

# **Wellington Peer Review of Assets Maintenance Standards**

**2006/07**

**Waikanae & Otaki Rivers**

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## 1. Introduction

Annual peer reviews are undertaken of assets on rivers in both the Western and Wairarapa Regions. The peer reviews provide an audit of maintenance standards and procedures, and an essential component of each department's asset management.

This year's inspection visited sites on the Otaki and Waikanae Rivers.

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**Guides:** Jeff Evans, Jacky Cox, Graham Winterburn and Kees Nauta of the Western Operations

**Inspection Date:** 7 August 2007

## 2. Otaki River

The Otaki River scheme covers the section of the river from the lower gorge to the mouth, a distance of 11.5 kilometres. The Western Operations team manages this section of the Otaki River and the river scheme provides flood protection to the Otaki township, the rural floodplain area and the State Highway 1. The river is predominantly in a semi-rural location with a mixture of reserves, urban and rural areas. Edge protection works on the river are a combination of rocklines, rock groynes, debris fences and extensive willow tree planting. Design channel alignment is maintained through construction of edge protection works and channel shaping activities. The river has an annual operations budget of \$470,000.

The inspections were focussed on a number of reaches from the Upper Taylor's rockline extension to the mouth of the river.

### 2.1 Upper Taylor's rockline extension

The nature of this river requires the maintenance programme to accommodate and be flexible to address erosion areas as they occur in conjunction with specific planned areas of work. The scope of maintenance works includes:

- Maintenance of the right bank rockline. Linton rock has been used which is priced competitively at \$50/tonne delivered. This rock line requires "top up" following periods of high flows, and was extended during the 2007/07 financial year. Future works include extending this rock line into the existing downstream rock groyne works.
- Debris fences and tree buffer on the right bank. Maintenance of these structures may include topping up of the groynes, re-driving of irons, (if the fences were undermined), and interplanting

- Tree buffer zone on the left bank , with more planting planned this year, using moutere, where previously “booth” *S.purpurea* was the preferred option
- Beach spraying of vegetation on the left bank. Noting the use of a tractor and boom unit has been successful in the reduction of resources and chemical drift from the previous operation using water tank and hand held spray units.



**Figure 1 - Upper Taylor’s rockline extension (upstream right bank)**



**Figure 2 - Upper Taylor’s rockline extension (downstream right bank)**



- *The reviewers agree with the approach taken to maintain the alignment and has resulted in a well developed and stable river edge. Access road and adjacent metalled pad area improves the accessibility for long term maintenance work. The change to using a tractor and boom to spray vegetation spraying has improved the efficiency of the operation from the previous hand spraying.*

## **2.2 Wallace / Lutz Cross blading and the cliffs area**

The cliffs area has been prone to erosion on the left bank with the adjacent cliff face being particularly vulnerable. Previous work has included substantial planting of approximately 14,000 willows. On the Wallace / Lutz area, the ongoing maintenance utilising dozer machinery was required to open the channel up, providing a cut through and cross blading work over a 2 week period in the last 12 months. This work was required to maintain the channel width of 255m specified for the Chrystalls to Otaki Gorge reach and to maintain the design alignment

*The reviewers endorse this approach for routine maintenance and recommend this practice is continued with ongoing development of the buffer tree zone.*



**Figure 3 - Wallace / Lutz left bank**

## **2.3 Leithbridge Rock Line**

The rockline has been developed over the last 10 years to stabilise the left bank. The rockline has been a successful structure but has suffered from erosion at the down stream end. To mitigate this problem a small groyne was constructed at the downstream end of the rockline. The groyne has been successful in changing the flow pattern and diverting the velocity away from the bank edge. There has also been gravel abstraction in the reach to maintain bed levels.

Future work includes 2 additional groynes on the down stream of the rockline on the left bank.



