

THE WEST COAST REGIONAL COUNCIL

KOWHITIRANGI RATING DISTRICT

ASSET MANAGEMENT PLAN

EXECUTIVE SUMMARY

Under the Local Government Act 2002 Councils are required to develop 'Asset Management Plans' to demonstrate that they are managing the infrastructure for which they have responsibility. The purpose of this Asset Management Plan is to describe how assets associated with the 'Kowhitirangi Rating District' will be managed over their lifetime.

The plan lists the current scheme assets which include:

- 6.9 kilometres of stopbanking
- 71,294 tonnes of rock in various bank protection structures

The total replacement value of these assets is estimated at \$4,070,895.

The Asset Management Plan indicates the levels of protection provided by the assets, the methods of monitoring the condition of the assets, and determines the annual maintenance needed to retain the service level.

The average annual maintenance cost of the Kowhitirangi Rating District is \$11,512.

The scheme assets will be maintained such that they continue to provide their level of service in perpetuity. Because they are maintained in perpetuity the scheme assets will not be depreciated resulting in no requirement to fund depreciation.

SECTION 1: DESCRIPTION

1.1 PURPOSE OF ASSET MANAGEMENT PLAN

Asset Management Plans define the objectives and performance standards of river and drainage schemes for which the Regional Council has the maintenance responsibility and provide a basis upon which the effectiveness of maintenance and performance can be measured. This plan:

- Identifies the service level for the Kowhitirangi Rating District.
- Describes the methods used to maintain the service level of the assets.
- Complies with the regulatory requirements of the Local Government Act 2002.

1.2 BACKGROUND

Around 1907 the Lands Department erected a groyne near Diedrichs Creek on the Hokitika River in order to protect land on the true right bank. The protection was effective but the groyne was progressively eroded away and by 1927 it had disappeared completely.

In 1927 the settlers on the right bank at Kowhitirangi approached the Government and requested protection works to protect their land. The response was a counter proposal that the settlers constitute a River board to carry out the necessary remedial measures. The settlers did not pursue the Government's proposal.

The floods in October 1936 damaged some local public works (Kokatahi, Mills and Malfroy's bridge and their roading approaches). The Government approved subsidy for the work required Council to reinstate and upgrade the local works. In 1937 the Westland County Council constructed a big stone protection wall at Camelback (above W. Jamison's land - Rural Sections 970 and 809).

In 1938 the Westland County Council (with a Government subsidy of \$4 for \$1) erected a gabion groyne across an overflow channel along the southern boundary of D.P. 1048 designed to block the mouth of Pigeon Creek.

In 1941 the Westland County Council constructed 110m of stopbank across the overflow channel formed by Diedrichs Creek at the southern boundary of D.P. 1048. The Hokitika River was hitting the right bank almost at right angles and threatening to break through to an old channel behind the existing protection works and outflank the big stone protection wall at Camelback.

In 1944 the Public Works Department constructed a large groyne on the true right bank of the Hokitika River approximately 2km upstream of Mount Camelback. This groyne, generally known as the Camelback Groyne, was designed to block off two large overflow channels which ran through the Kowhitirangi farmlands to eventually join the Kokatahi River.

The Westland Catchment Board was formed on 18 May 1945. From 1945 to 1958 the Westland Catchment Board, at the request of local ratepayers, spent about \$1,600 repairing and maintaining the rockwork on the stronghead of the Camelback Groyne. This was funded completely by individual contributions.

On 31 March 1958, as a result of further input from the immediately affected adjacent farmers, the Westland Catchment Board approached the Soil Conservation and Rivers Control Council with a proposed Kowhitirangi Flood Control Scheme.

