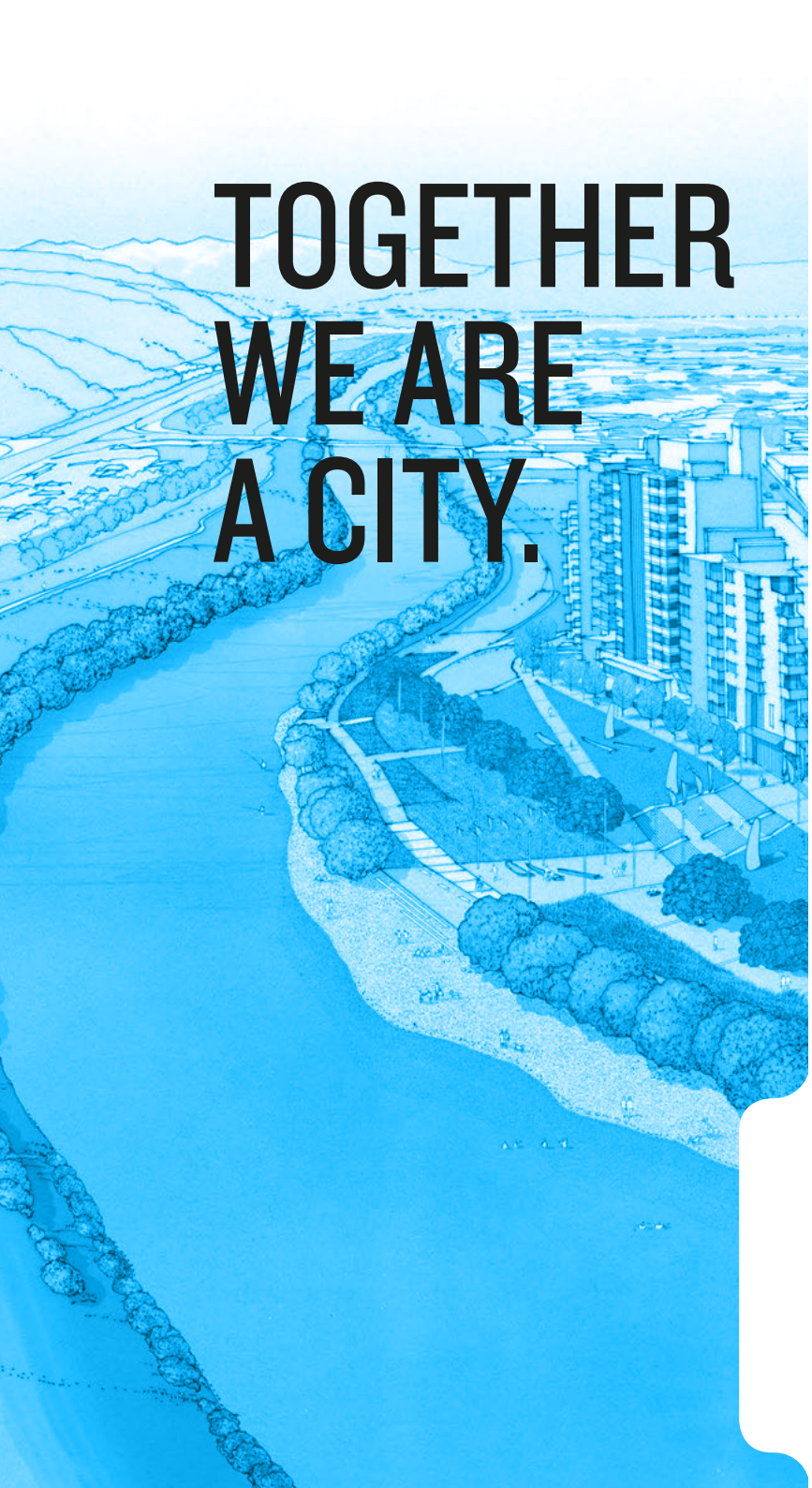
2015–2045

INFRASTRUCTURE STRATEGY

HUTT CITY
TE AWA KAIRANGI



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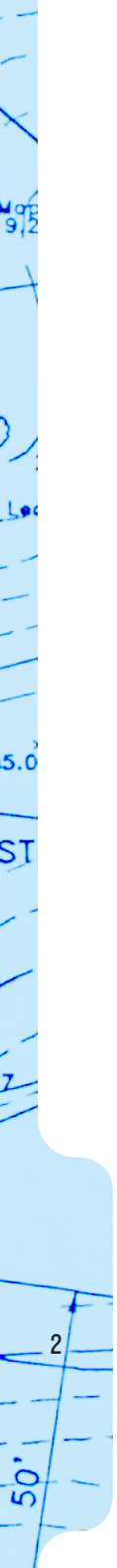


FOREWORD

I am pleased to present Hutt City Council's 'Infrastructure Strategy 2015-2045', another important strategy to move Hutt City forward. This strategy builds on the groundwork laid by Council's 'Integrated Vision for Hutt City – Making Our City A Great Place to Live, Work and Play'. The 'Integrated Vision' was published in 2014. It outlines the possibilities open to us based on our existing strengths, it addresses issues that we face, and provides a vision for achieving our true potential. To support the 'Integrated Vision' we have developed four underpinning strategies.

The 'Urban Growth Strategy', launched in early 2014, addresses the built aspects of the city and how we will grow and develop to meet the city's housing and business needs. The 'Environmental Sustainability Strategy', completed in December 2014, provides direction to ensure the city's environment is in a sound state for both current and future generations. The 'Leisure and Wellbeing Strategy' will be completed in early 2015 to address the wellbeing of our people, and how to provide wonderful leisure opportunities for this city.

Infrastructure

Infrastructure underpins the quality of life we value and includes essential services that are often taken for granted such as water, sewerage, stormwater, flood protection, roads and footpaths. These services ensure that the daily lives of our residents, visitors, businesses and communities are supported and protected, and provide the foundation for a multitude of activities to occur – from housing to manufacturing, recreation to public transport. We have a good understanding of our infrastructure, its current condition, the levels of service it is required to provide, and what needs to be done to properly manage and maintain infrastructure out to the end of the century.

This 'Infrastructure Strategy' outlines the core infrastructure that our city relies on and the challenges and issues we face with it, and how we will manage our infrastructure in light of these challenges and issues. It is vital that we manage our infrastructure in a way that ensures it is able to meet the needs of current and future residents, businesses and visitors. This strategy plots a pathway for achieving this outcome.

Ray Wallace
Mayor – Lower Hutt
1 July 2015

INFRASTRUCTURE UNDERPINS THE QUALITY OF LIFE WE VALUE AND INCLUDES ESSENTIAL SERVICES THAT ARE OFTEN TAKEN FOR GRANTED SUCH AS WATER, SEWERAGE, STORMWATER, FLOOD PROTECTION, ROADS AND FOOTPATHS.

CONTEXT

CONTEXT

INTRODUCTION

This 'Infrastructure Strategy' is incorporated into the '2015-25 Long Term Plan' (LTP) and is intended to:

- Identify significant infrastructure issues for Lower Hutt over at least a 30-year period.
- Identify the principal option(s) for managing those issues, and the implications of those option(s).
- Decide on the most likely option for responding to these issues.

Capital investment for long-lived assets typically consists of high replacement costs – including planning, design and construction. This significant peak in expenditure is normally followed by long periods where relatively low investment is required. This 'Infrastructure Strategy' provides the opportunity to consider the best way to manage and allocate this capital investment.

At a national level, sustained investment is needed over the next 20-30 years for the replacement and upgrading of ageing infrastructure.[1] It is estimated that an infrastructure funding gap (the capital investment required compared to the projected revenues) of $11.5 billion nationally will occur over the next 10 years.[2] However, for Hutt City Council the situation is less pressing – our core infrastructure has been managed well over many years and we do not anticipate any significant unplanned capital investment over the next three decades.

1 Waugh Infrastructure report, *Infrastructure Management Forecasting the Changes to 2030* (2013): www.waughinfrastructure.com/wp-content/uploads/2013/06/Waugh-Infrastructure-Management-%E2%80%93-Forecasting-the-Changes-to-2030-Ingenium-Conference-2013-Dunedin.pdf

2 Auditor General report, *Water and Roads: Funding and Management Challenges* (2014): www.oag.govt.nz/2014/assets/docs/water-and-roads.pdf

AN INFRASTRUCTURE VISION

Council has an important stewardship role for city infrastructure over the long term. The infrastructure vision incorporated within this strategy is:

Infrastructure is resilient, fit for purpose, affordable and meets the needs of today without compromising the needs of tomorrow.

