Section 2

he tirohaka whānui
strategic overview

Contents

te aka rautaki
our strategic framework

The DCC's current strategic framework

The DCC's strategic vision was developed through a city-wide engagement process that started in 2011. Developed over a period of approximately eight years, the first of the eight strategies was adopted in 2010 and the last completed in 2017.

Currently, there are eight strategies focused on long-term outcomes and Dunedin's development.

- The **3 Waters Strategic Direction Statement** sets out how the DCC will ensure the city has safe, reliable and affordable water services.
- The **Spatial Plan** shapes the form of the city.
- The **Economic Development Strategy** sets out priorities for creating jobs, incomes and opportunities.
- The **Social Wellbeing Strategy** outlines how the DCC will foster inclusive communities and quality lifestyles.
- The **30 year Integrated Transport Strategy** sets priorities for how the safe and efficient movement of people and goods will be supported.
- **Ara Toi Otepoti Arts and Culture Strategy** roadmaps strategic actions which support the creative sector in Dunedin and develop an environment which acknowledges the intrinsic value of the arts.
- **Te Ao Tūroa, Dunedin's Environment Strategy** delineates Dunedin's climate change impact plan and connects the communities with sustainable ecology and environmental actions.
- The **Parks and Recreation Strategy** develops the use of Dunedin's open spaces, recreation facilities and parks to connect and value our spaces and promote more active communities.

The DCC's work to achieve these strategic goals is underpinned by two overarching principles: Te Tiriti o Waitangi / the Treaty of Waitangi – the Council's work and partnership with Māori is guided by the Treaty principles; and sustainability – the Council takes a sustainable development approach that takes into account the social, economic, environmental and cultural interests of Dunedin's communities and the needs of future generations. The below image is an illustration of the current Strategic Framework.

Achieving great outcomes as a community

The purpose of a strategic approach to decision-making is ultimately to achieve great outcomes for the city. The hard work is done by everyone in the city when it comes to achieving our goals and the Council is just one of many stakeholders working to support Dunedin being one of the world's great small cities.

Summary of community outcomes, priorities & indicators

A summary of the community outcome priorities that set out what the city will be like if the Council achieves its goals, and the indicators for tracking progress in making this happen are shown below.

Outcome	Priorities	Indicators
Vision	Dunedin is one of the world's great small cities	Perception that Dunedin is one of the world's great small cities
Strategic principles	**Te Tiriti o Waitangi / the Treaty of Waitangi** A Treaty based partnership approach in our engagement with iwi Māori Partnership with Māori that is enduring, effective and valuable to all Partnership initiatives with mana whenua to create a Dunedin that has a healthy environment, a strong economy and vibrant communities	The DCC's capability to work with Maori is developed through the implementation of a Māori Cultural Capabilities Pathway for DCC staff and Councillors Meaningful partnership arrangements have been established with Māori in Dunedin An increased number of collaboratively developed partnership projects and ventures with mana whenua
	Sustainability	Percentage of residents agreeing that 'Dunedin is a sustainable city' Percentage of residents agreeing that 'the DCC is a leader in encouraging the development of a sustainable city'
A supportive city with caring communities and a great quality of life	**Connected people:** making people feel connected and involved in community and city affairs **Vibrant and cohesive communities:** building better communities both at a local/geographic level and communities of interest **Healthy and safe people:** promoting good health and ensuring people feel safe, and are safe **Reasonable standard of living:** promoting a good work/life balance and full employment **Affordable and healthy homes:** people are living in warm and healthy homes and affordable housing options are available to all	Percentage of residents who have experienced problems with damp or mould in their homes during winter Residents' sense of community within their local neighbourhood
A healthy city with reliable and quality water, wastewater and stormwater systems	**Meet water needs:** Utilising existing water sources for the safe and quality water needs of the city for the next 50 years **Adaptable supply:** Adaptable water supply to a variety of future climate change and population scenarios **Improve discharges:** Improving discharges to minimise the impact on the environment **Maintain service levels:** Maintaining, and where practicable, improving key service levels into the future **Kaitiakitaka:** An integrated approach to management of the three waters which embraces the concept of kaitiakitaka (Guardianship) **Waste Services:** Active commitment to zero waste, inclusive of a circular economy, to enhance the health of our environment and people by 2030	Satisfaction with the way the DCC manages the city's water related infrastructure

