



ASSET MANAGEMENT GROUP

Technical report

ISSN 1174 3085



SAFEGUARDING YOUR ENVIRONMENT + KAITIAKI TUKU IHO



**Heretaunga Plains
Flood Control
Scheme**

Asset Management Plan

September 2017
HBRC Plan Number 4773
HBRC Report Number-AM15-08



159 Dalton Street + Private Bag 6006 + Napier
Telephone (06) 835 9200
Fax (06) 835 3601
Regional Freephone (06) 0800 108 838

SAFEGUARDING YOUR ENVIRONMENT + KAITIAKI TUKU IHO

Asset Management Group Technical Report

ISSN 1174 3085

Engineering Section

Heretaunga Plains Flood Control Scheme Asset Management Plan

Prepared by:
Martina Groves - Team Leader Schemes

Reviewed by:
Gary Clode – Manager Regional Assets

Approved:
Graeme Hansen - Asset Management Group Manager

Adopted:
Hawke's Bay Regional Council November 2017

September 2017
HBRC Plan Number 4773
HBRC Report Number-AM15-08

© Copyright: Hawke's Bay Regional HBRC

Executive Summary

About This Plan

This Asset Management Plan outlines the management philosophy for the flood control and drainage assets on the Heretaunga Plains. It sets out a programme of work for the Flood Control Scheme over the next ten years to ensure that assets meet the objectives for which they were established.

There are a number of assumptions underpinning the Plan. These represent circumstances with which the Hawkes Bay Regional Council (HBRC) reasonably expects to occur, including: that the economic and legislative environment in which the Scheme operates will remain the same; that HBRC's current activities and policies will continue; and that there will not be a significant flood which requires a change to the Scheme or the way it is managed, beyond that included in Scheme assumptions.

This Asset Management Plan (AMP) is supported by, and links to, a number of other documents and databases across HBRC. These include the Asset Registers and Valuation databases, which hold specific information on all Scheme assets; Asset and Catchment Reviews, which investigate problems and identify preferred options for addressing these; Environmental Codes of Practice and Ecological Management and Enhancement Plans which guide wider environmental obligations and responsibilities and HBRC policy, strategy and guideline documents, which influence how HBRC manages the assets. From this AMP, annual contracts for physical works are developed and financial information is provided for inclusion in HBRC's Long Term Plan (LTP).

This Plan has been developed using the Core asset management plan model. This model is considered to provide the appropriate level of detail given the nature of the assets involved in the Scheme, and the defined asset management objectives which are aligned with Councils corporate goals and strategic context. The Plan is reviewed every six years and the assets are revalued every three years. The financial forecasts are reviewed annually.

The Plan is a living document and future improvements or enhancements will be considered as part of the next review or prior to that time if circumstances warrant.

The Scheme and Our Customers

The Heretaunga Plains Scheme covers the low lying historic river plains of the Tutaekuri, Ngaruroro and lower Tukituki Rivers. It includes all of Hastings, Flaxmere and Havelock North urban areas, as well as most of the Napier urban area. The area directly benefiting from the Scheme covers approximately 39,000 hectares with a population of around 138,000 people living within the Scheme boundaries - approximately 82% of the Hawke's Bay population.

The objective of the Scheme is to ensure that the Heretaunga Plains communities are very rarely affected by significant flooding, and that waterways within the Scheme are highly valued community assets, from a flood control, environmental and recreational aspect.

The Scheme as we know it today has evolved over the last 130 years from the efforts of Local River Boards in the late 1800's, through to the Hawke's Bay River Board, the Hawke's Bay Catchment Board, and since 1989, the Hawke's Bay Regional Council. Improvements in the Scheme have followed significant flooding events and specific catchment and asset reviews.

While the underlying goal of the Scheme has remained the same, the threats to the Scheme; its importance to the community; and the drivers behind how it is maintained, have changed.

