhoe outflow is: 1490 m<sup>3</sup>/s (excluding forecast); 1560 m<sup>3</sup>/s (including forecast). This flow is significantly greater than the calculated natural peak that excluded Wivenhoe releases.</li> </ul>	<p>Strategy W3 and Strategy S2 (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration is given to transitioning the operation to downstream rural life to protecting urban areas from inundation.</li> <li>Model results also showing likely rises in water levels in the dams provides further justification to consider transitioning to Strategy W3 within the next 6 hours.</li> <li>Using the BOM rainfall forecasts, a three day assessment showed the lower limit of three day forecast inflow to be similar to the October 2010 event, with the upper limit similar to the February 1999 event. Therefore, during this period consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line at the end of this period, releases continued from Somerset Dam.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 14:00</p> <p>Completed Sunday 09 Jan 2011 19:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>During this period releases continued from both dams at a level that maintained Mt Crosby Weir Bridge and Fernvale Bridge trafficable. Gate settings were unchanged and the Wivenhoe discharge was 1411 m<sup>3</sup>/s.</li> <li>Due to rainfall on the ground and the modeled rapid lake level rises, a decision is made to transition to focus on protecting urban areas from inundation at 19:00.</li> <li>Councils and the Seqwater CEO were notified of the decision soon after 19:00. The ramifications of the decision were that the new estimated peak flow at Moggill of 3300 m<sup>3</sup>/s would impact properties and commence to cause damage to urban areas below Moggill. Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 m<sup>3</sup>/s, damage costs would exceed \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>A decision is also made at 19:00, that because of the serious nature of the event, the Flood Operations Centre will be staffed with at least two Duty Engineers at all times until at least the peak of the event has occurred.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 208mm; Somerset 305mm; Lockyer 116mm; Bremer 96mm.</p> <p>Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.</p> <p>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 62mm;</li> <li>Somerset 106mm;</li> <li>Lockyer 22mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 65mm.</li> <li>Estimated peak Wivenhoe level is: 72.1 (excluding forecast); 73.9 (including forecast).</li> <li>Estimated peak Somerset level is: 102.3 (excluding forecast); 103.0 (including forecast).</li> <li>Estimated total dam inflow is: 1,272,000ML (excluding forecast); 1,712,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 770 m<sup>3</sup>/s (excluding forecast); 1940 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 05:00 on 8 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3300 m<sup>3</sup>/s (excluding forecast); 4400 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2</b> (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made at the end of this period no longer consider minimizing disruption to downstream rural life and to focus on protecting urban areas from inundation.</li> <li>Towards the end of this period, it was becoming apparent that Moggill was likely to experience a second naturally occurring peak on 10 January 2011 or later and that the Manual required the flow at Moggill to be minimized prior to this peak occurring. This requirement was competing with the need to protect urban areas by not allowing the Wivenhoe Dam level to reach a level that invoked Strategy W4. After considering these issues it was decided that the best course of action would be to increase releases as quickly as possible to the limit of non-damaging flows at Moggill. However before this could occur, Councils needed to be advised, bridges needed to be closed and actions needed to be taken to prepare for rural communities for isolation and urban areas below Moggill for river flows approaching 3500 m<sup>3</sup>/s.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Sunday 09 Jan 2011 19:00</p> <p>Completed Monday 10 Jan 2011 01:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>• Council and Agency notifications commenced at 7:00pm. The likely peak flow at Moggill of over 3000 m<sup>3</sup>/s was communicated to the Brisbane City Council and the Seqwater CEO.</li> <li>• Damage tables supplied by the Brisbane City Council indicated that at flows of 3000 m<sup>3</sup>/s, \$5M and 2600 properties would be impacted in some way. These impacts rise steeply as flows increase, so the focus was on minimizing the flow at Moggill.</li> <li>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increase releases from Wivenhoe Dam.