Building on this vision, Council and its community should aim to develop long-term goals and underpinning principles for guiding the strategic management of infrastructure. The proposed principles are to:

- Protect people, property and the environment.
- Contribute to creating liveable communities that allow for a wide range of activities to take place.
- Ensure infrastructure is resilient for the long-term and adaptable to changing circumstances.
- Increase community understanding and awareness of infrastructure services and issues facing them.
- Ensure robust information underpins long-term infrastructure decisions and that it is cost-effective.
- Ensure that infrastructure complies with all appropriate regulations or standards.
- Collaborate with stakeholders and partners to ensure joint outcomes are achieved.

It is likely that over the course of the next 30 years (the period of this strategy) significant changes in the operating environment will occur. These changes will include developments in technology, service delivery costs, desired service levels, population and employment trends, changes in governance and administration, or impacts from climate change. Many of these factors and their impact become increasingly uncertain over time – meaning that infrastructure decisions will need to be made that are robust for a range of possible futures.

The infrastructure vision incorporated within this strategy is: Infrastructure is resilient, fit for purpose, affordable and meets the needs of today without compromising the needs of tomorrow.

ABOUT HUTT CITY

Geography

Hutt City encompasses a total area of 38,000 hectares, stretching from Haywards Hill and Stokes Valley in the north to Turakirae Head in the south. It is bounded to the west by Belmont Regional Park and to the east by the Rimutaka Forest Park.

The Hutt River (Te Awa Kairangi) is a defining element of the city, rising in the southern Tararua Range it flows south-west along the Wellington Fault until it reaches Lower Hutt, where it turns south to Wellington Harbour. The river's headwaters are a major catchment for the region's water supply. Tributaries to the Hutt River within Lower Hutt include Stokes Valley Stream and Awamutu Stream. Other important rivers and streams in the district include the Wainuiomata River, Korokoro Stream, Waiwhetu Stream, and the Orongorongo River.

Hutt City's coastline stretches around Wellington Harbour from Petone Beach to Pencarrow Head, and continues outside the harbour to Baring Head and on past Turakirae Head to Windy Point (south of Mt Mathews). The Wellington Fault runs through the city and numerous other faults are also present in the area and across the wider region.

Population

Since the early 1980s the city's population has been largely static, the 2013 national census showing 0.55% growth in the city since 2006. The 2013 population was estimated as 102,900 people, and Statistics New Zealand predicts this population will be subject to slight decline over the next 30 years. However, Council's 'Urban Growth Strategy' (2012-2032) sets a target population of at least 110,000 people living in the city by 2032.

Lower Hutt has a diverse community with relatively high levels of inequality and areas of deprivation – particularly in the north-east of the city. Increasing ethnic diversity is anticipated with a continuing decline in the European population and increases in the proportion of Māori, Asian and Pacific populations. Whilst the population overall continues to age, both Māori and Pacific populations will retain a considerably younger profile.

Settlement and city development

Within months of the first European immigrants settling at Petone in 1840 it was flooded by the Hutt River. Ongoing flooding, together with the 1855 earthquake and tsunami prompted many early settlers to shift to Wellington. To manage the risk of flooding, stop-banks were developed on both banks of the Hutt River, extending through the city.

The Lower Hutt area was mainly developed for agriculture and horticulture until the 1920s, when the New Zealand Government bought large tracts of land for housing. In the mid-1940s state housing for 20,000 people was built in the north-eastern suburbs of the city (Epuni, Naenae, Taita), and a new suburban rail line connected people to workplaces further down the valley and in Wellington City. Subsequent development radiated out from the Hutt Valley flood plain.

From the 1960s, middle-class home buyers headed for the western hill suburbs – necessitating supporting infrastructure development in those areas. Maungaraki was developed by the then city council for private housing, and was the largest local government subdivision in New Zealand, involving significant earthmoving to cut hilltops and fill valleys. Today, the main commercial centres are Lower Hutt and Petone, while residential suburbs are located on the western hills, Eastbourne, Wainuiomata, the valley floor, and eastern suburbs.

THIS STRATEGY

Our long-term approach is to maintain and operate the existing system to a high standard to meet legislative requirements and community expectations and to enhance the infrastructure to meet anticipated future needs. This strategy takes a 'multi-asset' approach – looking across different types of infrastructure, rather than within a single category – and aims to ensure that Hutt City is managing and building the right long-term infrastructure in the right place, at the right price. This strategy also provides the opportunity to consider a range of challenges, including:

- Interdependencies between different infrastructure types.
- Overall infrastructure resilience to risks, hazards and shocks.
- Changing demand for services or changes to levels of service.
- Ongoing affordability across a range of infrastructure types.

Operational issues related to each category of infrastructure are dealt with in Council Asset Management Plans (AMP's). This strategy aims to provide an assessment of issues facing key infrastructure, and the way that Council will address these issues. The direction provided through this strategy – alongside other key Council strategies – will have significant implications for the city's future and affect decision-making within Council and across the city, including for:

- Asset management planning.
- District Plan changes.
- Council expenditure and prioritisation.
- Long Term Plans and Annual Plans.
- Responding to risks in areas such as natural hazards and climate change.

Infrastructure included in this strategy

This strategy includes all of the mandatory categories required under the Local Government Act (LGA), namely:

- Water supply.
- Wastewater (sewage conveyance, treatment and disposal).
- Stormwater drainage.
- Roads and footpaths.
- Flood protection.

In this strategy, flood protection is incorporated within the stormwater drainage category. Flood protection of the Hutt River is also covered in the Wellington Regional Council Infrastructure Strategy for major waterways.

Infrastructure networks in Hutt City are not isolated from activity occurring at a regional and national level, and some of our infrastructure is shared or co-managed with other councils in the region. Hutt City Council works closely and collaboratively with appropriate organisations to ensure consistency, efficiency and effectiveness in our respective work. Council elected to only include the categories of infrastructure in this strategy that we are required to report on under the Local Government Act. Additional categories may be included in future iterations of the strategy. Categories of infrastructure that are not included within this strategy include:

- Council owned/managed: Parks and gardens, libraries, swimming pools, halls and community facilities, playgrounds.
- Regionally owned/managed: 'Bulk' water supply infrastructure, flood protection, public transport, coastal management, emergency management services.
- Government owned/managed: Rail corridors, state highways and bridges, schools, hospitals, conservation land, social services, emergency services.
- Privately owned/managed: Utilities – electricity, gas, telecommunications.

This strategy takes a 'multi-asset' approach – looking across different types of infrastructure, rather than within a single category – and aims to ensure that Hutt City is managing and building the right long-term infrastructure in the right place, at the right price. Hutt City Council works closely and collaboratively with appropriate organisations to ensure consistency, efficiency and effectiveness in our respective work.

INFRASTRUCTURE NETWORKS

Hutt City has a series of well-developed and modern infrastructure networks and the overall condition of these networks is good.

Hutt City has a series of well-developed and modern infrastructure networks and the overall condition of these networks is good. The total capital replacement value for Council owned infrastructure included in this strategy is $1.8 billion, while each year Council spends around $138 million on managing infrastructure. The extent of Council infrastructure networks in this strategy is as follows:

INFRASTRUCTURE CATEGORY	TOTAL LENGTH	ESTIMATED VALUE [1]	KEY COMPONENTS	LEVELS OF SERVICE	CONDITION AND LIFESPAN
Wastewater	681 km (pipelines)	$544m	• Treatment plant • Trunk mains • Pump stations • Storage tanks • Outfall pipelines	• Residents' satisfaction • No resource consent infringements • Reliability of service • Prompt issue response	68% of wastewater pipes are rated moderate or better condition. Around 60% of pipes are due to reach the end of their useful life within the next 40 years.
Water supply	677 km (pipes)	$255m	• Reservoirs • Water mains • Pump stations	• Residents' satisfaction • Compliance with NZ Drinking Water Standards • Quality of water (measured by Ministry of Health) • Reliability of service • Prompt issue response • Maintain consumption levels	Nearly 75% of the network is rated moderate or better condition. Around 65% of pipes have a remaining life of 40 years or less.
Stormwater	548 km (pipes)	$311m	• Stormwater mains • Pump stations	• Residents' satisfaction • Reliability of service • Achieve water quality at main recreational beaches • Prompt issue response • Network upgrading aims to accommodate a 10-50 year 'average recurrence interval' (the average period between exceeding this level of rainfall)	Over 90% of the stormwater network is rated as moderate or better. The lifespan of stormwater assets varies between types of asset. For example, minor culverts have an estimated average design life of 100 years, while major culverts generally last 80 years. The majority of stormwater pipes will not need replacing for over 40 years, with many pipes still good for 70 years or more.
Local roads and footpaths	481 km (roads) 728 km (footpaths)	$734m	• Roadways and bridges • The eight bridges in the district that cross the Hutt River are, from south to north: – Waione St (or 'Estuary') Bridge – Ava Rail Bridge – Ewen Bridge – Melling Bridge – Kennedy Good/Avalon Bridge – Taita Rail Bridge – Silverstream Rail Bridge – Silverstream Road Bridge	• Residents' satisfaction • 'Quality of ride' measured by the percentage of the road network meeting roughness standards • Accident trend (measured by NZTA)	NZTA's 'Road Condition Index', which measures the condition of the road surface in relation to road safety, has shown an improving trend in Hutt City. Lifespans vary between various roading assets: for streetlights it is 25 years, while a bridge may last five times as long; chipseal has an average lifetime of 12 years; asphaltic concrete lasts for about 15 years.

