

Part 4 - Infrastructure Strategy

Wāhanga 4 - Rautaki Hanganga

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1. Executive summary

The Local Government Act 2002 (LGA or the Act) sets out requirements for councils for 30-year infrastructure strategies and asset management planning. The Act requires identification of issues that may impact on infrastructure management over the coming 30-year period and strategies that are to be put in place to address those issues.

Figure 1: Tukipo-Tukituki confluence, CHB.



Hawke's Bay Regional Council (HBRC) manages a major portfolio of infrastructure assets (Figure 2) as rated flood control and drainage schemes, and publicly accessible regional parks and cycleways throughout the Hawke's Bay region.

The following issues have been identified for HBRC's flood protection, drainage and open spaces infrastructure assets:

- Climate change
- Levels of service (LoS)
- Growth and development
- Land use changes
- Managing risks of natural hazards
- Aging assets
- Economic conditions
- Legislative changes.

Strategies and actions have been identified in relation to these issues some involving the continued development of asset management practice and policy, others requiring specific actions, or new initiatives.

Climate change is a consideration for all activity planning areas and adaptation to scientific forecasts will be an ongoing organisational response. Infrastructure asset planning in the period of the Strategy will incorporate the future level of service requirements based on the climate science as localised forecasts mature and are adopted as performance targets. Our current environmental monitoring will be a key component to assess our asset performance and future requirements.

Our historical infrastructure asset development has given HBRC an inventory of aging assets which are being assessed for future capability and capacity, and economic planning to maintain suitable asset performance as community and legislative requirements change. The need to fairly rate those who benefit from schemes and maintain sustainable levels of service (LoS) is an ongoing challenge with current economic pressures and compliance requirements. Compliance with environmental, consenting and operational health and safety add complexity and funding requirements across the scheme activities HBRC support. Provisions to support this work have been signalled in the Long Term Plan (LTP) in operational, technical staff resources and additional capital programmes.

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Funding models for sustainable future infrastructure will be investigated as part of a rating review to inform changes to the Revenue and Financing Policy post adoption of this Long Term Plan. HBRC consultation with stakeholders will continue and be reflected in the future infrastructure planning.

Community expectation for public access, recreation, cultural and environmental preservation is increasing, and this is recognised in greater activity planning specifically for Open Spaces management which incorporates regional parks, cycle trails and forestry activities. The traditional flood and drainage asset management remains the core critical activity base but public access is creating growing activity demand with different level of service expectation that requires sustainable future funding. Council recognises the impact of global events like COVID-19 on local economies and has taken on central government funding intended to stimulate regional areas to benefit infrastructure in the 2020-2023 period.

This 30-Year Infrastructure Strategy needs also to be considered in the context of other Council documents and processes including its Long Term Plan particularly the Financial Strategy and Asset Management Plans.

Figure 2: 2020 Asset valuation summary

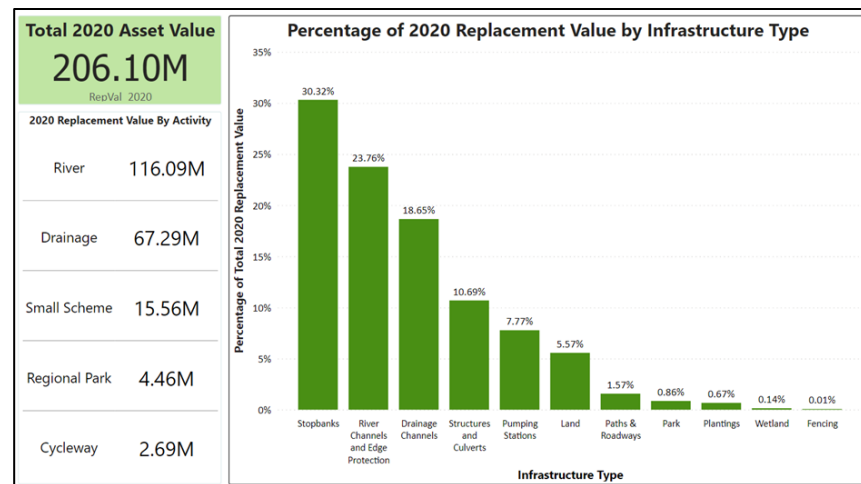


Figure 3: Plantation pump station and flood pump maintenance 2020



2. Introduction

The Hawke’s Bay Regional Council (HBRC) Infrastructure Strategy has been prepared as part of the 2021-31 long term planning process.

2.1 Organisational context

2.1.1 HBRC mission, vision and purpose

Mission statement:

Enhancing our environment together | Te whakapakari tahi i tō tātau taiao

OUR VISION: WE WANT	A healthy environment and a resilient and prosperous community.
OUR PURPOSE: WE WORK	With our community to protect and manage the region’s precious taonga of rivers, lakes, soils, air, coast and biodiversity for health, wellbeing, and connectivity.
OUR FOCUS: WE PRIORITISE	<ol style="list-style-type: none"> Water quality, safety, and climate-resilient security. <i>Te kounga o te wai, te haumarutanga me te mārohirohi ā-āhuarangi o te whakamarutanga.</i> Climate-smart, and sustainable land use. <i>Kia koj, kia toitū hoki te whakamahinga o te whenua.</i> Healthy, functioning and climate-resilient biodiversity. <i>Kia ora, kia āhei, kia mārohirohi ā-āhuarangi hoki te rerenga rauropi.</i> Sustainable and climate-resilient services and infrastructure. <i>Kia toitū, kia mārohirohi ā-āhuarangi hoki ngā ratonga me ngā hanganga ā-whare.</i>



2.1.2 Asset Management Group

The infrastructure detailed in this strategy is managed and operated by HBRC’s Asset Management Group. The Group operates with HBRC’s strategic vision objectives and community outcomes outlined above.

2.1.3 Contribution to community outcomes

The assets and activities managed by the Asset Management Group primarily contribute to two community outcomes as summarised in the table below:

Figure 4: Asset Management Group contribution to community outcomes

Community outcome	Asset Management Group contribution
	<ul style="list-style-type: none"> By providing communities protection from frequent flooding through well maintained flood and drainage schemes and regional parks. By providing regional monitoring and flood hazard information. By developing and delivering water storage and management solutions.
	<ul style="list-style-type: none"> By reducing the likelihood of damage from flooding on people, property, productive land, and businesses for long-term benefits to our economy. Gravel from Hawke’s Bay rivers is some of the best quality aggregate in New Zealand and essential for the economic development of the region’s construction industry, used for roads, cement production or landscaping.

2.2 Legislative drivers

This 30-Year Infrastructure Strategy has been prepared based on Council's 2021 suite of Asset Management Plans (AMP), asset databases and the 2021 – 2031 Long Term Plan, of which it forms part of. The requirements for an infrastructure strategy are described within section 101B of the Local Government Act 2002. The relevant sections state:

(1) A local authority must, as part of its long term plan, prepare and adopt an infrastructure strategy for a period of at least 30 consecutive financial years

And

*(6) In this section, **infrastructure assets** include-*

- a. existing or proposed assets to be used to provide services by or on behalf of the local authority in relation to the following groups of activities:*
 - iv) flood protection and control works:*
- b. any other assets that the local authority, in its discretion, wishes to include in the strategy.*

Section 10 of the Local Government Act 2002 - The purpose of Local Government, particularly point (b) has also been taken into consideration when preparing this strategy:

The purpose of local government is

- (a) to enable democratic local decision-making and action by, and on behalf of, communities; and*
- (b) to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.*

2.3 Regional context ³

2.3.1 Location

Hawke's Bay is a region of New Zealand located in the east of the North Island on the Pacific Ocean coast. Hawke's Bay has a mild Mediterranean climate. Summer can be sunnier and hotter than the average for New Zealand with long dry periods and droughts occurring regularly. Winters are mild, although frosts and occasional snow do happen.

2.3.2 Extent

The region's total land area is around 14,200 square kilometres (1.42 million hectares). It includes mountain ranges to the north and west, 350km of diverse coastline (cliffs, estuaries, sand beaches, gravel beaches), productive plains and hill country. Te Urewera (formerly a national park, now iwi managed) has Lake Waikaremoana on our northwest border, while other natural reserves include White Pine Bush and Ruahine Forest Park.

Hawke's Bay has seven major rivers - (from the north) Wairoa, Mohaka, Esk, Ngauroro, Tūtaekurī, Tukituki, Waipawa. The Regional Council has responsibility for managing the use of natural resources (air, water, land, coast, biodiversity) while four local councils manage local services (water supply, sewage, rubbish, roading, civic amenities such as sports, event and library facilities) – Wairoa District, Hastings District, Central Hawke's Bay District and Napier City Councils. HBRC flood and drainage schemes are shown in Figure 5 to Figure 10.

³ Sourced from: <https://www.hbrc.govt.nz/hawkes-bay/about-our-region/>

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Figure 5: Hawkes Bay Regional Council River and Drainage Schemes

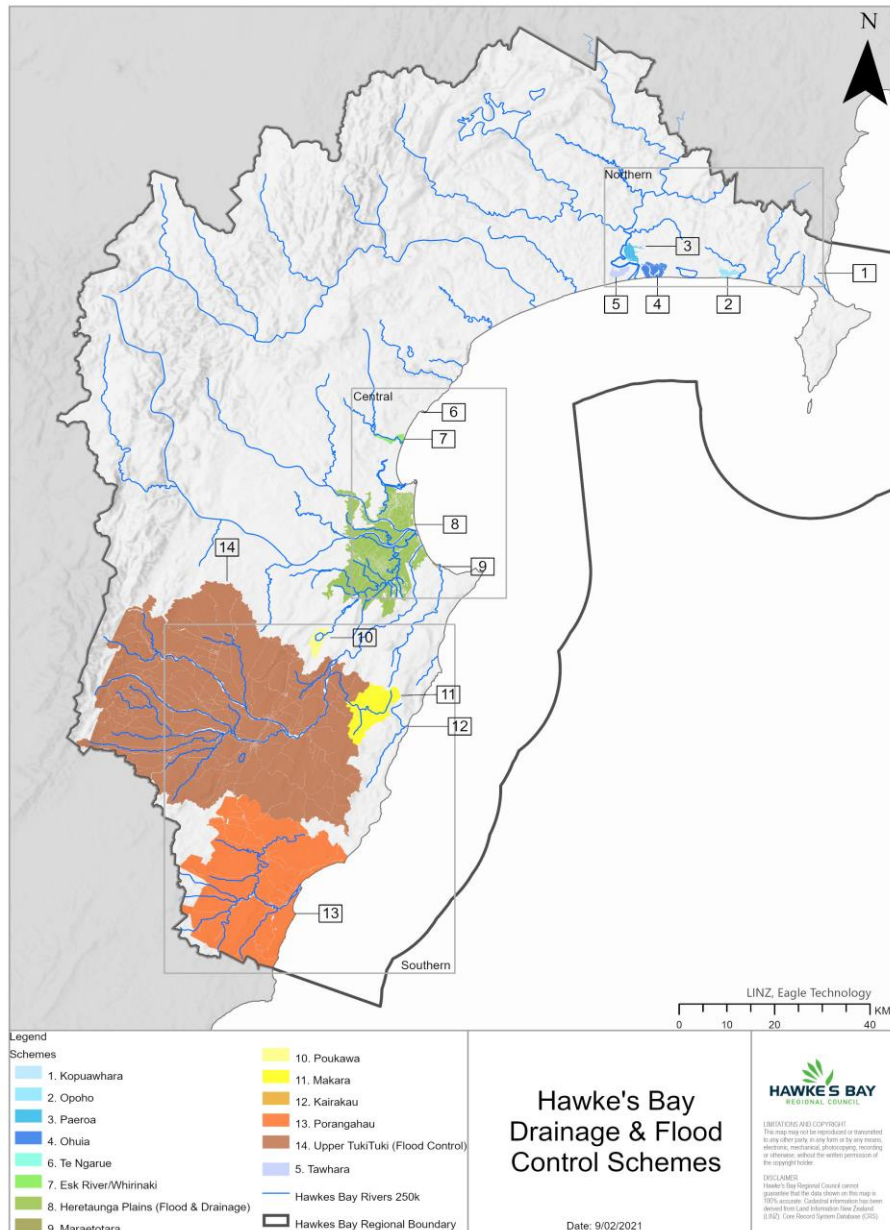
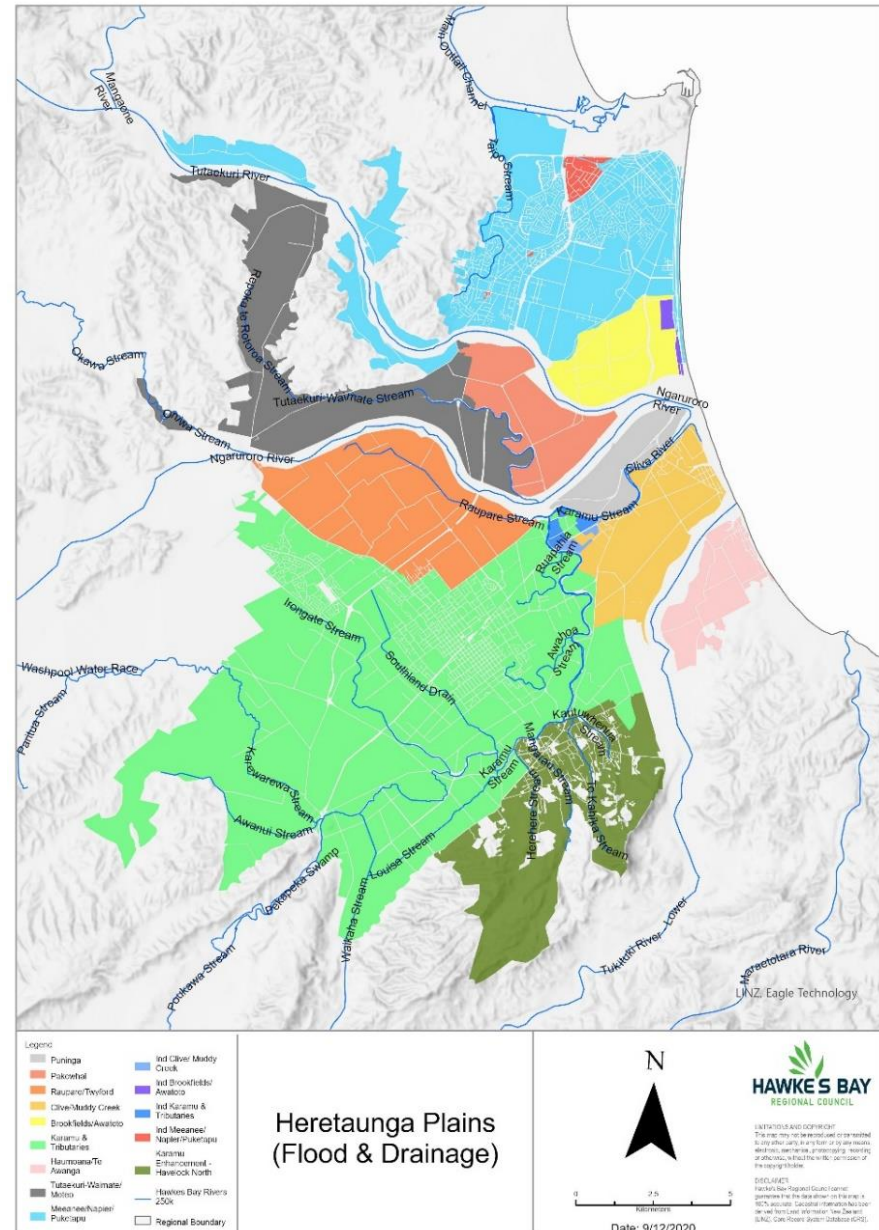


Figure 6: Heretaunga Plains Flood and Drainage Scheme



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Figure 9: Central Area Small Schemes

