Peer Review of Greater Wellington Flood Protection Assets

By Horizons Regional Council 19 & 20 June 2008

Report prepared by Paul Joseph and John Eyles, September 2008

1. Summary

Flood Protection assets owned and maintained by Greater Wellington are generally in good order and are being maintained appropriately. The assets reviewed were all well designed and durable, with some innovative design solutions being successfully trialled.

The visit by the Horizons Operations Management Team is viewed as a success. The opportunity to network and compare operating practices is of benefit to both councils. HRC staff expressed particular interest in:

1. The quality of asset information easily available on aerial photos through a GIS layer
2. A staged approach to asset condition.
3. The desire for CAD/mapping self sufficiency.

A reciprocal visit to review Horizon's RC assets is planned for 2009.

2. Background

The following staff from Horizons RC (HRC) were involved in the peer review:

Alan Cook - Group Manager Operations

Lew Marsh - Eastern Area Engineer

John Foxall - Southern Area Engineer

Rob Gardner - Projects Manager

Peter Blackwood - Investigations and Design Manager

Derek McKee - Central Area Engineer

Paul Joseph - Assets and Environmental Engineer

2.1 Otaki River

2.1.1 Chrystalls Extended Stopbank

This stopbank to enhance protection for the Otaki township, has recently been completed under capex for $1.4M and transferred to maintenance. The

stopbank was constructed by motorscraper (hauling and placing) for approx $2.80/m3. Similar stopbanks are constructed in the Horizons region for $4-$5/m3.

A suggested improvement from HRC is the use of a full time Clerk of Works for day to day contract supervision, as this frees up engineer's time.

HRC staff were very interested in the design and operation of the removable aluminium Blobel floodgates on the main trunk railway line, and are considering adopting this solution for similar situations in their region.

2.1.2 Chrystalls rockline

This rockline was constructed with 30,000 tonnes of rock from Tangiwai. Staff from GW and HRC both agreed that skilled machine operators are critical for placement of large rock. HRC practice is to specify and place angular rock for rocklines. GW preference is for more rounded shaped rock, although it was agreed that the shape of the rock is not critical compared to operator competence. River bank discussions included the embedment of rock into the bed of the river with regard to scour depths, durability of the works and the risk that the job could be outflanked.

HRC were impressed in the environmental enhancement work on the Otaki, particularly the pedestrian walkway, bridge, native plantings and overall community engagement. HRC also understood that the time required to organise this level of community engagement was considerable, and could require a dedicated staff member to manage. HRC were also interested in the "Great Gravel Grab" programmes run by GW from time to time to publicise flood protection activities.

2.2 Waikanae River

2.2.1 Jim Cooke Park

The new works at Jim Cooke park were shown as well as some existing sections of stopbank due for upgrade.

The old stopbank is rated poorly because of steep batter slope, trees growing in stopbank, steps cut in and private gardens, insufficient height and width. HRC are currently reviewing their condition ratings, and found the debate extremely useful. The revised asset condition ratings, customer and technical levels of service that will be included in the latest edition of HRC asset management plans will be forwarded to GW when finalised. Presently, HRC would rate this old stopbank a higher condition than GW (condition 4- due for capital upgrade).

Useful discussion about condition ratings:

Do you rate an asset over its whole length (average condition) or between cross sections? What constitutes "condition 1" or "condition 4"? Should there be different ratings for maintenance, structural rating and design (level of service)? GW practise is to rate for maintenance only. At HRC, condition is also age related, any asset 100 years old is an automatic condition 5 because of uncertainty over its standard of construction.

Waikanae river mouth - mouth is cut from time to time when trigger levels are met ie river wanders north or south. Not much river cutting done at HRC.

2.3 Hutt River

Gravel extraction at Kennedy Good Bridge. GW's global consent allows for gravel extraction on dry beaches, but this is not enough to return bed levels to 1998 levels. A wet extraction consent has been granted, but conditions require a natural channel shape with a meander pattern to be put back (requirement of Fish and Game). Wet extraction gives an income of $2 per m3 for gravel but increased dozer costs of $3 per m3 for pushing up and channel-shaping costs means a loser activity for GW. Wet extraction in this reach was completed last Christmas. HRC identified that the size of the gravel pile stockpile under the bridge could increase flood risk. This was acknowledged by GW staff who consider the risk to be low.

