**Technical Discussion Paper**

**Bundaberg flood protection study**

Developing a 10-year action plan for flood mitigation in Bundaberg.

**Option B – Bundaberg North floodway**

Option B involves construction of four lakes either side of Hinkler Avenue to improve conveyance through Bundaberg North and a channel from Queen Street to Waterview Road.

Stage 2 of the Bundaberg flood protection study involves assessing 11 flood mitigation options, including those identified through consultation with the Bundaberg community in late 2015.

**Option overview**

Option B aims to decrease flood levels in the Burnett River by increasing flow through Hinkler and Federation Parks. It would involve construction of:

- a series of four lakes in the parks (two either side of Hinkler Avenue)
- regrading of Thornhill Road to improve the flow of floodwater through the floodway
- a 2 km long, 100 m wide channel from Queen Street to Waterview Road.

Construction of this option would require some property acquisitions, including farmland.

Figure 1: Option layout

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**DISCLAIMER:** Jacobs has implemented reasonable, current commercial and technical measures using the usual care and thoroughness of a professional firm in the creation of these maps from the spatial data, information and products provided to Jacobs by the Department of Infrastructure, Local Government and Planning (DILGP), Bundaberg Regional Council (BRC), GHD and other consultants; and data custodians including Department of Natural Resources and Mines (DNRME) and data obtained from the Queensland Spatial Catalogue (QSpatial) under the Creative Commons Attribution 3.0 Australia licence. Jacobs has not independently verified the quality, content, accuracy or completeness of the Data. Jacobs is not responsible or liable for any costs, losses and/or damages suffered as a result of reliance on these maps. All information shown on these maps (including the nature, alignment and extent of any works) is preliminary and provided only for discussion purposes.

Note: The outcome depicted is a potential only of the implications associated with this option – and this outcome may not occur or eventuate.
What would this option achieve?

Creating a floodway trough Hinkler/ Federation Park would increase flow through this location by about 20%, and reduce peak flow in the Burnett River by up to 350 m³/s. This option:

- Avoids over-floor flooding for about 110 properties in Bundaberg in a 1% AEP flood event, of which 95 are located in Bundaberg North, and 10 in Bundaberg East.
- Avoids over-floor flooding for up to 60 properties in Bundaberg North for flood events smaller than the 1% AEP flood event, such as the 1942 and 2010 flood events.
- Reduces peak flood levels in the Burnett River near Harriet Island by about 0.04 m (i.e. 40 mm).

The floodway does not reduce the number of buildings with over-floor flooding in frequent flood events (i.e. events more frequent than and including the 5% AEP flood event).

The floodway increases flood levels downstream in the farmland near Waterview Road and Paddy Island. In a 1% AEP event, this increases over-floor flooding for one building. In rarer flood events, up to 12 houses experience increased over-floor flooding.

Figure 2 shows the changes to flood levels for the 1% AEP flood event.

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1% AEP flood is the name given to a flood event which has a 1 in 100 or 1% chance of occurring in any year. It would be similar to the January 2013 flood.
**Viability**

A key step in the options assessment involves identifying issues that may mean construction or implementation of the option is not viable. These relate to matters such as:

- The likelihood of obtaining environmental approvals, due to unacceptable environmental impacts
- Significant or unaffordable costs of construction or ongoing maintenance
- Potential for unacceptable impacts on other areas.

An option is considered to be unviable where the assessment identifies one or more of these matters are ‘unlikely to be achieved’. The assessment of Option B found that this option may be viable with modifications to reduce costs and impacts to areas outside of the benefited area. However the effectiveness of the option would also be impacted decreasing the relatively small reduction in flood damages achieved.

**Costs and benefits**

Initial cost estimates indicate that construction of the lakes would be about $124 million. The estimated reduction in flood damages (i.e. the tangible benefits) would be in the order of $7 million.

**Summary of assessment against key criteria**

Each option has been assessed against a set of 16 criteria. These criteria, if achieved by an option, indicate a strong link between the option and the overall objectives of the Bundaberg Flood Protection Study. The performance of this option against the 16 criteria is presented on the next page. These assessments will be used to derive an overall multi-criteria analysis score for this option. This score is then used in conjunction with other assessments to compare this option against the other options.

A summary of the performance of this option against the criteria as well as the costs, benefits and viability issues is presented below.