The Scheme comprised:

- (a) 3360m of stopbanking, on the true right bank, from the Camelback groyne up to the Whitcombe Valley Road.
- (b) willow planting along the berm (downstream along the river frontage of Rural Section 5637) and in the belly of the Camelback hook groyne.
- (c) Fencing of the stopbank (about 7080m) and willow planting.
- (d) Rock protection of about 160m of eroding land along the river frontages of Rural Sections 969 and 970 approximately 500 upstream of Camelback Road.
- (e) Rock protection where the stopbank crosses the two mouths of back flood channels (along the river frontage of Rural Section 4866) immediately below the Vine Creek confluence.
- (f) Repair and reconstruction of the Camelback groyne which had been damaged
- (g) Reinstatement of the access road to the Camelback groyne.
- (h) About 1300m of stopbanking on the left bank opposite the Camelback hook groyne (Rural Section 2332) to prevent overflows into Supply Creek with consequent flooding and erosion of Rural Sections 2330 and 2331.

In May 1958 the Soil Conservation and Rivers Control Council approved the Catchment Board's proposal at an estimated cost of \$58,000 and granted the following financial assistance:

- (a) A grant of \$12,000 (not eligible for inclusion in the calculation of the subsidy).
- (b) A \$3 for \$1 subsidy on the balance sum of \$46,000, i.e., \$34,500.
- (c) An advance of up to \$6,000 towards the local share of \$11,500 (The advance to bear interest of 5% and to be recovered from subsidy payments within the financial year 1958-9).

At the meeting held on 28 July 1958 the Westland Catchment Board resolved to finance the local share of \$11,500 by:

- (a) Requesting a contribution of \$1,500 from the Westland County Council.
- (b) Raising the landowner's share by a loan to be repaid by the landowners from rates struck on a graduated scale according to the benefit received by individual properties.

The landowners in the Kowhitirangi area (comprising about 7800 ha in 88 properties) between the Hokitika River and the Kokatahi River would be included in this special rating district. In September 1958 the Local Authorities Loans Board, sanctioned the "Kowhitirangi Flood Control Loan - 1958" for \$10,000 to be repaid over 10 years.

The scheme classification was a differential rate set up to address both the loan repayment and the ongoing maintenance. The Scheme was designed to contain 3700 cumecs with 0.80 metres freeboard. Earthworks on the main stopbank on the true right bank were commenced in August 1958 (The Soil Conservation and Rivers Control Council approved a tender to undertake the work on 25 August 1958 in anticipation of the Catchment Board obtaining the finance for the local share because of the urgency of the work) and were completed in December 1958. Rock protection along certain lengths of the stopbank was in place by March 1959.

Maintenance of the protection works have been ongoing since then with several flood events causing damage that has been repaired as required.

Resource Consent Numbers 940113 and 940114 were issued by The West Coast Regional Council on 10 November 1994 for a term of 35 years. These consents are to maintain existing river protection works to their original standard. The resource consent is in the name of the Kowhitirangi Flood Control Scheme, C/- The West Coast Regional Council.

The Kowhitirangi Flood Control Scheme extends from Diedrichs Creek at the lower end of the Hokitika Gorge downstream on the right bank of the Hokitika River for 6.5 kilometres to Mount Camelback. The area protected is predominantly dairy farming with some dry stock farming. Community infrastructure such as roads, power and telephone lines all derive benefit from the river control system.

In 2000, concern was expressed at the apparent anomalies of non-paying front line properties on the scheme. This was the result of additional lease land being freeholded from the Department of Conservation. Those ratepayers agreed that the "new" parcels of land should be included in the overall classification and as a result, a reclassification was carried out. The 2001 Rating District Annual Meeting formally endorsed the draft classification and as a result of further ratepayer consultation the reclassification was endorsed by Council.

1.3 DESCRIPTION OF ASSETS

The Rating District control works consist of all those works outlined in the Infrastructural Asset Register. The total replacement value of these works was \$4,070,895 as at 30 June 2014.

1.4 MAINTENANCE EXPENDITURE

Appendix II shows expenditure since 1987. The average annual expenditure on maintenance and capital works since 1988 has been \$11,512.

The capital value of land and buildings within the confines of the scheme is \$100M as at 30 June 2014.

SECTION 2: SERVICE LEVELS

2.1 GENERAL

Cross section surveys and flood flow analysis modeled in June 2008 indicate that its service potential is capable of containing river flows greater than the 2008 estimate of the 1 in 100 year return period flood flow plus 900mm freeboard.