The principal issues now facing asset managers are:

- Sustainable management of gravel within the river systems, including improving the understanding of the impact of river gravel extraction on sediment supply to the coast;
- Maintenance of the design flood capacity of the river channels and adjacent stopbank systems and drainage outlets, particularly in the face of climate change;
- Maintaining the integrity of the live edge protection and the stopbanks to mitigate the effects of insect pest infestations or other pests with the potential to adversely affect live tree edge protection;
- Confirming the integrity of the stopbanks and quantifying the risk of failure at less than design capacity;
- Increasing the levels of service to provide a greater level of flood protection and reduced flood risk to the Plains over time;
- Maintaining the desired capacity of the drainage systems, while balancing landowner expectations, community willingness to pay, further land development and environmental impacts;
- Defining levels of service within each drainage catchment;
- Potential impacts of co-management arrangements with Iwi on HBRC policy and Scheme management regimes;
- Minimising the adverse impact of river management methods on the environment by incorporating advice and direction from Environmental Codes of Practice and Ecological Management and Enhancement Plans;
- Reviewing maintenance methods and techniques to accommodate changes in land management practices; including organic fruit and crop production and trends in best practice management for stormwater and flooding; and,
- Equitably funding drainage capacity improvements required as a result of land use changes given that the Local Government Act 2002 does not provide Regional Councils with the ability to charge development levies on new subdivisions and development.

This Plan sets out the direction and work programme to be taken by the asset managers in addressing these issues.

The Services We Provide

HBRC maintains a network of stopbanks, hydraulic structures and pump stations, as well as managing the river, stream and drainage channels to ensure they work as expected during floods. The overall aim is to reduce the risk of flood and erosion damage while maintaining a high quality river environment. Five key outcomes have been identified for the Scheme:

1. **The protection of life and communities** - by providing for the control of flooding within Scheme rivers and the draining of surface water from Scheme land so that the frequency, duration and extent of flooding presents minimal risk to human life and community viability; and disruption to the community is minimised.
2. **The sustainable use of land** - by providing for the draining of surface water from land and maintenance of the water table assisted by a receiving facility for water from individual properties.
3. **The protection and enhancement of ecology and water quality values** - by ensuring that flood management and maintenance practices do not have significant adverse effects on the ecology of rivers, streams and wetlands, and ensuring that

where practicable enhancement aspects are included as part of asset upgrades and renewals.

4. **The sustainable management of river sediment (gravel, sand and silt) resources** - by monitoring and managing river sediment (including gravel and silt extraction) to maintain the flood carrying capacity of the river channels, and managing allocation of river gravel resources in a consistent and equitable way.
5. **The protection and enhancement of social and cultural values** - by providing for a wide range of amenity and recreation opportunities and balancing conflicting uses and demands on river berm and drainage reserve areas. Recognising tikanga Maori values and the contribution they make to sustainable development and tangata whenua roles as kaitiaki, in keeping with Maori culture and traditions. To consult with Maori in a manner that creates effective outcomes.

These outcomes are supported by Scheme Objectives and are reflected in the Levels of Service and Performance Targets identified for the Scheme.

In addition the Scheme contributes significantly to several Community Outcomes identified in the LTP including:

- Safe & secure communities;
- A strong, prosperous & thriving economy;
- Transport infrastructure & services that are safe, effective & integrated;
- Communities that value & promote their unique culture & heritage;
- A lifetime of good health and wellbeing;
- Safe & accessible recreational facilities; and
- An environment that is appreciated, protected, and sustained for future generations

Level of Service

The current Levels of Service (LOS) are based on legal requirements, community expectations and physical restrictions inherited over the evolution of the Scheme. The river assets are designed and maintained to provide protection from storms with up to a 1% AEP (Annual Exceedance Probability); also referred to as a 1 in 100 year ARI (Average Recurrence Interval) or a 100 year event (1 in 100 chance of occurrence any given year). The drainage system standard varies, but is typically between 20% and 5% AEP (approximately 5 and 20 year ARI events).

HBRC have carried out a hydrologic assessment of the design discharges based on historical data and all the additional data obtained since the scheme was first designed in order to arrive at a reliable estimate for the 0.2% AEP discharges. Work on channel design to accommodate the increased discharges as part of the flood protection and environmental outcomes is proceeding as part of the 2018/28 LTP. The primary drivers for this review are ongoing development of flood protected land and land-use changes that has occurred since the Scheme was last upgraded. The classification rating by which allocation is determined may no longer fairly reflect benefit received. Scheme ratepayer approval was sought and obtained as part of the 2015-25 LTP process to upgrade the flood protection scheme to a 0.2% AEP (1 in 500 chance of occurrence in any given year).