</li> <li>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required time to prepare for the isolation of rural communities, the onset of urban damage below Moggill and to undertake any necessary evacuations. Wivenhoe discharge is 1473 m<sup>3</sup>/s. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 232mm; Somerset 343mm; Lockyer 131mm; Bremer 102mm.</p> <p>Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 101.43 to 102.54 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 24mm;</li> <li>◦ Somerset 38mm;</li> <li>◦ Lockyer 14mm;</li> <li>◦ Bremer 6mm.</li> </ul> </li> <li>• Forecast rainfall in the next 24 hours is 65mm.</li> <li>• Estimated peak Wivenhoe level is: 72.9 (excluding forecast); 74.7 (including forecast).</li> <li>• Estimated peak Somerset level is: 102.9 (excluding forecast); 103.4 (including forecast).</li> <li>• Estimated total dam inflow is: 1,468,000ML (excluding forecast); 1,922,000ML (including forecast).</li> <li>• Estimated peak flow at Moggill excluding Wivenhoe releases is: 820 m<sup>3</sup>/s (excluding forecast); 2000 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 16:00 on 10 January 2011.</li> <li>• Estimated peak flow at Moggill including Wivenhoe releases is: 3240 m<sup>3</sup>/s (excluding forecast); 4480 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2</b> (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>• Consideration was on protecting urban areas from inundation. However before releases are increased to and above the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge.</li> <li>• The Manual requires the flow at Moggill to be minimized prior to its naturally occurring peak and this requirement was balanced against the need to protect urban areas by releasing water from the dams in an attempt to keep the Wivenhoe Dam lake level below a level that will invoke Strategy W4. However the onset of increased releases did roughly coincide with the calculated naturally occurring peak at Moggill (based on a 16 hour travel time between the dam and Moggill).</li> <li>• With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 01:00</p> <p>Completed Monday 10 Jan 2011 09:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate of 0.5 metres of opening per hour.</li> <li>Wivenhoe discharge is increased from 1473 m<sup>3</sup>/s to 2015 m<sup>3</sup>/s. All rural bridges below the dam are flooded.</li> <li>Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Moggill and to restrict Brisbane River flows at Moggill to 3500 m<sup>3</sup>/s. This was done following discussions with the Brisbane City Council that advised a flow of 3500 m<sup>3</sup>/s at Moggill will fully submerge 322 properties and impact on 7000 properties.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operating Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm.</p> <p>Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.</p> <p>Somerset Dam level rises from 102.54 to 103.08 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 12mm;</li> <li>Somerset 30mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 18mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 65mm.</li> <li>Estimated peak Wivenhoe level is: 72.9 (excluding forecast); 74.5 (including forecast).</li> <li>Estimated peak Somerset level is: 103.1 (excluding forecast); 103.5 (including forecast).</li> <li>Estimated total dam inflow is: 1,531,000ML (excluding forecast); 1,985,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1090 m<sup>3</sup>/s (excluding forecast); 2090 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 16:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3420 m<sup>3</sup>/s (excluding forecast); 4680 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2 (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</b></p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation and minimizing urban damage.</li> <li>Due to advice received from the Brisbane City Council that a flow of 3500 m<sup>3</sup>/s at Moggill will fully submerge 322 properties and impact on 7000 properties, an attempt was made to remain below this flow</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach was adopted. Advice received during the event from the Brisbane City Council that the upper limit of non-damaging floods was below the 4000 m<sup>3</sup>/s stated in the manual was noted and taken into account in the decision making processes.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 09:00</p> <p>Completed Monday 10 Jan 2011 15:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2087 m<sup>3</sup>/s. All rural bridges below the dam are flooded.</li> <li>At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 m<sup>3</sup>/s was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 m<sup>3</sup>/s was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and minimize urban damage.