1 Estimated value is the replacement value for all assets in category valued at 31 Dec 2011 (10 March 2011 for roading), excluding land value. Wastewater includes approximately $44m owned by Upper Hutt City Council.

Current and planned investment in our infrastructure means that the proportion of pipes rated as poor will drop markedly in coming decades.

Most of our infrastructure was built in two tranches in the 1930's and 1950's. The average age is over 30 years while average life expectancy varies from 10-80 years, depending on the infrastructure type.

The lifespan of an individual infrastructure asset can be estimated and programmes are put in place to renew or replace the asset at the end of its economic life. However, for some assets their long life and extremely high replacement values means that techniques are often applied to extend their economic life and they are likely to be maintained in perpetuity. When multiple assets in urban areas have overlapping upgrading, renewal and maintenance schedules the assets' combined lifespans are effectively eternal.

KEY INFRASTRUCTURE NETWORKS

The following section provides further information on each of the key infrastructure categories included in this strategy.

Wastewater

The main functions of the wastewater system are to collect, treat and dispose of sewage from residential and business properties, and industrial liquid wastes (or trade waste). The wastewater system consists of a network of pipes connecting to each property, which in turn discharge into a system of larger-diameter trunk sewer pipes.

There are two main trunk sewer pipelines for the Hutt Valley – one follows the western Hutt River stopbank, and the second passes through the eastern suburbs of Taita and Naenae, before following the rail corridor through to Moera. All wastewater from Wainuiomata, Eastern Bays, Lower Hutt and Upper Hutt is pumped to the treatment plant at Seaview. Treated effluent from the Seaview plant is then conveyed to an outfall at Pencarrow Head.

During wet weather, there is the possibility of stormwater entering the wastewater system (inflow), or groundwater entering the wastewater system (infiltration), leading to possible overloading of the system and consequent overflows which present health, water recreation and water quality issues. Existing infiltration/inflow reduction strategies, including pipeline inspection and renewal programmes, are designed to minimise the entry of stormwater or groundwater to the wastewater system. It is estimated that these strategies will achieve a reduction in average storm water volumes in the wastewater system from 20 per cent down to 15 per cent over the next 20 years. Critical assets are identified in the Asset Management Plan (AMP) and include large diameter pipes, trunk pipes, the Seaview Wastewater Treatment Plant, and the Silverstream Storage Tank. Seven out of the 29 pumping stations in the Hutt City wastewater network are identified as critical. It is assumed that critical assets will be replaced close to or at first failure and that non-critical assets will be repaired at first failure. A further 10-20 years of life is expected from these non-critical repaired assets before replacement.

Water supply

Bulk water is purchased from the Regional Council and comes from several sources including the Te Marua Lakes, the Wainuiomata and Orongorongo Rivers, and the Waiwhetu Aquifer. The Regional Council estimates that an additional water supply source for the region will be required by about 2035.

Hutt City's water supply system consists of a network of water mains, pumping stations, and reservoirs. All of this water meets the required public health standards. Most areas of the city meet expected standards for water storage (in reservoirs or storage lakes) and water pressure, while some areas for improvement have been identified in Asset Management Plans. Critical assets are identified in the AMP and include large diameter pipes, together with all reservoirs and pumping stations. Good health outcomes are achieved through careful management of the water supply and distribution infrastructure.

Stormwater

The stormwater system manages surface water run-off to minimize flooding, damage from flooding, and adverse effects on the quality of receiving water (ie, rivers, lakes and harbour). The primary stormwater system consists of pipes, open drains, retention dams and pumping stations. Stormwater is directed through streams, rivers, channels and pipes to the harbour. 'Secondary flow-paths' are provided in some areas to accommodate floodwaters when the primary system is overloaded.

The majority of the existing stormwater infrastructure was designed to accommodate a five-year "average recurrence interval" rainfall event. As such, some of the infrastructure may be overloaded when more severe rainfall is experienced. Service level expectations are now higher than when the system was designed, and general replacement or renewals are now built to a ten year average recurrence interval standard.

Council is continuously upgrading the network as part of its asset renewal and development programme, this includes funding hydraulic modelling to inform catchment management plans and to prioritise investment decisions. When stormwater upgrades are undertaken, factors such as increased rainfall due to climate change are considered and the design is modified appropriately. Under the proposed Greater Wellington Draft Natural Resources Plan, councils will be required to hold resource consents for stormwater discharges. This may require upgrades to the network to meet environmental standards, and could increase the need to consider alternate stormwater management approaches (eg, raingardens, swales) when developing new areas of the city. Critical assets are identified in the AMP and include large diameter pipes, pipelines that operate under pressure, pipes located beneath buildings, stormwater intakes and flap gates on stormwater pipelines. Two of the fourteen pumping stations have been identified as critical.

Flood Protection

Flood protection is important for city planning and development based on management of risk. Components of a robust flood protection system include stopbanks to prevent the occurrence of flooding, stormwater management to drain water away effectively and efficiently, and landuse controls to minimise exposure of property or infrastructure to flood risk.

A key planning requirement is to understand the likelihood and consequence of a flood that goes beyond agreed levels of flood protection. Avoiding building in high hazard areas is one way of managing

flood risk in the long-term. Flood protection in urban areas takes place via stormwater management (the responsibility of Hutt City Council) and through management of flood risk for significant waterways (primarily the responsibility of the Greater Wellington Regional Council (GWRC)). Hutt City Council works in collaboration with GWRC to develop and implement "catchment environmental strategies" (currently in place for the Hutt River) and Floodplain Management Plans (currently in place for the Hutt River and under development for the Waiwhetu Stream). The two Councils are also currently working on a major project to upgrade the CBD stopbank and enhance the river promenade.

Roading and footpaths

The purpose of the roading network is to provide for safe, convenient and efficient transportation through the city. Appropriately designed road and footpath networks can enhance living environments enabling Hutt City residents to interact and achieve social, economic, educational and other goals. The needs of all road users are recognised, including pedestrians and cyclists.

As well as roads and footpaths, roading assets include carparks, walkways, bridges, subways, street lighting, seawalls, and items such as parking meters. Of our total infrastructure value in this category, about 50 per cent is pavements (roads and footpaths), 20 per cent is bridges, and the remainder consists of streetlights, parking meters, signage, and so on.

Hutt City Council is taking a leading and progressive approach nationally in managing its roads and footpaths, including our advanced pavement deterioration modelling and our assessments of bridges for seismic strengthening. Critical assets include key strategic or arterial routes and bridges within Hutt City.

SIGNIFICANT INFRASTRUCTURE ISSUES, MANAGEMENT OPTIONS AND IMPLICATIONS

SIGNIFICANT INFRASTRUCTURE ISSUES, MANAGEMENT OPTIONS AND IMPLICATIONS

While the risk of a natural hazard event changes little over time, the exposure of property and infrastructure increases as investment grows in an area.

The significant infrastructure issues identified for Hutt City, together with the principal options for managing those issues and the implications of those options are outlined in the following section.

NATURAL HAZARDS

Much of Hutt City is located on a floodplain and large parts of the city are vulnerable to natural hazards. Natural hazard risks in Lower Hutt include:

- **Landslide/slope failure:** Western Hills, Eastbourne and Bays, and Wainuiomata Hill Road are most vulnerable.
- **Flooding:** Parts of the Hutt Valley flood plain could be subject to damaging flooding in the event of stopbank failure or overtopping.
- **Earthquake:** Fault rupture could cause catastrophic subsidence in Petone, and liquefaction in low elevation floodplain areas.
- **Tsunami:** Initial wave and ongoing wave oscillation within the harbour (seiching) could lead to major flooding to the Hutt Valley and significant damage to coastal infrastructure.