No extra work is required to increase the service level for the stopbank.

2.2 OBJECTIVE

The objective of the Kowhitirangi Rating District is to maintain existing protection works at current service levels with the aim to reduce bank erosion and flooding on the right bank of the Hokitika River between Diedrichs Creek and Mount Camelback.

2.3 MAINTENANCE

The maintenance of the Kowhitirangi Flood Control Scheme can be broken into two areas. Stopbanking and Erosion Control Works.

Stopbank Maintenance

Stopbanks exist along the right bank of Pigeon Creek and the Hokitika River downstream to 1900 metres below the Camelback hook groyne. Maintenance includes repair of any scouring, works to facilitate access, control of stock to prevent damage to stopbank batter slopes, topping up of stopbanks as required to maintain stopbank service levels.

During a flood stopbanks can be damaged by failure of a training permeable groyne such as a rock spur which can allow the full force of the river to suddenly run along a relatively unprotected stopbank, and cause scouring of stopbanks.

Grazing stock and off-road vehicles can destroy the vegetation and cause rutting and damage to the structure of the stopbank. Construction of pipelines cables under stopbanks as well as holes on top of stopbanks can weaken the structure.

Stopbanks can be damaged in the event of an earthquake by cracking vertical on horizontal displacement, or by liquefaction of the foundation material. The probability of seismic damage coinciding with a flood is very remote.

Erosion Control Works

Erosion control works consist of rock placed in continuous riprap, spur groynes, stub groynes, strongheads and hook groynes and in river training retards. Erosion control works identified in the Asset Schedule will be maintained by the rating district.

Erosion control and river training structures protect stopbanks from the river's erosive force during floods. Rock used in the formation of these structures of the required grading to resist the forces (velocity) of the river.

Maintenance includes ensuring any slumping of rock off strongpoints, spur groynes and rip rap are topped up. It is important to ensure repairs to damaged bank protection structures are undertaken swiftly.

Erosion control structures are constructed to absorb the energy of the river and to control the alignment of the flow of the rivers and subsequently give the required protection to stopbanks and natural banks.

2.4 MAINTENANCE PROGRAMMES

An annual maintenance programme will be prepared each year in consultation with the Kowhitirangi liaison committee prior to adoption by the Rating District Annual Meeting and for inclusion in the Council's Annual Plan.

In preparing the annual maintenance programme consideration will be given to:

- an inspection to identify works requiring immediate repair.
- works anticipated as being required given a 'normal' season.
- flexibility to meet unbudgeted damages.

An annual report will be presented to the Kowhitirangi Ratepayers outlining the maintenance works and expenditure required for the coming financial year.

2.5 DAMAGE EXPOSURE

River control works are constructed in a very high energy environment with the purpose of resisting and absorbing some of that energy. No matter what the standard of maintenance, it is inevitable that damage will occur to structures.

An assessment of maximum damage potential was derived from estimating the damage ratios and costs for three flood events as shown in Table 1, below.

TABLE 1 – ESTIMATED DAMAGE EXPOSURE

Flood size	Assets Value	Damage Ratio	Damage Exposure
20 year event	\$4,070,895	10%	\$407,089
100 year event	\$4,070,895	20%	\$814,179
500 year event	\$4,070,895	20%	\$814,179

The exposure to damage to the river and flood protection assets that belong to the Kowhitirangi Rating District, in a major flood event, is in vicinity of \$600,000.

SECTION 3: FUNDING

3.1 MAINTENANCE

Maintenance is funded by targeted rates, the level of rating being determined each year in the Annual Plan process. This involves:

- (a) Preparation of an annual works programme and corresponding budget, in consultation with the Rating District liaison committee.
- (b) Adoption of the works report and budget at the Rating District's Annual Meeting.
- (c) Adoption of the budget in the Annual Plan, by Council.

3.2. DAMAGE REPAIRS

Routine damage repairs are funded by a combination of:

- carrying out work as scheduled in annual works programme.
- reprioritising works identified in the annual works programme.
- use of financial reserves.

