



greater WELLINGTON  
THE REGIONAL COUNCIL

## AUDIT OF RIVER MANAGEMENT 2002-03

### ASSET MAINTENANCE STANDARDS

**Audit of:** River Schemes managed by the Flood Protection Department of Landcare Division, Greater Wellington Regional Council, Mabey Road Office.

**Inspected by:** Michael Hewison and Graham Reidy of the Land and River Operations Department, Wairarapa Division of Greater Wellington Regional Council.

**Guides:** Steve Murphy, Jeff Evans, Mike Jensen, Jacky Cox of the Flood Protection Department, Landcare Division.

**Inspection date:** 23 July 2003

#### 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 the Wellington River assets includes an extensive review of the Hutt River.

#### 1. Hutt River

The flood protection scheme for the Hutt River is generally accepted as running from the edge of the coastal marine area at the mouth of the river, north to the top end of Gillespies Road, a distance of approximately 25 kilometres. Catchment of the Hutt is approximately 388m<sup>2</sup>. The Hutt scheme is an old one, with early stopbanks prompted by large floods as the vegetation cover was removed from developing land. Aggradation of gravels brought down by the floods were later sold to extraction companies with the income funding further development of the scheme.

The Hutt is now one of the most densely populated floodplains in New Zealand. Proper maintenance of the scheme is vital to the wellbeing of the people who live there, and the economy of the Wellington area.

#### 2. Sites Visited

- Trench planting of willow poles
- Belmont groynes

- Maori Bank rock lining
- Manor Park – Trial native planting and rock groynes/rail fence
- Block Road – Rock lining and environmental enhancement
- Hutt River trail – new Melling link
- Marsden bend rock line and planting
- Estuary Bridge walkway and proposed rock line

### 3. Trench Planting Willows

We were informed that edge protection willows planted on the Avalon berms never seem to thrive and would tend to die after only a few years. Site observations confirmed the problem. These plantings consisted of standard 2m Tangoio poles, digger planted to approximately 1.2m deep. These poles were planted on the berm, just above river channel level in what would be considered a normal location for this type of pole. After noticing the poor performance, excavations indicated a very hard and impenetrable pan about 2.0m below the surface. Willow plantings are required at this site to control potential bank erosion, berm erosion and excessive water velocities.

It was therefore decided to try 4m poles and digger plant them to 3m deep. This meant that part of the poles root zone was below the hard pan, ensuring that water would always be available to the poles. The installed cost of the larger poles is \$9/pole, compared to \$7/pole for conventional planting of 2m poles. Initial indications are such that the success rate of the larger poles warrants the additional cost.

*The reviewers are of the opinion that a viable willow buffer zone is required at this location to control both bank erosion and berm velocities. They further agree that there is no absolute standard method of planting willows and the method being used in this case is a “fit for purpose” adaptation of the usual pole planting method. This method has been in use for many years on the Hutt. The reviewers recommend that some samples from an earlier pole planting be fully excavated and the root structure examined.*

### 4. Belmont Groynes

After a large flood, an extensive erosion bay had developed on the true right bank of the river. The solution to this was the provision of three large rock groynes running from the rear of the erosion bay out to the edge of the design channel alignment, together with a rock rip-rap wall, rising via a planted batter slope to a grassed berm.

*The reviewers were of the opinion that this was a good solution to the problem as it combined a number of appropriate tools to provide an integrated and robust outcome. It reflected the use of hard protection to maintain the design alignment, suitable plantings to reinforce the batter slope and a grass berm to resist berm flows and provide access for the public.*

## 5. Maori Bank Rock Lining

This section of the river is immediately downstream of a narrow sharp corner formed on an earthquake fault line. A narrow outcrop of bedrock just upstream of the bend acts as a form of grade control, causing some instability downstream. This had led to erosion of the left bank. Repairs and re-construction of the area back to the design alignment had been completed using rock rip-rap to the channel edge and a combination of willows and native plantings on the berm.