Outcome	Priorities	Indicators
A compact city with a vibrant CBD and thriving suburban and rural centres	**Liveable city:** a healthy and safe environment; quality air and water; a connected community; recreation, leisure and learning, opportunities; healthcare, and warm housing **Environmentally sustainable and resilient city:** resilient ecosystems and communities; actively responding to climate change; reducing dependence on non-renewable resources; seismic-strengthened heritage buildings **Memorable and distinctive city:** protecting significant landscapes; quality architecture and urban design; memorable and engaging public art; celebrating Tangata Whenua and European heritage; actively re-using built heritage **A city that enables a prosperous and diverse economy:** maintaining and growing our rural economy, industrial base and world class communications; attracting and retaining internationally-focused people; supporting and benefiting from the tertiary education sector **Accessible and connected city:** an urban form that supports accessibility from a range of modes and sustainable transport choices; a safe and efficient road network; affordable and convenient public transport; it is safe and pleasant to walk and cycle **A vibrant and exciting city:** a successful arts and culture scene, vibrant central city and local centres	Satisfaction with the way the city is developing in terms of its look and feel Number of new residential building consents issued in the past 12 months
A successful city with a diverse, innovative and productive economy	**Business vitality:** improving the ease of doing business and growing the value of exports **Alliances for innovation:** improving linkages between industry and research and increasing scale in innovative and tradable sectors **A hub for skills and talent:** increasing the retention of graduates, building the skills base and growing migrant numbers **Linkages beyond our borders:** increasing international investment and establishing strategic projects with other cities **A compelling destination:** marketing Dunedin and exporting education uplift	Growth in full time equivalent jobs Growth in real GDP per capita Ability to cover costs of everyday needs
A creative city with a rich and diverse arts and culture scene	**Identity pride:** embedding creativity in city decision-making **Access and inclusion:** investing in access to arts and culture and enabling self-expression **Creative economy:** leveraging the economic growth of the arts and culture sector **Inspired connections:** utilising existing networks and fostering new connections to drive creativity	Percentage of residents rating Dunedin as creative Percentage of residents visiting one or more cultural facility within the last 12 months

Outcome	Priorities	Indicators
A connected city with a safe, accessible and low-carbon transport system	**Safety:** prioritising safety improvements according to risk **Travel choices:** prioritising investment and space to improve the provision of active modes and public transport **Connectivity of centres:** improving connections within and between centres and the central city for public transport and active modes **Freight:** efficiently and effectively moving freight **Resilient network:** integrating land use and transport to reduce demand for vehicle travel and increasing the resilience of the transport network	Percentage of residents who walk, jog, cycle or take public transport to work Number of fatal and serious injury crashes
A sustainable city with healthy and treasured natural environments	**Resilient and carbon zero:** planning for and adapting to climate change and impacting positively on global environment and managing resources sustainably **Healthy environment:** sustaining ecosystem services, increasing indigenous biodiversity and restoring areas of ecological value **Caring for the natural world/Tiakitaka:** enjoying, connecting to, and celebrating the natural environment	City greenhouse gas emissions Total area of indigenous habitats in Dunedin protected by the Distract Plan, DCC reserve land and land held under QEII covenants and other statute-based protective mechanisms and/or recognised as Areas of Significant Conservation Value
An active city with quality and accessible recreational spaces and opportunities	**Active people:** people are living active lives by participating in formal and informal recreation and sport **Open spaces and facilities:** our parks and facilities are meeting the changing needs of our communities and are increasingly used **Treasured parks, natural landscapes, flora and fauna:** understanding, protecting and restoring our ecosystems and biodiversity, and our parks and landscapes bringing people together to celebrate our cultures and heritage **We work with others:** having strong relationships with tangata whenua, and creating effective local and national partnerships	Percentage of residents who participate in physical activity five or more days a week Percentage of residents using a park, reserve and/or open space and/or recreation facility at least once a month

Refreshing the Strategic Framework

In 2020, a high-level stocktake of the existing Strategic Framework was conducted. Based on this, the DCC will refresh the Framework, beginning work in the first year of this 10 year plan period. The Thriving Cities' City Portrait model of sustainability will be adapted as part of this refresh.

The objectives of the Strategic Framework refresh project are to enable a review and update DCC's strategies in a manner that is inclusive of mana whenua and the community, and addresses issues highlighted in the 2020 review. The project will achieve this by:

- Developing a good understanding of the DCC's current state and defining common principles and governance procedures to inform development of all strategies.
- Embedding the Thriving Cities – City Portrait model as a means of defining and measuring sustainable outcomes desired for Dunedin.
- Improving DCC partnership with mana whenua generally, with a focus on:
  - » articulation of what Treaty principles will underpin the Strategic Framework
  - » exploration of what sustainability and sustainable outcomes means to mana whenua
  - » exploration of how a Te Ao Māori worldview can be used to develop a City Portrait, including examination of the doughnut economics model.
- Improving partnership with the Dunedin community and promoting the collaborative effort needed for success.
- Reviewing and updating DCC's strategies and reviewing these against strategic priorities identified through the City Portrait process.
- Enabling implementation of defined sustainable outcomes and ongoing monitoring and adjustment of the strategic objectives, while maintaining an integrated and collaborative approach.
- Reviewing Levels of Service in alignment with the updated strategic priorities.

Dunedin's residents will have the opportunity to contribute to, and collaborate on the development of a new Strategic Framework over the course of this project.

