

# Keeping Wanganui Dry

## About your river

Wanganui has a history of flooding. Reports of floodwater at the intersection of Ridgway St and St Hill St date back to the 1840s. These levels significantly exceeded those of a 200 year flood.

In 1904 there was a 40 year flood, in 1940 a 70 year flood, and the February 2004 flood was calculated to have a return period of just 10 years.

Investigations by Horizons Regional Council have shown that the standard of flood protection for the urban area is currently lower than the normally accepted standard of 100 years or greater protection for significant urban areas in New Zealand.

This newsletter explains how Horizons proposes to improve the level of protection for the most at-risks areas, and how we propose to cover the costs. We are keen to receive your feedback on our plans and invite you to attend one of the public meetings we will be holding in Wanganui (see details at the end of this newsletter), or contact us directly for more information.

The Whanganui River starts in the mountains of Tongariro, Ruapehu and Ngaruahoe and winds its way through steep rugged hill country, confined within narrow valleys, to Wanganui.

The river's mouth naturally shifted over time but the moles built in the early 19th century fixed the mouth and restricted it during large floods.

In agreement with the Wanganui District Council, Horizons assumed responsibility for protecting Wanganui from flood in April 2006, and began an investigation to assess flood risk

and to develop mitigation options. This showed that Wanganui's flood protection was lower than the normally accepted standard of 100 year or greater protection for significant urban areas in New Zealand.

Regional Councils keep records of the size of floods in their important rivers, and talk in terms of the probability of a flood being equalled or exceeded in any given year. So a '100 year flood' is probably best known as a 1% Annual Exceedance Probability (AEP) flood, while a 200 year flood has a 0.5% AEP. The 200 year level of protection is commonly used as an appropriate standard for significant urban areas that are at risk of flooding. Based on detailed investigation, Horizons considers that to be the appropriate standard for Wanganui.

At present, if Wanganui experiences a flood of a 100 year return period, large parts of the lower areas of the city will flood. Approximately 60 hectares of Balgownie will flood to a depth between 0.5 metres and one metre, along with 20 hectares of Taupo Quay and 20 hectares of Kowhai Park, with the park itself flooding to a depth of two metres, as well as 50 hectares of the Putiki area.

In a 200 year flood, depths are 0.2 to 0.3 metres deeper.

Flood damage estimates are \$91 million for a 100 year flood and \$141.4 million for a 200 year flood.

## Key information used in flood protection considerations

### Primary flood risk areas

- Kowhai Park/Anzac Parade - North and south of Dublin St
- Putiki upstream of Cobham Bridge
- Moutoa frontage - Bates Street to City Bridge
- Balgownie industrial area - Wharf Street to Balgownie Avenue

### Other flood risk areas

- Below Cobham Bridge
- Flood-prone zones on SH4
- The Campground (Somme Parade)

Horizons has considered various levels of protection for flood return periods of 50 years, 100 years, 200 years and for a 'global warming' scenario event.

Annual Exceedance Probability	Flood Return Period	Discharge
2%	50 year	4441 cumecs
1%	100 year	4882 cumecs
0.5%	200 year	5321 cumecs
Global warming flood		5760 cumecs

# Proposals for at-risk areas



## Kowhai Park/ Anzac Parade

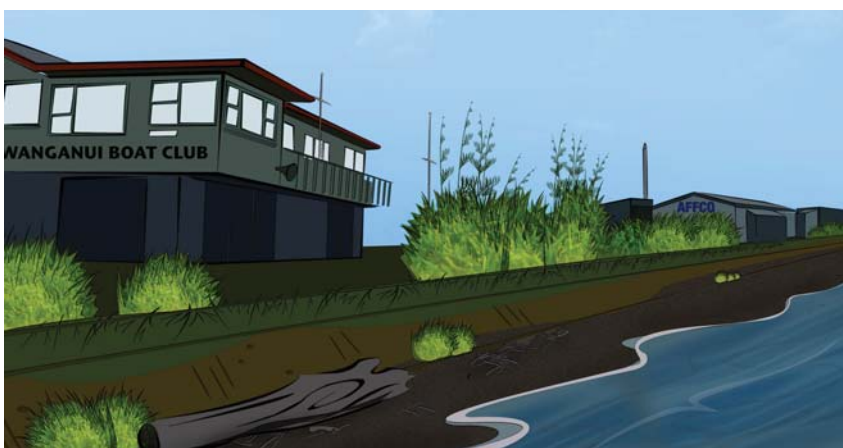
An earth stopbank 2.5 km long following the riverbank below Young Street. There would be a major diversion of the Matarawa Stream with culverting and return banking.



