BUSINESS CASE: EXECUTIVE SUMMARY MARCH 2016

Reducing stormwater flood risk: a business case study

Report prepared for Bayside City Council as part of the Financial Risks Adaptation Planning project

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Executive Summary

The Bayside City Council flood management case study

This Financial Risk Adaptation Planning (FRAP)[1] case study examines alternative approaches to planning and management of stormwater in the catchment including infrastructure upgrades and planning controls on impervious surfaces.

Parts of Brighton are already subject to frequent flash flooding due to under capacity of the drainage system. This flooding is having significant impact on local residents and Council. It causes temporary displacement, damage to property and other infrastructure in the vicinity of the study area.

Option assessment and results

As part of this case study, four options were examined:

- Business as Usual (BaU) assumes that council maintains existing drainage infrastructure.
- Detention systems: Option 1 considers the installation of a detention systems at 1 in 10 year average recurrence interval (ARI) in Stewart Street subcatchment to 1 in 100 year ARI in the Windermere Street subcatchment.
- 10kL Rainwater tanks: Option 2 would see the installation of 10kL above ground rainwater tanks at residential dwelling located east of New Street (the upper catchment) and/or between the railway line and New Street (the middle catchment).
- 20kL rainwater tanks: Option3 would see the installation of 20kL below ground rainwater tanks at residential dwellings located east of New Street (the upper catchment) and/or between the railway line and New Street (the middle catchment).

Flood maps developed by Water Technology for two different rainfall events (5 year and 100 year ARI events) were used to determine the number of parcels and dwellings affected by flooding to the east of the railway line. The flood maps also provided some indication of the flood height. Flood damage costs for the affected residential properties for the two different ARI events were estimated using Rapid Appraisal Method for Floodplain Management (Flood RAM) (DSE, 2009).

A cost effectiveness assessment was undertaken in conjunction with a threshold analysis. Threshold analysis was used to establish by how much flood damage costs would need to decrease under a particular option to achieve a lower net cost outcome than the Business as Usual scenario.

Table 1 presents the results of the threshold analysis.

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[1] Financial Risk Adaptation Planning (FRAP) is an initiative funded by the Victorian government. The initiative entailed developing a risk assessment and financial analysis framework to help councils assess the financial and economic risks of climate change to their operations. The framework has been applied through a series of issue specific case studies with member councils of South East Councils Climate Change Alliance (SECCCA).

Table 1: Results of the threshold analysis, present value ($'000)

	Business as Usual	Option 1 (Detention System)	Option 2 (10kL RWT)	Option 3 (20kL RWT)
Capital Cost		1,356	176	882
Operation & Maintenance Cost		274	15	189
Flood damage threshold estimate	**3,242**	**1,613**	**3,051**	**2,172**
Present Cost	3,242	3,242	3,242	3,242
Net Present Cost relative to BaU	*N/A*	*0*	*0*	*0*

Future flood damage costs over 2017-2031, under the BaU scenario, are estimated to be approximately $3.2 million in present value terms. Each option needs to achieve a certain reduction in flood damage costs for it to be a preferred alternative to BaU.

- Option 1 would need to achieve a reduction of at least $1.63 million (50%) in flood damage costs (i.e. flood damage costs are reduce to $1.6 million), for it to be preferred over the BaU scenario.
- Option 2 would need a reduction of 6% ($0.2 million) or more in flood damage costs to achieve lower present costs than the BaU scenario.
- Option 3 would require a 33% reduction ($1.1 million) in flood damage costs to be on par with the BaU scenario.

None of the required reductions in flood damage costs seem implausible. However, further flood modelling work is required to better understand the likely reduction in flood heights under each option and subsequently the avoided flood damage costs.

Conclusions and next steps

Overall the analyses undertaken suggest that all three options could plausibly achieve a sufficient reduction in flood damage costs to be worthwhile alternatives to the BaU scenario.

Option 1 and Option 3 incur relatively high present value costs of $1.6 million and $1.1 million respectively. It is likely however, that both options would achieve significantly greater benefits, in terms of reduction in flood damage, compared to Option 2 given their greater storage capacities.

Option 2 and Option 3 both rely on the proper maintenance of rainwater tanks by residents. Council would have limited, if any, control over the maintenance of the installed rainwater tanks. Therefore, there is a risk that this outcome may not be achieved if tanks are not maintained, are already full at the time of the high intensity rainfall event or have been disconnected.

On the other hand, Council has full control over the maintenance regime of Option 1, with the detention systems being council-owned assets.

Based on the risks associated with Options 2 and 3, Option 1 may well be the preferred option. To be confident on this conclusion however, further work, in particular flood modelling, is required to ascertain the avoided flood damage cost achievable under the options considered.