Our Zero Carbon 2030 goal

Climate change is a global problem requiring global action. New Zealand has signed the Paris Agreement, which commits New Zealand to reducing greenhouse gas emissions.

In 2019, the Government passed the Climate Change Response (Zero Carbon) Amendment Act. The Zero Carbon Act provides a framework by which New Zealand can develop and implement clear and stable climate change policies that:

- contribute to the global effort to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels
- allow New Zealand to prepare for, and adapt to, the effects of climate change.

The Zero Carbon Act also sets out a new climate change programme, a new national target to cut emissions, and establishes an independent Climate Commission to provide advice and leadership on both emission reduction and adaptation.

In June 2019, Council declared a climate emergency and set the ambitious goal for Dunedin city to be net carbon neutral by 2030, adopting a two-part 'Zero Carbon 2030' target, as follows:

- net zero emissions of all greenhouse gases other than biogenic methane by 2030, and
- 24 to 47 percent reduction below 2017 biogenic methane emissions by 2050, including 10 percent reduction below 2017 biogenic methane emissions by 2030.

The first comprehensive snapshot of Dunedin's emissions profile as a city was produced by the DCC in 2016. An updated emissions profile for the city has just been completed, using data for the 2018/19 year. In 2018/19, Dunedin emitted a gross 1,573,008 tonnes of carbon dioxide equivalent (tCO2e), an increase of 1% on 2014/15 emissions.

The DCC has been measuring and reporting its organisational emissions since 2013/14. In 2018/19, the DCC's activities generated 41,852.88 tCO2e. This was down from a peak of 56,892.49 tCO2e in the 2017/18 year, but still represents an increase of 49% on 2013/14 emissions.

To achieve net zero emissions by 2030, both the DCC and the city will need to do things differently as we move to a zero carbon future. Initial steps to Dunedin being zero carbon by 2030 are set out in this plan.

Impacts of climate change on Dunedin

The impacts of climate change are being felt around the world. By the end of this century New Zealand will experience higher rainfall, more frequent extreme weather events, rising sea levels and higher temperatures. New Zealand communities are particularly vulnerable to changes in sea level and extreme rainfall because many of New Zealand's towns and cities are built on the coast or near rivers. The impacts of climate change may have a major impact on New Zealand society and everyday Kiwi's wellbeing now and into the future.

The first comprehensive review of Dunedin's climate change vulnerability and risk as a city was produced by the Dunedin City Council (DCC) in 2016. Dunedin may face significant risks from sea level rise and rainfall (resulting in flooding) and its impact on human health, critical infrastructure, water resources and ecosystems.

South Dunedin in particular, has a higher level of risk to natural hazards. Prior to European settlement, most of the South Dunedin area comprised wetlands, salt marsh, mudflats, lagoon and low sand dunes. South Dunedin now sits on reclaimed land, and much of this, when combined with high ground water, seasonal conditions, and tidal fluctuations, is susceptible to inundation, and infiltration of the stormwater and wastewater networks. Groundwater levels are projected to rise as sea levels rise, increasing the frequency of flooding and inundation. South Dunedin is also home to a community of thousands of people along with schools, businesses, and a significant amount of city infrastructure. Along the coastline, the dune system at St Kilda and St Clair is eroding, reducing natural character and restricting access the beach. These existing coastal erosion issues will be exacerbated by climate change.

Other parts of the city are also low-lying and exposed to either flooding (such as the Taieri Plains) and/or coastal hazards in other coastal areas. Increases in the intensity, duration and frequency of rainfall will influence how stormwater and other infrastructure, including flood protection, water supply and wastewater services will be managed.

The DCC's work on adapting to climate change has a particular focus on South Dunedin as the area of highest risk. The DCC has been working with the Otago Regional Council, the community, mana whenua, Central Government and others to understand what is happening in South Dunedin, build resilience, identify opportunities and options, and create plans for long-term adaptation. Initial actions to reduce the impacts of climate change on Dunedin are set out in this plan.

A growing city

Like many of New Zealand's major urban centres, Dunedin is experiencing a period of rapid population growth. Such rapid growth brings many positives however it can also create pressure on land and infrastructure to accommodate growth and on the housing market.

Dunedin's population is projected to grow at a faster rate until 2033, reaching a population of 141,417. From 2033 onwards the population growth rate will begin to taper off. Dunedin's population is also projected to age. By 2038 the 65 years and over demographic will be our second largest age group (after those aged 25 years and under).

Dunedin's dwelling numbers will experience similar trends to the Dunedin population; experiencing a sharp rate of expansion until 2038 reaching a total of 60,511 dwellings before growth slows.