Annual provision of approximately \$900,000 has been included in the river Scheme budgets for a capital works programme for the 2018-28 LTP period, with work commencing in 2017-18.

A level of services review for the drainage part of the scheme is currently underway beginning with the Napier-Meeanee catchment. This catchment will be completed and the remaining Heretaunga Plains drainage catchments will be reviewed in financial years 2018 to 2021. The

review to date has considered the multi-values of the open drainage network and existing capacity. This review will identify:

- An acceptable standard for the drainage network performance, noting that a 10 year standard is in line with Territorial Local Authority aims to upgrade their stormwater networks;
- The degree of acceptability with respect to the level of residual risk inherent in the system; and,
- The future vision for environmental management and public use of Drainage Scheme areas.

The outcome from this level of service review will dictate future works and expenditure within the Scheme and may result in significant changes to how HBRC manages the flood control and drainage assets. This will be particularly relevant once the TANK (Tutaekuri, Ahuriri, Ngaruroro and Karamu rivers) plan change takes effect where more emphasis will be placed on water quality improvement and shading to achieve lower water temperatures and improved riparian habitat.

Assets in the Scheme

The Scheme is separated into two parts – assets associated with the main rivers (Tutaekuri, Ngaruroro and Lower Tukituki) and assets associated with the drainage network (waterways providing a drainage outlet to properties across the Heretaunga Plains).

The assets associated with the Scheme include 155km of stopbank and deflection banks; 577km of river, stream and drainage channel; 287km of live edge protection on the river banks (including 94km which has recently been improved as a result of Willow Sawfly remediation); 196 structures including, culverts, floodgates, control gates, weirs, rock groynes and pipelines; 5 detention dams; 18 pump stations; 7 mobile pumps; 2 emergency generators and approximately 760ha of land; including river berms and land underlying other Scheme assets.

The pump stations, live edge protection and stopbanks are considered to be the most critical assets of the Scheme because they provide protection to large areas of highly productive land and significant parts of urban Napier and Hastings; and the consequence of their failure is high.

Asset Condition and Risk

Assets within the Scheme are considered to be in good to excellent condition. HBRC has capital and maintenance programmes identified to address some localised issues. Insect pest infestations are an ongoing, widespread issue, and HBRC has a monitoring programme in place to identify at-risk areas and is currently undertaking an alternative species planting programme to lessen the threat of this risk.

Climate change represents a longer-term risk with more uncertainty and HBRC will investigate potential impacts and identify appropriate actions to minimise this risk through the level of service review. The prediction is for Hawke's Bay to be drier but with the potential for increased storminess. Severe storms are predicted to bring more intense rainfall which will result in increased flood flows. Sea level rise will also affect assets in the vicinity of the coast.

Checks of all assets are undertaken as part of the annual programme of works. An annual audit of the Scheme is undertaken by a Registered Engineer with experience in river control works and reported to HBRC. These audits are to be carried out in accordance with the recently introduced "*Flood Protection Assets Performance Assessment Code of Practice*" developed

by the River Managers Forum (2017). This is a methodology intended to provide a high level of consistency and thoroughness of inspections across New Zealand.

Residual Risk

Residual risk for the Scheme includes the chance of a flood event occurring that exceeds the capacity of the system (a super-design event), and the potential for failure of a flood protection asset. Both factors could result in widespread flooding and damage. There are a wide variety of potential causes for both super-design and failure events, representing a risk that is impossible to eliminate completely.

HBRC management of residual risk focuses on good design and maintenance practice, monitoring of asset status and development of contingency and emergency plans for response management should a super-design or failure event occur.

Asset Value and Maintenance

The replacement value of Scheme assets currently equates to nearly \$139m. (Drainage \$62m, Rivers \$77m).

Scheme management is provided by the HBRC's Asset Management Group (HBRC AMG), which is responsible for the management of the Scheme and its assets. The maintenance, capital and renewal work is delivered under contract by HBRC's Works Group. An annual contract outlines all maintenance, capital and renewal works and the required standards.