## Taupo Quay above Cobham Bridge

About 1.9 km of combined earth embankments, concrete flood walls or stoplog walls, which can be put in place during extreme flood events. Design factors include aesthetics, access to the Waimarie, and access and reasonable free movement for rowers and users of the Whanganui River walkway. There are three distinct portions:

- a. Rowing Club to below Waimarie berth:  
Combination of earth embankment and stoplogs.
- b. Waimarie to Town Bridge: This would be architecturally designed to fit into the existing walkway area.
- c. Town Bridge to Cobham Bridge: Standard earth embankment.



## Wharf Street to Balgownie Avenue

A 3.3 km stopbank along the riverbank with a floodgate and pump station needed at the Balgownie former rubbish tip area.

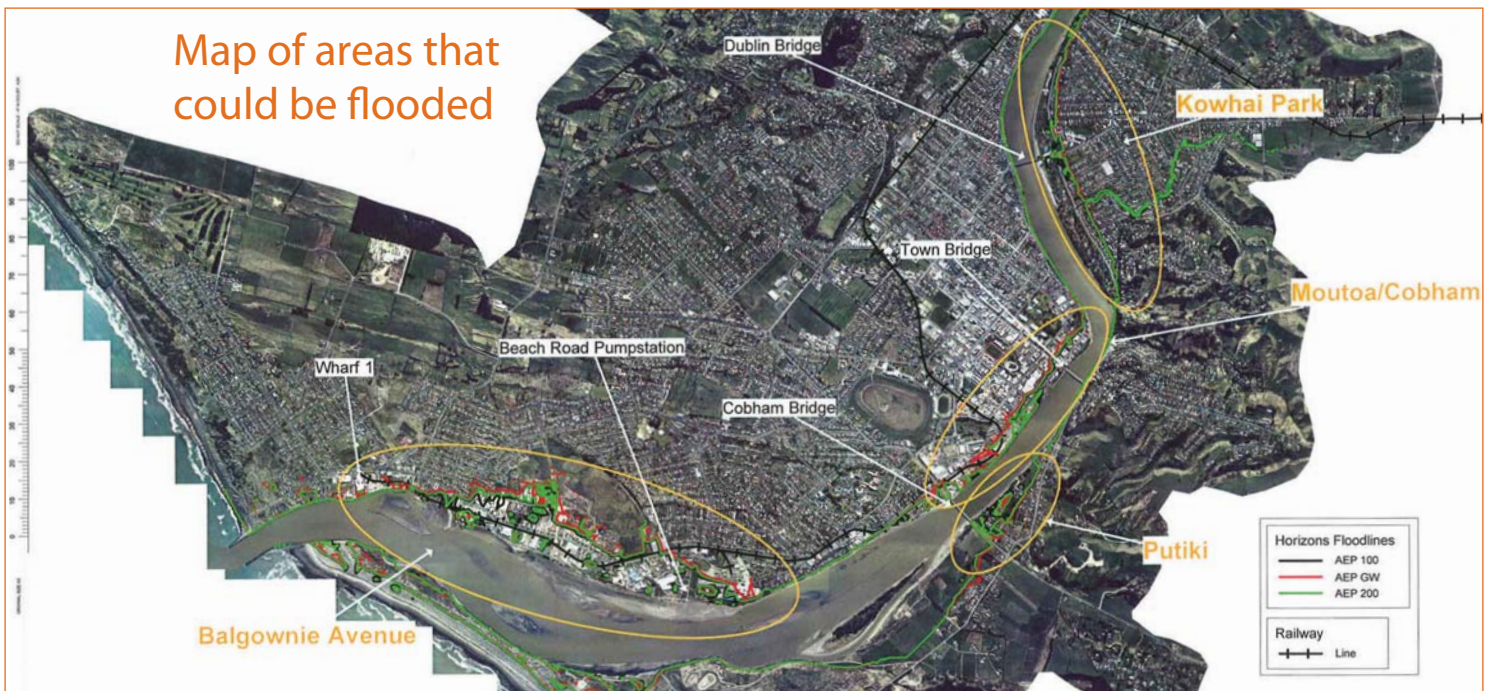
## Timber yard below Cobham Bridge

This area is not included for protection at this stage. However, the stopbanking could be extended some 600 metres downstream with two floodgated drain outlets required.

## Putiki above Cobham Bridge

Stopbank with a floodgate structure at the Ngatarua Stream outlet and rock protection along the toe of the stopbank upstream of Cobham Bridge.

## Map of areas that could be flooded



## What are the flood protection options?

### Overview of options

As a result of comprehensive research and modelling, a number of options have been considered in order to give Wanganui an appropriate standard of flood protection.

These options are as follows:

- Provide protection to at-risk areas using stopbanks, flood walls and stoplogs to ensure continued access to the river at key locations
- Do nothing

- Build an overflow weir through the sand spit to the south of the river mouth to reduce levels in the lower river
- Build a supplementary river mouth to reduce flood levels in the lower river
- Relocate or raise buildings in the flood risk areas.

Thorough assessment of all the above options leads us to believe that the first option offers the greatest benefits in terms of protection for dollars spent (see benefit details later in this newsletter).