Major damage repairs would be funded by loans raised by the Council and repaid by targeted rating over a number of years.

3.3 FINANCIAL RESERVES

Financial reserves are held within each rating districts account to:

- meet the costs of unscheduled works.
- enable an immediate response to flood damage repairs.
- prevent major fluctuation in rating levels annually.

The level of financial reserves held in each rating account are determined by the assessment of risk damage and the need for unprogrammed works. Analysis of previous maintenance and capital works records since 1988 show that the average expenditure on maintenance works has been \$11,512.

A prudent reserve target for this rating scheme is \$100,000.

3.4 DEPRECIATION

River control schemes are designed to be maintained in perpetuity by constantly repairing and replacing component parts which are damaged by floods or by the constant wear and tear encountered in a river environment.

The performance measure is that the infrastructure assets are maintained to meet their service levels at all times.

As there is a constant cycle of replacement of elements of the infrastructure as necessary, depreciation of the value of the assets is not appropriate and funding of depreciation is not necessary. This approach is consistent with the NZ Infrastructure Asset Valuation and Depreciation Guidelines (Section 5.4.4).

SECTION 4: PERFORMANCE MEASURES

The overall performance measure is that the infrastructure assets are maintained to meet their service levels at all times.

The following procedures will be adopted to ensure the adequacy of maintenance.

Annually

- (i) Produce annual works report to rating district annual meeting to include asset condition, type of work to be undertaken, quantities, location and costs.
- (ii) Organise contracts for agreed scheme work, oversee contract completion and report to Council.
- (iii) Report on works undertaken during the previous financial period to the Rating District ratepayers and Council.

Performance Measure

No reports of stopbanks or bank protection erosion requiring repairs without an agreed programme of remedial work in progress.

Triennially

- (i) Re-fly aerial photographs between Diedrichs Creek and Mount Camelback, analysing these photographs to assess changes in river meander patterns that could impact on Rating District Assets.
- (ii) Re-measure cross section river profiles to determine whether the riverbed is stable, or aggrading, and or identify management issues or options.
- (iii) Revaluation of the existing assets to include any additional volumes to stopbanks and bank protection works from previous reviews.
- (iv) Review this Asset Management Plan

Performance Measure

Report to Council and Kowhitirangi ratepayers on asset revaluation and plan review.

APPENDIX I - DEFINITION OF TERMS

AGGRADATION	The deposition of bed material resulting in the raising of the riverbed level and a reduction in the flood carrying capacity.
EROSION	Erosion includes processes of wearing away of the land surface by natural agents and the transport of the material that results.
EROSION CONTROL WORKS	Works designed to protect stopbanks or natural banks from erosion to maintain channel stability or to reduce the deposition of sediment into the lower reaches of a river reducing the effective depth of flow.
GROYNES	Embankments or structures built either at right angles or at an acute angle to the river flow designed to reduce water velocity adjacent to a stopbank or terrace. Groynes may be permeable or impermeable and constructed normally of rock.
HOOK GROUYNE	A "Hook – shaped" rock armored stopbank, used to divert flows by impounding water to use as a buffer against flood flows.
MAINTENANCE	Work required to keep the existing flood protection works in good repair, and includes spraying of stopbanks for weed control, topping up of earthwork for stopbanks and rock replacement.
MEAN ANNUAL FLOOD	The average value of the highest flood recorded in each year of records. Mean Annual Flood has a return period of 2.3 years.
RETARD	Large rock spur groyne
RIPRAP	A line of continuous rock along the edge of a riverbank, or any other man-made structure e.g. a stopbank or deflector.
SPUR	A short rock structure built generally at right angles to the riverbank, designed to deflect flows away from an eroding section.
STOPBANK	Compacted earth structures generally parallel to the river channel designed to increase the depth of water and hence capacity without overflow.
STRONGHEAD	A heavily rock armoured point on a structure e.g. hook groyne
TOE OF STOPBANK	The intersection of the batter of the stopbank with the natural ground.