While the risk of a natural hazard event changes little over time, the exposure of property and infrastructure increases as investment grows in an area.

Infrastructure effects

Impacts of a significant natural hazard event are likely to be felt across multiple categories of infrastructure and reinstating services could take a significant period of time. 'Lifelines' reports[3] estimate that following a major seismic event water supply may be disrupted for 20-30 days, and Lower Hutt road connections to Wellington CBD, Upper Hutt and Kapiti Coast may be disrupted for 8-12 weeks. A key roading issue is a lack of resilience for connections from Lower Hutt to Wellington City and Wainuiomata (ie, single access routes). For flood risk, a key planning requirement is to understand the likelihood and consequence of a flood that goes beyond agreed flood protection/stopbank levels. When flooding occurs, stormwater could inundate areas where people live, posing health risks through human contact with potentially contaminated water.

Principal management options

Current practices include strengthening at-risk infrastructure, robust emergency preparedness and responses and insurance provisions. Emergency responses for water supply may include desalination, a cross-harbour pipeline, or emergency storage of treated water. Insurance options include market cover, or self-insurance (setting aside funds for covering foreseeable events). Council aims to maintain appropriate levels of insurance to safeguard against significant losses. Current practices also include providing backup networks (such as the stormwater secondary network) or redundancy (eg, the provision of portable generating capacity to ensure that pumping stations can continue to operate if electricity supply is lost). To deal with the highest risk areas – such as those exposed to large subsidence in an earthquake, Council Asset Management Plans identify critical and at-risk assets, and the means for mitigating risk or providing redundancy.

Implications of options

Current practices increase the resilience of individual components of infrastructure networks to natural hazards, and prepare communities for hazard events. However, resilience in parts of the Hutt City may reduce as increased development and investment occurs in at-risk areas.

3 *Lifeline Utilities Restoration Times for Metropolitan Wellington Following a Wellington Fault Earthquake* (November 2012): www.getprepared.org.nz/sites/default/files/uploads/WeLG%20Restoration%20times%20report%2020.13.pdf; *Restoring Wellington's Transport Links after a Major Earthquake* (March 2013): www.getprepared.org.nz/sites/default/files/uploads/WLG%20Transport%20Access%20Report%202013.pdf

Council response

Significant work has already being carried out to ensure asset preservation, for example many bridges and reservoirs in the district have been seismically strengthened, or are identified for such work. Some existing or proposed projects, such as the Cross Valley Link roading work, will help us to achieve increased resilience. Council is continuing to carry out a range of projects to ensure that we are managing risks from natural hazards. Projects that will occur during the course of this strategy include:

- Bridge seismic strengthening: $1.6m is funded to strengthen three remaining bridges requiring works with work planned for 2015/16 (2 bridges) and 2020/21 (1 bridge).
- Network resilience: $2.9m is allocated to increasing the ability of the roading network to withstand shocks. Construction is planned for 2020/21.
- Critical water supply pipelines seismic upgrade: $19.3m is funded for ensuring security of supply through upgrading of outdated or critical pipes between 2015-45.
- Water reservoir seismic upgrades: $4.4m is allocated for seismic strengthening works to be carried out to five reservoirs with work to take place between 2015-32.
- Water main renewals: $3.1m is funded for earthquake resilience upgrades to connect two water systems with work planned for 2015/16, 2022/23, 2023/24, and 2029/30.

Further work is proposed to ensure that Council is as well prepared as possible to deal with the potential effects of natural hazards on our infrastructure – refer to the section on ‘Implications for further work’ on page 23.

CLIMATE CHANGE

Changing temperatures and rainfall patterns, sea level rise and the likelihood of more intense storms and extreme weather events, such as heavier rainfall and drought periods, are likely to place increased pressures on our infrastructure, including increasing the likelihood of flooding.

The Ministry for the Environment recommends that councils plan for sea level rise of between 50 and 80cm by the 2090's, and continued rise beyond that. By 2050 sea level is expected to have risen by an additional 30cm on top of the 20cm that has already been observed.

Council's 'Long Term Plan 2015-2025' (LTP) contains statements relating to the effects of climate change in the Storm Water Management and Economic Outlook sections. In addition, Asset Management Plans take account of climate change using Government guidance.[4]

Infrastructure effects

Increased drought periods may put pressure on water supply infrastructure, while more intense storms may exceed the capacity of some stormwater systems.

Sea level rise is likely to be a greater concern, increasing incidence of flooding, and damaging or threatening the viability of coastal infrastructure in the long-term. For example, it may compromise the ability of the stormwater network to drain efficiently, lead to increasing severity of damage to seawalls and coastal roads, public and private property, and other infrastructure such as wharves.

Council could also invest in education, collaboration and communication to enhance community engagement and increase understanding and acceptance of risk.

Parts of the city are likely to experience reduced resilience as increased development and investment occurs in at-risk areas.

Principal management options

Increased storm intensity and associated flood risk is being managed by replacing pipes with larger diameter ones with greater capacity in appropriate locations. Increasing the number of pump stations to handle greater water volumes is also an option, as is investment in peak flow storage.

For water supply, increased incidence of drought is being factored into estimates for projections of bulk water supply at the regional level. For sea level rise, there is the option of building protective or mitigating structures such as sea walls, which may deliver added benefits such as footpaths or cycleways. Other options include dune restoration, planning restrictions, and planning for a managed retreat in areas where there is no economically viable solution. Council could also invest in education, collaboration and communication to enhance community engagement and increase understanding and acceptance of risk.

Implications of options

Increased risk of asset failure or damage means increasing costs in the medium to long term.

Council response

Climate change effects are currently under consideration for the work to upgrade the Hutt River stopbanks between Boulcott and Ewen Bridge, where recent studies indicate that a 1 in 440 year event could become a 1 in 50 year event by the end of this century due to climate change.[5] More work is likely to be needed in other areas to determine the likely impacts of climate change and the costs and benefits of various response options, and this will form part of our programme for addressing climate change and resilience (referred to in Council's 'Environmental Sustainability Strategy'). Further work is proposed to ensure that Council is as well prepared as possible to deal with the potential effects of climate change on our infrastructure – refer to the section on 'Implications for Further Work' on page 23.

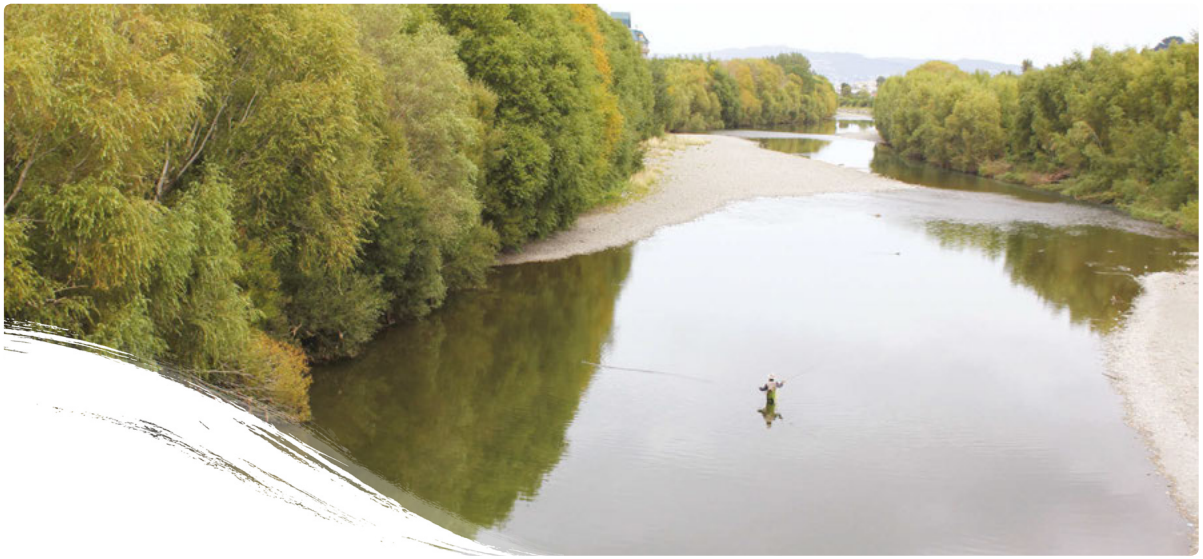
4 *Ministry for the Environment, Climate Change Effects and Impacts Assessment – A Guidance Manual for Local Government in New Zealand* (2008): www.mfe.govt.nz/sites/default/files/climate-change-effect-impacts-assessment-may08.pdf

5 Lawrence et al (2013): *Exploring Climate Change Uncertainties to Support Adaptive Management of Changing Flood-risk.*

ENVIRONMENTAL PRESSURES

Achieving a balance between infrastructure provision, cost and sound environmental management can be challenging. Pressures on the environment can be due to the construction or operation of infrastructure and may include:

- Greenhouse gas emissions from transport and energy for water pumps and treatment.
- Water depletion.
- Pollution from sewer and stormwater discharge.
- Wastewater odour or waste disposal.
- Environmental degradation and biodiversity loss.
- Changes to natural waterways (impacting on recreational, biodiversity and landscape values).