**Figure 4 - Leithbridge rockline, left bank. Use of the end groyne to assist in the transition from the rock lining to the unlined bank**

*The reviewers note the practice of the end groyne is robust methodology to ensure the integrity of rockline and that the asset is providing the required erosion protection on the left bank. The left bank downstream of the rockline shows similar erosion problems and as there is limited protection from the existing vegetated buffer zone, the area will benefit from the additional groynes that are planned to be constructed. This will need to be monitored as further protection may be required.*

## **2.4 Otaki River mouth alignment**

The river alignment on the mouth of the Otaki River is managed by maintaining the flow within the design criteria. There are set trigger points for the preferred alignment and once these are reached, machinery is deployed to open the mouth. This operation is infrequent and the channel design is maintained within the limits with an expected frequency of 1 in five years for the operation to be required.

*The reviewers note that there are robust procedures in place and there does not appear to be any adverse hydraulic or environmental issues that would suggest the current practices need to be reviewed.*



### 3. Waikanae River

The Waikanae River scheme covers the section of the river from river mouth to the main State Highway 1 highway bridge, a distance of 5.5 kilometres. The river is predominantly in an urban area location with a mixture of reserves, urban and rural areas. The objective of the scheme is to provide flood protection to the Waikanae Township and the rural floodplain area. The river has an annual operations budget of \$100,000.

#### 3.1 Wet gravel extraction areas

The current wet extraction consent expires in September 2007 and equates to an annual volume of 5000m<sup>3</sup>/year. The consent is structured to cater for protection of the environment and the sensitivity of the location to a scientific reserve. The remaining extraction is carried out using the standard methodology and does not require any bunding and equates to an annual volume of 9,000m<sup>3</sup>/year. The wet extraction has a number of conditions that includes the formation of a bund to contain any sediment caused by the extraction. The construction of the bund must allow for areas of no extraction both upstream and downstream of the specific area of extraction and further limits the periods in which the extraction can occur. The area observed on the site visit demonstrated the bund area that had been constructed, with the remnants of the bund wall still remaining.

*The reviewers note that the consent conditions are restrictive in what should be a simple extraction process and the operators are monitored and have been competent in complying with the consent conditions. The reviewers conclude that the conditions on the consent are operationally restrictive and a costly process for extraction and note that the loss in the volume of gravel from this consent is unlikely to have a detrimental impact on the river management. However, routine monitoring of cross section data will provide the appropriate information over the following years.*



Figure 5 - Wet gravel extractions



**Figure 6 - Wet gravel extraction**

### **3.2 Jim Cooke Park Capital works**

The rock line work at Jim Cooke Park was completed in 2006 at a cost of \$1,000,000. Prior to the construction erosion occurred as the meander created targets points on opposite sides of the channel bank.

*The reviewers were impressed with the standard of the asset and it appears to be well constructed. The overall improvement to the area will significantly contribute to establishing the preferred design alignment.*



**Figure 7 - Jim Cooke Capital Work**



### 3.3 Kebbels Corner

The works at Kebbels include 2 rock groynes and rocklining on the left bank. The rocklining leads into Kebbels weir at the downstream end of these works. The rock weir was constructed to mitigate the degradation upstream of the corner and reduce the rock lining being undermined.

Downstream of the weir, four rock groynes (known as Maple Lane groynes) have been constructed following the 1998 flood events. An erosion embayment had formed between the second and third groynes, as part of the routine annual maintenance programme, a lead in rockline (or rock return) was constructed upstream of the groyne. The existing weir structure is planned this year to have maintenance work with replacement of rock.

*The asset appears to be performing well and providing a robust erosion protection to the corner. However, a review of the weir should be considered and the original design concept evaluated against the current configuration.*



Figure 8 - Kebbels Corner

## 4. Summary

Six sites on the Otaki and Waikanae Rivers in the Wellington area were selected for this year's audit of the assets managed by the Western Area, Flood Protection Department. The inspections covered a sample of sites managed under the Western area operations on the basis that they are representations of the management and maintenance of the assets in the Kapiti area.

The reviewers endorse the engineering approach applied to the rivers and that appropriate resources continue to be available to maintain the current service level standards. The level of construction and maintenance of the assets inspected is to a high standard. The few areas that we recommend the scheme managers give attention to are:

- Maintain the channel to design alignment
- Review the original design concept of the Kebbels Corner weir against current operation
- Monitoring of gravel bed levels in Otaki

It was noted that there is a culture within the team to consider options and ideas for different approaches to flood protection. This is actively encouraged and has provided innovative ideas from all levels of the team.