*This solution was deemed by the reviewers to be quite appropriate for the location as it combined hard protection to the edge of the design alignment at a location that is highly stressed and also included plantings to mitigate any berm velocity problems.*

## 6. Manor Park Golf Course Rock Groynes

During the October 1998 floods, Manor Park lost a large part of its practice fairway to a large erosion bay. The works required the re-construction of the channel edge to the design alignment and the replacing of the lost berm or practice area. The erosion bay was repaired by first blading to shift the active channel of the eroding face and to form a platform for the planned protection works. Repairs were completed using a combination of rail debris fences and rooted willow plantings, with every second rail fence being hard tipped with a small rock end. A 50:50 cost share arrangement was organised with the club. Restoration of the practice fairway by filling behind the works was also the responsibility of the club. This leads to problems with fill quality, compaction, and timely completion and would not be readily recommended again.

*The reviewers consider that the innovative use of rock/ rail and willows was an appropriate solution to the outside of the bend erosion bay and is also consistent with the Floodplain Management and Environmental Plans.*

## 7. Trial Native Planting

Opposite the Manor Park works and on the inside of the bend, the Flood Protection Group had agreed with the Botanical Society to plant a trial plot of native trees on the battered channel edge berm. These trees had been hand released twice as agreed. The plantings were one year old. Different varieties had been planted in rows parallel to the river edge. The row nearest to the river edge was ferns and all were dead. Other seedlings were showing signs of frost stress. In all cases seedlings were still only typically 300 to 500mm tall.

*The reviewers would have serious doubts about using native plantings as the first line of defence on the outside of a bend. They see this type of planting as only being suitable for more protected areas and in combination with trees such as willows which do act as a nursery to help establish the slower growing native species.*

## 8. Block Road: Rock Line and Environmental Enhancement

Similar to Belmont, an erosion bay had developed at this site. The final design solution consisted of a low rock rip-rap wall, low level grassed berm, geo-textile reinforced “retaining wall” and higher level grassed berm. The reinforced earth wall was planted with native trees and shrubs.

*It is noted that this work is consistent with the Hutt River Floodplain Management Plan environmental and access aims, as well as being a solution that will resist the flood forces at both the toe of the bank as well as in the berm areas.*

## 9. Hutt River Trail: New Melling Link

This is a new section of the Hutt River Trail constructed along the berm of the river. The walking surface is protected by a fine gravel/chip layer. A pedestrian and bicycle turn-style is constructed at a strategic location to prevent access by powered vehicles. The walkway is protected by a willow buffer zone. Some surface damage does occur during large floods, but this is easily repairable. The track is easily accessible and is serviced by an adjacent car park.

*The reviewers understand that the Hutt River Trail is very popular and gets considerable use. This extension will enhance the popularity. This walkway is very consistent with the Hutt Floodplain Management Plans goals as the openness of the track provided easy access to the grassed berm areas and the river side rock lines, and plantings.*

## 10. Marsden Bend: Rock Line and Plantings

At this reach of the river, a large erosion bay on the outside of a sweeping bend was repaired by reforming the lost berm with demolition from the old Ewen Bridge and facing this with rock rip-rap which also acted as a toe protection. A low bench was required for maintenance so the face behind the bench was reinforced with a geo-textile installed as a number of pillow layers. A combination of willows and natives were planted in the pillows by cutting small slots and planting root trainer plants. Grass has now established to hide the geo-textile completely, and to provide some protection from velocities. As the grass and plantings continue to grow there is no hint that the face contains a geo-textile.

*It is considered that these works fit very well with the aims of the Floodplain Management Plan, while at the same time providing a sound structural flood protection barrier against future major erosion potential.*

## 11. Estuary Bridge walkway

One of the aims under the Floodplain Management Plan is to provide a walkway from the Seaview Marina area right up through the length of the Hutt River. Until now, this has meant that walkers had to cross the very busy Waione Street, which can be hazardous at times. The solution has been to provide a walkway under the main road bridge. The floor of the walkway

bridge is above high tide and small freshes. Larger floods will affect it and suitable signage will be erected to highlight this. The bridge is constructed from steel and H5 treated timber. Members have been sized to ensure durability and robustness as well as an ability to resist forces imposed by floating debris. All fasteners are either galvanised steel or stainless steel and timber joints have been "mulsealed" to resist water penetration.

