

7. HULVERSTONE DRIVE STOPBANK

| | |
|---|---|
| Officer responsible Parks and Waterways Manager | Author Paul Dickson - Drainage Engineer, DDI 941-8392 |
|---|---|

The purpose of this report is to seek the Board's guidance as to whether a stopbanking project on Hulverstone Drive should proceed.

BACKGROUND

Stopbanking was constructed along much of the Avon River edge downstream of Porritt Park in the early 1980s. The section on the south bank from Avondale Road to Wainoni Road had no stopbank constructed, probably because the ground levels were relatively high and the risks to housing were considered to be low.

In 1997, when the Council's first asset management plans were being drafted, funding of \$300,000 was put into the 20 year budget for stabilising of the Avon River stopbanks against liquefaction damage during a major earthquake. However, further analysis revealed that stabilising the stopbanks would be extremely difficult and could not be justified economically. Concurrently the Water Services Unit and Environment Canterbury were working on the Avon River Floodplain Management Strategy. Preliminary results suggested that the stabilisation funding could be reassigned for protection of parts of Avondale found to be at risk from river flooding. The budget assigned to stopbank stabilisation was provisionally reassigned for stopbank construction along Hulverstone Drive.

FLOOD LEVELS AND STOPBANK HEIGHTS

Stopbanks along the Avon River are designed to protect against the 1% annual exceedence probability¹ (AEP) or "100 year return period" flood. Most of the areas requiring protection are affected by tidal flooding and the stopbank level of 11.2 metres (to the Christchurch Drainage Board datum) is related to extreme tides. Mean sea level is 9.07 metres to the same datum.

HULVERSTONE DRIVE AREA - THE THREAT

Land levels along Hulverstone Drive are reasonably elevated and section levels lie in the range 10.9 to 11.2 metres. Ground levels are a little lower in some places further from the river; on Avondale Road, Breezes Road and Glenrowan through Waratah Streets. Street levels, as indicated by manhole cover levels, show that parts of some streets are at levels between 10.8 to 11.0 metres. These areas are potentially floodable shin to knee deep, in a 1% AEP flood, by such water as would traverse higher ground nearer the riverbank.

Shallow street flooding can be experienced more frequently than "once in a 100 years". Street flooding following high river levels during the 1992 snow storm caused local concerns and influenced promotion of the stopbank construction. The 1992 incidence of street flooding has an expected frequency of about 4 to 5% AEP.

One house and two electricity kiosks are subject to flooding in a 1% AEP event. The information is based on a mix of surveys and estimates: accurate floor levels were taken on those houses considered to be at risk and the majority of house floor levels were estimated from street levels.

Sea level rise would affect the level of hazard. The International Panel on Climate Change median prediction for sea level rise of 0.1 metres in 25 years would render eight houses and two electricity kiosks subject to flooding in a 1% AEP event.

COST OF FLOODING

The cost of flooding has been estimated, based only on the damage to inundated houses. This is a little conservative as it ignores potential damage to vehicles, utilities, sections and roads. However, garage flooding does not exceed 25 cm even under the sea level rise scenario and only some cars left parked on some streets are likely to be exposed to flooding damage. Road, section and utility damage is likely to be minimal.

The estimated nett present value of potential flood damages is \$25,000 (the annual value of damages over 50 years discounted at 7% to present value.)

¹ Annual exceedence probability is the risk that that a certain level of flooding will be equalled or exceeded at least once in any year.
Burwood/Pegasus Community Board Agenda 3 March 2003

PROTECTION OPTIONS

If it chooses to provide protection the Council can either deal with the affected house separately or build a stopbank. Stopbanking would extend 600 metres from Avondale Road to Wainoni Road, at an average height of 0.2 to 0.4 metres.

Options available to the Council are:

| Option | Present Day Cost of Option (2003 dollars) |
|--|---|
| 1. Do nothing. | \$0 |
| 2. Raise the house currently at a 1% annual risk of flooding. | \$40,000 |
| 3. Construct a stopbank now. | \$220,000 |
| 4. Construct a stopbank at a future time (say, in 15 years) when sea level rise threatens more than one house. | \$80,000 |

DISCUSSION

Stopbanking along Hulverstone Drive is a possible flood mitigation option suggested in the *Issues and Options for managing the Avon River floodplain* document, April 1997.

Because no houses are at risk in a 2% AEP ("50 year return period") flood the Council is not required under the Building Act 1991 to provide flood protection. However, surface street flooding does occur during this event.

The cost of protection exceeds the benefits; benefits being the \$25,000 present value of saved flood damages.

The cost/benefit equation will change over time if sea level rise occurs.

The funding available to build the stopbank can be usefully diverted to other stormwater utility improvements such as timber drain lining replacements or renewals.

The proposed stopbank will have some negative environmental effects, although these will be limited by its small height. Associated planting could achieve an enhanced outcome because the present river bank is rather bare.

No public consultation has been undertaken and residents' attitudes to a stopbank have yet to be canvassed. This will be done if the Board resolves that the process should proceed.

NATURAL + PEOPLE + ECONOMIC STEP ASSESSMENT

| # | CONDITION: | Meets condition ✓/0* | HOW IT HELPS MEET CONDITION: |
|--------------------------|---|-------------------------|---|
| The Natural Step | | | |
| N1 | Reduce non-renewable resource use | x | |
| N2 | Eliminate emission of harmful substances | 0 | Only emissions are during construction. |
| N3 | Protect and restore biodiversity and ecosystems | 0 | Effects on biodiversity very minor. |
| N4 | People needs met fairly and efficiently | NA | NA - See People Step + Economic Step |
| The People Step | | | |
| P1 | Basic needs met | ✓ | Stopbank reduces risk to residents. |
| P2 | Full potential developed | 0 | |
| P3 | Social capital enhanced | 0 | |
| P4 | Culture and identity protected | 0 | |
| P5 | Governance and participatory democracy strengthened | 0 | |
| The Economic Step | | | |
| E1 | Effective and efficient use of all resources | x | Negative benefit/cost ratio. |
| E2 | Job rich local economy | ✓ | Work provided locally. |
| E3 | Financial sustainability | x | |

Staff

Recommendation: That the proposed Hulverstone Drive stopbank construction be deferred until sea level rise increases the number of houses at risk and hence increases the benefits of stopbank construction - nominally a period of 15 years.

Chairperson's

Recommendations:

1. That the abovementioned recommendation be adopted.
2. That a further report be provided on the environmental enhancement of the stopbank.