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## **AUDIT OF RIVER MANAGEMENT ASSET MAINTENANCE STANDARDS**

- Audit of:** River Schemes managed by the Operations Department, Wairarapa Division of WRC
- Inspected by:** Geoff Dick and Steve Murphy of the Flood Protection Group, Landcare Division
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- Inspection Date:** 5 July 2001
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### **1. Introduction**

Annual peer reviews are undertaken of river asset maintenance programmes in the Wairarapa and Wellington areas. The peer reviews provide an audit of maintenance standards and procedures. The reviews are undertaken by inspections of representative sites selected by the peer reviewers.

This year's inspection of Wairarapa River assets included a number of sites on the Lower Wairarapa Valley Development Scheme, and a good look at the Waiohine-Mangatarere River Scheme.

### **2. Lower Wairarapa Valley Development Scheme**

The Lower Wairarapa Valley Development Scheme (LWVDS) covers the section of the Ruamahanga River from the Waiohine confluence downstream to the sea at Lake Ferry, the Tauherenikau River from the Rail Bridge downstream to Lake Wairarapa, and all the eastern and western tributary streams.

Scheme construction commenced in 1964 and was completed in 1988, and cost \$86 million (1996 \$). Key infrastructural assets include 190km of stopbanks, the Blundell Barrage gates, four overland floodways (Tawaha, Hikinui, Awaroa and Oporua) and associated control structures, 112 culverts and floodgates and 45km of fencing. The current value of scheme assets is \$42.4 million.

Sites visited on this scheme were:

- Donalds Creek Project
- Gillet Overflow Bank
- Butcher's Stopbank
- Oporua Floodway

## 2.1 Donalds Creek Project

The Donalds Creek project consisting of a flood detention area with control culvert, and floodway and stopbank improvements provides flood protection to Featherston. The project costing \$350,000 was completed in 1999.

The project was inspected from the Harrison Street box culvert. The detention area upstream of the culvert was being grazed under license. There was a small build-up of gravel immediately upstream of the culvert. Downstream the floodway was clear with the stopbanks in good condition. A rock grade control weir immediately downstream of Harrison Street required some minor maintenance.

There was quite a bit of discussion about whether the 8Ha detention area owned by the Regional Council should be sold. The general consensus was that it was better to retain the land and continue to lease the grazing. This view was based on a combination of a need to maintain appropriate controls over the land, and the marginal financial benefits of selling.

*We recommend that the 8Ha flood detention area remain in Council ownership unless a thorough review of both financial and management benefits, and costs, prove that selling is a better option.*

## 2.2 Gillet Overflow Bank

The build-up of gravel in the lower Tauherenikau River is a major management issue for the LWVDS.

The Tauherenikau River bed downstream of State Highway 53 is today substantially modified. Previous scheme works diverted a 3km reach of the river and constructed parallel stopbanks to the outlet in Lake Wairarapa. However, the capacity of the floodway has been progressively reduced by ongoing gravel deposition. The stopbank adjacent to the Gillet Property has breached four times since 1992. Gary Williams, Consulting River Engineer, has completed a study on the hydraulics and sedimentation processes, and the outcomes of this have been reported to the Rural Services and Wairarapa Committee.

Overall the reviewers gained the impression that an appropriate level of investigation into the issue had been undertaken and that sensible medium and long-term strategies had been put in place. As part of this review we inspected:

- The recently built Gillet spillway on the true left bank of the Tauherenikau.
- The Tauherenikau channel upstream of the Gillet spillway.
- Minor strengthening works completed to an auxiliary stopbank in the Gillet property.



Construction of the Gillet spillway was completed late autumn at a cost of \$115,000. The spillway consisted of a section of the original parallel stopbank that has been strengthened with gravel fill, capped with a silt layer which was sown to grass. The work appeared well executed with a very promising grass covering establishing. Appropriate maintenance of the river channel is being undertaken.

*Implementation of the medium term approach is well advanced with the successful completion of construction of the Gillet spillway. We also note that gravel extraction downstream of State Highway 53 is being actively encouraged. However, in the longer term the management strategy does rely on the eventual retirement of a significant parcel of farm land currently owned by Mrs Jane Gillet. We understand that a formal land agreement has yet to be negotiated with Mrs Gillet.*

*We recommend that further efforts be made to formalise land arrangements with Mrs Gillet. We endorse the currently preferred option of Council purchasing the necessary retirement land and leasing it back to Mrs Gillet in the interim.*

### 2.3 Butcher's Stopbank

We had a brief opportunity to look at the condition of a representative section of the stopbanks along the lower Ruamahanga River. No significant maintenance issues were noted.