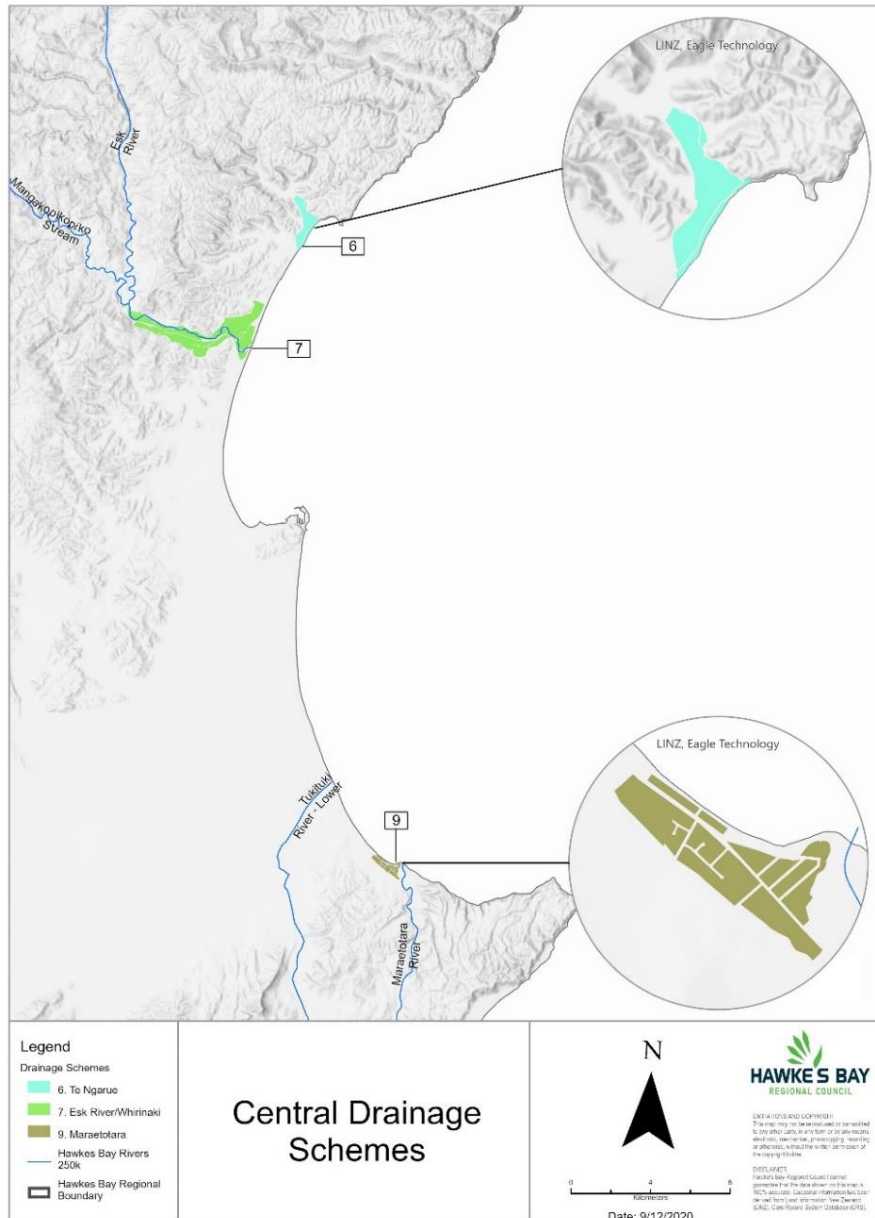
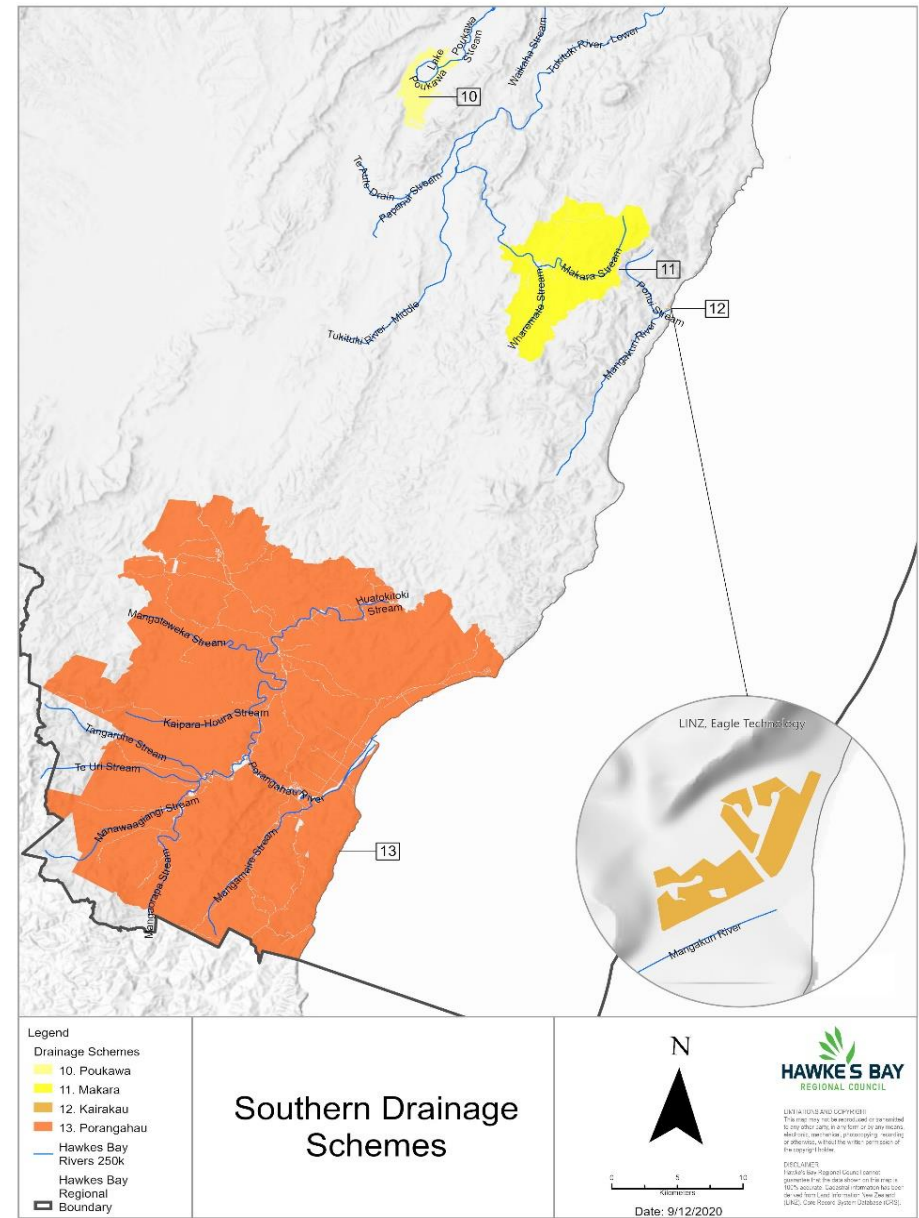


Figure 10: Southern Area Small Schemes



2.4 Population

The Council's assumptions on changes in population are set out in the Significant forecasting assumptions section of the 2021-2031 Long Term Plan. The population projections estimate Hawke's Bay's population in 2021 at 176,694. The region's population is expected to increase by 12,978 people (or 7.3%) over the 10-year life of this Long Term Plan.

2.5 The environment

Hawke's Bay's environment has been highly modified through generations of forestry, farming and development. We want to protect, enhance and sustain the environment and adapt to the challenges of changing climate conditions. There is a public eagerness to restore and sustain native fauna and flora, improve water quality and productively support economic activity in keeping with our climate and soils.

2.6 The economy

Farming, horticulture (apples, stone fruit, vegetables), wine and tourism are key industries.

Napier Port is a major export and transport hub. Hawke's Bay Regional Council derives dividend revenue from the Port through its investment company, HBRIC.

Several major rivers flow across Hawke's Bay so flood protection is an important function of the Regional Council to protect homes, industry, productive land and cultural/environmental values. A 2018 Review by NZ Rivers Group of Hawke's Bay flood and drainage protection schemes, as part of a national review, estimate a net present value benefit of over \$28.8 billion.

3. Strategic objectives and context

3.1 Strategy purpose and objective



The purpose of the Infrastructure Strategy is to identify significant infrastructure issues arising within the next 30 years in the Hawke’s Bay region, with the objective of describing options for managing them and awareness of the implications associated with applying those options. This is stipulated in section 101B of the Local Government Act 2002 and has links with the Financial Strategy which together are part of the Long Term Plan (Figure 12).

This strategy combines the current level of knowledge, complexity, and challenges within the HBRC infrastructure environment. Considerations associated with water quality and quantity, climate change, environmental degradation and natural hazards are all issues impacting infrastructure management decisions in the period of the Strategy. Infrastructure is an important part in an

integrated approach to catchment and regional environmental management. Regional initiatives relating to afforestation, environmental improvements, land use change and regulation are a critical component to management of the region’s natural resources.

Infrastructure management options taken into consideration by HBRC include:

- how best to manage renewal or replacement of assets over their intended lifespan
- how to respond to growth or decline in demand
- planned increases or decrease in levels of service
- safeguarding the community and improving the environment
- addressing risk associated with natural hazards in terms of providing resilience and ensuring sufficient financial provision.

3.2 Strategy extent

This Infrastructure Strategy covers the following infrastructure assets:

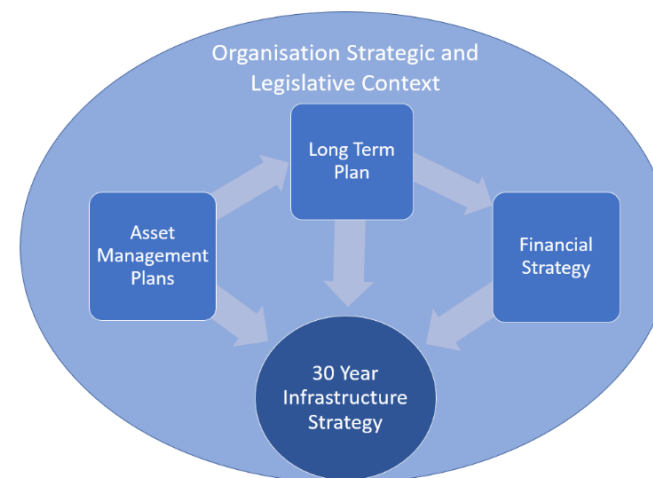
Table 11: Infrastructure assets

Infrastructure asset	Critical asset?
Heretaunga and Upper Tukituki Flood Protection and River Control Schemes (HPFCS and UTTFCS)	Yes
Heretaunga Drainage Schemes	Yes
Small Schemes	No
Coastal Assets (Currently part of HPFCS)	Yes
Cycleways (Open Spaces)	No
Regional Parks (Open Spaces including Forestry)	No

3.3 Strategy linkages

The diagram below summarises the key Infrastructure Strategy linkages with other Council strategies and plans.

Figure 12: Infrastructure Strategy linkages



Within the AMP framework there are a suite of documents that support the 30-Year Infrastructure Strategy, including;

- Asset Management Policy
- Scheme Asset Registers
- Scheme Asset Management Plans
- Scheme Annual Maintenance Contracts
- Various Scheme Review reports
- Annual audits.

3.4 Strategy review and improvement

The Infrastructure Strategy (IS) is formally reviewed every three years and will see ongoing levels of refinement driven by a clear direction to pursue a higher level of asset management process and maturity. Investment in technical human resources, operational assessment processes and risk-based assessment will better support asset decision making longer term. Planning includes provision for systems support for asset data management for operational and analytical process and delivery improvement.

3.5 Key issues and implications

The task of building, operating, and maintaining these infrastructure assets in an affordable manner is becoming increasingly challenging. This section highlights the projected changes in demographics, economy, policy, cultural trends, and geography that have the potential to impact our management approach in the future. Being aware of the potential for change, will allow us to adapt our approach accordingly.

The following key issues impact and influence infrastructure and scheme management.

- 3.5.1 Climate change (Climate Emergency June 2019)
- 3.5.2 COVID-19 economic impact (2020- ongoing)
- 3.5.3 Demographic changes
- 3.5.4 Tāngata whenua representation
- 3.5.5 Economic trends and affordability

3.5.6 Natural hazards

3.5.7 Legislation and guidance, including:

- Freshwater reform (Taumata Arowai–the Water Services Regulator Act 2020)
- Resource management reform (including plan changes to our Regional Resource Management Plan (RRMP))

3.5.8 Changes in community values

These issues and their infrastructure implications are detailed in the following sections.

3.5.1 Climate change

Council position

The Regional Council announced a climate emergency for the Hawke’s Bay region on 26 June 2019 recognising that we have a small window of time to act to avoid the most damaging effects of the climate crisis in the longer term. In declaring a climate emergency, the Regional Council is making climate change a focus in all its decision-making and relevant work programmes.

The climate emergency declaration recognises that the climate crisis is an urgent and pervasive threat to human and ecological wellbeing. A build-up of too many greenhouse gases like carbon dioxide and methane leads to too much heat being trapped in turn causing the climate to change.

Local government has responsibilities for adaptation to climate change under the Resource Management Act and Local Government Act, whereas central government leads policy to mitigate (reduce) greenhouse gas emissions. As such climate change adaptation is a key component of the Regional Council’s proposed work programme in this Long Term Plan.

Infrastructure implications and responses

The Hawke's Bay region has always experienced some extreme weather, but the increase in greenhouse gases will generate changes in global, national and local climates. In Hawke's Bay the expected climate change effects include:

- a rise in temperature and fewer frosts
- more extreme temperatures, more often
- more frequent and more severe droughts with greater fire risk
- drier in winter and spring, while summer and autumn may get more rainfall
- an increase in extreme rainfall
- stronger wind gusts during storms, including thunderstorms
- sea level rise.

HBRC is developing its infrastructure response to climate change through its planned work programmes, level of service and scheme reviews. Major projects in this LTP period in a direct response to climate change are the increase in flood protection standards (Flood Protection Assessment) in the Heretaunga Plains Flood Control Scheme (HPFCS) and the potential continuance of the Coastal Hazards Strategy 2120 which takes a Joint Committee approach to apply solutions to coastal hazards and sea level rise.

The Coastal Hazard Strategy 2120 is not formally adopted or part of any current schemes in 2020 but remains a potential future regional programme under discussion with other councils in Hawke's Bay with common interests in the climate change related coastal hazards. It awaits programme inter-council governance and funding decisions to move forward from the initial 2014-2017 collaboration by Hastings District Council, Hawke's Bay Regional Council, Napier City Council and groups representing mana whenua and tāngata whenua.

Ongoing HBRC stewardship of critical flood and drainage protection assets for the Hawke's Bay population requires the planned level of service reviews and flood protection assessments, supported by sound environmental monitoring and improved asset management approach. Schemes will be reviewed through the LTP period with upgrade, replacement, renewal, or disposal of current infrastructure possible.

HBRC has a programme of scheme reviews planned over the next 10 years, and then on a continuing cycle as climate change assumptions mature and level of service is reviewed. This will allow the renewals programme to be assessed against the forecast climate needs and identify areas of potential new capital requirement.

There is an expectation that improved climate modelling specific to the Hawke's Bay region will be developed in the next 5-10 years, and level of service and flood modelling will be adapted to reflect the future forecast climate outcomes.

Council's response programme includes:

- **Education, engagement and collaboration:** Late 2020, HBRC launched a climate action awareness campaign which included pop-up community events, opinion pieces, social media, videos and a new website www.hbrc.govt.nz [#climateactionhb](https://twitter.com/climateactionhb) followed by a Climate Action Youth Camp in early 2021. HBRC also supports Climate Action Hawke's Bay, an initiative bringing businesses and communities together to be more connected and focused on meeting the challenges and opportunities of climate change.
- **Work programme:** This Long Term Plan includes a number of projects to accelerate our response to the climate crisis. HBRC is already working on several other projects around the region enabled by central government regional recovery investment (HPFCS level of service review).
- **Hazard identification:** HBRC will continue to identify, monitor, and plan for major climate change hazards such as increased storm intensity and flooding, sea level rise and coastal erosion.
- **Monitoring and reporting:** HBRC will continue to monitor and report on climate change trends and indicators. SCADA controls for existing pump systems will be upgraded and cover more stations.
- **Level of services (LoS) reviews:** HBRC will continue to undertake LoS reviews and plan and implement infrastructure upgrades based on findings.

Examples of infrastructure related climate change work HBRC is currently undertaking includes:

- Flood Control Schemes/Drainage Schemes: Level of service reviews, greater investment in modelling, improved asset management of scheme assets, engineering and consenting.
- Development- Coastal Hazards, Heretaunga Plains Urban Development Strategy (HPUDS).
- Catchment management - Right Tree Right Place pilot, managing erosion.
- Continued environmental monitoring – water, air, climate.

3.5.2 COVID-19 economic impact

The COVID-19 pandemic that swept the world in 2020 had the potential to have a major impact on the New Zealand and Hawke’s Bay economies. The impact on different sectors of the Hawke’s Bay community has been variable with some impacted by a downturn in tourism for example. The COVID-19 pandemic will have an

enduring impact on the NZ and Hawke’s Bay economies, which in turn will have a bearing on the implementation of the 2021-31 Long Term Plan.

Infrastructure implications and responses

This issue has potential impacts on the timing and funding of activities in the period of the Infrastructure Strategy. Short-term regional recovery investment is advancing some infrastructure related projects but there may be some longer term impacts on regional economics which need to be reflected in future programme affordability if there are longer term economic impacts.

3.5.3 Demographic changes

HBRC has considered forecast changes in population and rateable properties. The regional projection reflects the combined projections from the main territorial authorities in the region (Hastings District, Napier City, Central Hawke’s Bay District and Wairoa District Councils). The basis for these assumptions is set out in 2021-2031 LTP’s Significant forecasting assumptions, as per Table 13.

Table 13: Hawke’s Bay population projections (combined projections from the region’s territorial authorities)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
HB population	176,694	178,042	179,397	180,696	182,001	183,313	184,632	185,938	187,239	188,527	189,672
Change		1,348	1,355	1,299	1,305	1,312	1,319	1,326	1,281	1,288	1,145
Percentage change		0.76%	0.76%	0.72%	0.72%	0.72%	0.72%	0.72%	0.69%	0.69%	0.61%
No of households	66,838	67,367	67,906	68,415	68,934	69,473	70,002	70,521	71,029	71,527	72,065
Change		529	539	509	519	539	529	519	508	498	538
Percentage change		0.79%	0.80%	0.75%	0.76%	0.78%	0.76%	0.74%	0.72%	0.70%	0.75%

Note: Sourced from HBRC Significant forecasting assumptions 2021-31 LTP: HBRC has taken into account forecast changes in population and rateable properties. The regional projection reflects the combined projections from the main territorial authorities in the region (Hastings District, Napier City, Central Hawke’s Bay District and Wairoa District).

Infrastructure implications

Population growth on the Heretaunga Plains will be incorporated in our LoS and scheme planning with planned resources and investment in modelling tools in the 2021-31 LTP. The intent is to review all schemes over the next 10 years to understand the impact of climate change, assess impact of growth and changes in farming practices (subsurface drainage) and flood protection assessment (FPA) incorporating catchment risk.

There will be ongoing demand for residential land in and around the Hastings and Napier conurbations with greenfield developments in flood and drainage scheme catchments (Te Awa, Parklands/Lagoon Farm, Park Island, Arataki, Lyndhurst Waingākau Village, Williams St). Drainage catchment areas and flood control schemes servicing urban and peri-urban areas need to accommodate this trend. This will be considered in the scheme level of service reviews for these areas. Growth is forecast to peak in 2033 on Statistics NZ data.

HBRC manages four schemes (one flood control and three drainage) in the Wairoa area. It is essential that the schemes remain affordable to their benefiting community. As the schemes service rural areas, this means that farming operations must be able to remain profitable and the cost of maintaining schemes continues to be exceeded by the value of the benefit provided.

The Upper Tukituki Scheme is likely to remain unaffected by any changes in the local population in Central Hawke's Bay, so this position needs to be considered in the levels of service review of the current 1%AEP design standard.

3.5.4 Tāngata whenua representation

Tāngata whenua relationships form an important component of Council's responsibilities and obligations. Cultural significance and awareness are paramount to achieving Council's objectives and policies, with relevance to managing water, protecting the land, environmental enhancement and ensuring protection for future generations.

Treaty of Waitangi (Te Tiriti o Waitangi) settlements require increased kaitiakitanga (stewardship) over the rivers and their environs by tāngata whenua.