### Construction of a supplementary river mouth

Construction of a supplementary river mouth to take surplus floodwater out to sea would involve very substantial costs (estimated at \$15.7 million in 2003) and would have significant potential detrimental impacts, though it would significantly reduce flood profiles in the lower river. The river last cut through the spit of its own accord in 1947, and rock protection work was needed to prevent future breakouts. A second mouth would pose a risk of being unable to return the river to its current course following a major flood. This option is not recommended for further consideration.

### Doing nothing

Doing nothing would result in an unacceptable level of risk. Around 150 hectares of land would be at risk of flooding with substantial economic and social impacts, plus possible risk to human life. Flooding of houses and other buildings would occur in a 20 year (5%

AEP) flood at Kowhai Park/Anzac Parade and in a 30 year (3.3%) flood at Balgownie, Putiki and Taupo Quay. A 200 year (0.5% AEP) flood would see water to depths of up to 2 metres in the Kowhai Park area around Ikitara Road.

### A 500 metre long sandspit overflow weir

Would not provide sufficient benefits in terms of savings on lower embankments and flood walls to justify the \$1.5 million cost.

There would be risk of the weir failing in a major flood and significant ongoing maintenance costs in keeping the weir clear of sand. This option is not recommended for further consideration.

### Relocating houses

Relocating houses at risk of flooding, mainly in the Kowhai Park/Anzac Pde area, would incur unacceptably high costs and cause unacceptable community disruption. Raising them above the design flood level would be impractical. This option is not recommended for further consideration.

### Dredging

Dredging was not considered an option because our studies have shown further dredging would not help reduce the impact of flooding. The Whanganui River estuary and mouth was once dredged to assist the commercial operation of the port, but this had no beneficial effect on flood flow.



## How will rates be shared?

Scheme rates that would fund 80% of the costs, would be levied on properties that are assessed to benefit either directly or indirectly from the flood protection provided.

Horizons proposes to set and assess new targeted rates to pay for these works. They will be assessed on the following four categories of land:

**Direct benefit** (Rating categories W1 and W2): Two categories of rates that are based on the Capital Value of properties in a specific area. This area is approximately the same as the former Wanganui District Council Urban Ward.

