

2018-2028 STORMWATER AND FLOOD PROTECTION ASSET MANAGEMENT PLAN
He Rautaki Whakahaere Rawa mō Te Wai Āwhā me te Taupā Waipuke

FLOOD PROTECTION

HE TAUPĀ WAIPUKE

VOLUME FOUR | PUKAPUKA TUAWHĀ



Mountain to Sea
Te Kaunihera-ā-Rohe o Ngāmotu
NEW PLYMOUTH DISTRICT COUNCIL
newplymouthnz.com

DOCUMENT CONTROL

Document Name	2018-2028 Stormwater and Flood Protection Asset Management Plan Volume 4 - Flood Protection
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August 2018



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This volume provides details of the asset lifecycle management for the **Flood Protection** asset category of the Stormwater and Flood Protection AMP. The framework and key elements of the overall asset management plan are outlined in Table 1.

Table 1 Asset management document structure

No.	Document Name	Key Document Contents
1	Long Term Plan (LTP)	Infrastructure Strategy <ul style="list-style-type: none"> • Strategic Framework • Guiding Themes • High Level Information for Each Asset Class Council Services <ul style="list-style-type: none"> • High Level Information • Levels of Service • Financial Plan
2	Asset Management Strategy	General Asset Management Principles and Overview
3	Asset Class General Volumes	General Information and Glossary about each asset class <ul style="list-style-type: none"> • Executive Summary • Introduction • Levels of Service • Future Demand • Risk Management Plan • Financial Summary • Plan Improvement and Monitoring

4	Asset Category Lifecycle Management Volumes	Asset Life Cycle Management for each asset category within each asset class <ul style="list-style-type: none"> • Description • Condition • Remaining Lives • Valuation • Operations & Maintenance • Renewals • Acquisition and Augmentation • Disposals • Annual Work Plan • Risk Management • Financial Summary • Improvement Plan
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Purpose and key issues

Flood protection assets are designed to protect floodplains (the land adjacent to streams and rivers), streams, rivers and riparian areas from the effects of major storm events i.e. storm events of a magnitude greater than a 100-year storm event. They are based on the requirements of Taranaki Regional Council.

The key issues regarding flood protection assets are:

- Climate change predictions result in increase in the number and severity of storms.
- Maintenance of flood protection schemes and assets in the district.

Levels of Service

All of the levels of service included in Section 3 of the Stormwater and Flood Protection General Volume apply to this volume.

Future Demand

Future demand forecasts have identified significant issues associated with the capacity of our flood protection assets. Climate change and changes to run-off caused by land development are the major influences on the performance of flood protection assets. TRC monitors the performance and compliance of flood protection assets.

Note: All financial forecasts are shown in inflation adjusted dollar values.

2. LIFECYCLE MANAGEMENT PLAN

2.1 Asset Description

We provide flood protection within the district through upstream detention dams, bunds, flood diversion tunnels, and through a weir on the Huatoki Stream in the New Plymouth Central Business District (CBD).

Diversion tunnels divert a stream from its normal path during high water flow. Detention dams and bunds reduce flood flows in a stream by temporarily detaining (storing) water to spread the total released flow over a longer period.

Flood Protection Dams

These are structures that detain and store the peak flows from the catchment above the dam, allowing a design flow to pass and gradually releasing the flood waters at a maximum allowable flow that does not cause unacceptable risk downstream of the dam. There are three earth dams protecting New Plymouth District:

- Huatoki dam (commissioned in 1987)
- Mangaotuku dam (commissioned in 1986)
- Waimea dam (commissioned in 1985)

Detention Bunds

Bunds provide a temporary buffer to peak flows on a waterway or within a sub-catchment by detaining and storing flood flows to a designed peak.

There are eight earth bunds, all within New Plymouth City:

1. Huatoki bund (built in the 1960's)
2. Sutherland Park bund (built in the 1970's)
3. Brois St bund (built in the 1970's)
4. Vogeltown bund (built in the 1990's)
5. Waimea St bund (built in the 1980's)
6. Rugby Park bund (built in 2002)
7. Magnolia bund (built in 2004)
8. Highlands Park bund (built in 2005)

Diversion Tunnels

These tunnels divert potentially damaging flood flows from their natural drainage path to another catchment or outfall, where the discharge effects are less harmful or can be mitigated.