Hawke's Bay tāngata whenua provide shared input into infrastructure-related activities through the Regional Planning Committee (RPC) which has responsibility to review the Council's Regional Resource Management Plan and Regional Policy Statement prepared under the Resource Management Act 1991; and the Māori Committee for activities likely to require specific consultation (e.g. gravel extraction, open spaces consultation).

The Māori Committee has 12 representatives nominated by each of the four Ngāti Kahungunu Taiwhenua/Executive in the region and provides representation to other HBRC committees e.g. Environment and Integrated Catchments where infrastructure issues are raised.

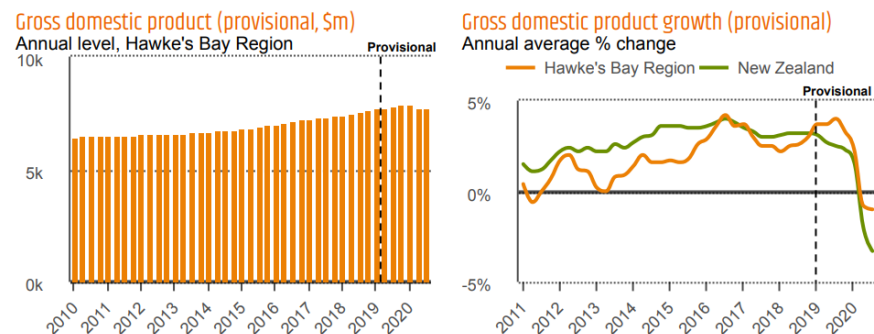
Infrastructure implications

Cultural values impacted by activities associated with the ongoing operation, maintenance and improvement of flood control and drainage schemes and their environment are considered in planning. HBRC engages with elected and tāngata whenua representatives through the RPC and Māori Committee representation on internal decision making committees, and scheme and open space consultation for specific activities e.g. open spaces, gravel extraction.

3.5.5 Economic trends and affordability

Our assets are fundamental to the continuing economic prosperity of our region. In particular, the Heretaunga Plains Flood Control Scheme (HPFCS) is the economic 'engine room' of the Hawke's Bay region accounting for approximately 85% of the regional economy across different indicators. The catchment comprises the majority part of the Hawke's Bay primary production/processing and related servicing base. It is an important component of the national fruit and horticultural sector and forms the main part of the Napier-Hastings urban area which is itself the fifth largest urban centre in New Zealand. Figure 14 shows the GDP trend for Hawke's Bay. The September 2019-2020 GDP (Gross Domestic Product) dropped 1% in Hawkes Bay compared to a 3.3% drop for New Zealand which covers the period of the COVID-19 pandemic lockdown. This demonstrates the high degree of uncertainty that is impacting infrastructure planning for things such as residential development.

Figure 14: Infometrics provisional Sept 2020 GDP trend



The economic impact losses of three major flooding stop bank breach scenarios were modelled as part of an economic study which will feed into the level of service reviews. These were breaches at Roy’s Hill on the Ngaruroro River, Taradale and Moteo on the Tūtaekurī River within the Heretaunga Plains.

The table below summarises potential breach economic impacts CPI (Consumer Price Index) adjusted to 2020 dollars:

100-year return flood breach impacts	Direct industry production Losses	Total Hawke’s Bay-wide GDP/value added economic impact losses	Net present value/discounted annualised value of these impacts
Roy’s Hill on the Ngaruroro River	\$546 million	\$613 million	\$46.1 million
Taradale on the Tūtaekurī River within the Heretaunga Plains	\$415.3 million	\$369.8 million	\$27.7 million
Moteo on the Tūtaekurī River within the Heretaunga Plains	\$28.4 million	\$37 million	\$2.8 million

These figures highlight the critical part our flood protection assets play for our economy.

Infrastructure implications and responses

The HBRC drainage and flood control schemes, in particular the HPFCS, protect a large amount of the Hawke’s Bay region’s residential and business assets and community infrastructure. Further demographic, economic, rural production and other industry growth is forecast over the longer term.

Growth planning, forecasting and infrastructure modelling and planning to meet future demand requirements will continue to be incorporated in reviews. Infrastructure condition monitoring, programmed scheme reviews, risk-based flood protection assessment (FPA), environmental monitoring and asset maintenance programmes will continue to be implemented to ensure appropriate levels of service, risk awareness, and stakeholder requirements are being sustainably and economically maintained.

Investment in more staff for scheme planning and asset management processes will improve the whole-of-life analysis for individual schemes to give better support for scheme review.

3.5.6 Natural hazards

Hawke’s Bay experiences several natural hazards which have the potential to impact our critical assets. These include:

- flooding
- earthquakes
- tsunami
- landslides
- coastal erosion and inundation.

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The table below details the natural hazard issues and infrastructure implications:

Table 15: Natural hazard issues and infrastructure implications

Hazard	Issues	Infrastructure implications and response
Severe weather and flooding	Severe weather events create many hazards. Potential risk to life and economic disruption by potential for overtopping of stopbanks or lack of timely drainage.	<ul style="list-style-type: none"> The levels of service review currently underway will identify the risk posed to flood protection assets on our rivers within the HPFCS relative to climate change guidelines published by the Ministry for the Environment. Floods and the potential impact these can have is well understood by HBRC. Flood forecasting and the potential for overtopping of stopbanks can be assessed quickly and our models are tied into our well maintained monitoring networks which provide real time data to validate our forecasting models. Regular risk and condition assessments of our assets also ensure any potential risk of stopbank failure is understood and maintenance works are performed in a timely manner. Investment in modelling software and training. Staff able to dedicate more time to modelling activity to deliver scheme review analysis, via additional resource allocated to scheme reviews. Adoption of consistent survey datum (NZVD2016). Increased river asset survey activity to support modelling and asset management process improvement.
Coastal Erosion	Coastal inundation (flooding by the sea), coastal erosion risk to existing communities and infrastructure. Planning considerations:	<ul style="list-style-type: none"> Coastal erosion maps have been compiled and can be accessed online at www.hbcoast.co.nz. Layers of probability (likely, possible, very unlikely, and highly unlikely) that coastal erosion will affect land in the present day, in 2065 and in 2120. Similarly, the extent of coastal inundation (flooding by sea

Hazard	Issues	Infrastructure implications and response
	Endangered areas and future development	<p>water) possible in a 1% storm event (i.e. there is 1% chance of a storm of that magnitude happening every year) in the present day, in 2065 and at 2120 has been mapped and is available on www.hbcoast.co.nz.</p> <ul style="list-style-type: none"> All work being considered in the coastal space will be aligned with the New Zealand Coastal Policy Statement and the need to consider 100-year time horizons. In Hawke's Bay we have faced these hazards in the past and understand some of the concerns. We can use this knowledge to look ahead to ensure we are prepared to deal with the challenges of coastal hazards in the future, creating more resilient communities.
Tsunami	Coastal inundation by tsunami causing damage and flooding of coastal areas. Risk to life. Economic disruption.	<ul style="list-style-type: none"> Infrastructure resilience planning, design standards, contingency planning and Lifelines help to mitigate potential tsunami impacts on infrastructure. Increased coastal survey and oceanographic information to support climate change adaptation decision making. The impacts of tsunami, including maps identifying evacuation zones are also available and HBRC has developed methods to forecast wave heights relative to different magnitude earthquakes occurring from both local and distant source. These forecasts, together with those provided by GNS, are used by CDEM to manage disaster risk in our region.

3.5.7 Legislation and guidance

Key legislation includes:

- Local Government Act (2002)
- Resource Management Act (1991)
- Soil Conservation and Rivers Control Act (1941) & (1967)
- National Statement for Freshwater Policy (2014) & (2020)
- New Zealand Coastal Policy Statement (2010)
- Hawke’s Bay Regional Resource Management Plan
- Health and Safety at Work Act (2015)
- National Policy Statement for Urban Development (2020)

Table 16 below summarises local and national plans and programmes related to HBRC infrastructure delivery:

Table 16: Local and national plans and programmes

Plan/programme	Description
TANK Plan	The way land and water resources are managed in the greater Heretaunga and Ahuriri area is under review. The area encompasses the Tūtaekurī, Ahuriri, Ngaruroro and Karamū catchments ('TANK'), plus the Heretaunga Plains aquifer system. The focus is on water quality, quantity, flows and allocations in the four catchments, including for wetlands and estuaries. This catchment-wide approach to managing water and land will lead to Regional Resource Management Plan (RRMP) changes that may impact scheme levels of service obligations. Subject to the impact of any changes, HBRC will need to consider how this is accommodated and managed within the schemes.
Government Three Waters	Over the past three years, central and local government have been considering solutions to challenges facing delivery of three waters services to communities. This has seen the development of new

Plan/programme	Description
Reform Programme ⁴	legislation and the creation of Taumata Arowai, the new Water Services Regulator, to oversee and enforce a new drinking water regulatory framework, with an additional oversight role for wastewater and stormwater networks. There is a need for improvements in freshwater outcomes, increased resilience to climate change and natural hazards, and enhanced community wellbeing. In July 2020, the Government announced a funding package of \$761 million to provide immediate post-COVID-19 stimulus to local authorities to maintain and improve three waters (drinking water, wastewater, stormwater) infrastructure, and to support reform of local government water services delivery arrangements. For HBRC, the consenting of existing pump stations and their related discharges may require infrastructure changes to accommodate water quality and stormwater management criteria including provision for fish passage, additional environmental monitoring, and control. This will require co-operation with peer councils in the Heretaunga Plains particularly.
National Policy for Fresh Water ⁵	The National Policy Statement for Fresh Water increases the focus on water quality in the region’s rivers. HBRC leases for grazing the major flood channels of the Heretaunga Plains Flood Control and Drainage Scheme and has established fencing where necessary to prevent cattle entering water. Grazing is a cost effective way of maintaining a short dense grass sward over the berm areas and stopbanks to reduce the risk of localised scour in a flood event and to minimise fire risk. However, there is now an increasing expectation that stock will be excluded from the vicinity of waterways. The presence of fences (especially electric) on the river berms is resented by a portion of the community. In the long term there is likely to be an expectation that areas of scheme land currently grazed are managed through other approaches. This will result in increased costs as alternative means of maintaining appropriate vegetative cover on these areas will need to be found which is recognised in plan changes (TANK).

⁴ <https://www.dia.govt.nz/Three-Waters-Reform-Programme>

⁵ <https://environment.govt.nz/publications/national-policy-statement-for-freshwater-management-2020/>

Plan/programme	Description															
Crown Investment Partners-Shovel Ready Programme ⁶	<p>The Government established the Infrastructure Reference Group (IRG) to identify a pipeline of shovel-ready projects to support the economy during the NZ COVID-19 rebuild. The process was supported by Crown Infrastructure Partners.</p> <p>Council have received confirmation from IRG of funding allocation for a total amount of up to \$19.2million (plus GST, if any) which is a 64% contribution to the projects. Council received formal approval for allocated funding from the PDU on 29 September 2020.</p> <p>Project 1: Heretaunga Plains Flood Control Scheme (Levels of service) - \$20 million</p> <p>This project is programmed over a three-year period and will build upon existing river modelling, condition assessment and property analysis undertaken as part of the Heretaunga Plains Flood Control Scheme (HPFCS) level of service review.</p> <p>HBRC co-funding of \$7.2 million is required to match IRG funds of \$12.8 million.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>IRG contribution</th> <th>HBRC contribution</th> </tr> </thead> <tbody> <tr> <td>20-21</td> <td>\$320,000</td> <td>\$180,000</td> </tr> <tr> <td></td> <td>\$6.24 million</td> <td>\$3.51 million</td> </tr> <tr> <td>22-23</td> <td>\$6.24 million</td> <td>\$3.51 million</td> </tr> <tr> <td>TOTAL</td> <td>\$12.8 million</td> <td>\$7.2 million</td> </tr> </tbody> </table> <p>Project 2: Upper Tukituki Gravel Extraction Flood Control Scheme - \$8 million</p> <p>Removal of over 800,000m³ gravel is required to maintain existing nameplate capacity of 1:100 level of protection from Upper Tukituki Scheme. Gravel aggradation across this scheme has been an area of concern for the last decade.</p> <p>IRG funding is a major opportunity to subsidise gravel extraction from this region with a focus on competitive tendering and supporting the local economy.</p>	Year	IRG contribution	HBRC contribution	20-21	\$320,000	\$180,000		\$6.24 million	\$3.51 million	22-23	\$6.24 million	\$3.51 million	TOTAL	\$12.8 million	\$7.2 million
Year	IRG contribution	HBRC contribution														
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TOTAL	\$12.8 million	\$7.2 million														

Plan/programme	Description																											
	<p>This project is programmed over a three-year period which requires HBRC co-funding of \$2.88 million to release IRG funding of \$5.12 million. A large portion of HBRC's contribution will be loan funded then paid back via targeted and general rates under the Upper Tukituki Scheme.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>IRG contribution</th> <th>HBRC contribution</th> </tr> </thead> <tbody> <tr> <td>20-21</td> <td>\$604,000</td> <td>\$340,000</td> </tr> <tr> <td>21-22</td> <td>\$1.92 million</td> <td>\$1.08 million</td> </tr> <tr> <td>22-23</td> <td>\$2.594 million</td> <td>\$1.46 million</td> </tr> <tr> <td>TOTAL</td> <td>\$5.12 million</td> <td>\$2.88 million</td> </tr> </tbody> </table> <p>Project 3: Upper Tukituki Flood Control Scheme SH50/Waipawa Erosion - \$1 million</p> <p>This one-year project programme will provide engineered erosion protection works of southern approach to NZTA's SH50 bridge. The left bank of the Waipawa river immediately upstream of SH50 bridge has eroded over the past five years. If left unattended, there is a risk that the southern approach will be compromised, and the river may outflank the bridge.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>IRG contribution</th> <th>HBRC contribution</th> <th>NZTA contribution</th> </tr> </thead> <tbody> <tr> <td>20-21</td> <td>\$640,000</td> <td>\$60,000</td> <td>\$300,000</td> </tr> <tr> <td>TOTAL</td> <td>\$640,000</td> <td>\$60,000</td> <td>\$300,000</td> </tr> </tbody> </table>	Year	IRG contribution	HBRC contribution	20-21	\$604,000	\$340,000	21-22	\$1.92 million	\$1.08 million	22-23	\$2.594 million	\$1.46 million	TOTAL	\$5.12 million	\$2.88 million	Year	IRG contribution	HBRC contribution	NZTA contribution	20-21	\$640,000	\$60,000	\$300,000	TOTAL	\$640,000	\$60,000	\$300,000
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⁶ <https://www.crowninfrastructure.govt.nz/irg/>

Plan/programme	Description												
	<p>Project 4: River Parade Scour Protection, Wairoa - \$1 million This one-year project programme will provide steel sheet piled erosion protection works on left bank of the Wairoa river. Over the last five years the Wairoa River has gradually undermined the embankment immediately south of the Ferry Hotel. This has in turn compromised Wairoa District Council (WDC) water assets and more recently Carroll Street and River Parade</p> <table border="1"> <thead> <tr> <th>Year</th> <th>IRG contribution</th> <th>HBRC contribution</th> <th>WDC contribution</th> </tr> </thead> <tbody> <tr> <td>20-21</td> <td>\$640,000</td> <td>\$180,000</td> <td>\$180,000</td> </tr> <tr> <td>TOTAL</td> <td>\$640,000</td> <td>\$180,000</td> <td>\$180,000</td> </tr> </tbody> </table>	Year	IRG contribution	HBRC contribution	WDC contribution	20-21	\$640,000	\$180,000	\$180,000	TOTAL	\$640,000	\$180,000	\$180,000
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20-21	\$640,000	\$180,000	\$180,000										
TOTAL	\$640,000	\$180,000	\$180,000										
Provincial Growth Fund	<p>The New Zealand Government has allocated \$3 billion over a three-year term to invest in regional economic development through the Provincial Growth Fund (PGF). Through the PGF, the Government seeks to ensure that people living all over New Zealand can reach their full potential by helping build a regional economy that is sustainable, inclusive, and productive. The PGF is administered by the Provincial Development Unit, part of the Ministry of Business, Innovation, and Employment. The Provincial Growth Fund has funded the following HBRC projects:</p> <table border="1"> <thead> <tr> <th>Project</th> <th>Total funding</th> </tr> </thead> <tbody> <tr> <td>Whakakī Lower Catchment Pilot Project deal</td> <td>\$100,000</td> </tr> <tr> <td>Hawke’s Bay Regional Water Security Programme – Heretaunga Flow Enhancement Scheme (Loan 1)</td> <td>\$1,700,000</td> </tr> <tr> <td>Hawke’s Bay Regional Water Security Programme – Heretaunga Flow Enhancement Scheme (Loan 2)</td> <td>\$11,200,000</td> </tr> <tr> <td>Hawke’s Bay Regional Water Security Programme –Tukituki Water Security Projects (Loan 1)</td> <td>\$2,500,000</td> </tr> </tbody> </table>	Project	Total funding	Whakakī Lower Catchment Pilot Project deal	\$100,000	Hawke’s Bay Regional Water Security Programme – Heretaunga Flow Enhancement Scheme (Loan 1)	\$1,700,000	Hawke’s Bay Regional Water Security Programme – Heretaunga Flow Enhancement Scheme (Loan 2)	\$11,200,000	Hawke’s Bay Regional Water Security Programme –Tukituki Water Security Projects (Loan 1)	\$2,500,000		
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3.5.8 Changes in community values

The flood control and drainage schemes administered by Council were designed at various times over the past 50+ years and reflect the knowledge and understanding of that time. These schemes have modified the natural environment to varying degrees relevant to practices of the time, e.g. drainage, tree clearing, watercourse modifications. The community values and climate impacts with respect to the natural environment have changed and continue to change rapidly. Legislation such as the Resource Management Act 1991, that requires that any adverse effects of future modifications to the natural environment are avoided or mitigated, are pivotal elements of law driving parts of this change. More recent impacts, such as climate change and the prediction of more extreme weather events is influencing community thinking and direction as these experiences are felt in Hawke’s Bay.

The public increasingly seek value in addition to the original single purpose of flood protection or drainage scheme. There are opportunities within scheme areas, particularly where they include river and stream corridors, for these multiple values to be enhanced such as aquatic and terrestrial biodiversity, and for public recreation. This has come through scheme management and more recently in the recognition of the “Open Spaces” activity area which cover Regional Parks and Cycle Trails, as well as the management of community activity in scheme areas (dog walking, cycling, fishing, vehicle access).