In the future technological improvements or more stringent pollution controls are likely to deliver improved environmental outcomes.

Infrastructure effects

Stormwater and wastewater can carry contaminants which may be transferred into rivers, streams and the marine environment. Some elements of infrastructure operation can restrict ecological processes (eg, piped or channelled waterways making fish spawning difficult), while others require significant energy or resource inputs (eg, pumping and treatment of water and wastewater). Environmental concerns will increasingly influence the management of roading assets. As technologies such as electric vehicles gain traction, there will be pressure for councils to provide adequate support services (eg, charging stations). The active transport (walking and cycling) lobby will also stimulate roading services to adapt how they provide services. These changes will also provide opportunities to improve community outcomes, such as the overall health of residents.

Principal management options

River and harbour water quality are measured for levels of contamination, which reflect how well the city has been keeping stormwater free of these substances. The better this is managed, the more desirable rivers and beaches are for swimming, dog-walking and other recreational activities. Council is also beginning to explore alternative service delivery methods with improved environmental outcomes, such as Low Impact Urban Design (LIUD). In the future technological improvements or more stringent pollution controls are likely to deliver improved environmental outcomes.

Implications of options

Expectations within the community are that higher standards of environmental protection will be achieved over time, particularly for stormwater and wastewater. There is increasing recognition that approaches such as LIUD will offer reduced costs and greater sustainability for the long-term.

Council response

Stormwater and wastewater requirements already exist to contain and minimise adverse environmental effects however changes to national and regional environmental standards present some significant uncertainty on future requirements. Health and high quality are core elements of water supply. For roads and footpaths, minimising greenhouse gas emissions is a key element of project efficiency and effectiveness (as considered by the New Zealand Transport Authority). Council's 'Environmental Sustainability Strategy' outlines goals for leadership, protection and enhancement of the environment, and these concepts are adopted in this 'Infrastructure Strategy.'

POPULATION AND DEMOGRAPHIC CHANGE

Statistics New Zealand indicates that an ageing population will dampen population growth, but there will be more households, partly because of the trend to fewer people per household. For Lower Hutt the ageing population is expected to result in:

- A shift toward one and two person households and a fall in the average household size from around 2.7 people today to around 2.4 in 2032.
- A fall of around 5000 working-age people in all areas of the city between 2006 and 2032.

Council's 'Urban Growth Strategy' aims for a total population of 110,000 by 2032 (growth of 0.6% p.a.), with an additional 6,000 homes over the same time period. It is expected that population growth would be concentrated in some areas of the central valley and Western Hills areas. This anticipated level of growth is used in the LTP and in this Strategy.

Infrastructure effects

Much of our infrastructure demand is driven by the number of households, and not from the total population. A drop in population is not likely to have much impact on infrastructure needs. Treasury notes that some areas of public spending are likely to expand as a result of population ageing, while other areas of expenditure may shrink.[6] A recent report from the Auditor General[7] finds that an ageing population may mean that household incomes will be under increasing pressure. Demand for some services such as public transport and quality footpaths may increase, while the possibility of pressure on infrastructure and service affordability could lead to changed expectations for services and levels of service provided.

Principal management options

Identified options include the introduction of additional demand management initiatives, altering funding mechanisms, enabling modular or scalable infrastructure services, or increasing involvement of community volunteers.

Implications of options

If development doesn't occur as anticipated then Council is not committed to spending on additional infrastructure services, the work will only take place if development is assured. There is little risk to our infrastructure with an ageing population, as there are no major spending requirements identified that are not already included within the LTP. Councils 'Financial Strategy' limits rates increases to the rate of increase of the Consumers Price Index (CPI), and Council has no intention or need to impose larger rates increases on our ratepayers. We also have a strong credit rating which means Council can afford to increase the level of borrowings if required.

Council response

The Treasury report finds that the economic implications of population ageing across New Zealand are pervasive, complex, and inherently uncertain and would benefit from further research focus. This suggests the need for Hutt City to more specifically identify the likely effect of an ageing population on our rates income and long-term expenditure. Further work is proposed to ensure that Council is as well prepared as possible to deal with the potential effects of population changes on our infrastructure – refer to the section on 'Implications for Further Work' on page 23.

The Treasury report finds that the economic implications of population ageing across New Zealand are pervasive, complex, and inherently uncertain and would benefit from further research focus.

6 *The Economics of Population Ageing* (2002): www.treasury.govt.nz/publications/research-policy/wp/2002/02-05/twp02-05.pdf

7 *Water and Roads: Funding and Management Challenges* (2014): www.oag.govt.nz/2014/assets/docs/water-and-roads.pdf

MANAGING HUTT CITY INFRASTRUCTURE

Changes to levels of service

Hutt City Council requires levels of service to be of a high standard for quality, responsiveness and timeliness, as agreed through community consultation and asset management processes. There are a number of indicators for monitoring the performance and service provided by city infrastructure, as follows:

- **LTP performance measures:** Performance measures published in the LTP and reported on in the 'Hutt City Council Annual Report' enable the community to judge the standard of the infrastructure service.
- **Customer standards:** Quality and service availability, target response times for addressing problems with service provision, and courtesy, eg, keeping property owners informed of system maintenance or other works.
- **Activity standards:** Activity standards cover aspects of activity likely to be of concern to the community, such as service quality, customer focus, cost-effectiveness, environmental performance and compliance with legal and industry standards.
- **Management indicators:** Indicators relating to the performance of particular assets (eg, pump stations), and the performance of service contracts.

For stormwater, wastewater, water supply and roading Hutt City Council consistently achieves satisfactory service levels (as indicated through LTP measures). Council looks to improve levels of service in response to community expectations, and it is always important to take a consistent and robust approach to considering changes. Any planned increases or decreases in levels of service will need to be well justified and ensure that risks are managed. Key factors in determining changes to levels of service include criticality, lifespan, condition, level of risk exposure and cost implications.

Some of our planned work relates to increasing the level of service provided above current levels. For example, for the stormwater network some of the renewals spending is for increased capacity of pipes (ie. replacing with larger diameter pipes). Work on Awamutu Stream is an example where channel widening and deepening, and increased stormwater pumping station capacity will be developed to reduce the likelihood of flooding in that area. For the wastewater system there is work being done to deliver increased levels of service, particularly for discharges to Waiwhetu Stream, in anticipation of new regional plan requirements for discharges to water. For the roading and footpaths category there are a number of projects that will deliver increased levels of service, including the proposed Cross Valley Link (CVL) and the potential Petone-Grenada road – delivering improved travel times between Lower Hutt and Porirua, Kapiti and Wellington City. The potential for a replacement Melling Bridge will also improve levels of service for the Lower Hutt CBD.

Expectations for levels of service from public infrastructure are likely to vary over time as communities change, and include consideration of cultural needs and provision of services to vulnerable members of the community. It is likely that the public will desire an increased role in determining the extent and spend on key infrastructure in coming decades. There may be growing demand for increasing levels of service at lower cost (eg, higher levels of flood protection). Some of this may be able to be met through development of more efficient and cost-effective technologies and capital investments, including shared service models.

Maintaining or improving public health and environmental effects

Public health outcomes are managed on an operational basis through compliance with appropriate legislation and standards for water delivery, stormwater and wastewater management, and for the safety of our roads and footpaths. In this strategy, Council intends to continue its focus on ensuring that public health and environmental standards are met or exceeded, and continue to work actively with Regional Public Health and other health authorities to achieve this.

Infrastructure resilience

Infrastructure resilience encompasses both shock events (such as earthquakes) and emergent risks (such as climate change impacts). In its widest sense, infrastructure will need to be resilient across economic, environmental, social and cultural elements. Strengthening resilience has a strong link to improving health and wellbeing, enabling a strong economy and communities and is likely to be cost-effective in the long-term.