An annual work programme is prepared by HBRC AMG each year in conjunction with developing the HBRC's annual budgets. An estimate of costs is established as part of developing the work programme and any issues associated with affordability are addressed as part of the Annual Plan or LTP process, to ensure that the agreed programme of works does not compromise the levels of service and that the consequence of any variance is clearly understood and documented. The annual programme of maintenance is undertaken unless circumstances dictate otherwise.

At the end of each financial year, a report is prepared outlining the work completed in each rating area, and the associated expenditure. This report is presented to HBRC in November for the previous financial year.

Asset and Management Plan Improvements

The Scheme monitoring programme includes asset and catchment reviews, asset condition assessments and annual audits, as well as review of this Asset Management Plan and associated registers. The programme identifies potential areas for performance improvement in both the physical assets and asset management process.

A number of projects aimed at improving HBRC's understanding and knowledge of assets, and future requirements within the Scheme, are included in the Scheme Operational budget.

Key projects include:

- Research and further river and floodplain modelling;
- Data collection, including cross section surveys, sediment samples and LIDAR;
- Native and exotic plant trial programme;
- Level of Service review including future demand and risk assessments;
- GIS asset data improvements;
- Plant pests, climate change and specific asset reviews;
- Code of Practice and Waterways Guideline review and development;

- Development and implementation of Ecological Management and Enhancement Plans; and,
- Implementing the recommendations resulting from the Gravel Management Plan relating to the effects of extraction and beach raking on instream fish and macroinvertebrates.

A number of special projects, capital improvements, and renewal works have been identified to maintain and upgrade Scheme physical assets, so that they achieve their desired design standards and environmental enhancement goals.

There is approximately \$30.2m of capital improvements and renewals (\$23.4m capital, \$6.8m renewals) planned over the next 10 years within the Scheme (subject to the current Level of Service review).

Key capital works and special projects are:

- Implement the Level of services improvements for the HP Drainage Scheme;
- Increase the HP river channel capacity from 1:100 to 1:500 year standard (stopbanks and channel works);
- Environmental enhancement projects within the rivers;
- Ecological management and enhancement plan implementation.
- Alternative species

Expenditure on these improvement projects are identified in HBRC's 2018/28 Long Term Plan.

Financial Management

The financial information for the Scheme is based on the Asset Register, asset condition assessments and asset valuation assessments. Three key assumptions are made with regard to the Scheme financials outlined in this Plan:

1. Inflation (based on construction costs) is forecast at 3.0%;
2. There will be no major floods requiring changes to maintenance or capital works programmes; and,
3. There will be a continuing willingness to pay for the level of service set out in this AMP.

These assumptions are justified by the knowledge that the likelihood of a major flood exceeding the capacity of the river system in any one year is less than 1%, and HBRC's disaster provisions allow for the assets to be replaced following such an event.

Funding

The Scheme's annual costs come from:

- Annual operations and maintenance;
- Capital works;
- Renewal work;
- Loan servicing;
- Depreciation, disaster reserve and other contributions; and,
- Other miscellaneous costs.

The average annual costs over the next ten years are forecast at:

- \$4.8 million for Operations; including maintenance, monitoring and research;
- \$2.4 million for Capital Works;
- \$680,000 for Asset Renewal.

Income from Scheme owned land leased for grazing or other purposes;

- Targeted rates levied specifically for the purpose of funding scheme works;
- HBRC Public Good general funding (30% for river assets, 10% for drainage assets);
- Borrowing where deemed appropriate and reasonable;
- Interest from the Disaster Damage and Depreciation Funds; and,
- Miscellaneous minor income sources.

No borrowing has been provided for in the budgets presented in this report.

The Scheme Ratepayers are defined by the Scheme boundary. Those within the boundary gain both direct and indirect benefit from the Scheme through reduced frequency of flooding of their land and reduced disruption to their lives, livelihoods and communities. The direct beneficiaries from the nine drainage areas are also separately rated within the Scheme boundary. Those outside the Scheme and within the wider Napier and Hastings areas also gain indirect benefits from the increased economic activity and the increased choice of service industries, employment and investment opportunities; and recreational and cultural facilities resulting from the associated increase in population sustained though the protection provided by the Scheme. As such, a portion of the Scheme costs are met from general funding sources, part of which is from rates levied on all rateable land within the Hawke's Bay region.