While not critical to the core function of the flood or drainage schemes, the community amenity and increased demand for recreational space is making it popular with the wider community. Service levels for the supporting infrastructure for Open Space areas will need to be reviewed with stakeholders to determine the levels of service and affordability.

The flood control schemes have substantially reduced the incidence of major flooding in Hawke’s Bay. As a result, many of the Hawke’s Bay public and businesses have little or no knowledge of the potential impact of a major flood on them and are not well prepared for the consequences should a major flood occur.

Infrastructure implications and responses

The construction of flood protection and drainage systems has resulted in substantial changes to the natural hydrology of their associated catchments. These changes have included a reduction in areas frequently flooded, the diversion and straightening of waterway reaches, the removal of streamside vegetation and the use of structures to control flows and erosion.

These changes and the ongoing methods used to maintain the schemes have resulted in some adverse effects on river and stream ecology and habitats, as well as affecting the social and cultural values of the waterways. HBRC has initiated an enhancement programme, including alternative management of riparian areas, which will promote improvements in water quality and aquatic and terrestrial habitats. Work practices have been changed to comply with the Ecological Management and Enhancement Plans for the major rivers. Complementing these plans is our Environmental Code of Practice, which ensures best practice measures are implemented to safeguard our waterways unique environment during performance of river control and drainage works.

HBRC is currently working with tāngata whenua, hapū, and community groups to enhance waterways, although only in limited areas to date. An example is Hawea Historical Park which is under development beside the Karamū Stream in an area rich with cultural value within the Heretaunga Plains. The park has cultural and visual connections with the wider region with views south-east to Te Mata and Kahurānaki and to the west of Kaweka. Hawea Historical Park will be developed and managed by the Hawea Historical Park Whenua Tōpū Trust in equal partnership between local hapū (Kohupātiki, Matahiwi, Ruahāpia, and Waipatu) and HBRC who will collectively be responsible for ongoing development and management of the park. The park is planned to open in 2021.

Waitangi Regional Park links the Tukituki, Ngaruroro and Tūtaekurī Rivers, and Karamū Stream-Clive rivers and coastal reserves. The area was an early arrival site for both Māori and pākehā. The Star Compass, Ātea a Rangī in the Waitangi Regional Park symbolises the navigational skills of early settlers and was developed by the Ātea a Rangī Educational Trust and installed through 2017.

Hawke's Bay rivers, particularly the Ngaruroro, Tukituki and Waipawa, are noted as important braided rivers that provide essential habitat for many endangered bird species and fish including gamefish. As such, braided rivers are popular with anglers. It is important that the braided nature of the rivers are able to form and not be choked up with unwanted trees such as willow and lupin. Future river management will most likely require extending the flood protection scheme upstream boundary together with additional funding to allow for the ongoing removal of unwanted tree species from the braided riverbed. It is essential that the gravel be transported through the river system to the lower reaches and coast to maintain both channel capacity and the braided channels.

Community consultation and awareness is dealt with in several ways, dependent on the size of the scheme and scale and significance of the issue at hand. Scheme ratepayers are able to engage in the wider consultation process as part of the development of long term plan and annual plan processes, which typically deal with any new initiatives, review of scheme maintenance costs, inflation considerations and any minor adjustments proposed for the schemes.

Issues of a more substantial nature, such as major level of service reviews, or capital works are dealt with through targeted meetings such as Liaison Committees where they are established for the scheme or in focused ratepayer meetings in the area where the issue has relevance, such as specific drainage areas in the Heretaunga Plains drainage catchments. Consenting processes, where they are required for substantial assets, provide another forum for public and ratepayer input and influence.

All members of the public have access to Council <https://www.hbrc.govt.nz/contact-us/>, 0800 108 838 or in person.

Greater levels of community education/communication may be required to sustain scheme function and general hazard awareness.

Freshwater reform and regulatory change

The previous Infrastructure Strategy assumed little to no regulatory impact from plan changes (particularly TANK) on asset management, however this assumption is no longer valid. The following new work tasks have been highlighted for the current Infrastructure Strategy in relation to the regulatory environment:

Fish passage

- Additional capital funding for fish passage up to \$100,000 per year for 10 years to retrofit fish passages to existing infrastructure.
- Continued R&D investment in fish friendly pumps through Waikato Regional Council.

Consenting of 23 drainage pump stations

- Additional resources for the management of the pump station consenting requirements in LTP provision.

Ahuriri Estuary

- Additional Environmental Engineer FTE to address additional consenting and environmental tasking including new tidal gate consent into Ahuriri Estuary. Joint consultation lead by Napier City Council.
- A provision of \$100,000 per annum for 10 years for the Napier Meeanee Drainage scheme to deliver water quality improvement initiatives.

3.6 Significant assumptions

Significant assumption	Risk & impact
<p>Budgets have been prepared on the basis that there will be no flood events in the next 10 years that cause major damage to HBRC's flood protection and drainage assets.</p>	<p>There is always a risk of a flood event occurring that causes damage to flood control or drainage assets. Flood control assets have a high degree of exposure to failure during times of major or prolonged flood flows in the rivers. HBRC holds reserve funds to meet the cost of minor flood damage repairs, and insurance for repairs following a major event. Maintenance programmes and associated budgets will need to be reviewed following a major event.</p>
<p>Current arrangements for gravel extraction will continue but there is a major change in management approach under consideration to have HBRC Asset Management Group (AMG) manage gravel extraction excluding Esk and Mohaka. The new gravel consent will add more control for longer term gravel allocation.</p>	<p>The maintenance of the design flood capacity in river flood control schemes is reliant on the ongoing extraction of gravel within river channels by commercial gravel extractors. The substantial demand reduction in gravel extraction particularly from the Upper Tukituki (UTT) Scheme rivers has resulted in accretion of the river beds within some areas of the Scheme and a resulting reduction of flood carrying capacity.</p> <p>The Gravel Management Plan has initiatives to address gravel accumulation and will continue to be reviewed. The additional capital included in the 2021-31 LTP for gravel management will reduce UTT flood risk substantially. A major gravel extraction programme in the next three years as part of the central government resilient funding support will maintain the overall UTT flood LoS.</p>
<p>HBRC maintains its current policy with regard to responsibility for funding of existing and new flood protection and drainage works.</p>	<p>HBRC currently funds flood control and drainage schemes through a mixture of targeted rates and general funding. The current level of funding provides for the maintenance of designed levels of service (on the assumption that commercial gravel extraction is adequate to maintain scheme flood capacity).</p> <p>If funding is reduced the ability to maintain the current level of service provided by schemes will be compromised.</p>
<p>There will be changes to legislation that impact on the role of the Regional Council in land drainage and river control.</p>	<p>Flood Control and Drainage Schemes have been established in accordance with the Soil Conservation and Rivers Control Act 1941. This Act provides specific powers to HBRC that enable it to protect assets on private land and to undertake works necessary to continue to deliver the scheme levels of service.</p> <p>This legislation and the powers it provides are essential for HBRC to carry out its functions.</p> <p>Reinterpretation of current legislation requires HBRC to consent its existing pump stations where previously it was not thought to be specifically required. This has been reviewed and substantial effort is likely to be required to address this requirement. Provision has been made in the current LTP for this specific requirement. Additional technical requirements for items such as fish passage and possible stormwater regulation/water quality will be considered in scheme planning. The LTP includes additional environmental engineering resources to achieve this target.</p>
<p>The current multi-value approach to the management of waterways managed under the major schemes will continue to be accepted by the community.</p> <p>Co-governance or co-management arrangements under new Treaty of Waitangi settlement legislation will inform and enhance the multi-value approach.</p>	<p>Community engagement will continue with this type of work to ensure awareness of all values relating to infrastructure asset planning and operation. Failure to do this could generate reputational risk, loss of co-stake holder operation, and potential for programme delays.</p> <p>Additionally, HBRC has the Regional Planning Committee and Māori Committee with both elected and tāngata whenua representatives involved in decision making. This results in better outcomes.</p>

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Significant assumption	Risk & impact
<p>Budgets have been prepared on the basis that there will be no new flood control and drainage schemes established within Hawke’s Bay.</p>	<p>HBRC are approached by property owners from time to time requesting that HBRC, using their powers under the Soil Conservation and Rivers Control Act 1941, provide protection to their property. HBRC are willing to consider the establishment of new schemes where there is a community willingness to meet a substantial portion of the cost of any new works and its ongoing maintenance.</p>
<p>Budgets have been prepared on the basis that any changes to levels of service as a result of population growth will be considered as part of scheme reviews.</p>	<p>Schemes are scheduled to be reviewed over the next 10 years. These reviews may result in changes to the predicted level of capital expenditure included in this Strategy. While water quality and quantity issues continue to have a high profile in the region opportunities such as water storage or augmentation will be evaluated. The potential for water storage at scale has the potential to impact on population and economic growth in Hawke’s Bay. Decisions on whether projects of this scale may proceed is expected to be made prior to levels of service reviews being completed.</p>

4. Activity summary

4.1 Background

Hawke's Bay has 24 river catchments comprising seven major rivers (the Wairoa, Mohaka, Esk, Tūtaekurī, Ngaruroro, Tukituki and Waipawa) and numerous smaller rivers and streams.

Between the mountain ranges and the coast lie flat river plains (Heretaunga, Ruataniwha and Wairoa) containing rich alluvial soils which provide the basis for the important Hawke's Bay rural economy and horticultural sector.

Historically, frequent flooding or poor drainage have been an issue for local landowners. The Hawke's Bay Regional Council and its predecessor organisation, the Hawke's Bay Catchment Board, have worked with landowners to establish flood control and/or drainage schemes provided that they have been willing to contribute to both the capital and ongoing operations and maintenance and costs. This has enabled landowners to use their land with greater productivity and with reduced risk of flooding.

4.2 Schemes purpose

A substantial portion of HBRC infrastructure assets are associated with flood control and drainage schemes that have been established under the Soil Conservation and Rivers Control Act 1941 to provide benefit to defined areas within the region.

All flood and drainage schemes have the primary purpose of reducing flood risk and/or a reduced time taken to drain stormwater runoff from the land following a major rainstorm event. Open Spaces activity planning aims to provide cost effective asset management while achieving appropriate levels of service to meet community public access outcomes and wellbeing.

The schemes also allow increased land productivity by utilising existing small streams along with a network of man-made drains, together with low level

pumps which enable the natural near surface water table to be lowered to a manageable level able to support a wider range of productive use.



4.3 Schemes overview

HBRC administers 25 flood control and drainage schemes throughout the region shown in Figure 17. It is the assets associated with these schemes that form the substantial infrastructure managed by HBRC.

This Infrastructure Strategy focus on the most critical assets including the two largest schemes - the Heretaunga Plains Flood Control and Drainage Scheme and the Upper Tukituki Scheme, and the Small Schemes (comprising a range of smaller drainage schemes across the region). Figure 17 highlights the location and extent of the schemes:

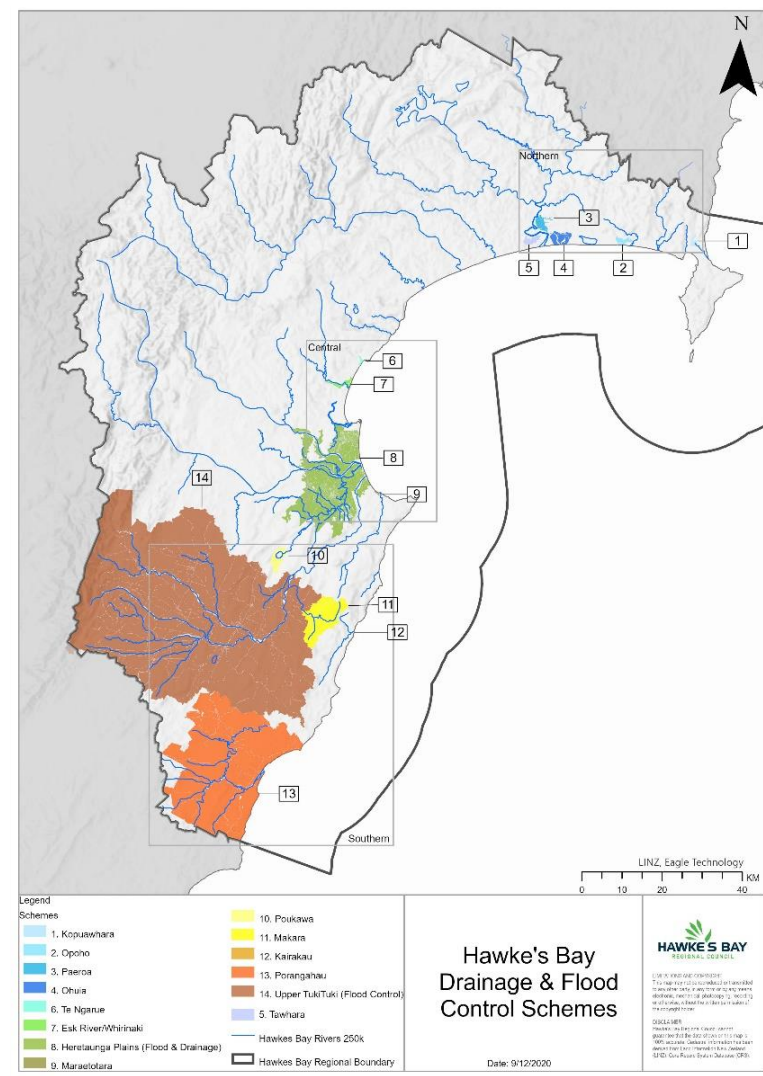
4.4 Levels of service and impacts

Levels of service (LoS) describe what the Council is delivering and what customers can expect to receive in terms of quality, reliability, responsiveness, accessibility and cost. Performance measures are specific indicators to demonstrate LoS delivery. The scheme levels of service are based on three key drivers:

1. **Legislative requirements** which set out procedures that HBRC must follow;
2. **Historic levels of service** which dictate the nature and design of assets inherited by the scheme; and,
3. **Community expectation** for the level of service provided and its associated cost.

Community expectation is important; and community engagement and consultation initiatives will continue to be undertaken to inform future levels of service.

Figure 17: Our region's flood protection schemes



4.4.1 Current levels of service

The current drainage and flood protection scheme levels of service are summarised in Table 18:

4.4.2 Level of service review

The current levels of service are largely based on the legislative requirements and the historic levels of service that the scheme stopbanks were originally built to meet. Climate adaptation is a key driver for undertaking a technical level of service review and consultation process with scheme beneficiaries. The most substantial area of potential risk to life and property in the region is the Heretaunga Plains area with major rivers and significant areas of low lying populated coastal plains with diverse economic activity. Accurate environmental information is critical to understanding the nature of flood hazards and flood risk management. Supporting environmental information is also crucial to support in planning, design and consenting processes for all schemes HBRC manage. The Drainage Act 1908, the Soil Conservation and Rivers Control Act 1941, the Resource Management Act 1991 (RMA), the Local Government Act 2002, the Local Government (Rating) Act 2002, the Civil Defence and Emergency Management Act 2002, and the Building Act 2004 are the key Acts for managing flood risk.

An outcome of the current level of service review is a validation of the current Heretaunga Plains flood protection design standard. The target change from the original standard of 1% AEP (1 in 100) to 0.2% AEP (1 in 500) for stopbank overtopping specifically for the Heretaunga Plains flood control scheme (Tūtaekurī and Ngaruroro Rivers only) is being assessed.

The Upper Tukituki Flood Control Scheme remains at 1%AEP for stop bank overtopping.

This review incorporates Flood Protection Assessment (FPA) for the validation of the new standard. FPA code of practice is a methodology developed in New Zealand by river managers to provide an agreed

approach for assessment method and frequency aligned with the risk posed to the community. Any required scheme improvements will require a substantial capital investment programme to upgrade the flood protection infrastructure which has been signalled by targeted Provincial Growth Unit (PGU) support.

Drainage scheme level of service is based on a drainage modulus approach based on the catchment area being able to remove a designated design catchment runoff (not rainfall) in a 24-hour period expressed in mm/24hours.

4.4.3 Infrastructure investment to meet future level of service

The LoS review and scheme review will continue to be undertaken in the LTP period. Outcomes and future investment programme recommendations will be included in the next LTP in 2024. Capital investment supported by the IRG capital programme will upgrade the Heretaunga Plains rivers flood protection infrastructure to meet increased design standards, asset risk assessment, and improved resilience (2021-23). HBRC will be using good practice methodology (FPA) to assess the required LoS and community risk profile for river assets.

Additional LTP supported engineering roles (design and environmental) will better resource the formal scheme review process for all schemes to be progressed as a programmed operational task over a 10-year period.

Consenting of existing HBRC pump stations has also been identified as an improvement item requiring capital investment, and co-operation with other council entities.

Additional regulatory changes in the freshwater sector (amended National Policy Statement for Freshwater Management) are likely to require review of existing schemes and water quality impacts which may require capital investment and operational process review to reflect these regulatory requirements. This would be signalled as impacts are assessed.