At Butchers slump failures had occurred in the past leaving no berm to provide security to the adjacent stopbank. In fact some of the slump failures included slips on the river face of the stopbank

An ongoing project to reconstruct a low level bench with a rip-rap facing and grass only cover has been very successful. Where possible the river stopbank face is being reconstructed to a 2: 1 batter.

About 200m of bench is required to complete the project. \$30,000 has been included in the 2001/02 work programme to progress this.

*The reviewers concur with the chosen repair option and note that the basic cause of the original slumping (silt build-up on the berm) was appropriately considered in the selected repair option. We consider that the project is being progressed acceptably. Some future maintenance may be required to remove the silt build-up on the reformed low level bench.*

### 2.4 Oporua Floodway

The drop structure in the Oporua floodway downstream of Kahutara Road (the "Ducksbill") was inspected.

The inspection showed this structure to be in very good condition. No flood damage has occurred since 1994. The additional reno mattresses to the top of the sills in critical areas and anchoring the mattresses with gabion baskets have overcome some of the original design and construction short-comings. The drop structure is fenced off and the adjacent berm is now mown.

*The engineering issues at the 'Ducksbill' now appear to have been resolved. Our overall impression from this visit was what a beautiful spot it is now. The location has significant potential as a picnic area. We think that consideration should be given to whether public use of the area can be encouraged with some amenity planting and car parking space.*

## 2.5 Summary – LMVDS

A comprehensive inspection of the Lower Valley scheme was not undertaken or intended. Instead four sites were visited which had quite distinct and separate management issues.

*The management issues at all four sites were being appropriately managed. We remain satisfied that overall the Lower Valley scheme remains robust, well managed and financially sound.*

## 3. Waiohine Scheme

The Waiohine River Scheme extends from the Tararua Range foothills 16 kilometres to the Ruamahanga River confluence. It also covers 5km of the Mangatarere Stream and 1km of the Kaipatangata stream

The scheme provides flood and erosion protection benefits to Greytown and some highly productive orchard and dairy farms. The current annual maintenance budget is approximately \$225,000.

A series of significant flood events has occurred in the Waiohine River (and the Mangatarere) since the mid 1990s, the most recent in October 2000. The ongoing flood events and a previously very tight maintenance budget had seen the scheme going backwards. Buffer zones were deteriorating, channel alignment problems were becoming severe and sections of stopbank were either damaged or coming under significant threat. However, action has now been taken to stop this deterioration and work is well underway to rectify scheme maintenance issues. The key to this response was a 60% increase in Scheme rate income in the 1999/00 financial year.

Other management work underway or completed includes:

- A review of the scheme rating classification. Scheme rates are now split 50:50 between the benefiting rural and urban areas.
- A review of floodplain management options, in particular the Apple Barrel Floodway.

The Waiohine River was inspected following completion of a substantially increased works programme following the October 2000 flood events. Total scheme expenditure was \$410,000 for 2000/01, approximately double the annual works programme. This has left a substantial scheme deficit, estimated at \$216,000 at the end of June 2001.

### 3.1 Saywells Stopbank

The Saywell stopbank cuts off an overflow path to Greytown. The current (new) stopbank was constructed in 1998. The stopbank, as inspected, was in good condition. It was well fenced with good stock crossings. However, we did note that a scour channel had formed in front of the stopbank. Some large river boulders had been placed in the scour channel as an initial repair.



The Saywell stopbank is located on the outside of a major bend in the river. The key to the ongoing security of the stopbank is management of the adjacent channel alignment and planting of a buffer zone. Some weaknesses in the buffer zone were noted. However, this is being addressed with planting and an active channel maintenance programme. Substantial work had been completed in 2000/01 to maintain a clear fairway and encourage the active channel into the centre of the fairway.

*The Saywell stopbank was in good condition as inspected. However, we do recommend that further maintenance work is considered for the adjacent berm and buffer zone to ensure the on-going security of this important stopbank. In particular we think the scour channel should be either, blinded off with some soil and sown to grass (a good grass cover is very resistant to surface erosion), or alternatively planted with willows in a herring bone pattern. We also strongly recommend that the current channel maintenance and planting programme continue with the aim of improving the channel edge willow buffer zone.*

### 3.2 Mangatarere Stream at Hodders

A section of the Mangatarere Stream adjacent to Mr Colin Hodder's dairy farm was inspected. We also looked at a small cut-off stopbank recently constructed in the Hodder farm.