Since February 2020, the New Zealand economy has undergone a significant period of upheaval due to the COVID-19 pandemic. This has created uncertainty around Dunedin's growth and economy into the future. In June 2020, the DCC commissioned a review of the DCC's growth projections to assess the impact of the COVID-19 recession and border restrictions. While the review did not anticipate significant differences in population and dwelling growth as a result of the pandemic, there is greater uncertainty around future growth as a result of the pandemic, particularly over the longer term.

Under the National Policy Statement on Urban Development, Dunedin is categorised as a tier 2 urban environment. This brings into effect a range of provisions relating to growth planning, such as assessing the amount of development capacity that is required. The DCC is planning for growth in numerous ways. Work is underway to enable further development capacity under the Second Generation Plan (2GP) and provide for infrastructure to accommodate anticipated growth. DCC is also preparing to start work on a Future Development Strategy, which will look at where and how Dunedin will grow over the next 30 years.

te tūhono ki te Māori
Māori partnership

Long term success and enduring partnership with Māori are important to the DCC. We acknowledge our Treaty of Waitangi responsibilities and we are committed to working in partnership to provide opportunities for Māori to contribute to decision making processes and to have an active role in the city's development.

DCC relationship with mana whenua and mataawaka

In recent years the DCC has taken solid steps toward growing our internal capability and progressing relationships with mana whenua and mataawaka. We recognise that this is an ongoing process as we move towards a future where it becomes business as usual for all our staff to view DCC work through a Māori responsiveness lens.

We continue to develop our relationship with mana whenua through the local Papatipu Rūnaka, Te Rūnanga o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki. In 2006 the DCC signed a Memorandum of Understanding that provides the framework through which the DCC and mana whenua give effect to Treaty partnership. The Araiteuru Marae Council, Dunedin's urban marae are also recognised as representing the mataawaka community in the city.

Māori Participation Working Party

Mana whenua and mataawaka interests are currently represented within the Council's governing arrangements by the Māori Participation Working Party (MPWP). Māori membership of the MPWP is made up from Kāti Huirapa ki Puketeraki Rūnaka, Te Rūnaka o Ōtākou and Araiteuru Marae. The MPWP was established as a Councillor advisory panel with the aim of providing greater understanding of Māori needs and aspirations and greater involvement in strategic decision making. The DCC is working closely with the MPWP members to ensure Māori representation arrangements are fit for purpose and reflect the changes occurring across the wider local government sector. Plans for the future of the MPWP include a review of the purpose and role of the MPWP and Māori representation on Council standing committees.

Ko te akitu pūmau, ko te haumitaka tāroa ki a Kāi Māori tētahi mea whakahirahira ki te DCC. Kai te aro atu mātau ki ō mātau kaweka Tiriti o Waitangi, ā, kai te ū titikaha mātau ki te mahi kātahi ki te whai ara e whai wāhi ai te Māori ki kā tūkaka whakatau kaupapa, ki te whai tūraka hoki ki te whakapakaritaka o te tāone-nui nei.

Te honoka o te DCC ki te Mana Whenua, ā, ki te Mataawaka hoki

I kā tau tata ko hori ko aka kaha atu te DCC ki te whakapiki i ō mātau ake pūkeka, ki te whakakōkiri i kā honoka ki te Mana Whenua, ā, ki te Mataawaka hoki. He mea mōhio nā mātau he tukaka moroki i ā mātau e aka whakamua ki tētahi ao hou he māori noa te aro o kā kaimahi ki te tirohaka Māori ki roto i tā rātau mahi o te DCC.

Ko te whirika o te honoka ki te Mana Whenua mā kā Papatipu Rūnaka, arā Te Rūnaka o Ōtākou rāua ko Kāti Huirapa Rūnaka ki Puketeraki he mahi e kore e mutu. I te tau 2006 i waitohutia he Kawenata Huatau Tahi e noho ana hai aka kia whai wāhi ai te DCC me te mana whenua ki te whakatutuki i ō mātau kaweka ki te Tiriti. Ko te Kaunihera o te Marae o Āraiteuru, te marae ā-tāone o Ōtepoti ka tū hai mākai mō te hapori mataawaka.

Te Ohu Whakauru Māori

Ko Te Ohu Whakauru Māori (MPWP), kā mākai o te mana whenua, o te mataawaka hoki ko whai wāhi ki kā nukuhaka whakahaere o te Kaunihera. Ko kā pou o te MPWP ko kā mākai nō Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnaka o Ōtākou me te Marae o Āraiteuru. I whakatūria te pae takata nei hai pae ārahi ki kā Kaikaunihera, ā, kia mārama pai ai kā matea, kā wawata me te aroka nuitaka o te Māori ki te whai wāhi ki kā whakatauka rautaki. E mahi kātahi ana te DCC ki kā pou o te MPWP ki te noho tika, ki te whakaata tika i te whakakanohitaka o Kāi Māori ki kā panonihaka e haere ana ki te rākai kāwana-ā-rohe, ā-tāone hoki.