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Table 18 Level of service summary table

WHY WE DO IT Strategic alignment: HBRC Strategic Plan 2020-25	WHAT WE DO Level of Service Statement (LOSS):	HOW WE KNOW Level of Service Measure (LOSM):	Previous performance	Performance targets			
				Year 1 (2021-22)	Year 2 (2022-23)	Year 3 (2023-24)	Year 4 -10 (2024-31)
Flood Protection and Control Works (Rivers, Drainage and Small Schemes)							
<p>A resilient community A prosperous community</p> <p>Outcome measures: By 2030, flood risk is being managed to adapt to foreseeable climate change risks out to 2100.</p>	<p>HBRC will maintain a cost-effective flood control and drainage network that provides protection from frequent flooding to communities and productive land within designated flood protection schemes in the Heretaunga Plains and Ruataniwha Plains.</p> <p>HBRC administers these schemes: 1) Heretaunga Plains Flood Control Rivers and Drainage Scheme 2) Upper Tukituki Scheme 3) Small Schemes</p>	<p>Major flood protection and control works maintained, repaired and renewed to the standards defined in the relevant scheme Asset Management Plan and annual works programme:</p> <p>1. An annual maintenance programme is prepared and delivered. 2. Annual capital programme is prepared and delivered.</p>	<p>Mandatory measure</p> <p>Achieved (2019-20) Achieved (2018-19)</p>	Achieved	Achieved	Achieved	Achieved
		<p>Following a flood event, affected areas are surveyed and repairs are programmed.</p> <p>1. Following a major flood event, a flood report will be compiled within 6 months of the event (major event is defined as material impact to property or productivity). 2. Major event report outcomes incorporated into AMP.</p>	New measure	Achieved	Achieved	Achieved	Achieved
	<p>HBRC will protect and enhance the scheme's riparian land and associated waterways administered by the Regional Council.</p>	<p>Ecological Management and Enhancement Plans (EMEP) are implemented.</p>	New measure	Achieved	Achieved	Achieved	Achieved

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WHY WE DO IT Strategic alignment: HBRC Strategic Plan 2020-25	WHAT WE DO Level of Service Statement (LOSS):	HOW WE KNOW Level of Service Measure (LOSM):	Previous performance	Performance targets			
				Year 1 (2021-22)	Year 2 (2022-23)	Year 3 (2023-24)	Year 4 -10 (2024-31)
Flood Risk Assessment and Warning							
A resilient community A prosperous community Outcome measure: By 2030, flood risk is being managed to adapt to foreseeable climate change risks out to 2100.	HBRC provides reliable regional environmental telemetry network monitoring and flood hazard information via a regional web-based platform.	Percentage of time that priority telemetered rainfall and river level sites are operational throughout the year.	99.5% (2019-20) 98.06% (2018-19)	98%	98%	98%	98%
Regional Water Security							
A resilient community A prosperous community Outcome measure: By 2030, Hawke's Bay has environmentally sustainable, harvestable water identified and stored or plans to be stored if required.	HBRC will develop and deliver water storage and management solutions that support resilience in the supply of freshwater needs of communities, particularly in the context of projected climate change impacts.	Actions from the Regional Water Assessment are identified and implementation is progressing according to the approved plan.	New measure	Action plan developed	Implementation on track	Implementation on track	Implementation on track
Open Spaces							
A resilient community A prosperous community Outcome measure: By 2025, HBRC is carbon zero and plays a leadership role in the region's goal of net zero greenhouse gases by 2050. By 2050, all highly erodible land is under tree cover.	HBRC will maintain, develop, and provide public access to Council owned regional parks and trails, and investigate affordable new opportunities for multi-purpose benefits. HBRC will demonstrate smart sustainable land use in maximising the multi-purpose benefits of its forestry investments and the Tangoio Soil Conservation Reserve.	Regional Parks and HBRC trails are maintained as per Council's Asset Management Plan. HBRC Forests and the Tangoio Soil Conservation Reserve are managed to the standards defined in their respective management plans.	Achieved (2019-20) Achieved (2018-19)	Achieved	Achieved	Achieved	Achieved
			New measure	Achieved	Achieved	Achieved	Achieved

4.5 Activity management approach

4.5.1 Asset Management Group

The Asset Management Group (AMG) is responsible for the management and operation of the flood protection and drainage schemes, and open spaces areas. The maintenance of scheme assets is the direct responsibility of the AMG.

Additional resource for asset management data, process and general quality improvement has been provisioned to support better asset management maturity internally. Practice will be supported by IIMM (International Infrastructure Management Manual (2015) framework and subsequent revisions and aligned with ISO 55000.

The AMG is continuing to develop asset management practice with staff resources and improving asset information to better support decision making and long-term planning. Provision has been made for an improved asset management framework supported by modern asset information tools. Year 1 of the LTP has provision in the IT capital programme for implementation of an enterprise asset management IT solution.

This Long Term Plan projects increased capital expenditure spend across the 10 years, particularly in the first three years. This covers infrastructure renewal and replacement, and our larger projects to increase service levels like the Heretaunga Plains Flood Control Scheme upgrade. There is always an inherent level of risk in delivering a capital programme, particularly one that is substantially increased.

Pressure on the contracting market from a boom in construction and other capital works may provide challenges in procuring the services on time and to budget. Mitigation of risks includes increasing the size of our project management team to enable delivery. The planning for these projects is well advanced. Should there be an issue with delivery, the Council will prioritise its renewal work and critically review the capital work programme including operational solutions to enable deferral.

The schemes are managed and operated via a combination of in-house and contracted services. The key service delivery arrangements are summarised in Table 19.

Table 19: Management tasks and responsibility

Activity/tasks	Who
Asset management planning	Asset Management Group Regional Assets internal Specialist consultants
Operation and maintenance	HBRC Works Group Specialist contractors
Capital works planning and supervision	Asset Management Group:in-house engineering and project delivery Specialist consultants (as required)
Contract management	Asset Management Group Contract resources (as required) HBRC Procurement
Regulations and compliance	Asset Management Group HBRC Compliance

4.5.2 Core activities

Flood Control

The AMG has developed a holistic approach to sustainably manage and enhance waterways for flood protection to protect the life and property of the Hawke's Bay region. Hydraulic modelling based on extensive regional environmental monitoring of river levels and rainfall supports the engineering assessment of LoS for flood control schemes. Schemes are reviewed, assets maintained based on the LoS requirements, and annual contracts developed for scheme maintenance. The Flood Protection Assets Performance Assessment code of practice (FPA) tool is used to provide a nationally recognised risk-based assessment framework (River Managers Forum: 2015) for river and flood assets. Environmental, cultural and biodiversity values are considered as a core part of flood activity management. Additionally, the AMG is involved in the provision of civil defence support for flood event management response, and engineering advice for activity within flood scheme areas for councils and the community.

Drainage

Drainage schemes have developed to allow the sustainable and productive use of scheme land and the effective management of water table levels. Drainage schemes are managed based on reliable environmental data, and site monitoring with regular annual maintenance planning to maintain capacity and capability to meet defined LoS. Schemes are rated to reflect the community benefiting from the drainage, and scheme reviews engage with stakeholders to ensure that LoS are sustainable. Schemes include detention dams, open drains, piped culverts, pump stations and control gates according to requirement.

The AMG and Works Group maintain a wide array of professional skills and contract support resources in maintaining these schemes. The LTP provides for investment in greater SCADA control rollout for HBRC pump stations in the 2021-31 period. This will improve the management and monitoring of pump station operation generally and in flood conditions. Greater integration with the HydroTel environmental monitoring system is to be developed as part of this programme. Safe and effective maintenance and operation of schemes in co-operation and good communication with other Hawke's Bay councils is a key part of scheme operation.

Open Spaces

Open spaces incorporates regional parks, cycle ways and forestry, and has been recognised as an area of specialised asset management with growing recognition of the community outcomes including wellbeing, physical activity, economic and tourism development, and environmental outcomes such as biodiversity protection and climate change mitigation.

Open spaces assets are mostly dependent on existing flood or drainage scheme land and the management approach requires different community facing management with a range of different physical assets. Outcomes need to be complementary to the core flood and drainage protection outcomes but also allow wider community beneficial outcomes in scheme areas.

Management of open spaces assets requires collaborative co-operation with peer councils and the wider community (e.g. open spaces CCTV monitoring with Hastings District Council). This is recognised with an Open Spaces Asset Management Plan and increasing operational differentiation in recognition of evolving public access management requirements. This requires management of greater public access in terms of greater service levels (e.g. mowing, signage, rubbish management, security) and demand for amenities (e.g. seating, toilets).

4.5.3 Rates review

As part of a review in the Revenue and Financing Policy, HBRC has undertaken a structured review of the allocation of costs for all schemes to confirm the allocation of overheads and labour costs is consistent for all schemes. Forecasting for smaller schemes show an indication of reducing scheme reserves over the next 10 years when this is applied so action is required to be sustainable. HBRC will review and consult on schemes based on this more consistent rating approach in the next two years and a revised rating schedule will apply from year 3 with the new LTP. Small Schemes have not had full labour costs and overheads allocated and so the scheme economics will change, necessitating formal review to determine long-term affordability.

4.5.4 Scheme reviews

The AMG will have additional resources for scheme review activity to validate current funding levels for each scheme (opex/capex/renewal). Reviews will validate the maintenance necessary to maintain scheme assets such that they continue to deliver the level of service required based on scheme reviews and stakeholder consultation.

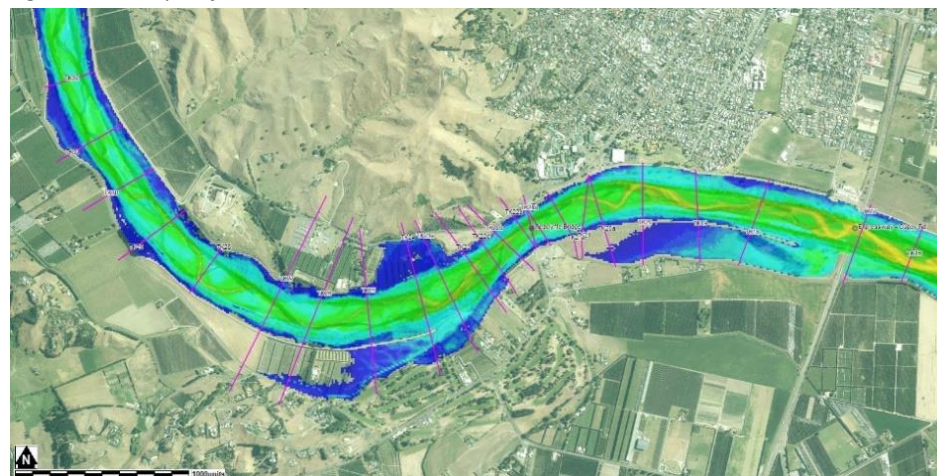
LTP resources have provision for a dedicated scheme review FTE and an environmental engineering FTE to progress the consenting of 23 pump stations, and across the board improvements in asset management process to better support forward planning of any required renewal investment. Work will include fish passage review, additional ranger resources for security and presence, and engineering scheme review resources.

Scheme reviews consider the current levels of service, aging assets, and increasing demand for potential higher levels of protection, resulting from land intensification and climate change predictions. Review findings and outcomes may result in proposals to increase the level of service and maintenance and/or improvement expenditure, which would need to be consulted with scheme ratepayers.

The scheme reviews for some of the small schemes are likely to require consultation on the costs of maintaining and in some cases renewing some scheme assets. Often these schemes have a small ratepayer base and revised costs from scheme reviews are likely to require substantial operational and capital increases to sustain a suitable LoS. Opoho and Ohuia in the Wairoa area are likely to be in this situation.

The largest Scheme is the Heretaunga Plains Flood Control and Drainage Scheme which protects the cities of Napier and Hastings and highly productive land in their vicinity. The 2020 LoS review is focusing on the stopbank network in this scheme to validate stopbank over topping hydraulic model and stopbank risk based on the Flood Protection Assessment (FPA) tool. The FPA is based on a code of practice intended to provide an agreed framework for assessing performance of flood protection assets where the assessment method and frequency is aligned with the risk to the community. Increasing urban intensification and rural land use changes within scheme catchments will be considered in review processes. Effort will be invested in improving asset information and condition assessment in all scheme reviews.

Figure 20: Example of a Flood model scenario on the Tūtaekurī River at Taradale



4.5.5 Integrated activity management

In recent years HBRC has acknowledged the substantial potential for the corridors associated with rivers and streams as habitat and refuge for regional biodiversity, as well as being an integral part of the social and cultural fabric of the region. Substantial work has been done to quantify those values and several projects are now funded through scheme funds to enhance those biodiversity, environmental, cultural, recreational, and social values.

HBRC manages approximately 105km of pathways that have been constructed on land it owns or administers. These together with other recreational uses of river berm land provide substantial opportunities for public health and wellbeing. A review of the management approach and different levels of service with greater public access is being developed in the Open Spaces Asset Management Plan. This is a recognition of the need to manage service levels required for public access while maintaining essential flood and drainage function in the schemes. It also allows greater strategic and financial understanding for Open Spaces activity for stakeholders.

HBRC is also seeking to reduce eliminate, where possible, any adverse environmental effects of activities associated with the operation or maintenance of the schemes.

Recent studies completed relative to this are:

- The Environmental Code of Practice for River Control and Waterway Works (2017)
- The Hawke's Bay Riverbed Gravel Management Plan (2017), adopted and approved by HBRC in mid-2017
- The Ecological Management and Enhancement Plans for the main river systems.

Our management approach takes into consideration the entirety of an asset's lifecycle, from build, through to operation, maintenance, renewal and disposal if required. We tailor our asset management to fit the needs of our community and local businesses, providing infrastructure to an agreed level of service with the associated risks being well understood and more importantly well communicated.

Key areas of focus for decision making around key infrastructure investment are:

- maintenance of existing assets (operation and maintenance)
- review or improvement of existing assets (levels of service)
- replacement of existing assets (renewals)
- providing new assets to allow for community growth (capital works).

4.5.6 Asset condition and reliability

The current approach to determining scheme asset condition and reliability is detailed in each of the respective Asset Management Plans. Asset condition assessment is included in the annual asset maintenance contract structure.

Assets are separated into component categories within the asset registers relative to their function and significance. A condition matrix is applied to relevant scheme assets that provides a condition scoring, taking account of criteria such as asset conformance to design specifications, physical condition of the asset, level of establishment for tree plantings and plant quality, as examples. Review of critical assets will see more risk based asset information and assessment to support effective asset management decision making.

Annual river audits and inspections of critical scheme asset components are undertaken by a professional engineer. The inspection findings are documented in an Annual Inspection Report. The report records the overall asset condition and performance and identifies remedial work required. In the next five years greater focus on risk and condition based assessment will be developed by asset management resources allocated in the LTP. This will build a data supported set of base asset information to improve evidencing of asset life and criticality determinations.

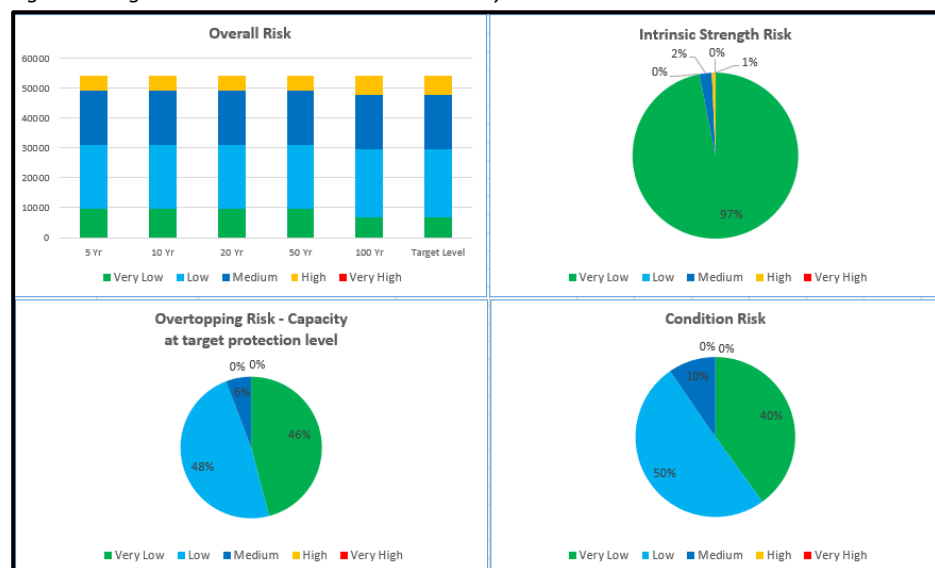
From the scheme review process an updated view on the scheme will be available better determine the risks and criticality of the scheme and its asset base. Outcomes will include:

- validation of future investment requirements and timing
- scheme scope, LoS achievement, benefits, economics, risks and sustainability
- updated operational and capital work programme.

The scheme review processes are expected to assess the aging asset base and may identify additional capital requirements in addition to the current programme. The older drainage assets are starting to show age-related deterioration, which is managed operationally but may require wider review for larger scale replacement, rationalisation or in some cases retirement. Alternatively, assessment of remaining asset life/condition may be revised based on the review process.

Inspection methods for culverts and enclosed spaces have greater health and safety requirements and greater use of remote controlled CCTV inspections will be required in the future to perform these inspections. In the same way there is greater use of remote drone flights for condition inspection for scheme assets, notably stopbanks, vegetation, open spaces and forestry assets.

Figure 21: Ngaruroro River FPA condition summary

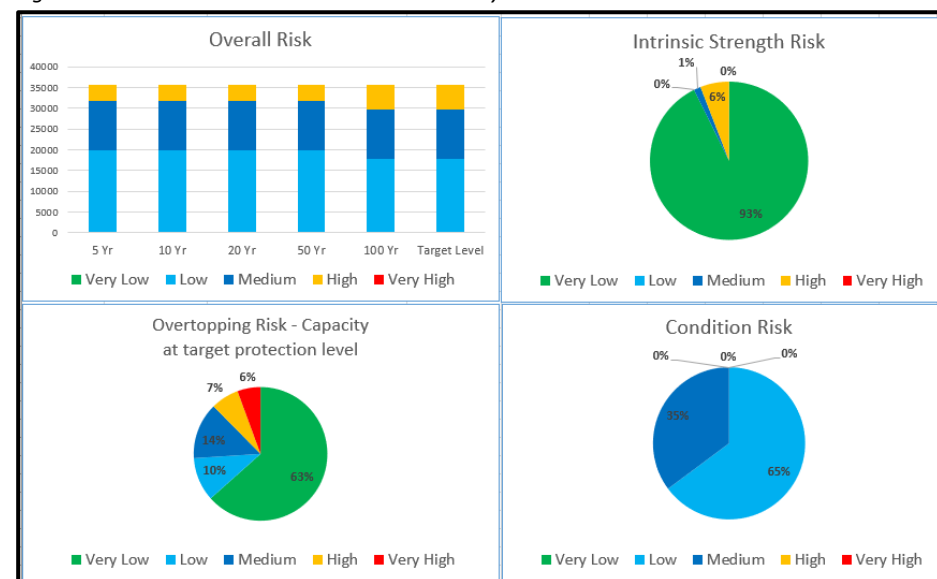


Scheme review and Flood Protection Assessment (FPA) are used to validate performance and stopbank risk criticality based on a recognised New Zealand River Managers Forum assessment method.

All major rivers in the HPFCS will be assessed with this tool as part of LoS reviews. The assessment covers all aspects of river assets and potential community impact with a risk based assessment criteria. This represents a standardised methodology for condition, risk, and service level for river assets. As at January 2021 the Tūtaekurī and Ngaruroro Rivers have had FPA reviews completed which will contribute to the wider Heretaunga Plains River level of service project.

