McCreadys Creek South
Stormwater Trunk Infrastructure Study

Mackay Regional Council
0628-06-B, 2 December 2015

Extract of Section 5 - Existing Scenario Hydraulic Assessment
Report Title  
McCreadys Creek South Stormwater Trunk Infrastructure Study

Client  
Mackay Regional Council

Report Number  
0628-06-B

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<th>Report Author</th>
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Tel 07 3225 0200

Greg Roads  
Director

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5 Existing Scenario

5.1 OVERVIEW

The calibrated hydrologic and hydraulic models were used to derive design discharges, flood levels, depths and velocities throughout the study area for the 18%, 2%, 1%, 0.5% and 0.2% AEP design events and the PMF for the Existing Scenario.

5.2 DISCHARGES

Table 5.1 shows the Existing Scenario design flood discharges at various locations within the model estimated using the TUFLOW model (and RAFTS inflows). The critical duration varies across the catchment and ranges from 1 hour to 3 hour at different locations. Table 5.1 summarises the peak discharges for different storm durations at the reporting locations.

The 1% AEP peak discharge at Beaconsfield Road is 191.5 m³/s for the Existing Scenario. Climate change is expected to increase peak 1% AEP discharges at Beaconsfield Road by some 28% to 245.6 m³/s.

Table 5.1 - TUFLOW peak discharges - Existing Conditions

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<tr>
<th>ID</th>
<th>Location</th>
<th>18% AEP</th>
<th>2% AEP</th>
<th>1% AEP</th>
<th>0.5% AEP</th>
<th>0.2% AEP</th>
<th>PMF</th>
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<th>2% AEP</th>
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<td>1200.1</td>
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<td>206.3</td>
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* Not all discharges measured for the 0.2% AEP and PMF as water is distributed in many directions.

5.3 FLOOD LEVELS AND FLOOD EXTENTS

Figure 5.1 shows the Existing Scenario design flood level contours and depths within the study area for the 1% AEP design flood. Appendix B shows the design flood level contours and depths for the 18% AEP and 2% AEP design floods for existing conditions.

Table 5.2 shows the Existing Scenario design flood levels for the 18%, 2%, 1%, 0.5% and 0.2% AEP and PMF design floods at selected reporting locations. Design flood depths for the three climate change scenarios are also given. The reporting locations are shown on Figure 5.1. The following is of note:

- For the 18% AEP event:
  - substantial overbank flooding occurs throughout the study area including the golf course;
Figure 5.1 - 1% AEP flood Levels, depths and extent - Existing Conditions
• Flood depths in the Richmond Tributary and the Northern Tributary are generally less than 0.5m;
• All roads except Mackay Bucasia Road are overtopped;
• Holts Road east of Mackay Bucasia Road is just overtopped to a flood depth of 0.05 m.
• The channel from the Northview Gardens estate breaks out of the channel upstream of Mackay Bucasia Road and heads northward under the railway to the Richmond Tributary; and
• Significant ponding occurs upstream of Mackay Bucasia Road for all tributaries.

• For the 2% and 1% AEP events:
  • Mackay-Bucasia Road is overtopped by the Richmond Tributary flows; and
  • Above floor level inundation potentially occurs on Baxter Drive upstream of Mackay Harbour Branch Railway. The storage yards on Beaconsfield Rd are also inundated. It is not known if above floor inundation occurs in Beaconsfield.

• For the 0.5% AEP, 0.2% AEP and PMF events:
  • Significant inundation occurs throughout the catchment;
  • Above floor level inundation potentially occurs on Baxter Drive and around Stuart Hindle Drive upstream of Mackay Harbour Branch Railway; and
  • Some McCreadys Creek floodwater overflows to the Vines Creek catchment near Stuart Hindle Drive for these events due to the Mackay Harbour Branch Railway.

• For the climate change scenarios:
  • Peak flood levels are between 0.02m and 0.37m higher than their corresponding design events. This suggests that peak flood levels are not overly sensitive to changes in design discharges throughout the catchment.
Table 5.2 - TUFLOW peak flood levels - Existing Conditions

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<tr>
<th>Location</th>
<th>Design Flood Level</th>
<th>Climate Change Design Levels</th>
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<td>(m AHD)</td>
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<td>18% AEP</td>
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</tr>
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<td>PMF</td>
</tr>
<tr>
<td></td>
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5.4 FLOOD VELOCITIES

Figure 5.2 shows the design velocities within the study area for the 1% AEP design flood for existing conditions. Appendix B shows the design velocities for the 18% AEP and 2% AEP design floods for existing conditions. Flood velocities throughout the study area are generally low for the three design events. Overbank velocities are generally between 0.25 m/s to 0.75 m/s and channel velocities between 1 m/s and 2 m/s. Flood velocities marginally increase with event magnitude.
Figure 5.2 - 1% AEP flood velocities - Existing Conditions