Partnership agreement

To assist in the city's development and in delivering services to the Māori community, the DCC signed an operational partnership agreement with Aukaha Ltd in 2019. This partnership agreement ensures mana whenua perspectives and mataawaka views are represented in decisions about the city, its community capacity and natural and physical resources. Aukaha is a Kāi Tahu Rūnaka based consultancy service. Aukaha represents five Papatipu Rūnaka across the broader Otago region. Aukaha provides a range of services including trade training for Māori and Pasifika, Business Development and Procurement, Resource Management and Cultural Services.

Building Māori capability

Recent key developments in 2021 in which the Council has expressed its Treaty partnership commitment include the development of the Manahautū (General Manager) Māori, Partnerships and Policy role as part of the executive leadership team. This role provides strategic advice and direction across the DCC business and works to develop partnership opportunities with mana whenua and mataawaka in Ōtepōti. Further areas of progress beginning in the later part of 2021 and progressing over the following 2 years, will include the development of a more culturally responsive Strategic Framework and a Māori Strategic Framework, Māori Capability plan and a Māori Engagement plan as part of the DCC Strategic Refresh Project.

10 Year Plan

The 10 year plan budget provides additional resources to support strategic initiatives to advance Māori development and continue to build strong relationships with mana whenua and mataawaka. The DCC and mana whenua will continue to work together to strengthen Treaty partnership across Council business, to foster the development of Māori capability and engagement and develop opportunities for mana whenua, mataawaka and the DCC to build strong and enduring relationships over the next 10 years.

Development Funding for Marae: Dunedin City is home to three Marae. Ōtākou Marae and Puketeraki Marae are both Ngāi Tahu ancestral marae and Araiteuru Marae is Dunedin City's urban marae. All three marae are vital in the development of Māori cultural connection and identity with each marae playing an important role in developing a sense of community for an increasing number of Dunedin residents. This funding allows the DCC to further develop our relationships with each of the City's marae and importantly, support each of the marae to develop capacity to continue their work in supporting Dunedin communities to thrive.

Innovation Funding for Māori and Pasifika: This funding is a continuation of two new funds that were originally established to support Māori and Pasifika communities post-Covid. The Hapori Māori Innovation and Development Fund and the Pasifika Communities Innovation and Development Fund will support innovation and development projects and initiatives that contribute and support Māori and Pasifika communities to grow and thrive.

Whakaaetaka Tūhonotaka

Ki te āwhina ki te whakawhanaketaka o te tāone, ā, ki te whakarato hoki i ētahi ratoka ki te hapori Māori, i waitohutia tētahi whakaaetaka mahika tahitaka ki a Aukaha Ltd i te tau 2019. Mātua nei ko te mahi a te whakaaetaka ka tū hai paepae ka whai mana kā tirohaka mana whenua me kā tirohaka mataawaka ki kā whakatauka e hākai ana ki te tāone, ki kā pukeka o te hapori, ki kā rawa taiao, ā, ki kā rawa rauhaka hoki. Ko Aukaha tētahi ratoka tohutohu Kāi Tahu e tū ana hai kanohi mō kā Rūnaka Papatipu e rima e whai mana ana ki te takiwā nui o Ōtākou. He nui kā ratohaka o Aukaha tae noa atu ki te whakakūkū kaimahi Māori, kaimahi Pasifika, Whakawhiwhika me te Whakawhanaketaka Pakihi, ko te ratoka Whakahaere Rawa, ā, ko te ratoka Ahurea hoki.

Whakapakari i kā Pūkeka Māori

Ko ētahi whakatutukihaka o te ū pūmau o te Kaunihera ki ōna kaweka Tiriti, ko te whakatūtaka o te tūraka Manahautū (General Manager) Māori, Honoka me te Kaupapa Here hai tūraka ki te pae manukura o te DCC. Ko tā te tūraka kawe ko te ārahi, ko te whakarato i te tohutohu hākai ki kā momo kawekawe mahi o te DCC, ā, ka mahi kia whai ara anō, kia whai wāhi anō te DCC ki te whakakaha i kā hereka ki te mana whenua me te mataawaka ki Ōtepoti. Ko ētahi atu kōkiritaka ka tīmata hai te whiore o te tau 2021, ā, ka rua tau e haere tou ana, ko te whakariteka o tētahi Aka Rautaki Aroka Ahurea, tētahi Mahere Pūkeka Māori me tētahi Mahere Whakaaka Māori hai wāhaka o te Kaupapa Whakahou Rautaki o te DCC.

Mahere Kahuru Tau

Kai te tahua o te mahere kahuru tau he rawa anō hai amo i kā kaupapa rautaki ki te whakakoke i te whakapakaritaka o te Māori, ā, ki te whatu tou i te taura takata ki waeka i te DCC, te mana whenua me te mataawaka. Ka mahi kātahi tou te DCC me te mana whenua ki te haukaha i te honoka ā-Tiriti ki kā mahi katoa o te DCC, ki te maimoa i te whakapakaritaka o te mātau Māori, o te whakaaka ki te Māori, ā, ki te whakarite i ētahi atu ara e taea ai e te mana whenua, e te mataawaka, e te DCC hoki te whiriwhiri tou, te raraka tou, te whatu tou i taua taura.