Changing legislative requirements require additional compliance consideration for drainage schemes in terms of resource consenting, fish passage, confined spaces compliance and possibly stormwater management.

Figure 22: Tūtaekurī River FPA condition summary



4.5.7 Maintenance activity approach

An annual maintenance programme for all infrastructure assets is prepared prior to the commencement of each financial year. Maintenance work is largely undertaken by HBRC's own internal contractor (HBRC Works Group) under annual asset maintenance contracts.

The annual programme of maintenance is designed to ensure that the infrastructure assets continue to be maintained in accordance with the scheme asset management plans such that the scheme continues to deliver the required LoS. Where scheme review shows the LoS requires additional investment or maintenance inputs, additional funding will be assessed and if not able to be resourced by the scheme, a formal revision of the LoS will be adopted.

Inspections of sections of representative assets are undertaken as part of the annual programme of works (asset management contract), with all assets inspected over a

five-yearly interval. The annual audit of the schemes is undertaken by a registered engineer with experience in river and drainage control works.

Cost effective delivery of services

Under the Local Government Act 2002, the purpose and principles of local government require the Council to promote well-being in the present and the future and in performing its role give effect to its identified priorities and desired outcomes in an efficient and effective manner.

The HBRC Works Group operates a fleet of specialist plant and equipment that is specifically designed to deliver the maintenance contracts efficiently and effectively. In addition, the Works Group undertakes other less-specialist work utilising local contractors. The Works Group also tenders for work within their area of expertise from other organisations allowing them to test their competitiveness in the open market.

Any surpluses made by the Works Group on these maintenance contracts are returned to the respective scheme at the end of each financial year.

The maintenance activities are defined for each of the respective schemes, with many of the activities defined and established over a considerable period of time. Issues such as seasonal influences, effectiveness of the maintenance regime and consideration of new techniques and technologies are considered by scheme managers on a regular basis, with programmes modified as necessary. A typical example of the scheme maintenance regime is tabled below.

Table 23: Heretaunga Plains & Upper Tukituki Scheme Maintenance Plan

Asset group	Maintenance regime	
	Activity	Frequency
Stopbanks	Mowing	2-6 times/year
	Spraying	20km/year (as required)
	Fertiliser	20km/year
	Misc. repairs	As required
	Inspections	Rotating monthly
Berms and buffers	Spraying	Annually
	Lopping	As required
	Mowing	2-6 times/year
	Grazing	On-going
	Misc. repairs	As required
Active channel	Beach raking	Annually
	Spraying	Annually where required
	Survey	3-yearly (gravel extraction reaches) 6-yearly (non-gravel extraction reaches)
	Gravel extraction	As required, where directed
Drainage structures	Inspections	Annually (minimum)
	Misc. repairs	As required
	Replacement	As scheduled (approx. every 50 years)
Groynes	Inspections	After major flood events

Annual contractual maintenance expenditure (2020-21) is in the order of:

- HPFCS – Rivers \$0.79 million
- HPFCS – Drainage \$1.33 million
- UTTFCS – Rivers \$0.62 million
- Small Schemes (All) \$0.67 million

Figure 25 in the financial summary of this Strategy sets out the assumptions under which these estimates have been developed.

4.5.8 Renewal approach

The effective life of each asset (and in some cases components of an asset) has been identified, assessed and recorded as part of the HBRC Infrastructure Asset Database. Examples are set out in the table below.

Table 24: Asset life table

Asset type	Expected effective life
Stopbanks, live trees for river control and drainage channels	Maintained in perpetuity. Do not deteriorate over time if they are adequately maintained and therefore assumption of infinite expected life.
Pump station buildings, concrete structures, and culverts	Depreciated up to 70 years.
Pump station electrics	Depreciated from 25 to 30 years.
Exposed steelwork e.g. weed screens on pump stations	Depreciated from 5 to 30 years depending on environmental conditions.

There is intent to improve the quality of asset information including more condition assessments to better evidence asset lives and provide greater confidence in programme timing and overall risk assessment as part of asset management process improvement. This is an intent resourced in the current LTP within the AMG.

Depreciation is charged to each scheme based on asset deterioration on a straight-line basis over the estimated asset life. No depreciation is charged on assets that have an infinite life, e.g. stopbanks, on the assumption they are maintained in perpetuity.

An asset replacement reserve is held for each scheme to which the annual depreciation charge and any interest accruing to the reserve is credited, and the cost of asset replacements is debited.

The condition of any asset is assessed prior to a decision being made to replace it. Where the assessment determines the asset has a further residual life the replacement date of an asset is extended and documented in the database. Prior to replacing any asset, a review is undertaken to determine whether or not there is justification to change the level of service provided by that asset, and particularly for substantial assets to consider a range of alternatives to determine the most cost effective approach to its replacement. This is particularly relevant where the depreciated asset forms part of a wider asset component configuration, such as pump station electrics.

Nominal lives allocated of common asset items produce some peaks in the longer term and refinement of the detailed programme for replacement will validate the timing of assets with some smoothing of renewal expenditure based on condition assessment. Large portions of schemes were constructed during the 1960s and 1970s and therefore a coincident number of assets are nearing the end of their nominal useful lives. The condition of these assets will be reassessed, and the priority confirmed as the time for planned replacement reaches the planning inspection phase, and where appropriate, programmed replacement dates will be revised. Any amendment or revision of renewals dates based on risk and/or condition assessment reviews will also be reflected in subsequent funding and budget reviews.

4.5.9 Shared service delivery approach

HBRC has several areas of substantial potential shared operational and regional interest in asset infrastructure areas. Areas of current shared interest include:

- HBRC/NCC: Management of urban pump stations
- HBRC/NCC/HDC: Cycleways management and maintenance
- HBRC/NCC/HDC: Coastal Hazard Strategy

- HBRC/NCC: MOU for Napier Urban Waterways
- HBRC/HDC: MOU for Havelock North Waterways
- HBRC/NCC/HDC/WDC: 3 Waters Reform. Limited HBRC scope.

Co-operation between the component councils in the region happens at a range of levels with HBRC AMG. HBRC provides flood modelling support for regional hazard portals and support for a range of technical flood/drainage and consenting support.

4.5.10 Capital work (enhancements and increased level of service)

Capital or improvement works are undertaken on some schemes in accordance with direction determined within the asset management plans. However, the majority of capital works will be undertaken to improve the level of service provided based on the adaptation to climate change and legislative changes (freshwater reforms, TANK plan changes).

In its 2015-25 Long Term Plan, HBRC consulted on a proposal to increase the level of service provided by the river control and flood mitigation works on the Heretaunga Plains Scheme – Rivers, from a 1% AEP to a 0.2% AEP (or alternatively from a 1 in 100 year to 1 in 500 year standard). Analysis to determine what this means in terms of design discharges for the major rivers is in progress. Using these values, the next phase is to look at the effects of confining the flow, dealing with high shear stresses and gravel movement and final design requirements. This has been picked up in the 2021-23 IRG supported LoS review for the Heretaunga Plains rivers. The Flood Protection Assessment tool is being used to better risk assess scheme stopbanks and river channels.

Concurrent with this process is also an ongoing review of individual drainage catchment areas within the Heretaunga Plains drainage areas which measures current scheme performance and considers opportunities for scheme enhancements or improvements. This includes waterway capacity, environmental enhancement, and recreational opportunities.

Infrastructure consultation items were:

- Upper Tukituki gravel
- Clive River dredging

- Ahuriri Regional Park (Napier City Council lead)

For more information on the above consultation items see Part 2 – Key decisions of the 2021-31 Long Term Plan.

Capital works will be funded through loans or funded directly from scheme funds as necessary. The identification of an appropriate funding source is determined by the size and scale of any proposed works and through a long term plan or annual plan process, or through a special consultative process if one is considered necessary.

Key capital projects expected to be undertaken within the life of this Strategy are set out in Table 27. HBRC has consulted and received support from the community for increasing the level of service provided by the stopbanks protecting the Heretaunga Plains from floods with a likelihood of occurrence of 1% AEP in any one year (100 year return period) to 0.2%AEP (500 year return period) for stopbank overtopping.

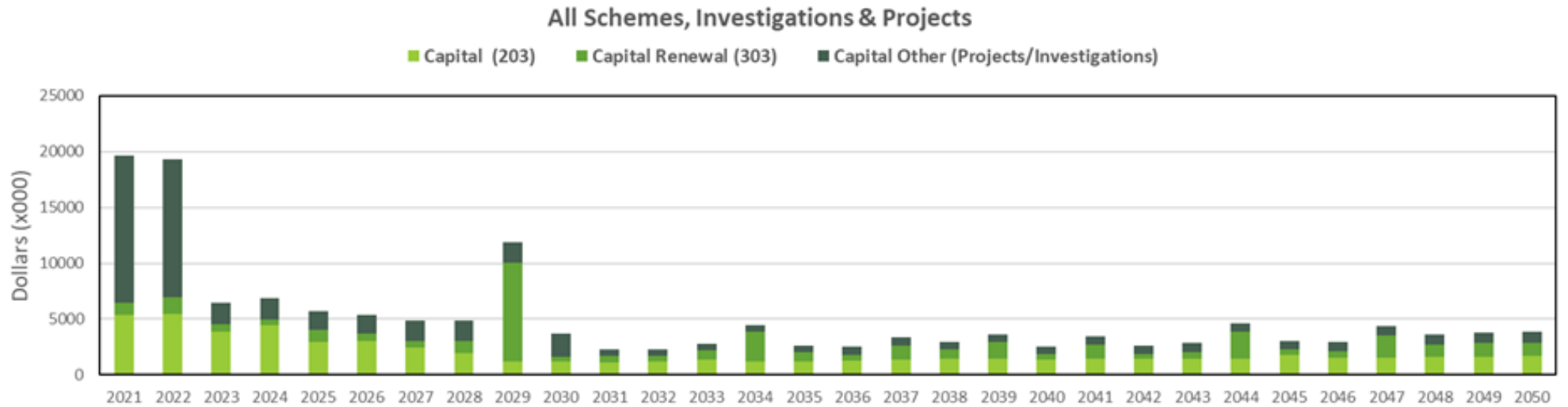
HBRC has yet to determine changes in levels of service provided by the Upper Tukituki Flood Protection Scheme and the other smaller schemes as the effort to date has been committed to the Heretaunga Scheme. Level of service change options will be determined after the level of service reviews for each respective scheme are completed progressively over the next 10 years. The principal options Council expects to consult on are whether to increase the level of service, and by how much, or whether to retain the current service levels. This will probably be decided on a willingness to pay.

A “status quo” scenario is manageable for the scheme based on the current level of development and land use within the protected areas of the scheme. Maintenance costs would progressively increase to respond to ongoing issues of gravel accumulation and the increased levels of risks posed by climate change. Along with potential further urban and rural development likely on the Ruataniwha Plains this will provide background to the levels of service review.

These decisions will be substantial decisions for HBRC prior to commencement of any capital works. Expected timing and costs (for the maximum expected level of service changes) are set out in the Table 27 below.

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Figure 26: Projected new capital and capital renewal expenditure – infrastructure assets



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Table 27: 10-year scheme summary

Scheme	Capital work description	Indicative project value	Timing	Delivery
Heretaunga Plains FCS				
Level of service review - rivers	Increase level of service from current 1 in 100 year protection to 500 year protection	\$19.5 million over 2 years with IRG funding contribution	\$7.02 million funding provision included in the LTP with \$12.48 million of IRG co-funding	2021-2023
Public use of rivers	Development of land within the flood protection for the public use for recreational activity and for planting or productive activity	\$765,000 over 10 years	Provision in the LTP/part of the LoS review	2021-2031
Scheme review and capital work from these reviews	Review of all small schemes to include climate change and performance of the assets to current and future conditions	Only opex budget, but capex to be confirmed in next LTP.	No funding provided in the LTP	2021-2031
Pump station - fish passage	Installation of fish passages where practical across stream barriers e.g. pump stations	\$1 million over 10 years	Provision in the LTP	2021-2031
SCADA system for all pump stations	Installation of the communication system SCADA for all pump stations	\$1 million over 10 years	Provision in the LTP	2021-2031
Capital work for TANK plan change	Plan change related activity and work programme implementation	\$938,000 from year 3 to year 10 (perpetuity)	Provision in the LTP	2023-2031-ongoing
Clive River- land for dredging	Dredging Clive River and discharge of silt to land	\$5.9 million in 2025-26 & 2029-30	Provision in the LTP	2025-26 & 2029-30
River and lagoon opening	Installation of CCTV for better monitoring	\$30,000 in 2021-22 & \$625,000 over the following 10 years	Provision in the LTP	2021-2031
Karamū Scheme- weed harvesting	Investigate and purchase equipment for better operation of weed cutter	\$159,000 in 2023-25	Provision in the LTP	2023-2025
Gravel management- processing and new access to rivers	Building new access to location where gravel needs to be managed for flood protection.	\$1.2 million annually for 10 years	Provision in the LTP	2021-2031
Upper Tukituki FCS				
Public use of rivers	Development of land within the flood protection for the public use for recreational activity and for planting or productive activity	\$328,000 over 10 years	Provision in the LTP	2021-2031
UTT- Gravel extraction	Extraction of gravels for surplus areas	\$7.05 million over 2 years	\$2.54 million provision in the LTP with \$4.51 million of co-funding	2021-2023

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Scheme	Capital work description	Indicative project value	Timing	Delivery
Open Spaces				
Hawea Park - Stage 3	Further development of Hawea Historical Park consistent with original approved 2017 plan	\$939,000 over 3 years	From 2018-28 LTP	2021-2024
Waitangi Regional Park - Stage 3	Final stage of the Waitangi Regional Park	\$250,000 over 3 years	From 2018-28 LTP	2021-2024
Ahuriri Regional Park	Development of the park	\$10.2 million over 10 years	Provision in the LTP	2021-2031
Karamū enhancement	Enhancement of the Karamū stream	\$3.6 million over 10 years	Provision in the LTP	2021-2031
Regional cycling development	Further regional pathway development (contribution to match the funding only)	\$757,000 over 3 years	Provision in the LTP	2021-2025
Wairoa Regional Park development	Park development along Wairoa River as per consent plan completed in 2017	\$580,000 over 3 years	Provision in the LTP. Other funding to be sourced	2023-2025
Small Schemes				
Opoho - new pump station	Upgrade and build of new pump station subject to scheme review	\$261,000 in 2022-23	Provision in the LTP	2022-2023
Ohuia - Whakakī - new pump station	Upgrade and build of new pump station subject to scheme review	\$305,000 in 2021-22	Provision in the LTP	2021-2022

*Please note there is uncertainty as costs/timings will depend on the outcomes of scheme reviews as well as further community consultation requirements and demand.

4.6.2 Scheme extent, operating costs and LoS

The table below summarises the scheme assets, operating costs and levels of service:

Table 29: Heretaunga Plains scheme assets, operating costs and levels of service

Asset description	Physical dimension/ number*	Replacement value (2020)	Average annual operations and maintenance budget (2020-30)	Level of service summary
Stopbanks	157km	\$152 million	\$7.5 million	<p>Currently the design Level of Service (LoS) (1%AEP capacity) is provided on the major rivers, however HBRC has committed to increasing the LoS to convey flood water with a 0.2% chance of occurrence in any one year.</p> <p>Current assessment is that the river control assets provide 100% effectiveness for 1% AEP capacity and is at no more than a low risk of failure.</p> <p>A LoS review for the drainage network is underway and scheduled for completion in the next three years.</p>
River channels and edge protection	129km			
Drainage channels	447km			
Pumping stations	18			
Structures and culverts	217			

4.6.3 Asset condition

Asset condition is monitored based on a schedule of inspections for major asset types. Stopbank and river channel condition is assessed using the flood performance assessment (FPA) criteria. The current IRG LoS project will further investigate these assets to confirm performance and condition where required.

Drainage assets have regular operational inspections, compliance and maintenance checks as part of the annual asset maintenance contracts. This covers the key pump station assets and drainage network. The age of the pump station structures is generating more operational maintenance typical of aging concrete, mechanical and electrical assets. Drainage scheme culverting is also aging and with greater health and safety regulation will require more remote CCTV inspection to determine condition safely.

4.6.4 Scheme operation and management

The scheme is operated and managed within the Asset Management Group's management framework, via a range of inhouse and external resources.

Key issues:

- LoS review
- Aging drainage assets
- Increasing urbanisation in scheme areas/changing land use
- Chilean needle grass and giant aphid incursions.