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operating Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises at Wivenhoe.</li> </ul>	<p>Total rainfall since commencement:                      Wivenhoe 274mm;                      Somerset 407mm;                      Lockyer 169mm;                      Bremer 149mm.</p> <p>Wivenhoe Dam level rises from 71.56 to 72.54 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 34mm;</li> <li>Somerset 31mm;</li> <li>Lockyer 27mm;</li> <li>Bremer 30mm</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 75mm.</li> <li>Estimated peak Wivenhoe level is: 73.6 (excluding forecast); 75.2 (including forecast).</li> <li>Estimated peak Somerset level is: 103.4 (excluding forecast); 103.7 (including forecast).</li> <li>Estimated total dam inflow is: 1,708,000ML (excluding forecast); 2,162,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1500 m<sup>3</sup>/s (excluding forecast); 2570 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 20:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3910 m<sup>3</sup>/s (excluding forecast); 5180 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2</b>                      (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation and minimizing urban damage.</li> <li>A decision was made at 15:00 to attempt to remain below a target flow of around 4000 m<sup>3</sup>/s at Moggill.</li> <li>The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach continued to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 15:00</p> <p>Completed Monday 10 Jan 2011 20:00</p>	<p><b>Strategy W3 and Strategy S2 Wivenhoe Directive #11.</b></p> <ul style="list-style-type: none"> <li>Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate of 1.0 metres of opening per hour.</li> <li>A target of 4000 m<sup>3</sup>/s at Moggill was set in accordance with the Manual, on the basis that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and minimize urban damage.</li> <li>Wivenhoe discharge is increased from 2087 m<sup>3</sup>/s to 2695 m<sup>3</sup>/s.</li> <li>Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Moggill and to restrict Brisbane River flows at Moggill to 4000 m<sup>3</sup>/s.</li> <li>No gate movements occurred at Somerset Dam during this period, with dam levels plotted under the Wivenhoe/Somerset Operating Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm.</p> <p>Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>Wivenhoe 4mm;</li> <li>Somerset 8mm;</li> <li>Lockyer 5mm;</li> <li>Bremer 3mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 38mm, with isolated falls to 100mm.</li> <li>Estimated peak Wivenhoe level is: 73.6 (excluding forecast); 74.3 (including forecast).</li> <li>Estimated peak Somerset level is: 103.5 (excluding forecast); 103.5 (including forecast).</li> <li>Estimated total dam inflow is: 1,731,000ML (excluding forecast); 1,982,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1500 m<sup>3</sup>/s (excluding forecast); 1840 m<sup>3</sup>/s (including forecast). This peak was estimated to occur at 20:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 3980 m<sup>3</sup>/s (excluding forecast); 4470 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2</b> (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <ul style="list-style-type: none"> <li>Consideration was on protecting urban areas from inundation and minimizing urban damage.</li> <li>The target maximum flow at Moggill was now 4000 m<sup>3</sup>/s. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach continued to be followed.</li> <li>With dam levels under the Wivenhoe/Somerset Operating Target Line during this period, releases continued from Somerset Dam.</li> <li>The reduced rainfall forecast provides justification to retain the target of 4000 m<sup>3</sup>/s at Moggill, with the Wivenhoe peak of 74.3 (including forecast) indicating that it may be possible to keep urban damage within tolerable limits. A discussion is held with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period (maximum 12 hours) without invoking Strategy W4 if the safety of the dam can be guaranteed and urban damage reduced. The Regulator agreed with this approach.</li> <li>The strategy continues to be not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Monday 10 Jan 2011 20:00</p> <p>Completed Tuesday 11 Jan 2011 04:00</p>	<p><b>Strategy W3 and Strategy S2</b></p> <ul style="list-style-type: none"> <li>Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to restrict flows at Moggill to close to 4000 m<sup>3</sup>/s. No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2726 m<sup>3</sup>/s.</li> <li>A target flow of 4000 m<sup>3</sup>/s is set at Moggill in accordance with the Manual (the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s). However BCC damage tables indicate this would still impact 5325 properties and cause damage in excess of \$47M.