*The reviewers consider that the solution to this problem is simple, effective and environmentally pleasing. The design and detailing have been well thought out and illustrate a very good understanding of the likely service and operating conditions that will be encountered. Fish were also noted swimming in the estuary adjacent to the work site.*

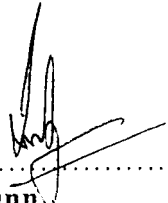
## 12. Proposed rock line port road

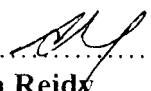
The Port Road area is mainly reclaimed land dating from the fifties and sixties. Concrete rubble or demolition was used to face the fill, but some sections are now eroding quickly as the rubble fill has slowly succumbed to wave action. A programme has been developed for the planned replacement of the face rubble using rock.

## 13. Summary

Our overall impression is that the mix of structural tools that are available and being used, such as rock groynes, rock rip-rap, reinforced earth banks using geo-textiles, rail fences reinforced with rock ends and suitable plantings are appropriate to the forces involved. These works are consistent with the Floodplain Management Plan. In particular, the walkways provide a simple and cost effective means of accessing the grassed and/or planted berm areas. While some flood scouring may occur on these paths, this damage is easily repairable.

Our only concern, based on observation and our own experience is that the deliberate planting of native trees and shrubs as the first line of flood defence in high to moderate stress areas will be unsuccessful, and cannot be used in place of the tools described above.

  
.....  
**Ian Gunn**  
Manager, Land & Rivers Operations  
Date: 8/8/03

  
.....  
**Graham Reidy**  
Engineering Officer  
Date: 8/8/03







Report 03.462  
Date 7 August 2003  
File PK/01/01/01

Committee Landcare  
Author Ross Jackson, Advisor Community Projects

## Environmental education and environmental enhancement projects

### 1. Purpose

To report to the Committee on the 2002/03 environmental education and enhancement projects in order to meet the performance indicator requirements of the annual plan.

### 2. Annual plan performance indicator

The 2002/03 Annual Plan contains the following performance indicator:

*The annual environmental education and environmental enhancement projects as agreed with the Divisional Manager, Landcare, will be completed, within a budget of \$23 7,000 and reported to the Landcare Committee following the end of the financial year.*

The performance indicator was **substantially achieved** at a cost of \$236,000.

### 3. Environmental education projects

Officers worked with the Environmental Education Co-ordinators (Environment Division) during the year to develop infrastructure needed in the parks and forests for the Environmental Education Programme. This included:

- two small bridge structures at Stratton Street for environmental trail walks, and a 38 metre span truss bridge at Kaitoke Regional Park to link campground areas to the Pakuratahi Forks. A small structure was also built at Battle Hill to provide safe access along the Bush Reserve Loop track.
- a water treatment system for Stratton Street Education Centre. Lighting and kitchen facilities were also improved at Battle Hill Woolshed Centre.
- fencing at Stratton Street for a re-vegetation site that students can plant in as part of the 'Take Action' programme.
- a boardwalk structure at Stratton Street which was not completed on time due to design delays. This will be completed in the next financial year.



#### **4. Environmental enhancement projects**

Nine environmental enhancement projects were also included with this performance indicator. A brief summary of the work that was carried out on these projects this year is set out below.

##### **Te Marua Bush restoration**

Members of the Wellington Botanical Society (Botsoc) have carried out extensive weed control work and planting based on the weed maps prepared by Philippa Crisp. In addition, some members of Botsoc and the Upper Hutt Branch of Royal Forest and Bird Protection Society (Forest and Bird) have collected seedlings and assisted in the transplanting of some Swamp Maire from the State Highway 2 road deviation and relocated them in a bush remnant alongside the Stuart Macaskill Lakes. They have also provided advice to the roading contractor, when requested, on remnants being impacted by the road works.

##### **Korokoro Bush goat control**

Professional hunters were used to track Judas goats and cull any goats that the Judas goats had met up with. Forty-five goats were culled this year (121 goats last year). The under-story is continuing to show positive signs of recovery after the sustained hunting pressure of the last three years.