A key task is to improve both Council and community understanding of risk and apply appropriate risk management measures. This might involve, for example, identifying the proximity of key infrastructure to high-risk areas such as faultlines, steep banks, flooding, vulnerability to liquefaction, or areas affected by sea level rise. Building resilience is not always about making things stronger. In some instances there may be the need to investigate relocation, duplication, back-up systems or operational changes for infrastructure in the highest risk areas. Investigations take place through development of Asset Management Plans to identify risks and appropriate responses.

Council's Asset Management Policy states that asset management will be undertaken using a risk-based approach, and will be cost effective and sustainable

Resilience is increasingly being incorporated into Asset Management Plans, including via contingency and emergency planning.

in the long-term. Key outcomes Council aims to achieve include reducing risk, increasing resilience, and minimising physical and social losses. Resilience is a key consideration for how, when and where investment should take place.

Council is both responsive and proactive in the way that its infrastructure is managed, depending on the criticality of the infrastructure. Clearly Council aims to avoid failure of critical infrastructure, however, failure of less critical infrastructure such as smaller pipes, minor roads, footpaths and so on may have little impact overall.

There will frequently be a requirement for one category of infrastructure to rely on another, for example where the failure of one may have serious repercussions for the other. The National Infrastructure Advisory Board states that "understanding the interdependence between assets and managing the demand across the whole system is crucial".[8]

At the asset level Activity Risk Management Plans outline the risks associated with providing infrastructure services, and the risk management activities associated with their operation, maintenance and management. Resilience is increasingly being incorporated into AMPs, including via contingency and emergency planning. For the roading network Council has commissioned a resilience study to examine parts of the network at risk from earthquake and other hazards, as well as possible mitigation measures.

8 *National Infrastructure Advisory Board, Demand Management* (2013): www.infrastructure.govt.nz/plan/2011implementation/niab-demand-management-thinkpiece-sep13.pdf

IMPLICATIONS FOR FURTHER WORK

Stemming from the issues identified in this strategy the following focus areas are proposed as the basis for specific projects within the initial three-year period of the 'Long Term Plan' (LTP) (2015-2018). The implementation of such projects will require specific programme, project, or activity plans, and may require funding through future Annual Planning or LTP processes.

Spatial planning

Many aspects of our infrastructure vary due to geographical/spatial factors. For example, natural hazard risks are greater in close proximity to faultlines and sea level rise risk is greatest close to the coast. Both the Government's Infrastructure Efficiency Expert Advisory Group and the National Infrastructure Unit of Treasury support a spatial planning approach.

A regional spatial planning approach is currently being investigated with participation from Hutt City Council. The regional approach will encompass factors such as risk and resilience, growth and demand, and economic and demographic factors. Infrastructure would form one of the key elements of such a spatial plan, but the scope of such work would be wider than infrastructure only. This might involve, for example, identifying the proximity of key infrastructure and other activities to high-risk areas such as faultlines, steep banks, flooding, vulnerability to liquefaction, or areas affected by sea level rise.

In 2015, the Parliamentary Commissioner for the Environment will be releasing a report showing which areas of the coastline around the country are most vulnerable to sea level rise and assessing the risk to the infrastructure in those areas. The outcomes of this report may be beneficial for spatial and coastal planning for Hutt City. Until this work is further progressed, the implications for infrastructure are unknown, but will be considered in future iterations of this strategy.

A regional spatial planning approach is currently being investigated with participation from Hutt City Council.

Analysis and modelling

Council Asset Management Plans should continue to develop new or enhanced modelling tools, which allow Council to:

- Evaluate long-term infrastructure investment options including capital spend and 'whole of life costs'.
- Develop methodologies to strike the balance between cost (including asset replacement or renewal), level of service and risk exposure.
- Assess long-term risk/resilience issues based on multiple hazards, disruptions, likely challenges or changes expected. Robust scenario modelling would inform Council of the impacts for alternate options, for example, investigating if managed retreat approaches would ever be needed in areas prone to increasing flood risk.
- Establish how level of service adjustments may be made between infrastructure categories or geographic areas (this is related to the criticality of assets outlined in AMP's).
- Prioritise infrastructure expenditure based on criticality and condition of assets. For underground pipes, predictive modelling is used together with observation and testing to identify pipe condition. If failure starts to occur then preventative or responsive action is taken and modelling is adjusted accordingly.
- Update, improve and add to existing future demand models.
- Identify the possible effects of an ageing population on our rates income and long-term expenditure.

Communication and engagement

It is recognised nationally that better efforts are needed to plan, fund and deliver infrastructure in conjunction with the community to ensure that key projects and decisions reflect community values. This involves improved consultation and engagement with the public and key stakeholders. Council's Asset Management Policy outlines the need to engage with residents and work in partnership with others, become an environmental sustainability leader, and respond to a changing social and economic climate.

Council carries out in-depth community consultation on major infrastructure projects, issues or proposed changes to levels of service. Council has also adopted a 'Community Engagement Strategy' that outlines our philosophy and our commitment to the community, and aims to enhance public engagement through applying best practice. This includes developing ongoing dialogue with stakeholders on key strategic, planning or policy matters. It is expected that this will lead to more effective community engagement across all Council activities over coming years.

Council has also adopted a 'Community Engagement Strategy' that outlines our philosophy and our commitment to the community, and aims to enhance public engagement through applying best practice.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MOST LIKELY SCENARIO FOR MANAGING HUTT CITY'S INFRASTRUCTURE

MOST LIKELY SCENARIO FOR MANAGING HUTT CITY'S INFRASTRUCTURE

SIGNIFICANT DECISIONS ABOUT CAPITAL EXPENDITURE HUTT CITY EXPECTS TO MAKE

We have a good understanding of our infrastructure's current condition, the levels of service it is required to provide, and what needs to be done to properly manage and maintain infrastructure out to the end of the century.

Decisions have already been made on a wide range of key projects for infrastructure investment, and funding allocated within the 'Long Term Plan.'

There are only a handful of identified projects where significant decisions are still to be made, or where the investment improves levels of service as shown on the table on page 27.

INFRASTRUCTURE	PROJECT	SCALE OF COSTS	DECISION / DESCRIPTION	TIMING	PRINCIPAL OPTIONS TO CONSIDER
Roading and footpaths	Cross Valley Link (CVL)	$1.0m (project feasibility)	The project feasibility investigation will inform full cost estimates and options for development.	Investigation and design study in 2017/18. Decision in 2018/19	Bring feasibility work back to 2015/16. We would seek to work with NZTA to deliver this in conjunction with other major projects such as the Petone to Grenada route.
Roading and footpaths	CBD Riverbank replacement parking	$1.6m	Compensating for lost carparks due to stopbank relocation work.	Decision required by 2016/17.	Include replacement parks in stopbank areas to be upgraded or survey carpark requirements across the city and assess need for replacement parks.
Roading and footpaths	Additional funding for city walkways and cycleways	$10.9m	Development of Eastern Bays, Hutt Valley and Wainuiomata Hill shared walkways/cycleways providing increased level of service. Also includes a potential contribution to Petone/ Ngauranga cycleway. This would result in an accelerated cycleway programme if funding is secured.	Construction of Hutt Valley (2015-18), Eastern Bay's (2015-18), and Wainuiomata (2015-17).	Seek additional funding from the urban cycleway fund to accelerate the programme of works.
Roading and footpaths	Replacement Melling Bridge	$20-80m	To alleviate congestion and reduce flooding risk a replacement bridge is being considered.	Decisions considered by 2016. Replacement commenced by 2024.	Discussions are under way between HCC, GWRC and NZTA to investigate the feasibility of such a project in conjunction with the preferred options for Hutt River stopbank realignment and upgrades in the CBD.
Stormwater	Awamutu Stream	$5.7m	Channel improvements and pump station installation to reduce the risk of flooding to increased level of service. Includes preparing for likely consenting requirement for stormwater discharges. Decisions to be made on final configuration.	Construction to take place 2015 -23.	Continue to carry the current flooding risk; delay the programme of works.
Stormwater	Climate change project	$10.2m	To identify and address the impacts of climate change on stormwater activity and flood risk. Further work is needed to scope out the detailed work required and its priority.	Decision on detailed programme of works by 2022. Work to take place 2026-45.	No principal alternatives are apparent.