Pūtea Whakapakari Marae: E toru kā marae ki Ōtepoti, ko Ōtākou, ko Puketeraki kā marae o Kāi Tahu, ā, ko Āraiteuru te marae ā-tāone o Ōtepoti. He manapou ēnei marae e toru ki te whakapikitaka atu o te hono ā-ahurea, o te hono ā-tuakiri o Kāi Māori, ā, ka tū ko ia marae hai whakaruruhau matua e honohono ana, e piripiri ana te mahi a te takata o Ōtepōti hai hapori. Mā tēnei pūtea e taea ai e te DCC te whakakaha i āna hereka ki kā marae e toru, ā, mātua hoki tana tautoko ki ia marae ki te whakakaha ake i a ia anō, ā, i tana mahi tuitui takata, i tana tāwharau i ōna hapori kia ora rawa atu ai ratau.

Pūtea Auaha Māori me te Pasifika: He whakakokeka tēnei pūtea i ētahi pūtea tautoko hou e rua, i whakatūria ki te tautoko i kā hapori Māori me kā hapori Pasifika mō muri mai i te Kowheori. Ko te Pūtea Auaha me te Haukaha Hapori Māori me te Pūtea Auaha me te Haukaha Hapori Pasifika ka tautoko i kā kaupapa auaha, kā kaupapa whakapakari e tukuna ana, e tautoko ana i te whakatipuraka matomato o kā hapori Māori, o kā hapori Pasifika hoki.

he tirohaka o te tāone
snapshot of a great small city

Taupori | Population

Pāpori | Social

Ahurea | Culture

Ōhaka | Economy

Whare | Housing

Taiao | Environment

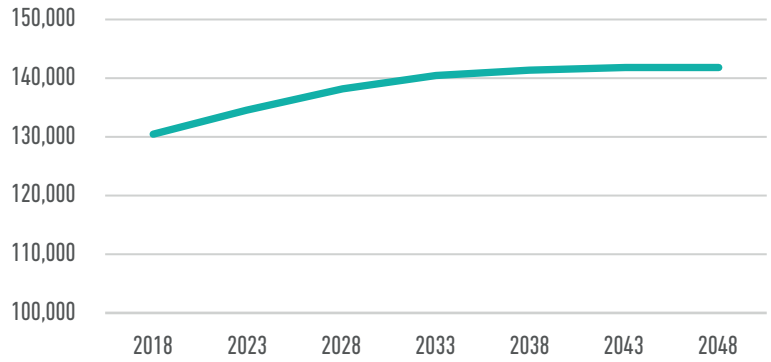
Āhuaraki hurihuri | Climate change

Ngāi māori ki ōtepoti | Māori in Dunedin

Ngāi pāsifika ki ōtepoti | Pāsifika in Dunedin

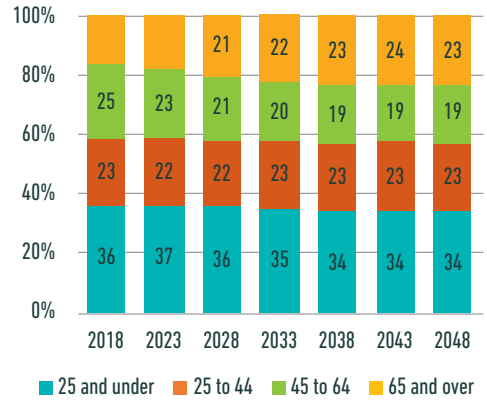
taupori population

Dunedin's total population over time



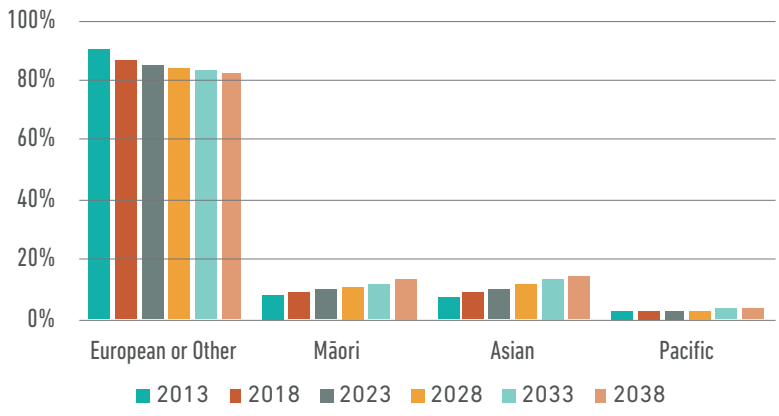
Source: 2020 Post Covid-19 growth projections

Dunedin's age groups over time



Source: 2020 Post Covid-19 growth projections

Dunedin's ethnicity make up over time



Source: StatsNZ 2018 Census

Dunedin's population of **130,480** in 2018 is projected to grow to **141,606** in 2048.