##### **Mainland island restoration operation (MIRO)**

The MIRO group based at East Harbour Regional Park have worked on several projects with officers during the past three years. Activities that have taken place this year are:

- an enclosure plot has been erected and measured
- rat traps have been purchased
- a fish survey completed
- council staff work with MIRO on an ongoing basis, advising on monitoring being conducted by MIRO
- we have also assisted with the analysis of fi-uitfall plot data and the interpretation of flowering and fruiting recordings
- an expert ecologist (Philip Simpson) was invited to visit the ratas at East Harbour and to advise on the ecology of these trees
- an interpretation sign will be placed in Williams Park in conjunction with Hutt City.

##### **Pakuratahi River riparian planting and Ladle Bend wetland**

Over the past year, the emphasis has been on restoring the top of the catchment at the former summit rail yards of the Rimutaka Incline, and removing weed species. Planting of a riparian zone by the streams at the summit took place at an Arbor Day event and has been continued over the past few months.

### **Queen Elizabeth Park remnant forest restoration**

Monitoring of bird numbers was begun this year. The perimeter fence has also been extended outwards and there have been two community plantings carried out beyond the remnant. The plantings will eventually link up with the surrounding wetland areas.

### **Queen Elizabeth Park wetland restoration**

The main focus of our work this year has been on planning the new entrance and the detailed design of a 2 hectare wetland adjacent to the Marines Memorial. This wetland contract was let in June 2003 and work began in July 2003. A problem that impacted on the project was the discovery of buried ordnance from the former marine camp.

Ongoing planting in the existing ephemeral wetlands has taken place during the winter including a recent Arbor Day celebration attended by Aka Arthur representing Ngati Toa, Chairperson Margaret Shields and Kapiti Coast District Council Mayor Alan Milne.

### **Queen Elizabeth Park foredune restoration**

During the past year there were four organised walks in the dunes looking at aspects of history, geology, plants and ecology. Detailed plant and weed surveys have been carried out and work continues on the control of the most serious weeds. A blackberry control trial was implemented and also a spinifex trial on the foredunes. Very active support from the community made a big impact on three planting days.

Staff constructed several sand ladders and erected protective fences at five access points onto the beach. This is to try and reduce the erosion that is induced by people making numerous tracks through the foredunes.

### **Battle Hill wetland restoration**

Construction of several ponds were completed last year. This year one kilometre of fencing was completed. This has allowed a large portion of Swampy Gully to be retired. A thousand plants have now been planted in the vicinity of the ponds including 350 at a successful Arbor Day this year with local schools. Extensive planting will continue to take place at Battle Hill over the next five years. Technical assistance has been provided by members of Wetland Care Inc., a voluntary organisation who specialise in wetland restoration. They have also provided advice on Queen Elizabeth Park.

### **Cannons Creek Valley bush restoration – Belmont Regional Park**

A restoration plan was jointly prepared in 2001 and planting is currently being carried out in earnest every second Saturday morning during June and July. The council contribution was used to purchase plants, which has been augmented by plants grown by Friends of Maara Roa.

Tragically, earlier this year a major fire destroyed most of the 34,000 plants the group had planted over the past two winters. However, the group has remained very positive and has embarked on a planting programme with an emphasis on creating 'green firebreaks.' An additional \$5,000 was spent on the project by Council to clear a lot of the burnt gorse to allow planting to take place.

Council staff in conjunction with the Friends have carried out some specific weed control, track construction and possum control. In addition, Parks staff constructed a new footbridge over Cannons Creek which will allow a good loop track to be connected. The Friends organised an Arbor Day planting with local schools on the Porirua City Council owned portion of Belmont Regional Park.

## 5. Communication

These projects provide excellent public relations opportunities. A number have already been publicised in the local and daily newspapers, and in *Elements*. We are working with Corporate Communications to ensure continued publicity of these projects.