2.3.1 Ava to Rail bridge Capital works

This $5M capital project has recently been completed. HRC were very impressed by the standard of the works at this site. The walkways and rock complemented each other aesthetically and provided a sound engineering solution to bank erosion in this reach. Interesting to note that rock was barged in from the South island, and how smoothly this operation went, showing good project management skills by GW.

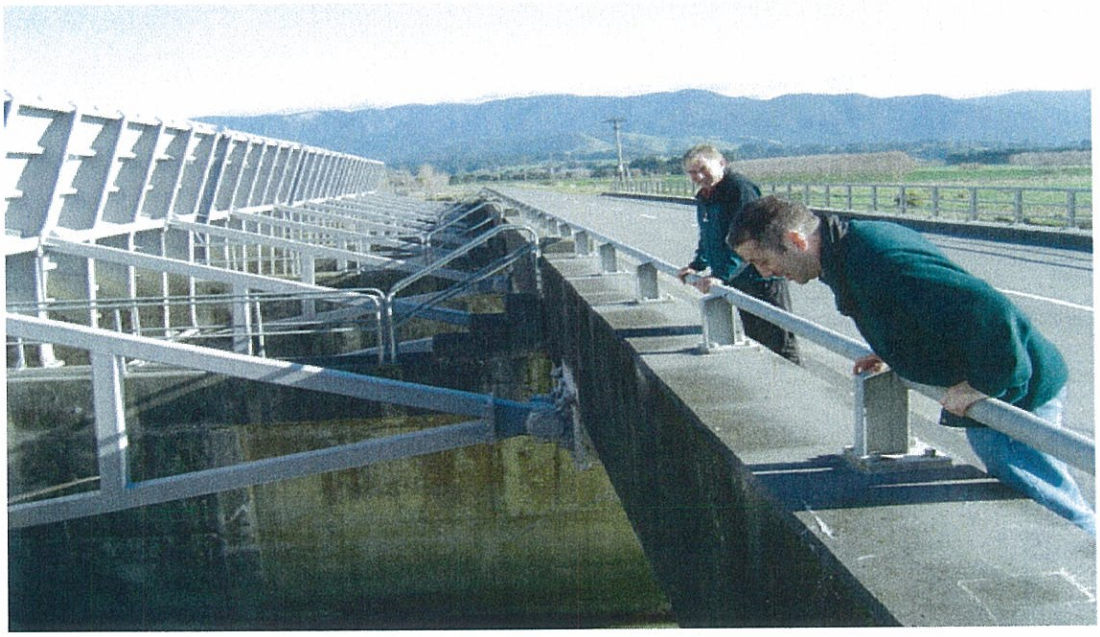
2.3.2 Maoribank Corner

This is an identified problem on the Hutt river. Services and assets are at risk because the river is cutting down. HRC suggest additional bed armouring in front of rockline for protection.

2.4 LVWDS

2.4.1 Barrage Gates

HRS considered that the scale and operation is very similar to their floodgates at Moronui. Depreciation is allowed for but no funds are physically set aside. The mouth at the exit from Lake Onoke needs frequent cutting (11 times already in last 6 months)



2.4.2 Hikinui Sill

The Hikinui sill operates as an overflow path in the lower valley in high flows and operates about once every 2 years. Previous problems with fast flows caused a hydraulic "jump" together with steep batters causing scour. The solution was to smooth out batters and reinforce grass cover over the sill to prevent scour. Rail irons have also been installed for debris protection. There is a boulder lining on the outside approach curve to the sill which is loose but effective.

About 95% of the 200km of stopbanks in the lower valley scheme is in private property. Grazing is allowed on assets if controlled. Any damage is repaired by the property owner. This is similar to HRC landuse.

HRC were particularly interested in this innovative solution to the problem of hydraulic jump bank erosion. The holistic view taken of this reach of the river, and the combination of a variety of works to solve this problem was a good example of sound river engineering practices.

2.4.3 Dakins Road Rock Groynes

These are in the Gladstone scheme of the Ruamahanga river and are designed to protect a road, vineyard and camping ground. The groynes were installed in 2007 and jointly funded by Carterton DC, Transit and GW. HRC were keen to implement this style of protection for a similar job, where the $4M estimate is not affordable. HRC understood that this site was particularly difficult, both with access and river conditions, and considered the solution employed by GW to be the best both in cost effectiveness and philosophy for this particular site.