In 2018, **36%** of Dunedin's population is aged 25 and under, compared to **34%** of NZ's population.

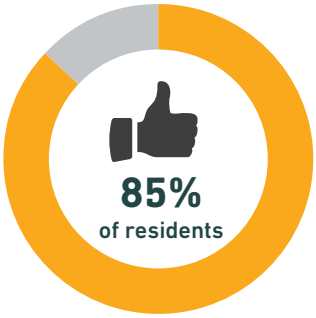
A **7%** increase in Dunedin's 65 years and over population is projected by 2048.

A **6%** decrease in the 45 – 64 age group is projected by 2048.

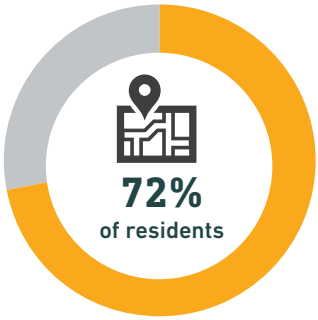
Dunedin's population is becoming more diverse, and by 2038 Māori, Asian and Pacific people are projected to increase by **5%**, **7%** and **1%** respectively.

Different age groups/demographics will have different housing needs to be planned for.

pāpori social



say they have a good quality of life



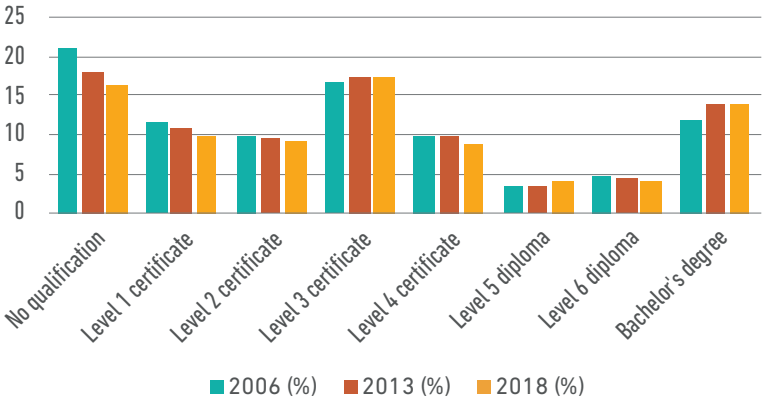
say they have pride in the look and feel of the city

Source: Quality of Life 2018

Dunedin residents' top five reasons for a high quality of life: Health and Wellbeing, Relationships, Financial Situation, Lifestyle, and Work.

Dunedin's youth are far more likely to experience stress and loneliness than any other age groups.

Highest qualification for Dunedin resident over time

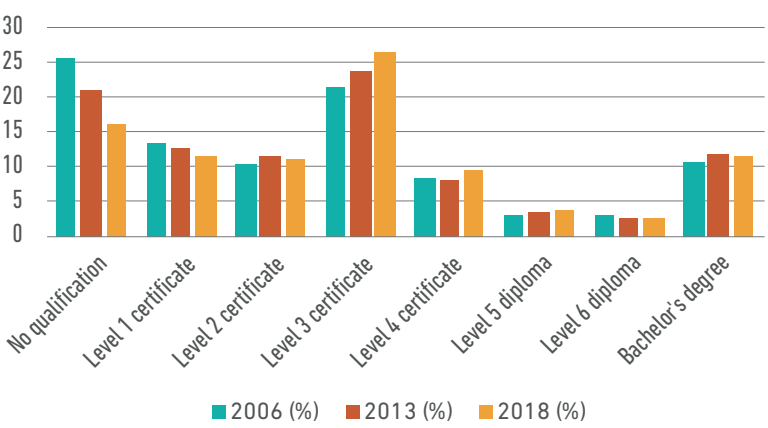


Source: StatsNZ 2018 Census

The number of Dunedin residents with no qualification has declined by **4.8%** from 2006 to 2018 and has also declined by **9.4%** for Māori residents.

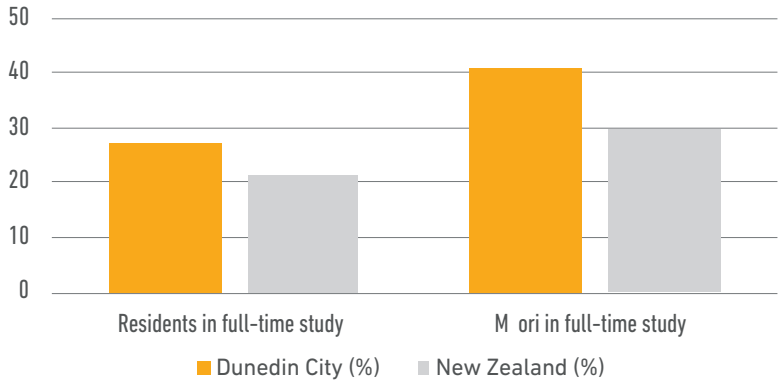
The number of NCEA level 3 or higher education achievers has increased by **6.9%** from 2006 to 2018.