We have three diversion tunnels:

- Mangaotuku diversion tunnel (built in 1972)
- Lower Mangaotuku diversion tunnel (built in 1995)
- Gilbert St diversion tunnel (built in 1997)

Huatoki Plaza Weir

This barrier constructed across the Huatoki Stream (in the Huatoki Plaza) provides aesthetic amenity value. In times of normal flow the weir is raised, causing the flows in the stream to 'pool' behind the weir structure and creates a tranquil area of water of constant depth alongside the plaza. The weir lowers completely in high flows to remove any impediment to the stream flow, and to prevent localised flooding.

The accuracy of the data presented in this AMP has been assessed and graded in accordance with Section 5 of the Asset Management Strategy.

The data presented in this AMP on the length, diameter, quantity and age of the assets is classed as grade **A – Highly Reliable**.

2.2 Asset Condition

Asset condition grades are given in accordance with Section 5 of the Asset Management Strategy.

The three dams we operate are each classified as High Potential Impact Category (PIC) dams. A consultant conducts an intermediate level inspection of the three dams annually and a Comprehensive Safety Review (CSR) every five years. Changes in Building Act legislation, and particularly in Building (Dam Safety) regulations, came into effect force on 1 July 2015. To comply with this legislation we have prepared an Emergency Action Plan ECM_1520213 that contains instructions, advice and information for emergency management of these dams. The plan covers all three dams with information specific to each site clearly identified where necessary.

2. LIFECYCLE MANAGEMENT PLAN

Condition assessments of the Mangaotuku diversion tunnel conducted in April 2005 and in 2010 showed that overall, the tunnel is an excellent condition. No formal condition assessments have been carried out for any other diversion tunnels. **This is a data integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

The Huatoki weir was constructed in 2010 and is in an excellent condition (based on its age and serviceability). The weir was inspected and valued by Beca as part of the 2016 statutory valuation.

No formal asset conditions are recorded for flood protection in the asset inventory and all asset conditions are recorded as **6 - Unknown**. However, because we have conducted some condition inspections as described above, the asset condition data is classed as grade **C – Uncertain**.

2.3 Asset Remaining Lives

All stormwater dams, bunds and tunnels were constructed to meet a 200 year life expectancy. Associated structures and grilles have different expected lives dependent on their construction material and function.

Data accuracy for asset remaining lives is classed as grade **B – Reliable**. Ongoing regular inspections and monitoring programmes will maintain this accuracy.

2.4 Asset Valuation

The value of the flood protection assets as at 30 June 2016 is shown in Table 2.

Table 2 Asset valuation

Gross Current Replacement Cost (GRCR) (\$)	Annual Depreciation (\$)	Optimised Depreciated Replacement Cost (\$)
18,403,503	115,723	13,756,321

The plant and equipment assets at the Huatoki Weir were revalued during the 2016 statutory valuation. The remaining assets were valued some time ago and values uplifted to reflect inflation and current day construction costs. The accuracy of the valuation data is therefore classed as **B – Reliable** due to the asset inventory being well maintained and

2.5 Operations and Maintenance

2.5.1 Operations

Operations consist of general site attendance to conduct routine weekly visual checks/inspections. Pore pressures inside the dam walls and groundwater flow from inside the dam walls are measured and recorded monthly.

We have installed telemetry for alarms to control water levels at Huatoki Weir to monitor operations. New telemetry has recently been installed at the Mangaotuku and Waimea dams

2.5.2 Maintenance Plan

We engage a consultant to carry out an annual intermediate level inspection of the three dams.

Although they are not formally inspected, we undertake regular maintenance on the bunds e.g. mowing of grass and weeds.

The height adjustable weir has weekly inspections and removal of debris. It also undergoes routine maintenance including checking of oil, drive maintenance, and air dry function.

2.5.3 Critical Spares

We do not have an updated assessment of the critical spares required for flood protection assets. This is an asset integrity issue concerning multiple stormwater assets for which commentary is included in Section 5 of the Stormwater and Flood Protection General Volume.

2.5.4 Opex Forecast

The general 10-year Opex forecast for flood protection assets is included in the Stormwater and Flood Protection General Volume. It includes the Opex forecast for the maintenance and operation of the flood protection assets.