</li> <li>Initial advice on a significant flash flood originating in Lockyer headwaters received at 17:32, with details received at 20:00. Considerations were undertaken during this period to develop strategies to manage these potential flows, but because any strategy would involve significantly reducing outflows from Wivenhoe, the strategies were not adopted.</li> <li>During this period the plotted dam levels shifted just above the Wivenhoe/Somerset Operating Target Line. This led to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> </ul>	<p>Total rainfall since commencement:                      Wivenhoe 323mm;                      Somerset 437mm;                      Lockyer 186mm;                      Bremer 167mm.</p> <p>Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.</p> <p>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 44mm;</li> <li>Somerset 22mm;</li> <li>Lockyer 12mm;</li> <li>Bremer 14mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 38mm, with isolated falls to 100mm.</li> <li>Estimated peak Wivenhoe level is: 74.1 (excluding forecast); 74.6 (including forecast).</li> <li>Estimated peak Somerset level is: 103.5 (excluding forecast); 103.7 (including forecast).</li> <li>Estimated total dam inflow is: 2,016,000ML (excluding forecast); 2,267,000ML (including forecast).</li> <li>Estimated peak flow at Moggill excluding Wivenhoe releases is: 1500 m<sup>3</sup>/s (excluding forecast); 1810 m<sup>3</sup>/s (including forecast). This peak was estimated to have occurred at 20:00 on 10 January 2011.</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 4040 m<sup>3</sup>/s (excluding forecast); 4540 m<sup>3</sup>/s (including forecast).</li> </ul>	<p><b>Strategy W3 and Strategy S2</b>                      (Lake level greater than 68.50, maximum release 4000 m<sup>3</sup>/s)</p> <p>Consideration on protecting urban areas from inundation and minimizing urban damage. The target maximum flow at Moggill remains at 4000 m<sup>3</sup>/s. The Manual states that the intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s and this approach continues to be followed.</p> <ul style="list-style-type: none"> <li>Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.</li> <li>With dam levels moving above the Wivenhoe/Somerset Operating Target Line during this period, a decision is made to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.</li> <li>Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause high level urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible, although with continued rainfall, the strategy is now being reviewed on an hour by hour basis. The discussion at 21:00 with the Dam Safety Regulator requesting permission to exceed a level of 74.0 in Wivenhoe for a short period without invoking Strategy W4 (provided the safety of the dam can be guaranteed) is also being considered carefully in view of the continued rainfall.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 04:00</p> <p>Completed Tuesday 11 Jan 2011 08:00</p>	<p>Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.</p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (estimated to exceed 1 in 500 year intensities) commenced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located east or south, it may have been possible to avoid transition to Strategy W4.</li> <li>Because the extreme intense rainfall was occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to prevent a situation arising during which the safety of the dam is put at risk. Accordingly at 08:00 a decision is made to transition to Strategy W4. Significant urban damage can now not be avoided. The Dam Safety Regulator, Seqwater CEO and the Councils are advised of this development.</li> <li>No change to gate settings, however occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 m<sup>3</sup>/s.</li> <li>During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operating Target Line. This decision is consistent with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm.</p> <p>Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.</p> <p>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over the period were: <ul style="list-style-type: none"> <li>Wivenhoe 33mm;</li> <li>Wivenhoe Local 74mm;</li> <li>Somerset 46mm;</li> <li>Lockyer 54mm;</li> <li>Bremer 10mm.</li> </ul> </li> <li>Forecast rainfalls in the next 24 hours is 38mm, with isolated falls to 100mm.</li> <li>Estimated peak Wivenhoe level is: 74.5 (excluding forecast); 75.1 (including forecast).</li> <li>Estimated peak Somerset level is: 103.9 (excluding forecast); 104.2 (including forecast).</li> <li>Estimated total dam inflow is: 2,210,000ML (excluding forecast); 2,460,000ML (including forecast).</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 5870 m<sup>3</sup>/s (excluding forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>At 08:00, model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.