Over recent years maintenance of the Mangatarere Stream has been given a low priority given the pressures on available funds. This was evident from the inspection. An annual digger run with appropriate willow clearing/planting and gravel extraction is now planned.

The new stopbank on the Hodder property was constructed to specifically provide improved flood protection to the Mr Hodder's house and adjacent sheds. The stopbank costing \$7,000 is an appropriate solution for the situation.

*The reviewers agree that an annual maintenance run of the Mangatarere Stream to maintain channel capacity and to address developing channel misalignments is required.*

### 3.3 Brazendale

The Brazendale property is located on the left bank of the Waiohine River upstream of State Highway 2. At the site a number of rock groynes had been constructed to repair bank edge erosion and protect the adjacent stopbank. Gravel had been extracted off a large river beach opposite the site.

The groynes are an appropriate solution for the site. Rock size and quality were good. The reviewers would have liked to see the groynes more heavily keyed into the bank edge, however, we do note the trade off of some outflanking risk until willow planting establishes against the additional length of bank covered by minimising the groyne size.

*Overall the solution chosen at this site is appropriate and well executed. We think encouraging Oldfield's to set up an extraction site upstream **of** the State Highway will offer significant river management benefits, however, ongoing bed level monitoring will be required to ensure the extraction is sustainable,*

### 3.4 Wongs

This site is located on the true right bank of the river, downstream of the State Highway. At this location the river had been realigned and new bank protection work constructed, at a total cost of approximately \$55,000.

The work at Wongs is a significant step up in the treatment of major erosion on the outside of bends in this river. The key difference being the bulldozer had been used to realign the river back to a more sustainable alignment before edge stabilisation works were constructed. This should pay dividends in reduced erosion problems downstream.

Following completion of the channel shaping work, 3,000 tonne of large river boulders from upstream of the railway line were placed in a gently sloping rip-rap blanket to armour the reformed bank edge. Willow planting, using rooted stock, of the reclaimed berm had just been completed at the time of inspection. A cement stabilisation trial of the gravel berm at the downstream end of job was looked at.

*Overall the reviewers believe that an appropriate scale and type of work had been completed to restabilise this bend in the river. The river stone armouring will require close inspection and prompt maintenance to ensure its ongoing integrity. Similarly the berm area will be vulnerable to surface erosion until the willows and general vegetation establish.*

### 3.5 Bicknells

The Bicknell's site is located downstream of State Highway 2, and close to the Ruamahanga confluence.

Work inspected included:

- A reconstructed stopbank. The level of this stopbank had been carefully set to overtop at 4.0m stage level (about a two year return period event), the same as similar banks on the true left bank of the river.
- Channel widening work to remove a historic narrow point, and create a uniform channel width.

The work as inspected had just been completed. A grass cover had yet to fully establish on the new stopbank and some follow up willow planting was proposed.

*The works inspected were consistent with scheme management objectives and appeared well executed.*

### 3.6 Waiohine River Scheme – General Comments

The Waiohine River Scheme was last peer reviewed in 1997. At that stage the scheme managers were struggling with an unrealistic maintenance budget, and continuing flood damage.

During this most recent visit a new more proactive approach to managing the Waiohine Scheme was clearly evident. A key to this has been the 60% increase in funding levels and a commitment to repairing flood damage, despite the significant flood fund debt now being carried.




This years inspection also showed a change in the nature of work being undertaken. More permanent type works are being completed, some using rock rip-rap, even though this may require some hard decisions regarding priority.

We note that the completed rating review should result in a more robust and sustainable funding base. We also understand that flood protection levels of service have been reviewed and a strategy has been decided to deal with the Apple Barrel Floodway / State Highway 2 bridge waterway requirements.

*Our overall impression is of a scheme that is showing the benefits of some major review work being completed, and a commitment by scheme ratepayers to make the scheme sustainable. We were impressed by the very proactive management approach now being taken, and think that the scheme managers are heading in the right direction.*

*Further work is required' over parts of the scheme to fully re-establish alignment control, lost buffer zones and some catch-up stopbank maintenance. The key to this work being completed, and the current scheme deficit being substantially reduced, is a respite from further significant flood events.*



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