Figure 1: Historic, budgeted and projected capital and operational costs for three waters and roading infrastructure

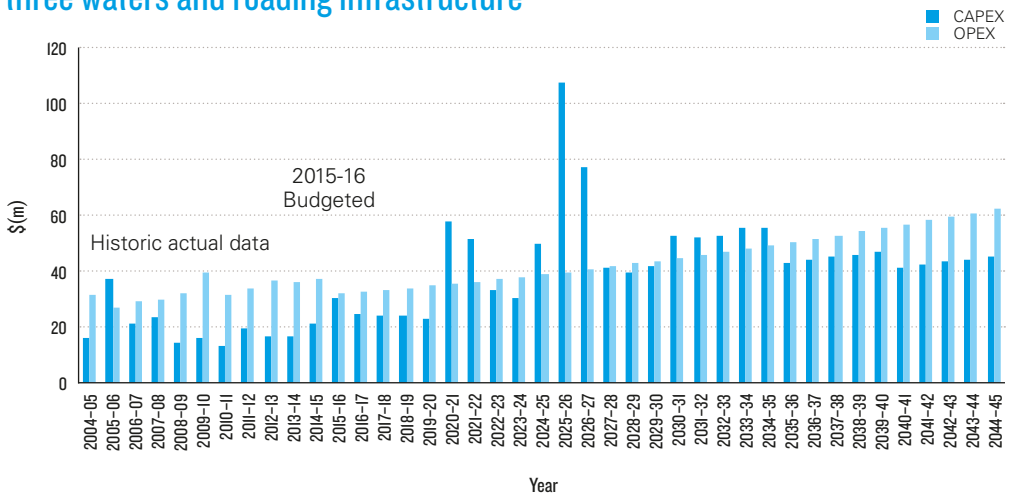
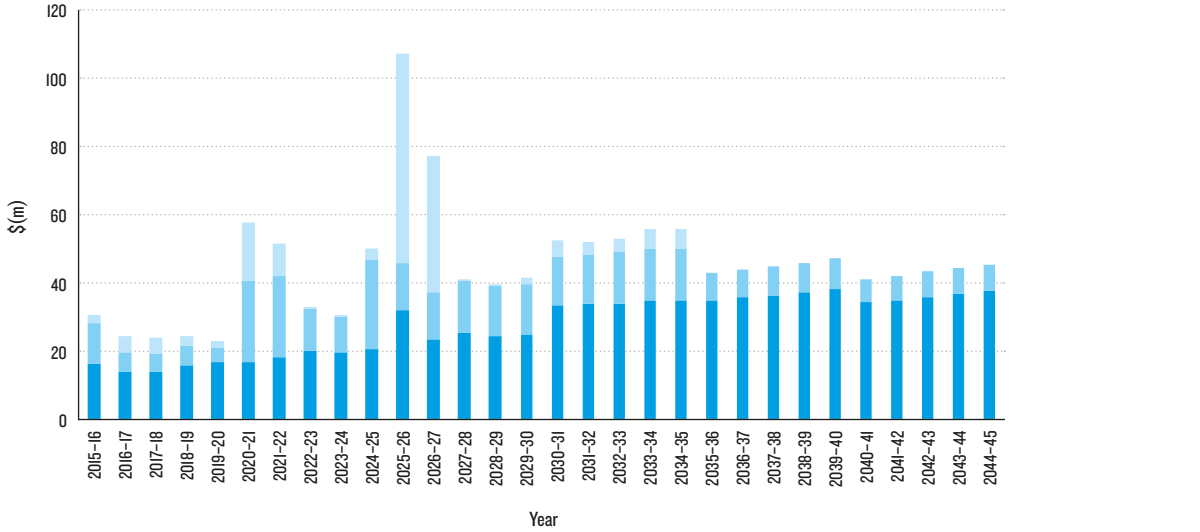


Figure 2: Projected capital costs for three waters and roading infrastructure: for replacements, improvement and growth



INDICATIVE ESTIMATES OF EXPENDITURE

Costs to maintain current levels of service for the existing infrastructure configuration are shown in Figures 1 and 2 (adjusted for inflation using BERL local government cost index figures). It should be noted that the costs used for roading represent total costs before subtraction of NZTA subsidies (generally 51 per cent, with budgeted subsidy levels based on the assumption that the current funding patterns and subsidy percentages will not change over the next 10 years and beyond). The total projected capital expenditure over the next 30 years for the three waters (water supply, wastewater and stormwater) and roading is $1.3 billion. Operating expenditure over the same period is estimated at $1 billion.

ASSUMPTIONS

This strategy is consistent with assumptions made in the 'Long Term Plan', the 'Financial Strategy', the 'Urban Growth Strategy', the 'Leisure and Wellbeing Strategy' and the 'Environmental Sustainability Strategy'. There is inherent uncertainty in predicting some of the issues, pressures, or risks associated with infrastructure over a long time period. The assumptions on which the above projections are based and the nature of uncertainty in these assumptions and the potential impacts include:

Level of service

Minor service level improvements are planned in relation to certain areas of Council activity as a result of capital projects. There are no categories of infrastructure in this strategy that are underutilised or in which Council intends to curtail activity.

Population growth

An average growth of 0.6 per cent p/a is assumed throughout the 10 year period of the LTP. Rates of growth that vary significantly from this assumed level may result in unbudgeted financial pressures. However, if lower levels of growth or population decline occur then Council funding will not be used for development projects. There is a moderate level of uncertainty regarding population growth, however, the risk to Council funding if growth targets are not achieved is relatively minor.

Governance

The impact of any change in the governance or management structure of local government in the Wellington region, including any transitional costs, has not being provided for. There is currently a high degree of uncertainty and high likelihood of changes to the governance structure within the region over the course of the next three years and beyond. At the time of writing, proposals relating to amalgamation of councils are facing high levels of public resistance.

Level of debt

Council has set debt limit targets of $125m in 2020, 2025 and 2030 (but it may exceed this level in other years). There is currently no factor to allow debt limits to increase over time (eg, with inflation, or as a percentage of total Council revenue). The target for the net debt to income ratio is below 100 per cent (eg, about $140m would be the ceiling today). There is little uncertainty in the expected level of debt that Council will take on, which is calculated in detail during preparation of the LTP.

Borrowing

The long-term cost of borrowing is assumed to be an average of 6 per cent (interest) over the period of the strategy. There is a high level of uncertainty in this rate over the thirty-year period covered by this Strategy.

Inflation

An assumption is used of stable inflation over the next 10 years (between 1.7 per cent and 2.5 per cent), and continuing at 2.4 per cent beyond that time, based on the CPI forecast issued by BERL in October 2014. There is a high level of uncertainty in this rate over the thirty-year period covered by this Strategy.

Council rating

Rates increases limited to no more than the Consumer Price Index shift per annum plus 1 per cent for growth with an additional 1 per cent per year (above) from 2014 - 2017, and no more than CPI after allowing for growth from 2017 - 2018 onwards. Uncertainty is low for this category over the short-term and based on the budgeted expenditure in the LTP. Beyond this period, uncertainty would increase to a high level over the thirty-year period covered by this strategy.

There is inherent uncertainty in predicting some of the issues, pressures, or risks associated with infrastructure over a long time period.

Confidence in costs

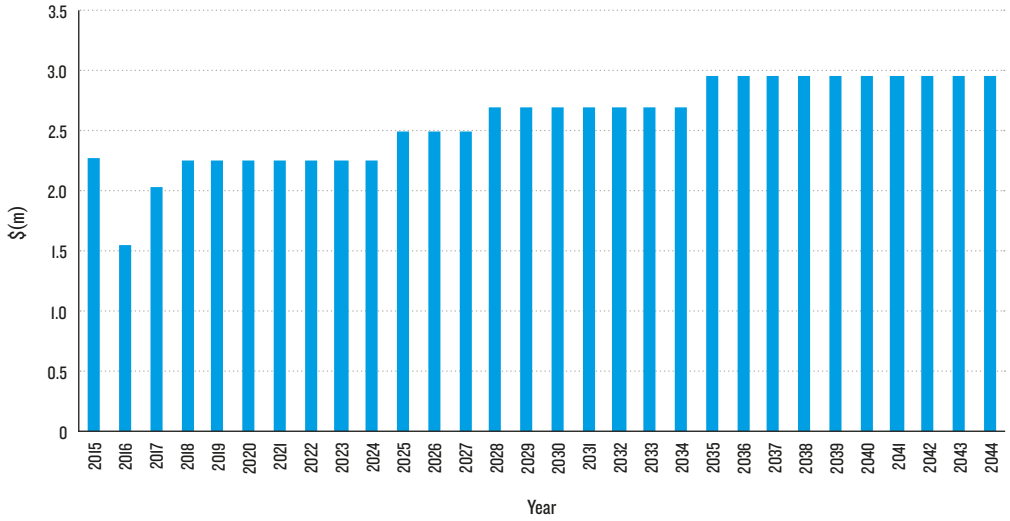
Asset management plans assess the level of confidence for financial programmes (both capital and operating costs) and for asset data. For example using a 90 per cent confidence interval our stormwater costs are estimated to range from -3 per cent to +22 per cent of the budgeted figures. For stormwater asset data, we have highly reliable data for asset quantity, type and location, reliable data for asset material and unit costs, and uncertain data on asset depth. All asset data is assessed as either accurate or containing minor inaccuracies (+/- 5 per cent, with the exception of asset depth which may be inaccurate by up to +/- 20 per cent.