## 6. Recommendations

*That the Committee.*

1. *receive the report.*
2. *note the contents of the report.*

Report prepared by:



**Ross Jackson**  
Advisor Community Projects

Report approved by:



**Murray Waititi**  
Manager, Parks and Forests

Report approved by:



**Rob Forlong**  
Divisional Manager, Landcare





Report 03.372  
Date 27 June 2003  
File PK/14/01/03

Committee **Landcare**  
Author Ross Jackson, Advisor Community Projects

## **Queen Elizabeth Park – State Highway 1 overbridge/ MacKays Crossing entrance**

### **1. Purpose**

To present to the Committee the current status of Transit New Zealand's proposal for changes to State Highway 1 (SH1) at MacKays Crossing and its implications for the MacKays Crossing entranceway to Queen Elizabeth Park.

### **2. Background**

MacKays Crossing is the ideal place for the main entrance to Queen Elizabeth Park. The entrance provides a focal point on which access to the wider Park can be facilitated and on which any future developments can be driven (see reports 94.145 and 01.04).

Transit NZ is upgrading the road at MacKays Crossing and the upgrade presents an opportunity to redesign the entrance area in a manner most beneficial to the Park in the long term.

### **3. Current status of project**

Transit NZ has indicated that they have received the necessary approval and funding to start the project, and believe construction of the upgrade will start around May 2004. At present they are in the final stages of completing detailed designs and land purchases for works involved in constructing the railway overbridge and altering the alignment of SH1 at MacKays Crossing. Transit has approached the Council about what entranceway roading configuration would be desirable for us.

We have investigated different entranceway options and have agreed with Transit that the proposal attached (**see Attachment 2**), including the upgrades noted in section 4 of this report, satisfied the future needs of the Park.

#### **4. Implications for the MacKays Crossing entranceway to the Park from the realignment of SH1**

The project removes a portion of the Department of Conservation (DoC) wetland between SH1 and the Park directly south of MacKays Crossing. As compensation for the loss of some of the DoC wetlands outside the Park, Transit has agreed to fund \$85,000 for the restoration of a 3.5ha wetland in the Park. In addition, Transit will fund a replacement tree-planting programme at the MacKays entrance because existing trees at the road frontage will be removed for road construction. Transit will also relocate the existing barn as it is sited on the new road alignment.

Approximately 4 hectares of Park land at the road edge is required by Transit for the road works. In compensation for the loss to the Park, land owned by Transit of equivalent value at the Raumati end of the Park will be exchanged (see **Attachment 1**).

##### **For the entranceway into Queen Elizabeth Park**

The highway overbridge with an underpass into the Park will improve access into the Park (see **Attachment 2**). Officers and Transit NZ have been investigating options for the best long-term access into the Park. The present entrance through the memorial brick gates will continue to be used. However, the entrance will need upgrading at some point as it is narrow and the road needs raising. Difficulties arise when large volumes of traffic, or vehicles such as horse floats or buses, enter/exit the Park. Ultimately a new or better aligned entrance may be necessary, but this will not be considered until the next LTCCP.

##### **Redesign of the MacKays Crossing area required**

With the major modifications taking place, the placement of surplus fill material, vegetation patterns, and the placement of future facilities are being closely looked at by Council and Transit staff. In addition to the relocation of the existing barn, new toilets are to be constructed and future sites for the Rangers office and possible facilities will be identified. Also, with the wetlands at the entrance being restored, this will create very good education opportunities.

##### **Funding for the project**

No additional funding is required at this stage. The cost of the design is mostly being met by Transit. Any additional design work that we would like done will be funded out of existing budgets.

#### **5. Communication**

There are excellent promotional opportunities for the local press once the realignment project commences. We will investigate promotional opportunities and implement a media campaign when the timing is right.

## 6. Recommendations

*That the Committee.*

1. *receive the report.*
2. *note the contents of the report.*

Report prepared by:



**Ross Jackson**

Advisor Community Projects

Report approved by:



**Murray Waititi**

Manager, Parks and Forests

Report approved by:



**Rob Forlong**

Divisional Manager, Landcare

**Attachment 1:** Queen Elizabeth Park map

**Attachment 2:** MacKays Crossing entrance