</li> <li>At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator, Seqwater CEO and the Councils are advised of this decision. It was now apparent that significant urban damage resulting from releases from Wivenhoe Dam could not be avoided due to the extreme intense rainfall (estimated to exceed 1 in 500 year intensities) that commenced on and close to the Wivenhoe Dam lake area during this period</li> <li>With dam levels moving above the Wivenhoe/Somerset Operating Target Line during this period releases from Somerset Dam were progressively closed down to limit further rises in Wivenhoe (sluices closed down at hourly intervals in accordance with the Manual).</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 08:00</p> <p>Completed Tuesday 11 Jan 2011 13:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.</p> <ul style="list-style-type: none"> <li>Extreme intense rainfall (estimated to exceed 1 in 500 year intensities) continued on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located east or south, it may have been possible to avoid transition to Strategy W4.</li> <li>Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam. Once Strategy W4 is invoked, the Manual requires the opening of gates in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall. Accordingly gates are opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour. This increases the dam discharge from 2753 m<sup>3</sup>/s to 4250 m<sup>3</sup>/s. The threshold limit for urban damage has been exceeded and the lake level continues to rise.</li> <li>During this period sluice gate openings at Somerset Dam are closed off to limit rises in Wivenhoe in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 382mm; Somerset 570mm; Lockyer 287mm; Bremer 237mm.</p> <p>Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.</p> <p>Somerset Dam level rises from 103.46 to 103.83 over the 5 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 27mm;</li> <li>Wivenhoe Local 85mm;</li> <li>Somerset 86mm;</li> <li>Lockyer 47mm;</li> <li>Bremer 55mm.</li> </ul> </li> <li>Forecast rainfall over the next 24 hours is 100mm.</li> <li>A portion of the extreme intense rainfall to the dam catchment was falling in an un-gauged area (e.g. on the dam lake area) and this resulted in difficulties in the model being able to accurately predict lake level rises. Accordingly, during this period dam operations at Wivenhoe commenced taking gauge board readings every 30 minutes during this period and relaying this information to the Flood Operations Centre by telephone.</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 76.2 (including forecast).</li> <li>Estimated peak Somerset level is: 104.8 (excluding forecast); 105.7 (including forecast).</li> <li>Estimated total dam inflow is: 2,506,000ML (excluding forecast); 3,123,000ML (including forecast).</li> <li>Estimated peak flow at Moggill including Wivenhoe releases is: 9180 m<sup>3</sup>/s (excluding forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake level predicted to exceed 74.00, now maximum release rate)</p> <ul style="list-style-type: none"> <li>The strategy was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level continued to rise at 13:00. During this period, a Dam Operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and flood operations decisions were commenced to be made on a half hourly basis once the gauge board readings from Wivenhoe Dam were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period releases from Somerset Dam are closed down (all sluices closed at 10:00) to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 13:00</p> <p>Completed Tuesday 11 Jan 2011 19:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.</p> <ul style="list-style-type: none"> <li>• Extreme lake level rises in Wivenhoe Dam continue during this period. The QPF issued at 16:00 is for a catchment average rainfall of 75mm over the next 24 hours.</li> <li>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with Strategy W4 and the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.</li> <li>• Wivenhoe discharge is increased from 4250 m<sup>3</sup>/s to 7464 m<sup>3</sup>/s. Significant damage to urban areas below Moggill cannot be avoided.</li> <li>• No releases are made from Somerset Dam to limit increases in Wivenhoe Dam in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm.</p> <p>Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.</p> <p>Somerset Dam level rises from 103.83 to 104.60 over the 6 hour period.</p>	<ul style="list-style-type: none"> <li>• Catchment average rainfalls over this period were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 15mm;</li> <li>◦ Wivenhoe Local 35mm;</li> <li>◦ Somerset 40mm;</li> <li>◦ Lockyer 38mm;</li> <li>◦ Bremer 40mm.