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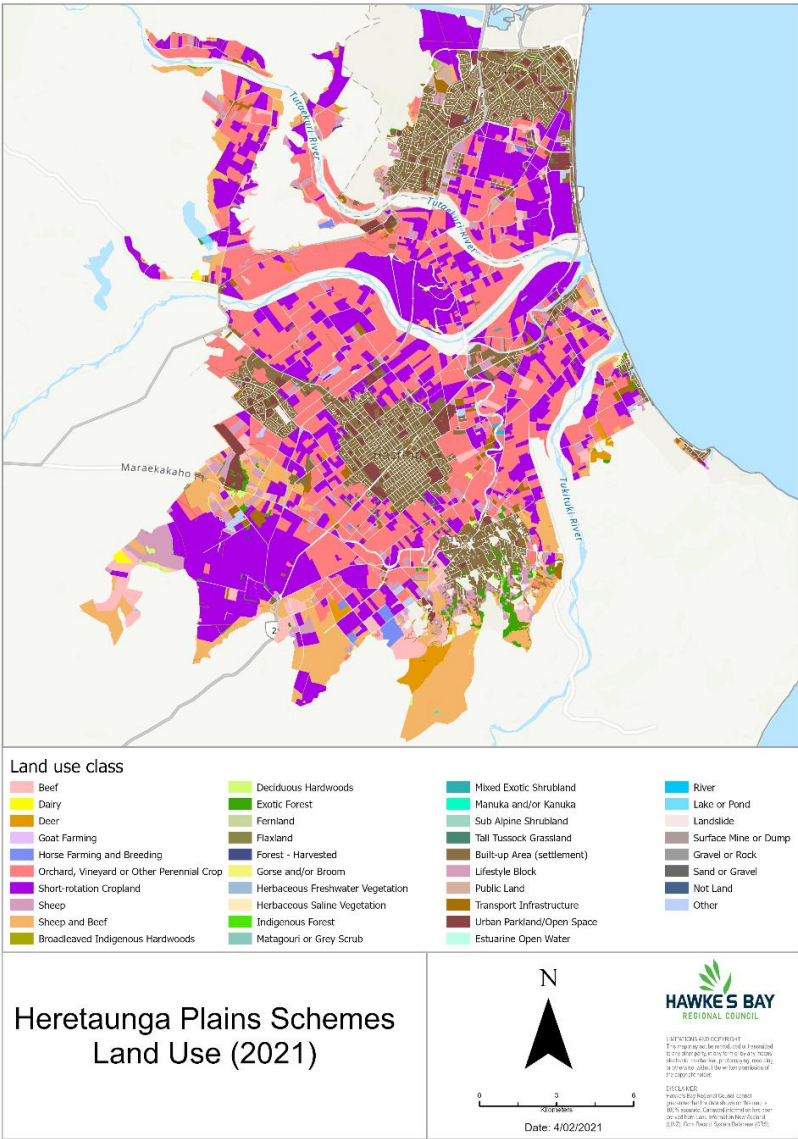


Figure 30: Waipawa River erosion upstream of SH50 Bridge



4.7 Upper Tukituki Flood Control Scheme

The Upper Tukituki Flood Control Scheme is the second largest scheme. This scheme includes stopbanks and river control works on the Tukituki, Waipawa, and Tukipo Rivers and several their tributaries across the Ruataniwha and Takapau Plains. The integrity of the Heretaunga Plains and Upper Tukituki flood Control Scheme assets are critical to the Hawke’s Bay economy as they protect a large percentage of the urban Hawke’s Bay population and substantial areas of horticultural and agricultural infrastructure. Stopbanks and associated river control assets on the three major rivers crossing the Heretaunga Plains are considered critical assets.

Key issues:

- Gravel management
- Chilean needle grass and giant aphid incursions.

Table 31: Upper Tukituki Scheme assets, operating costs and levels of service

Asset description	Physical dimension/ number	Replacement value (2020)	Average Annual operations & maintenance budget (2020-30)	Level of service summary
Stopbanks	76km	\$34 million	\$1,160,703	Currently the design LoS (1%AEP capacity) is provided over 95% of the stopbanked reaches. The remaining 5% of reaches remain with reduced free board (distance between design flood level and the top of the stopbank)
River channels and edge protection	206km			
Drainage channels	12km			
Structures and culverts	44			

4.8 Small Schemes

The remaining schemes cover small catchments with minor infrastructure and are each considered small compared to the above schemes.

Table 32: Small Schemes assets, operating costs and levels of service

Asset description	Physical dimension/ number*	Replacement value	Average annual operations & maintenance budget (2021-31)	Level of service summary
Stopbanks	15km	\$16 million	\$953,789	Current LoS are being achieved across most the smaller schemes. LoS vary across the schemes, depending on their purpose. Estimated to be operating at 95% or higher after allowing for periodic flood damage.
River channels and edge protection	31km			
Drainage channels	85km			
Pumping stations	4			
Structures and culverts	37			

4.9 Open spaces assets

4.9.1 Pathways/trails

HBRC manages approximately 105km of pathways which have been constructed on land it owns or administers. The majority of the pathways form a portion of the New Zealand Great Rides known as Hawke's Bay Trails, and are constructed along stopbanks and berm areas which are assets of the flood protection schemes.

While Hawke's Bay cycle trails are not critical infrastructure assets, the cost of constructing these has been met in part by the regional ratepayers and in part by central government through its Ngā Haerenga New Zealand Cycle Trails initiative. The replacement value of the pathways is \$2,512,514. HBRC therefore has an ongoing obligation for the management and maintenance of these pathways in accordance with the agreement HBRC entered into with the then Ministry of Economic Development (22 Nov 2011) which states that:

“Under this agreement HBRC is required to brand the Hawke's Bay Trail as forming part of the Ngā Haerenga New Zealand Cycle Trails, and has agreed to comply with such reasonable conditions as required by the Ministry, including that the Hawke's Bay Trail be managed and maintained in a manner that is consistent with the objectives of Ngā Haerenga New Zealand Cycle Trails.”



4.9.2. Regional parks

HBRC also manages and administers a regional park network including:

- Pākōwhai Regional Park
- Pekapeka Regional Park
- Waitangi Regional Park
- Tūtira Regional Park
- Waipātiki Motor Camp
- Contribute towards the management of Te Mata Park
- Hawea Regional Park (under development).

Prior to 2014, the narrower term wetlands was used to describe what are now known as regional parks and managed under the Open Spaces activity area. Within these parks are various recreational facilities, pathways, observation points etc.

It is acknowledged that the pathways and these parks are important but not critical community assets. HBRC has made financial provision in its long term plan for ongoing management and maintenance of these assets, and for their development and improvement. The 2020 replacement value of the regional parks assets is \$4.46million (exclusive of land value).

Figure 33: Regional park and cycle trails locations



The 2021-31 Long Term Plan is resourcing two FTEs for urban catchment co-ordination (Ahuriri and Karamū) to encourage greater community engagement and also improve urban stormwater quality. One additional ranger resource has also been included to manage the increase in public access issues and operational management and security support.

4.9.3 Coastal assets

HBRC currently has a small number of coastal assets it has constructed and maintains, and at present funding for these assets is covered by financial provisions within the flood protection schemes. HBRC began a Coastal Hazards Strategy in 2016 with community representatives and is currently progressing the detail and outcomes of the Strategy. Further direction for coastal hazards is dependent on future consultation with the community and other territorial local authorities.

The current coastal strategy work, identified as the Clifton to Tangoio Coastal Hazards Strategy 2120, includes the Hawke's Bay Regional Council, Napier City Council and Hastings District Council as partner contributing councils. The focus of the project needs to ensure coastal issues are considered in a regional context and have flexibility to incorporate future potential coastal issues within the timeline of the 30-year strategy. This will enable areas within Wairoa District Council and Central Hawke's Bay District Council to be considered as and when issues arise.

Due to the potential substantial size, complexity, and scale of the Coastal Hazards Strategy, likely covering all council areas within the Hawke's Bay region, it will be structured into its own project structure for funding, delivery, and management, with any assets separately identified.

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4.9.4 Coastal Hazard Strategy 2120

The Coastal Hazard Strategy 2120 (Clifton to Tangoio) was completed to stage 3 by NCC, HDC and HBRC and tāngata whenua partners (Maungaharuru-Tangitū Trust, He Toa Takitini, and Mana Ahuriri Trust) between 2014-17.

There are still decisions to be made on public/private benefit and therefore who will be funding the required works. A decision is yet to be made on whether these funds will be managed at the regional or city/district council level. Until these decisions are made, the required works are unfunded, and the Strategy implementation is on hold. It remains a substantial area of potential infrastructure investment when the governance and funding regime is resolved.

The Strategy assesses coastal hazards risks and identifies options for the management of those risks for the next 100 years. The intent of the Strategy is to develop an understanding of the risks along the entire stretch of coastline and to respond to community concern about the effects of coastal hazards in a more coordinated and forward-looking way. An outline of the initial three stages of the Strategy are shown in Figure 34 and Table 35.

Figure 34: Coastal Strategy location map

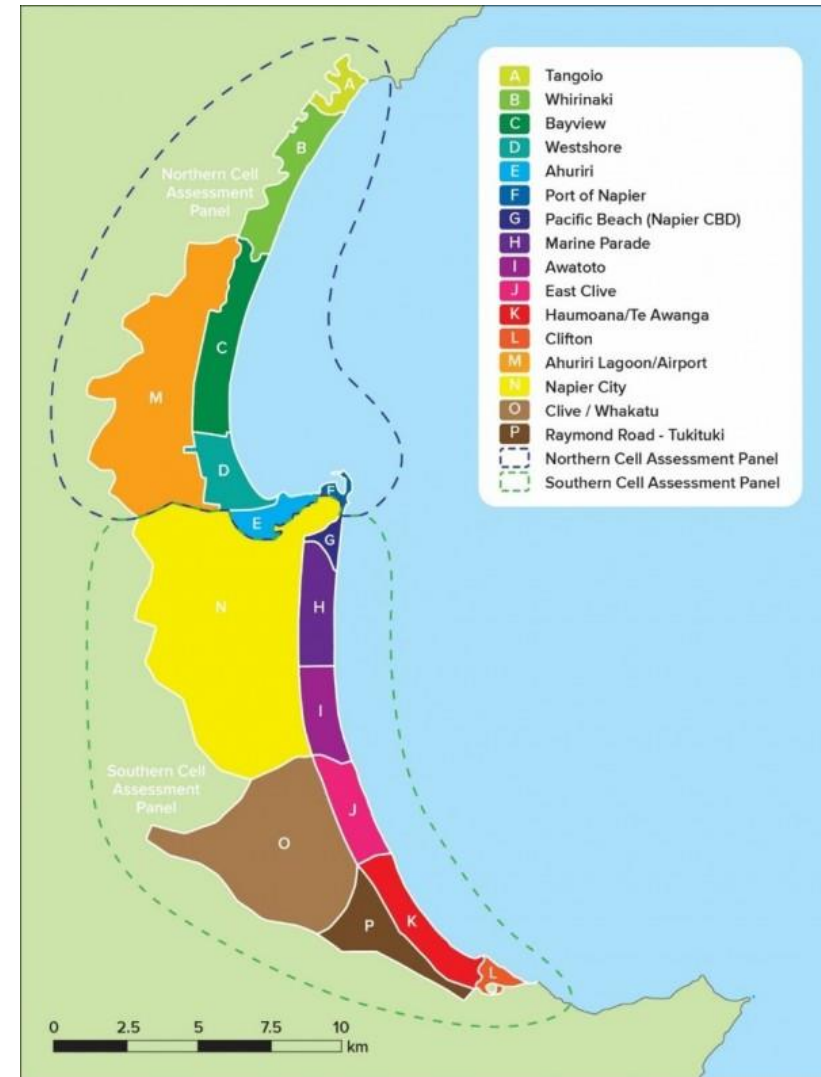


Table 35: Coastal Strategy recommendations and timing

Area	Short term (0-20 yrs)	>	Medium term (20-50 yrs)	>	Long term (50-100 yrs)
Clifton (L)	Sea wall	>	Sea wall	>	Managed retreat
Te Awanga (K2)	Renourishment & control structures	>	Renourishment & control structures	>	Renourishment & control structures
Haumoana (K1)	Renourishment & control structures	>	Renourishment & control structures	>	Managed retreat
Clive (J)	Status quo	>	Renourishment & control structures	>	Retreat the line/managed retreat
Ahuriri (E1)	Status quo	>	Sea wall	>	Sea wall
Pandora (E2)	Inundation Protection	>	Inundation Protection	>	Inundation Protection
Westshore (D)	Renourishment	>	Renourishment & control structures	>	Renourishment & control structures
Bayview (C)	Status quo / Renourishment	>	Renourishment & control structures	>	Renourishment & control structures
Whirinaki (B)	Status quo/ Renourishment	>	Renourishment & control structures	>	Sea wall

The Strategy requires substantial capital investment to support a cross-council approach to identify and respond to these hazards in the future. Governance and asset ownership approach will be assessed, and capital funding required to implement specific initiatives. The Strategy status is summarised in the Case study: Challenges with implementing the Clifton to Tangoio Coastal Hazards Strategy 2120.⁷ HBRC is participating in the Coastal Hazards Strategy with the aim of working through a solution, including its funding, as a region.

⁷ <https://environment.govt.nz/assets/Publications/Files/challenges-with-implementing-the-Clifton-to-Tangoio-coastal-hazards-strategy-2120-case-study.pdf>

4.10 Key schemes issues and options

Section 3.5 has identified several infrastructure issues that are expected to be experienced over the life of this Strategy. Detailed responses to these have been identified in the scheme asset management plans.

A number of these issues impact on future levels of service. Level of service reviews are underway and will continue to be a focus over the first three years of the 2021 LTP period.

The level of service reviews includes a wide range of actions, and active consideration of:

- Climate change including national and international advice on climate change predictions.
- Level of service for Open Spaces as part of a new separate asset management plan (AMP). This will see work over the next iterations of the AMPs to work through the public access and operational management of open spaces assets while schemes AMPs focus on core flood and drainage asset management. This is an area of development for HBRC and will allow greater visibility on the growing open spaces operational and level of service requirements to stakeholders.
- Asset ownership and maintenance responsibility for Open Spaces. The Hawke's Bay Trails assets have a relatively complicated mixed ownership/maintenance model, and the separation of Open Spaces from scheme operational responsibility is being worked through in the new Open Spaces AMP.
- Development of a new Open Spaces adoption criteria to consider whole of life asset management costs, resourcing and consistent proposal assessment criteria for future candidates.
- Government's 3 Waters Reform programme.
- Experience and learnings from other schemes nationally.
- Community expectations for appropriate levels of flood protection.

- Community expectations of environmental and ecological standards.
- Appropriate social and cultural involvement and commitment within scheme reviews.
- Affordability and willingness to pay.

There are options available to achieve improved levels of service, particularly where climate change predictions provide adequate lead time, in some cases decades. This allows time to undertake a rigorous level of service review and consider longer timeframes for rating implications, intergenerational funding opportunities and loan funding. For shorter timeframes issues such as reprioritising and greater innovation around methods and techniques will be required.

The requirement for informing and educating scheme ratepayers to possible impacts and threats to schemes and scheme assets is a challenging area. Recent experiences within New Zealand, such as the Canterbury and Kaikōura earthquakes, and Edgecumbe floods reinforce the changing climate and provide a level of tangible evidence and proof that levels of services and past approaches to management need to adapt and be flexible to a changing environment. This is particularly relevant to Hawke's Bay.

There is a clearer and greater level of certainty around future impacts on schemes meaning there are a greater number of challenging issues for schemes, scheme managers, councils, and ratepayers to confront, with doing nothing becoming less of an acceptable option. With early intervention and commitment of councils and scheme managers to address and educate scheme ratepayers on predictions and possible alternative solutions, a number of the challenging issues confronting schemes can be planned, programmed, and implemented in an affordable manner.

A summary explanation of the most significant issues and options for addressing them are set out below in Table 36.

Table 36: Infrastructure Issues, options, and management implications

Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
Environmental driver:	Climate change	<p>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.</p> <p>Sea level rise will also affect assets in the vicinity of the coast.</p> <p>HBRC declared a climate emergency in June 2019 and indicated a desire to respond actively.</p>	<p>Option 1: Retain current design standards that may not cope with potential climate change impact such as increasing exposure of the schemes to more extreme rainfall and flood events and more challenging growing conditions due to extended drier summer conditions.</p> <p>Option 2: (preferred option) The potential impacts of climate change (flood flows and sea level rise) are being considered as part of levels of service reviews and related management impacts.</p>	<p>The implications on maintaining the status quo will see a steady decline in levels of service or a more intensive response required for flood events and damage caused by more extreme events, as climate change predictions take effect. This is not a tenable option.</p> <p>LoS reviews will involve public consultation. If preferred option(s) are for retention of existing levels of service, or increased level of service, a capital works programme to increase current capacity of schemes is expected to be required.</p> <p>Issues such as greater freeboard allowances for stopbanks, greater capacity within stopbanks and more resilient plant species will be considered as part of scheme reviews.</p> <p>Investment in increasing scheme capacity and resilience i.e. pump and flood management capacity with effective environmental monitoring. LTP has provision for more additional design and environmental staff resources to address this requirement.</p> <p>The impacts of increased drought risk on environmental and river control plantings will be considered as an operational matter. Investigation of live edge protection plant resilience i.e. drought/pest tolerant species.</p> <p>Expansion of an integrated management approach i.e. improved weed management techniques,</p> <p>Resource consents for the pump stations requirement addressed with environmental engineer resources in LTP.</p>

Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
<p>Environmental/social/cultural/economic drivers:</p>	<p>Levels of service reviews</p>	<p>Land use change and climate change are predicted to result in increased runoff from the land into the waterways</p> <p>The level of service currently provided by the schemes to the Hawke’s Bay public includes:</p> <ul style="list-style-type: none"> • The conveyance of flood water in the major rivers safely to the sea up to a flow with a 1% chance of occurrence in any one year. • The drainage of flood water from the Heretaunga Plains without significant ponding for rainstorm events that have a 20% chance of occurrence in any one year. • A reduction in the frequency of flooding in areas serviced by smaller schemes managed by HBRC to levels defined in their asset management plans. 	<p>Option 1 : Retain current LoS</p> <p>Option 2: (preferred option) Undertake LOS reviews and investigate options for future LOS.</p>	<p>If no work is undertaken, the level of service will decline over time, with potential increased exposure to flood and drainage hazards to stakeholders and related loss of reputational credibility. This is not tenable.</p> <p>LoS options are being explored through the level of service review process which will include consultation with benefiting communities and/or landowners.</p> <p>Improvements over time in environmental, cultural, aesthetic values of the environs of waterways under schemes on public land as measured by the Stream Environmental Valuation (SEV) methodology.</p> <p>If the current levels of service are to be increased, then improvements will be required to the scheme infrastructure.</p> <p>Generally enhanced river environment, biodiversity and recreational opportunities are expected to be required in addition to an increased level of protection against flood risk.</p>

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Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
Environmental/social drivers:	Land use change	<p>There are several potential changes to land use that can impact on the amount of water running off the land and into waterways during heavy rainfall events.</p> <p>Climate change is predicted to result in increased storminess and increased severity of rainfall events. A 5% increase in peak rainfall falling in an event with a 1% chance of occurrence in any one year, may result in an increase peak flow in a waterway of up to 25%.</p> <p>Improvements to urban stormwater systems, increased building and/or urban expansion, changes in crops grown on the land – particularly forestry, can all result in changes to the speed and quantity of runoff from the land.</p>	<p>Option 1: Ignore potential land use changes and impacts</p> <p>Option 2: (preferred option) Review all schemes over time. This process will take at least 10 years, however reviews of some of the larger schemes are programmed to be undertaken within the next five years.</p>	<p>There may several negative impacts if land use changes as well as climate change impacts are ignored i.e. frequency and extent of flooding, failure to correctly identify flood consequence and community impact. These must be accounted for in HBRC planning.</p> <p>The potential for increased runoff through land use change associated with urban areas may be managed to some extent through regulation in regional and district plans.</p> <p>The impacts on runoff through land use change in rural areas will be considered as part of the Scheme reviews and appropriate provision made in improvement options that flow from the reviews and NPS for Urban Development (2020).</p>

Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
Environmental/economic drivers:	Flood channel capacity management	<p>Significant quantities of sediment are carried by the major rivers. While soil conservation initiatives may reduce the amount of sediment finding its way into rivers over time, New Zealand’s geology is young in geological terms and erosion will continue to occur in heavy rain events for many centuries even with the best soil conservation efforts in place.</p> <p>The flood carrying capacity of waterways will be compromised by aggradation of sediment unless appropriate measures are put in place to manage that risk.</p>	<p>Option 1: Retain current practices including the following range of river management practices are in place to manage this risk. These include:</p> <ul style="list-style-type: none"> • Riverbed beach raking and commercial silt and gravel extraction. • Tree (e.g. unwanted willows and lupin) removal from the braided riverbed within and outside the current scheme areas. <p>Option 2: (preferred option) A significant gravel management review programme (seven years) was completed in 2017 and provides the basis for managing gravel riverbeds in the future.</p> <p>Implementation of revised gravel management cost structure: Options: to increase current extraction rate of \$0.8/m³ to \$1.20/m³. Consideration for regional rating to support for extraction will be considered as part of option analysis.</p>	<p>Retain current practices may lead to flood capacity of waterways being compromised by aggradation of sediment unless appropriate measures are put in place to manage that risk. Current stakeholder feedback confirms this is a community concern in the Upper Tukituki Scheme in particular and requires more active management.</p> <p>The gravel management review process has enabled the establishment of a management regime that will ensure a sustainable and resilient gravel (and sediment) management process.</p> <p>River management will need to extend outside the current scheme areas to protect the braided rivers and encourage transport of sediment through the system.</p> <p>The implications of this can largely be managed within existing budgets and programmes as the physical efforts will be redirected from the areas within the schemes, where flood capacity is at manageable levels, to peripheral areas that would benefit the schemes from more intensive management.</p>

Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
Environmental driver	Environmental and ecological management and enhancement	<p>Most schemes were developed and constructed in an era when economic growth and development were the primary focus of the time. Drainage, flood protection and land clearance enabled farm land and agricultural initiatives to develop and prosper and generate the wealth needed to support the schemes.</p> <p>Some of this development has occurred at the expense of the natural environment with significant impacts on wetlands and rivers and the surrounding habitat. Initiatives are now included in appropriate areas of the schemes to reinstate, enhance, or offset environmental and ecological opportunities.</p>	<p>Option 1: Ignore environmental and ecological management and enhancement opportunities</p> <p>Option 2: (preferred option) Continue to implement and develop a wide range of management options available for environmental enhancement. These include riparian retirement and planting, removing stock from waterways and berm areas and fencing, modifying water courses to more natural forms, improving water quality by shading, community, and tāngata whenua engagement in improvement initiatives. A number of these initiatives are included in sections of a number of the schemes.</p>	<p>This approach will have potential negative and undesirable environmental and ecological outcomes.</p> <p>Doing nothing is not considered an acceptable option due to the high expectation of scheme ratepayers for the schemes to deal with water quality and ecological issues, particularly in proximity to urban areas.</p> <p>Inclusion of a wide range of environmental enhancement initiatives within scheme budgets will ensure long term improvements to water quality, development of more natural channel forms and native planting resulting in habitat enhancements.</p> <p>The financial commitment involved in achieving better ecological outcomes is modest alongside scheme maintenance budgets and typically involves refocusing existing budgets to alternative species planting and lessening intensive maintenance activities such as weed boating once shading efforts take effect.</p> <p>Ratepayer and community involvement can offset the cost of these initiatives.</p> <p>This initiative is also consistent with Councils refocused commitment to improving environmental and ecological outcomes.</p>

Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
<p>Environmental/social/cultural and economic drivers:</p>	<p>Coastal asset management</p>	<p>Our coast is eroding and in particular the coastal communities from Clifton to Tangoio are at most significant risk. With sea level rise, the northern and southern coastal settlements will face increasing risk of erosion and inundation.</p>	<p>Option 1: Ignore coastal erosion hazards and risks.</p> <p>Option 2: (preferred option) Continued development and implementation of the Clifton to Tangoio 2120 Strategy to understand coastal hazards risks and the management options for this key part of the Hawke’s Bay coastline. It has begun with the priority areas between Clifton and Tangoio but will move to focus on other coastal areas in the future.</p> <p>To date the Strategy has identified the areas that will be affected by various coastal hazards over the next 100 years to 2120 and the risks to public and private property, cultural sites and areas, recreational use, and infrastructure services. A multi-criteria analysis has been carried out with a pathways approach determined by the community representatives to best deal with the future hazards.</p>	<p>The cost of doing nothing is estimated to run into 100s of millions of dollars. Guidance must be provided for long term planning so do nothing is not sustainable.</p> <p>If the results of the multi-criteria analysis being undertaken as part of the strategy indicate intervention is needed in terms of hard engineering solutions for safeguarding our coastline, then major construction works would commence in the lifetime of this strategy.</p> <p>The next phase of the project will determine the cost of the various options, timing, and funding options between the partner Councils. This is likely to be determined through a special consultative process, with costs in the order of \$150 – 200 million for the 100-year life of the Strategy.</p>

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Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
Social driver:	Changing community expectations	In the past the drainage and flood control infrastructure focused on single service delivery objectives. There is now a more integrated approach to infrastructure use and management aimed at meeting community desires and expectations	<p>Option 1: Retaining historical traditional single use of drainage infrastructure.</p> <p>Option 2: (preferred option) Diversify infrastructure use to meet multiple community expectations/outcomes.</p>	<p>This approach will not meet community and Council aspirations for greater public access.</p> <p>Development of integrated asset management looking at the multiple use of assets such as cycle paths on stop banks. Increase in level of service due to greater public access (e.g. mowing, security, ranger management, fly dumping). Demand for non-drainage assets (e.g. seating, amenity features, signage).</p> <p>Reduction in use of herbicides or change in type. Potential less efficacy and more weed control activity required.</p> <p>Change from grazing of river berms to mechanical mowing; Increase in mowing requirements.</p>
Cultural driver:	Increasing co-management approaches	Council is committed to increasing and prioritising co management approaches	<p>Option 1: Status quo management approach.</p> <p>Option 2: (preferred option) Identification of co management opportunities and Development of co-management strategies and plans.</p>	<p>This option is not desirable.</p> <p>Potential review and adaptation operations and maintenance techniques in line with co-management objectives.</p>

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Wellbeing driver	Significant issue	Description	Principal management options	Implications of management options
Environmental/social/cultural and economic drivers:	Asset management capacity and capability development	Council is committed to developing AM capacity and capability to meet the future challenges.	<p>Option 1: Maintain the AM status quo.</p> <p>Option 2 : (preferred option) Implement the AM Improvement Programme to develop AM capability and capacity to meet the challenges of future asset management, including:</p> <ul style="list-style-type: none"> Human resource planning to overcome engineering resource scarcity regionally and nationally. Need for AM systems upgrade technology advancement. Emerging /increasing regulatory requirements (new consents and their management). 	<p>This option is not desirable.</p> <p>Participate in regional and national engineering skills development initiatives (i.e. cadetships, career path development etc.)</p> <p>Utilisation of consultancy services (creative approaches, Public Private Partnerships) to increase skills and capability in the short to medium term.</p> <p>Core asset management systems development (ADMS, GIS, Finance system) and integration.</p> <p>Development of regulation and compliance systems and skills.</p>
Economic	Affordability issues	Increasing costs to meet the scale and extent of future management requirements.	<p>Option 1: Status quo.</p> <p>Option 2: (preferred option) Improved overall asset management maturity with improvement in asset information systems resourced in LTP provisions. Enabling improved decision support and long term forecasting.</p> <p>Improved works planning and innovation.</p> <p>Investigation of funding models (intergenerational view). Identify alternative funding sources.</p>	

4.11 Financial summary

4.11.1 30-year budget forecasts

The 30-year regional assets operational cost forecast is shown in Figure 25: Projected operational expenditure – infrastructure assets.

4.11.2 Funding the activities

The schemes have enabled the areas benefiting from them to improve land productivity, with resulting benefits to the economy and resilience of the region. HBRC sources the majority of funds to meet the ongoing operation, maintenance, and improvement cost of the schemes from targeted rates levied on properties benefiting from the schemes, and a minority portion from general funding sources on a calculated private/public good basis. General funds are sourced from general rates levied on all properties across the region and from dividends and interest from HBRC investments.

A separate operating account is held for each specific scheme. All scheme funds (targeted rates, general funding allocated to the scheme, other scheme income and interest on accumulated funds) are credited to the operating account. Scheme costs (operating, maintenance, and improvement costs, rate collection costs, depreciation, and interest on scheme deficits) are debited from the account. Any balance remaining in the account (credit or debit) is carried forward from one financial year to the next as a reserve balance.

The major beneficiaries of the schemes are the owners of land within the scheme areas that are able to use their land more productively. These beneficiaries pay the majority of the cost of operating and improving each scheme through a rating classification approach using targeted rates. However, HBRC recognises that there are wider benefits to the region including more productive land use and greater security to major urban areas and critical infrastructure in flood events. Accordingly a portion of the scheme costs are funded from HBRC's general funding sources, i.e. general rates and interest and dividends from HBRC investments.

In 2020, HBRC undertook a structured review of the allocation of costs for all schemes to confirm the allocation of overheads and labour costs is consistent for all schemes. Forecasting for Smaller Schemes show an indication of reducing scheme reserves over the next 10 years when this is applied so action is required to be sustainable. HBRC will review and consult on schemes based on a more consistent rating approach in the next two years and a revised rating schedule will apply no later than year 1 of the next LTP. Small Schemes in particular have not had full labour costs and overheads allocated so the scheme economics will change, necessitating formal review to determine long-term affordability.

Additionally, Open Spaces has been separated from the traditional schemes recognising the need to identify Open Spaces activities specifically and to manage changed levels of service for greater public access requirements, new activities, and types of assets in the HBRC portfolio.

Economic assessments of the wider benefit to the Hawke's Bay Region have assisted HBRC in establishing the proportion of direct benefit versus region-wide benefit for the major schemes. This work showed that the Heretaunga Plains Flood Control and Drainage Scheme – Rivers provided an environment within which significantly increased economic activity was able to occur across the whole region resulting in increased population and facilities to support that population. Accordingly, 30% of the cost of the scheme is met by HBRC general funding.

The schemes covering the individual catchment areas on the Heretaunga Plains have resulted in improved productivity from the land which is assessed as justifying 10% of the cost of those schemes being met from general funding sources.

Similarly, the Upper Tukituki Scheme provides approximately half the benefit attributable to the Heretaunga Plains Flood Control and Drainage Scheme – Rivers to the whole region, but the cost of maintaining this scheme is exacerbated by gravel flowing from the Ruahine Ranges. This is deemed to warrant an additional 2.5% of general funding input.

The principles used for the Small Schemes are as follows.

- Schemes that provide protection to a State Highway receive 12.5% general funding contribution.
- Schemes that provide protection to local roading networks receive 10% general funding contribution.
- Other schemes receive 5% general funding contribution.
- Cost allocation will be normalised to be consistent with other schemes over a three-year period inclusive of a Revenue and Financing review prior to the 2024-34 Long Term Plan.

Hawke’s Bay Regional Council established public/private good benefit allocations for the various schemes many years ago. A variety of rationale was used to initially establish the splits such as economic performance, population areas and access to urban areas and State Highways and roading networks. These have generally been reviewed as part of LTP deliberations or as part of significant scheme reviews, such as Level of Service reviews. A review was completed by Sean Bevin of Economic Solutions Ltd in October 2010, and efforts were made in 2020 to make all schemes cover costs consistently.

Information from the Bevin (2010) review indicated that private benefit proportions for other New Zealand schemes similar to those in Hawke’s Bay ranged from 50 – 100%, with an average benefit proportion of around 80%.

While every scheme has their own peculiarities and nuances the report concluded that the approach of using capital valuation for the rating basis, along with specific rationale applied to each respective scheme to develop the above public/private good rating splits was a reasonable balance of all these parameters within the Hawke’s Bay schemes.

The table below sets out the funding sources for each scheme.

Table 37: Scheme funding sources

Scheme	Targeted rate portion (Private)	General funding portion (Public)
Heretaunga Plains Flood Control and Drainage Scheme		
Rivers	70%	30%
Drainage Catchment Schemes		
Napier/ Meeanee	90%	10%
Awatoto/ Brookfields	90%	10%
Pākōwhai	90%	10%
Muddy Creek	90%	10%
Haumoana	90%	10%
Karamū and tributaries	90%	10%
Raupare/ Twyford	90%	10%
Tūtaekurī -Waimate	90%	10%
Puninga	90%	10%
Upper Tukituki Scheme	82.5%	17.5%
Small Schemes		
Upper Mākara	90%	10%
Paeroa	87.5%	12.5%
Porangahau	90%	10%
Poukawa	95%	5%
Ohuia – Whakakī	95%	5%
Esk	87.5%	12.5%
Whirinaki	87.5%	12.5%
Te Awanga	90%	10%
Te Ngarue	90%	10%
Kopuawhara	90%	10%
Kairakau	90%	10%
Opoho	90%	10%
Wairoa Rivers and Streams	87.5%	12.5%
Central and Southern Area Rivers & Streams	87.5%	12.5%

5. Hazards, risk and resilience

5.1 Risk management

Risk management is the culture, process and structures that are directed towards realising potential opportunities whilst reducing either or both the probability and consequence of adverse effects.

Risks and risk management is covered in detail in section 5 of the specific Scheme Asset Management Plans, with HBRC using “Quantate Risk” software to establish risk registers, likelihood of occurrence and consequence scoring to develop the levels of risk matrix.

There is an ongoing review process in place in HBRC considering all significant risk issues for Council. These are reviewed on a six-monthly basis and reported to Council every three months. While the component parts of the scheme risk registers are reviewed as part of scheme reviews, the overall risks of scheme performance, impacts of climate change, ratepayer confidence and ability to pay, consideration of recent events (e.g. Edgcumbe stopbank failure event) are considered within the wider HBRC regular review process.

5.2 Resilience

Scheme beneficiaries have a high expectation that infrastructure has a high degree of resilience that will ensure scheme functionality and ongoing protection against flooding. The key activities that help ensure infrastructure resilience include:

- Infrastructure design standards reviews
- Levels of service reviews; these reviews will include:
 - risk assessments of the schemes, including climate change considerations
 - scheme performance assessments or enable the level of service to be reinstated more rapidly following a natural hazard event that impacts on the scheme
 - scheme reinstatement options (where the risk exposure is considered too great, e.g. structural works in lieu of live edge protection)

- planned/scheduled operations and monitoring plans
- monitoring and reporting.

Scheme beneficiaries have a high expectation of continuing functionality and ongoing protection against flooding. Reviews of the level of service provided by each of the schemes are progressing as programmed. These reviews will include risk assessments of schemes, including climate change, and where appropriate may recommend changes or improvements that reduce the risk of premature failure or enable the level of service to be reinstated more rapidly following a natural hazard event that impacts on the scheme. The reviews will also consider alternative techniques to scheme reinstatement where the risk exposure is considered too great, e.g. structural works in lieu of live edge protection.

5.3 Risks to asset performance

The main risks that would affect the performance of the infrastructural assets are listed below in Table 38.

HBRC holds disaster reserves and insurance to fund reinstatement of scheme levels of service should infrastructure assets be damaged in a significant natural hazard event. The highest risk event to infrastructure assets is a major flood event, followed by a major earthquake (or earthquake followed by a flood).

HBRC disaster reserves are designed to meet the cost of reinstatement following damage by events with a 4 to 5% chance of occurrence in any one year (i.e. on average events that occur more regularly than once every 20 to 25 years). Insurance secured through an external organisation is held and may be called upon should serious damage occur in a major, but infrequent, event.

Table 38: Risks to asset performance

Risk	Description	Treatment
Significant natural hazard event	A significant natural hazard event (e.g. flood, earthquake, tsunami) will impact on the scheme assets and may affect their integrity or their ability to provide the level of service they were designed to achieve.	Emergency Management incorporating CDEM includes Regional Asset Management and effective environmental monitoring to manage events. Risk based LoS review of critical assets is included in current programmes
Significant biological incursion	<p>An essential part of river control work (and ecological enhancement) is live trees. These include a variety of willows, some exotics, and natives. Willows have in the past been damaged by a significant biological incursion e.g. willow sawfly which caused significant damage to willows in the mid 1990s. The response to this incursion involved a \$10 million alternative species and structural works programme.</p> <p>Currently the schemes are experiencing an impact from the giant willow aphid that affects willow tree growth rates. This is presently being monitored and involves a review of resistant alternative plant species.</p> <p>Chilean needle grass: This grass is a significant issue in the Lower Tukituki River below Stockade Road. There is limited gravel extraction in this area and so there are potential problems with managing gravel accumulations traditionally extracted. Management options are under active consideration, and biosecurity monitoring is in place.</p>	Maintain environmental and biosecurity monitoring, and staff education to identify potential threats. Research management options based on best practice.
Inadequate funding	Ongoing maintenance is essential if the scheme assets are to provide the design level of service. Maintenance is currently funded through rates levied on land benefiting from the schemes. The cost of ongoing maintenance must however be affordable to the land owners and be outweighed by the benefits received by them. Where costs outweigh benefits an alternative level of service may need to be considered subject to agreement with ratepayers.	Develop and maintain scheme LoS assessments and long term asset planning to allow economic assessment of scheme operation and performance. Communicate issues and risks identified to stakeholders.
Management of HBRC's community assets and Infrastructure (Enterprise Risk Register Item 12)	This risk considers the management of HBRC's community (field) assets and infrastructure. Asset management aims to reduce asset related risk events by optimising the value of the asset throughout its lifecycle. This includes development of asset objectives that align to the organisation's strategy then maintaining, upgrading and where appropriate disposing of assets aligned to objectives in a cost-effective way. HBRC's assets and infrastructure includes bridges, boardwalks, stop banks, cycle trails, and forestry.	Identify, agree, and align HBRC's asset management systems to a current external standard.