<table>
<thead>
<tr>
<th>Likelihood of obtaining environmental approval</th>
<th>Likely to achieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordability</td>
<td>May achieve with modification</td>
</tr>
<tr>
<td>Tolerable impacts outside benefited area</td>
<td>Unlikely to achieve</td>
</tr>
</tbody>
</table>

- This option would involve diverting floodwater through Hinkler and Federation Parks, reducing flood levels in the Burnett River and Bundaberg North.
- Downstream of the lakes and floodway, some properties would experience increased flood levels.
- This option would have high costs due to the large volume of excavation and the need to treat and dispose of this material.
- Benefits of this option are limited due to the ability to lower flood levels in this area. The flow rate through this area would not change and the flood levels in the urban area are not significantly lowered.
- The costs for this option would be about 16 times the estimated monetary benefits.
## Technical Discussion Paper

### Evaluation criteria

<table>
<thead>
<tr>
<th>Objective</th>
<th>Criteria</th>
<th>How does it perform against the criteria?</th>
<th>Preliminary Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce flood risk to life and reduced flood impacts on people</td>
<td>Improves people’s safety during flood events and people’s ability to evacuate</td>
<td>• Minor increases flows over Hinkler Avenue, decreasing access to Tallon Bridge and hindering evacuation</td>
<td></td>
</tr>
<tr>
<td>Reducing the occurrence of flood deaths and injury and improving people’s ability to plan for and recover after a flood</td>
<td>Reduces the impacts on people for very large / rare floods (larger than say Jan 2013 flood)</td>
<td>• Minor reductions in flood levels in events greater than the 1% AEP event.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase people’s resilience to flooding by improving their preparation for flood events and ability to recover after flood events</td>
<td>• Minor decreases in over-floor flooding would improve ability to recover after flood events.</td>
<td></td>
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<tr>
<td></td>
<td>Targets vulnerable community members or areas (e.g. elderly, poor)</td>
<td>• Targets Bundaberg North (vulnerable community).</td>
<td></td>
</tr>
<tr>
<td>Reduce flood risk to property</td>
<td>Reduces damages and costs to residential property caused by floods</td>
<td>• Minor decreases in flood damages.</td>
<td></td>
</tr>
<tr>
<td>Reducing flood damages and properties and improving the recovery of businesses after floods</td>
<td>Reduces damages and costs to business / industry / government caused by floods</td>
<td>• Minor decreases in flood damages.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduces the impacts on property for very large / rare floods (larger than say Jan 2013 flood)</td>
<td>• Minor reductions in flood levels in events greater than the 1% AEP event.</td>
<td></td>
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<tr>
<td></td>
<td>Increase a property’s “flood resilience” (improving a property so it is less affected by a flood event and recovery after an event is faster)</td>
<td>• Minor decreases in flood levels would improve resilience.</td>
<td></td>
</tr>
<tr>
<td>Achieve a balanced investment approach that considers social, economic and environmental issues</td>
<td>Economic benefits (increased confidence leading to economic growth) for the broader region</td>
<td>• No change for existing situation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental benefits: Terrestrial, aquatic, riverine benefits, effects upon heritage</td>
<td>• Acid sulphate soils would be generated but would be treated in this option.</td>
<td></td>
</tr>
<tr>
<td>Considering social, economic and environmental issues (independent of the improvements to flooding)</td>
<td>Social Health benefits: Effects upon mental health, psychological issues, stress</td>
<td>• Positive impact on mental health resulting from undertaking mitigation works.</td>
<td></td>
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<tr>
<td></td>
<td>Community benefits: Effects upon &quot;livability&quot; of the area, urban amenity, social cohesion</td>
<td>• Improves livability via creation of new amenity area.</td>
<td></td>
</tr>
<tr>
<td>Long term reduction in flood risk and adaptable levels of protection</td>
<td>Adaptable flood performance with respect to climate change</td>
<td>• The lakes and floodway would be difficult to adapted to change performance once operational.</td>
<td></td>
</tr>
<tr>
<td>A focus on the long-term benefits and adaptability of options and also the impact on future development land</td>
<td>Long term benefits</td>
<td>• Floodway and lakes would have long design life.</td>
<td></td>
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<td></td>
<td>Decreases flood damage to areas of future development</td>
<td>• Minimal change to existing situation.</td>
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<tr>
<td></td>
<td>Staged benefits with staged construction / investment</td>
<td>• Construction of floodway could not be easily staged.</td>
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</tr>
</tbody>
</table>

- ✓ Achieves the criteria
- ◐ Partially achieves criteria or has no change to current status
- ✗ Does not achieve the criteria
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Find out more about this option
Community consultation on the flood mitigation options and the findings of the options assessment will take place from 24 October to 20 November 2016. To find out more about the flood mitigation options and to provide your feedback:

Visit the website
www.qld.gov.au/bundabergfloodstudy
Interactive mapping is available on the website so that you can see how the flood mitigation options would change flooding in your area.

Contact the project team
Email: bundabergfloodprotection@jacobs.com
Telephone: 1800 994 015 (during business hours)

Next steps
The Bundaberg flood protection study is due to be completed later this year. Engagement on the 10-year action plan will occur in 2017. It is important to note that the flood mitigation options have not yet been considered by the State government and are not government policy. No commitment will be made on any of the options until the State government has consulted with the community and stakeholders on the 10-year action plan.

The Queensland Government will continue to engage with the Bundaberg community as the action plan develops.