</li> </ul> </li> <li>• Forecast rainfall for the next 24 hours is 75mm (issued at 16:00). However, catchment average rainfalls for the 24 hour period commencing at 16:00 were: <ul style="list-style-type: none"> <li>◦ Wivenhoe 8mm;</li> <li>◦ Wivenhoe Local 13mm;</li> <li>◦ Somerset 19mm;</li> <li>◦ Lockyer 9mm;</li> <li>◦ Bremer 8mm.</li> </ul> </li> <li>• A portion of the extreme intense rainfall in the dam catchment had fallen in an un-gauged area (e.g. on the dam lake area) and this resulted in difficulties in the model being able to accurately predict lake level rises.</li> <li>• Estimated peak Wivenhoe level is: <ul style="list-style-type: none"> <li>75.0 (excluding forecast);</li> <li>75.2 (including forecast).</li> </ul> </li> <li>• Estimated peak Somerset level is: <ul style="list-style-type: none"> <li>105.2 (excluding forecast);</li> <li>105.9 (including forecast).</li> </ul> </li> <li>• Estimated total dam inflow is: <ul style="list-style-type: none"> <li>2,659,000ML (excluding forecast);</li> <li>3,289,000ML (including forecast).</li> </ul> </li> </ul>	<p>Strategy W4 and Strategy S2 (Lake level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>• The strategy was to protect the structural safety of the dam.</li> <li>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur in accordance with standard sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>• The lake level in both dams continued to rise during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>• With dam levels above the Wivenhoe/Somerset Operating Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>• The water level in Wivenhoe Dam peaked at 19:00 on 11 January 2011 at 74.97m AHD.</li> </ul>



JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 19:00</p> <p>Completed Tuesday 11 Jan 2011 21:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.</p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7458 m<sup>3</sup>/s.</li> <li>The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A decision to commence closing down the gates as quickly as possible to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention of the minimum gate opening settings required under Strategy W4; however it is made in an attempt to minimize urban damage below Moggill which is an objective that must be considered under Strategy W4. Gates would have been re-opened if further lake level rises were experienced.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 398mm; Somerset 610mm; Lockyer 326mm; Bremer 278mm.</p> <p>During this 2 hour period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.</p> <p>Somerset Dam level rises from 104.60 to 104.78 over the 2 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 1mm;</li> <li>Somerset 1mm;</li> <li>Lockyer 1mm;</li> <li>Bremer 1mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 75mm.</li> <li>A portion of the extreme intense rainfall in the dam catchment had fallen in an un-gauged area (e.g. on the dam lake area) and this continued to result in difficulties in the model being able to accurately predict lake level behaviour.</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 75.2 (including forecast).</li> <li>Estimated peak Somerset level is: 105.2 (excluding forecast); 105.9 (including forecast).</li> <li>Estimated total dam inflow is: 2,659,000ML (excluding forecast); 3,289,000ML (including forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.</li> <li>The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.</li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> <li>The water level in Wivenhoe Dam peaked at 19:00 on 11 January 2011 at 74.97m AHD.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Tuesday 11 Jan 2011 21:00</p> <p>Completed Wednesday 12 Jan 2011 08:00</p>	<p>Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.</p> <ul style="list-style-type: none"> <li>During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The decision to close off the release in this way is potentially in contravention of the minimum gate opening settings required under Strategy W4; however it is made in an attempt to minimize urban damage below Moggill which is an objective that must be considered under this Strategy.</li> <li>Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.</li> <li>Wivenhoe discharge is decreased from 7464 m<sup>3</sup>/s to 2547 m<sup>3</sup>/s. All rural bridges below the dam remain flooded and significant damage to urban areas below Moggill has been avoided.</li> <li>No releases are made from Somerset Dam in accordance with Strategy S2.</li> </ul>	<p>Total rainfall since commencement: Wivenhoe 399mm; Somerset 613mm; Lockyer 328mm; Bremer 279mm.</p> <p>Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.</p> <p>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 1mm</li> <li>Somerset 3mm;</li> <li>Lockyer 3m;</li> <li>Bremer 1m.