- **W1** applies to properties which, if not for the protection provided by the scheme, would be flooded in a 200 year flood, i.e. a 0.5% AEP event; and
- **W2** covers the rest of the properties in that area, which would receive a medium degree of direct benefit.

A 100:60 differential between W1 and W2 will

apply, to reflect the higher direct benefit to the properties which would otherwise be flooded.

**Indirect benefit** (Rating categories N1 and N2): two categories of rates that reflect the indirect benefit of the proposed works.

- **N1** applies to all properties covered by the W1 and W2 direct benefit rating categories, it can be explained as another 'layer' of rates that recognises a secondary benefit (charged as a rate in the dollar based on Capital Value); and
- **N2** applies to all properties in the Wanganui District, excluding those in the N1 area (collected as a Uniform Annual Charge).

**The other twenty percent of all scheme costs** would come from general rates on an ongoing basis, in line with all other schemes for flood protection works in the Region. In addition, there would be an additional special \$100,000 contribution from general rates income for each of the first five years, in order to reduce the levels of debt early in the project and thereby save interest costs for the term of the loans.



## What form of protection is feasible?

Investigations and past experience show Wanganui's best option is a combination of earth embankments (stopbanks), concrete flood walls and removable stoplogs. Particular attention would be given to developing sensitive designs where buildings and other infrastructure are close to the river bank, and where access and aesthetic considerations are particularly important.



## How would this work?

- Earth stopbanks and concrete floodwalls would be built to withstand flood levels for extended periods of time without failure.
- Stopbanks would have a crest width of 4 metres. All structures would be built high enough to provide 0.5 metre freeboard in a 200 year flood.
- Temporary walls (timber or concrete stoplogs) would enable continued river access to be kept open at key points for recreational and other use. The stoplogs would be slotted into the stopbanks or floodwalls to close the gaps in response to major flooding alerts.

# The different levels of protection

Cost estimates have been prepared for different key areas requiring protection, for a range of flood return periods from 50 year to a global warming flood.

Location	50 year (\$)	100 year (\$)	200 year (\$)	Global warming (\$)
Kowhai/Anzac	2,800,000	3,200,000	3,600,000	4,000,000
Putiki	480,000	510,000	550,000	600,000
Taupo Quay	1,700,000	1,900,000	2,100,000	2,400,000
Balgownie	2,700,000	2,800,000	3,000,000	3,400,000
Sub total	7,680,000	8,410,000	9,250,000	10,400,000
Fees	620,000	690,000	750,000	800,000
<b>TOTAL</b>	<b>8,300,000</b>	<b>9,100,000</b>	<b>10,000,000</b>	<b>11,200,000</b>

The recommended protection standard is for the 200 year or 0.5% AEP flood.



## How would Wanganui benefit?

While many parts of Wanganui would not be physically flooded during a flood event there would be widespread social and economic effects. People would not be able to get to work, infrastructure would be damaged, businesses may close and income could be lost due to damage and disruption.

The Balgownie industrial area would be worst hit and there would be significant

damage in the Taupo Quay commercial area plus the Kowhai Park/Anzac Parade and Putiki residential areas.

The 100 year standard of protection would provide an estimated \$1.62 million in average annual savings in reduced damage, while the 200 year standard has average annual savings estimated at \$2.10 million.

## How would the flood protection works be managed and funded?

Horizons proposes to establish a river management and flood protection scheme similar to a number of other schemes already operating around the Region.

The proposed scheme would include a seven year capital works programme, with the greatest benefits obtained in the earlier years, and then an ongoing maintenance programme.

The capital work would be prioritised over the seven-year construction period according to the present likelihood of flooding, risk to human life and potential damage. This means the Balgownie industrial area protection would be built first, followed by Kowhai Park/Anzac Pde.

An annual maintenance programme would ensure that the flood protection works are maintained to a high standard; that river edge

vegetation is managed to provide erosion protection; and that the channel is maintained for flood conveyance and recreational purposes.

The scheme would be funded by new targeted rates and loans. Borrowing is very commonly used to fund major capital works of this nature, so future generations who would benefit also contribute a fair share to the costs.