IMPLICATIONS FOR INFRASTRUCTURE CATEGORIES

The effect of the 'most likely' approach for each category of infrastructure in this strategy is outlined below:

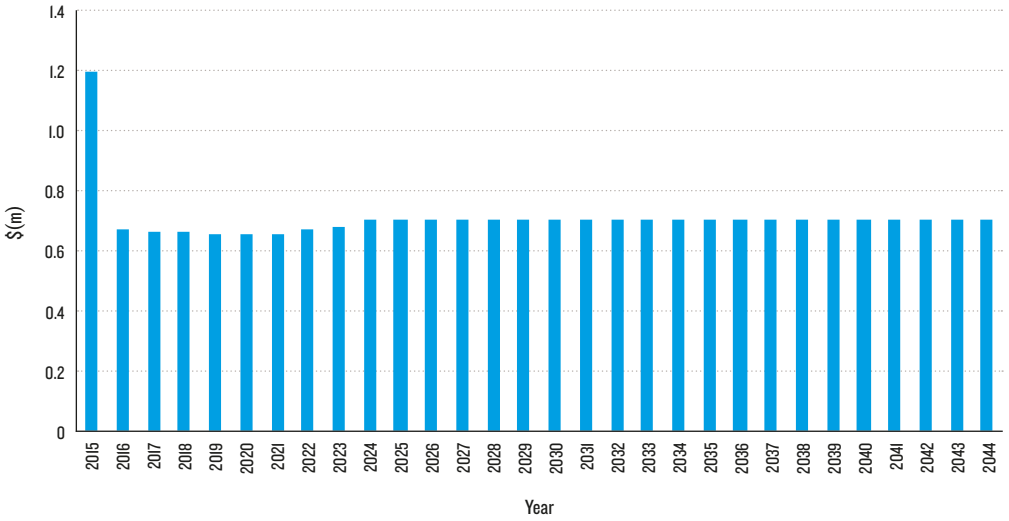
Water supply: Renewals are expected to climb from 2024 and peak around 2040. The following chart indicates the anticipated renewal curve for water supply-pipes.

Water supply-pipes 30-year renewals curve forecast



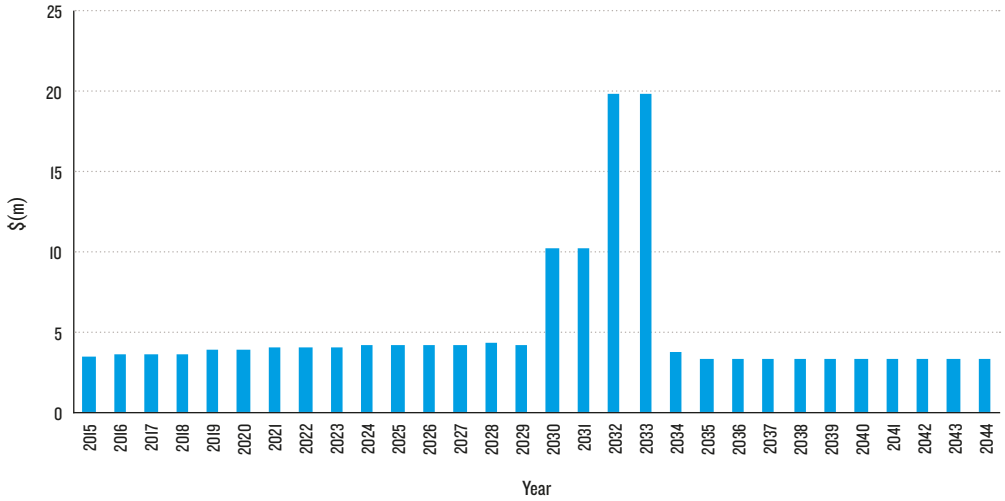
Stormwater: There will be a very low level of renewals for 35 years, with core renewal expenditure not commencing until around 2050. The following chart indicates the anticipated renewal curve for stormwater pipes.

Stormwater pipes 30-year renewals curve forecast



Wastewater: Renewal costs are currently at a moderate level, but are set to peak in 2033 with renewal of trunk wastewater pipes. After this time, renewals return to a moderate level out to 2050, before dropping substantially. The following chart indicates the anticipated renewal curve for wastewater pipes.

Wastewater pipes 30-year renewals curve forecast



Roads and footpaths: The renewal process for this category is much shorter than for underground infrastructure such as pipes. This allows for more flexible management which is able to adjust to changing circumstances. Looking at future works, bridges and subways have a capital improvement and renewal spike in year 2106. The rate of renewal for 'kerb and channel' is low out to 2030, but increases substantially beyond that.

APPENDIX 1: LOCAL GOVERNMENT ACT REQUIREMENTS

APPENDIX I: LOCAL GOVERNMENT ACT REQUIREMENTS

The requirement for councils to complete an Infrastructure Strategy was incorporated into changes to the Local Government Act in 2014. The key components of the strategy are outlined in section 101B shown below.

(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.

(2) The purpose of the infrastructure strategy is to:

- (a) identify significant infrastructure issues for the local authority over the period covered by the strategy; and
- (b) identify the principal options for managing those issues and the implications of those options.

(3) The infrastructure strategy must outline how the local authority intends to manage its infrastructure assets, taking into account the need to –

- (a) renew or replace existing assets; and
- (b) respond to growth or decline in the demand for services reliant on those assets; and
- (c) allow for planned increases or decreases in levels of service provided through those assets; and
- (d) maintain or improve public health and environmental outcomes or mitigate adverse effects on them; and
- (e) provide for the resilience of infrastructure assets by identifying and managing risks relating to natural hazards and by making appropriate financial provision for those risks.

(4) The infrastructure strategy must outline the most likely scenario for the management of the local authority's infrastructure assets over the period of the strategy and, in that context, must:

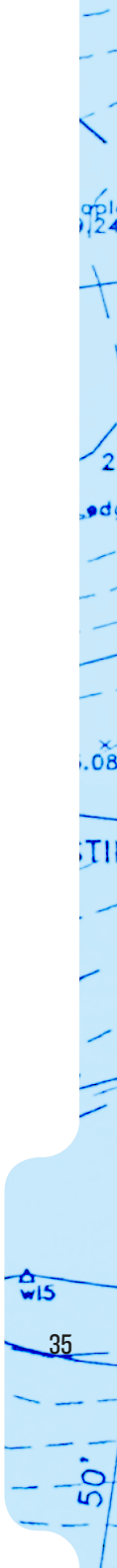
- (a) show indicative estimates of the projected capital and operating expenditure associated with the management of those assets:
  - (i) in each of the first 10 years covered by the strategy; and
  - (ii) in each subsequent period of 5 years covered by the strategy; and
- (b) identify:
  - (i) the significant decisions about capital expenditure the local authority expects it will be required to make; and
  - (ii) when the local authority expects those decisions will be required; and
  - (iii) for each decision, the principal options the local authority expects to have to consider; and
  - (iv) the approximate scale or extent of the costs associated with each decision; and
- (c) include the following assumptions on which the scenario is based:
  - (i) the assumptions of the local authority about the life cycle of significant infrastructure assets:
  - (ii) the assumptions of the local authority about growth or decline in the demand for relevant services:
  - (iii) the assumptions of the local authority about increases or decreases in relevant levels of service; and
- (d) if assumptions referred to in paragraph (c) involve a high level of uncertainty,
  - (i) identify the nature of that uncertainty; and
  - (ii) include an outline of the potential effects of that uncertainty.

(5) A local authority may meet the requirements of section 101A and this section by adopting a single financial and infrastructure strategy document as part of its long-term plan.

(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:
  - (i) water supply:
  - (ii) sewerage and the treatment and disposal of sewage:
  - (iii) stormwater drainage:
  - (iv) flood protection and control works:
  - (v) the provision of roads and footpaths; and
- (b) any other assets that the local authority, in its discretion, wishes to include in the strategy.

Section 101B: inserted, on 8 August 2014, by section 36 of the Local Government Act 2002 Amendment Act 2014 (2014 No 55).



making our city a great place to live, work and play

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