2. LIFECYCLE MANAGEMENT PLAN

2.6 Renewal Plan

Our general approach to asset renewals can be found in Section 4.3 of our Asset Management Strategy.

Dams, bunds and tunnels have a life expectancy of 200 years and all assets are around 30 years old. Therefore, no renewals have been identified as being required during the 10-year forecast period or for the years beyond 27/28 for major civil assets.

However, there are a number of plant and equipment assets associated with operating flood protection assets that have shorter life expectancies. We also need to install and update rainfall and stream stage monitoring equipment at Waimea and Mangaotuku Dams so as to maintain continuous record and to generate automatic alarms to trigger increased monitoring and mitigate impact of potential dam breach. We have made an annual allowances for these renewals as shown in Table 3. Renewal expenditure is aimed at maintaining assets in a safe and fit for purpose condition by replacing them at or before the end of their useful life. Renewals are selected using the general principles described in the Asset Management Strategy.

Table 3 Renewals expenditure forecast

Flood Protection Renewals Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
FP2001 - Flood Control Planned P&E Renewals	20	21	21	22	22	22	23	24	24	25	224
FP1003 - Monitoring equipment at Detention Dams	8	8	8	9	9	9	9	9	10	10	89
Total	28	29	29	31	31	31	32	33	34	35	313

2. LIFECYCLE MANAGEMENT PLAN

2.7 Acquisition and Augmentation Acquisition

There is no acquisition of flood protection assets planned over the period of the AMP

Level of Service

No level of service projects are planned during the period of the AMP.

Growth

No growth projects are planned during the period of the AMP.

2.8 Disposal Plan

Disposal is the retirement or sale of assets when they become surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation
- Obsolescence
- Provision exceeds required level of service
- Replacement before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social)

No asset disposals are planned over the 10 year AMP period.

2.9 Annual Work Plan

Detailed work plans included in Annual Plans will be based on the asset renewal forecasts included in section 2.6 and the augmentation projects identified in section 2.7.



3. RISK MANAGEMENT PLAN

3.1 Critical assets

Floodwater protection assets are considered critical for the protection of the connected waterways, their surrounds and adjacent property.

We have not yet conducted formal criticality ratings for flood protection assets and there is no criticality data recorded in EAM. **This is an asset data integrity issue and is recorded as an improvement action in Section 5 – Improvement and Monitoring Plan.**

Following asset criticality assessments, we will develop a focused management plan to ensure the integrity and resilience of critical assets. **This is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

3.2 Risk Assessment

Details of our Risk Management Framework are included in section 6.2 of the Stormwater and Flood Protection General AMP volume and section 7 of the Asset Management Strategy.

3.3 Infrastructure Resilience Approach

The physical integrity of the floodwater protection assets is maintained by regular inspection, maintenance and condition assessment. Asset performance is monitored during flood events to ensure they deliver at their designed protection levels.



4. FINANCIAL SUMMARY

A summary of the Capex forecast included in this volume is shown in Table 4.

Table 4 Capex forecast summary

Flood Protection Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
Renewals	28	29	29	31	31	31	32	33	34	35	313
Service Level	-	-	-	-	-	-	-	-	-	-	-
Growth	-	-	-	-	-	-	-	-	-	-	-
Total	28	29	29	31	31	31	32	33	34	35	313

The Opex forecast for operations and maintenance is included in the overall Opex forecast for Stormwater and Flood Protection and Control detailed in the LTP. It is also included in the Stormwater and Flood Protection General Volume.

5. IMPROVEMENT AND MONITORING PLAN

The general asset management maturity improvement plan is included in Strategic Asset Management Plan.

General improvements to stormwater assets are included in the Stormwater and Flood Protection General Volume.

The specific areas of improvement identified for flood protection assets are listed in the table below.

Table 5 Improvements summary

No	Improvement Area	Owner	Start Date	End Date
1	Conduct asset condition assessment and record results in EAM where not currently assessed. Record asset condition ratings where already known.	Manager Water & Waste	2018	2019
2	Conduct criticality assessment and record results in EAM.	Asset Operations Planning Lead	2018	2019
3	Produce focused management plan for those assets identified as critical.	Manager Water & Waste	2018	2019



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DANGER
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