**Under Horizons' funding policy, 20% of the cost of all river and drainage schemes is funded from General Rates.**

The balance of scheme costs is funded by a targeted rate.

Horizons has considered a number of funding options involving different capital work programmes, different levels of borrowing,

different loan repayment terms, and either 'flat' or 'progressively increasing' levels of rates. The recommended funding option for the Wanganui scheme assumes:

1. the capital works to be completed over a seven year period
2. protection to be provided to the 200 year (0.5% AEP) standard
3. capital works to be funded by a combination of borrowing and rates
4. loans to be repaid over a term of 20 years; and
5. scheme rates to be set at a uniform level for the 20 year loan term, varying only as a result of inflation or changing interest costs.

A different funding model could be adopted, depending on submissions received on the proposal.

# Lower Wanganui Scheme

## Rating Calculations

Category Name	Category Code	Capital Value (\$million)	Number of properties	Proportion	Effective Capital Value (\$million)	Annual Rate Required	Less Indirect Benefit Rate	Total Rate Required	Rates per \$100,000 of CV	Rates per \$100,000 of CV (GST Incl)	For per \$215,000 property (GST Incl)
							20%				
A	B	C	D	E	F	G	H	I	J	K	L
Whanganui River Flood Control Medium Benefit	W1	204		100%	2,394	790,031	-158,006	632,025	\$26,40	\$29.70	\$63,86
Whanganui River Flood Control High Benefit	W2	3,650		60.00%					\$15.84	17.82	\$38.31
Rural Indirect Benefit	N2		3,129				24,517	24,517	UAC	UAC	UAC
									\$7.84	\$8.81	\$8.81
Urban Indirect Benefit	N1	3,854	17,037				133,490	133,490	CV	CV	CV
									\$3.48	\$3.90	\$8.38
						\$790,031	0	\$790,031			

## Having your say: how to provide feedback

- You can obtain a copy of the full Statement of Proposal for the Lower Whanganui River Flood Protection Scheme at
  - Regional House Wanganui
  - Regional House Palmerston North
  - all Horizons Regional Council Service Centres
- By calling freephone number **0508 800 800**

OR

- Emailing [helpdesk@horizons.govt.nz](mailto:helpdesk@horizons.govt.nz)
- From our website [www.horizons.govt.nz](http://www.horizons.govt.nz)
- We also invite you to attend a meeting to learn more about the scheme, where our specialist staff will be happy to answer your questions.

Written submissions on the proposal will be accepted until 2 May 2008. You may, if you wish, appear in support of your submissions to the Regional Council at a formal hearing. Hearings are scheduled for 19 May to 21 May 2008. Submissions on this flood protection scheme proposal will be heard in combination with the submissions on the Draft Annual Plan.

## Sample Properties

### Impact on rates according to rating category

Location/Description	Rating Category	Proposed Rate (GST incl) Total Rate of \$790,031
Average House (CV \$215,000) in floodable area	W1 & N1	\$72.74
Average House (CV \$215,000) in urban area but outside directly floodable area	W2 & N1	\$46.70
Executive House (CV \$500,000) in urban area but outside directly floodable area	W2 & N1	\$108.60
Large industry (Balgownie)	W1 & N1	\$4,704
Large retail complex (Trafalgar Square)	W1 & N1	\$6,451
Rural Property	N2	\$8.81

## Come and talk to us

Horizons is holding public meetings about the Wanganui Flood protection, so you can come and talk to the team about any questions you have. Details for the meetings are as follows;

Venue	Date/Time
<b>Saturday Market Day</b>	Sat 29 March 2008 9 am
<b>Sailing Wanganui Clubrooms</b> 70 Gilbert Street Wanganui	Thur 3 April 2008 6.30 pm
<b>Wanganui Bridge Club</b>	Fri 11 April 2008 6.30 pm
<b>Wanganui Girls College Hall</b> Jones St Wanganui	Tue 16 April 2008 6.30 pm