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 10mm (issued Wednesday morning).</li> <li>Estimated peak Wivenhoe level is: 75.0 (excluding forecast); 75.0 (including forecast).</li> <li>Estimated peak Somerset level is: 105.1 (excluding forecast); 105.1 (including forecast).</li> <li>Estimated total dam inflow is: 2,650,000ML (excluding forecast); 2,650,000ML (including forecast).</li> </ul>	<p>Strategy W4 and Strategy S2 (Lake level predicted to exceed 74.00, no maximum release rate)</p> <ul style="list-style-type: none"> <li>The target was to protect the structural safety of the dam.</li> <li>The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall. Because the lake level was falling slightly, a decision was made to reduce releases from Wivenhoe Dam as quickly and to as low a level as possible, to minimize urban damage below Moggill.</li> <li>It was calculated that reducing to a discharge of 2547 m<sup>3</sup>/s from Wivenhoe Dam would:                             <ul style="list-style-type: none"> <li>Not increase the downstream flood peak;</li> <li>Not cause the water level in Wivenhoe Dam to rise and;</li> <li>Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul> </li> <li>With dam levels above the Wivenhoe/Somerset Operating Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.</li> </ul>

JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Wednesday 12 Jan 2011 08:00</p> <p>Completed Thursday 13 Jan 2011 12:00</p>	<p>Transition from Strategy W4 to the Drain Down Phase</p> <p>Somerset Directives #8 to #9.</p> <ul style="list-style-type: none"> <li>No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2534 m<sup>3</sup>/s. All rural bridges below the dam remain flooded.</li> <li>Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operating Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operating Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual.</li> </ul>	<p>Total rainfall since commencement:</p> <ul style="list-style-type: none"> <li>Wivenhoe 401mm;</li> <li>Somerset 619mm;</li> <li>Lockyer 330mm;</li> <li>Bremer 280mm.</li> </ul> <p>Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.</p> <p>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this period were:                             <ul style="list-style-type: none"> <li>Wivenhoe 2mm;</li> <li>Somerset 6mm;</li> <li>Lockyer 6mm;</li> <li>Bremer 6mm.</li> </ul> </li> <li>Forecast rainfall in the next 24 hours is 10mm.</li> </ul>	<p>Drain Down Phase (Stored floodwaters emptied from the dam in seven days)</p> <p>During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.</p> <ul style="list-style-type: none"> <li>Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within 7 days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:                             <ul style="list-style-type: none"> <li>Causing no renewed increases in river levels below the dam (except where they were unavoidable due to tidal influences.</li> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul> </li> </ul>

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JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 20

DATE/TIME	BACKGROUND	DAM CONDITIONS	RAINFALL AND MODEL RESULTS	STRATEGY
<p>Commenced Thursday 13 Jan 2011 12:00</p> <p>Completed Wednesday 19 Jan 2011 12:00</p>	<p><b>Drain Down Phase</b>  <b>Wivenhoe Directives #35 to #62</b>  <b>Somerset Directives #10 to #13.</b></p> <ul style="list-style-type: none"> <li>During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled to ensure that at no time during this phase do downstream water levels rise except if impacted by tidal influences.</li> <li>During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible.</li> </ul>	<p>Total rainfall since commencement:  Wivenhoe 415mm;  Somerset 626mm;  Lockyer 337mm;  Bremer 288mm.</p> <p>Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.</p> <p>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.</p>	<ul style="list-style-type: none"> <li>Catchment average rainfalls over this six day period were: <ul style="list-style-type: none"> <li>Wivenhoe 14mm;</li> <li>Somerset 7mm;</li> <li>Lockyer 7mm;</li> <li>Bremer 8mm.</li> </ul> </li> </ul>	<p><b>Drain Down Phase</b></p> <p>During this period the target was to release stored floodwaters from the dam within 7 days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:</p> <ul style="list-style-type: none"> <li>Causing no renewed increases in river levels below the dam (except where they were unavoidable due to tidal influences.</li> <li>Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowwood area could continue to operate;</li> <li>Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);</li> <li>Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;</li> <li>Achieving full supply levels in the dams at the conclusion of the event.</li> </ul>

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