Highest qualification for Dunedin Māori over time



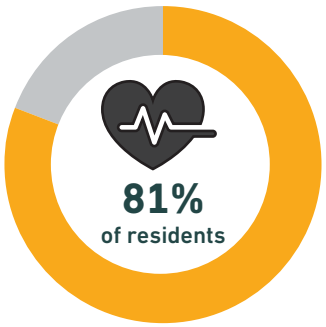
Source: StatsNZ 2018 Census

Dunedin residents in full time study vs New Zealand

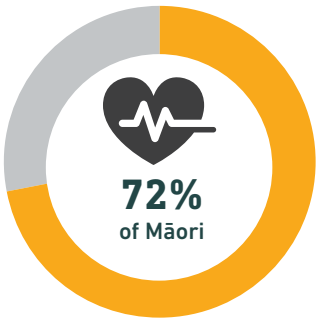


Source: StatsNZ 2018 Census

27.4% of Dunedin residents were in full-time study in 2018, more than the NZ average of 21.3%.



rate their general health highly



rate their general health highly

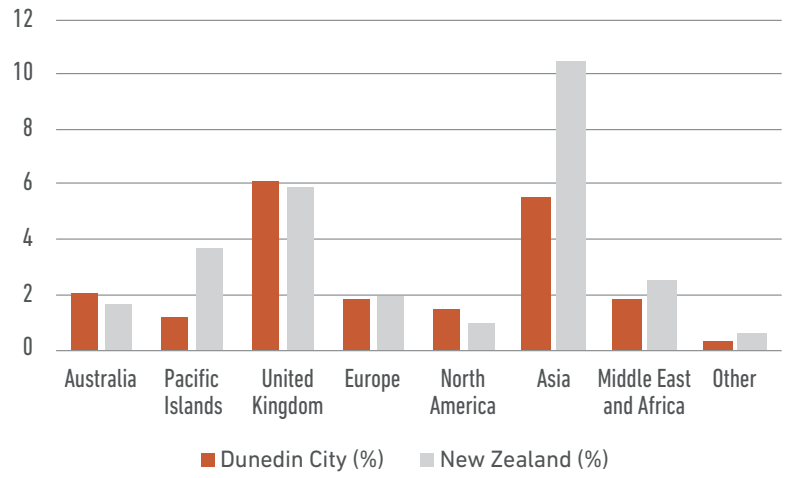
Source: Quality of Life 2018

Dunedin residents rate their general health highly, but Māori residents are less likely to rate their general health as highly as the average resident.

ahurea culture

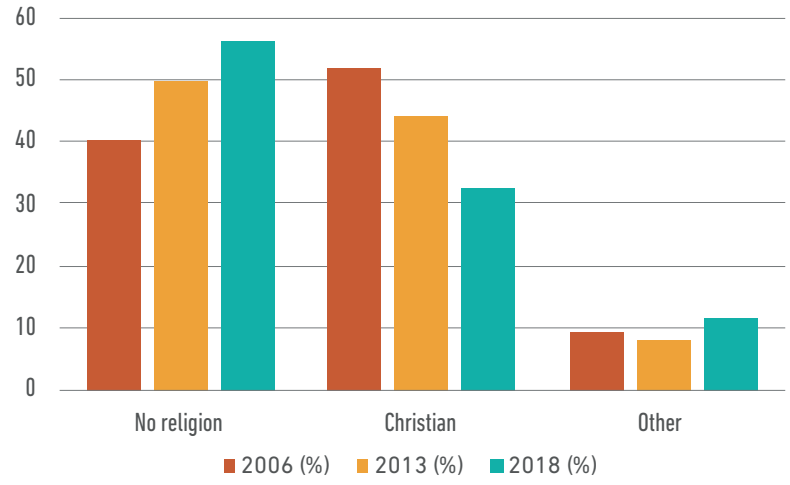
Dunedin is New Zealand's first UNESCO City of Literature. The city has three Marae, and many other locations of significance to Mana Whenua. There are 740 protected historic buildings.

Dunedin residents born overseas – country of origin



Source: StatsNZ 2018 Census

Major Religions



Source: StatsNZ 2018 Census

Dunedin's population consists of **2%** Australian, **6.1%** Britain and **1.4%** North American born residents compared to NZ's overall population consisting of **1.6%**, **5.9%** and **0.9%** respectively.

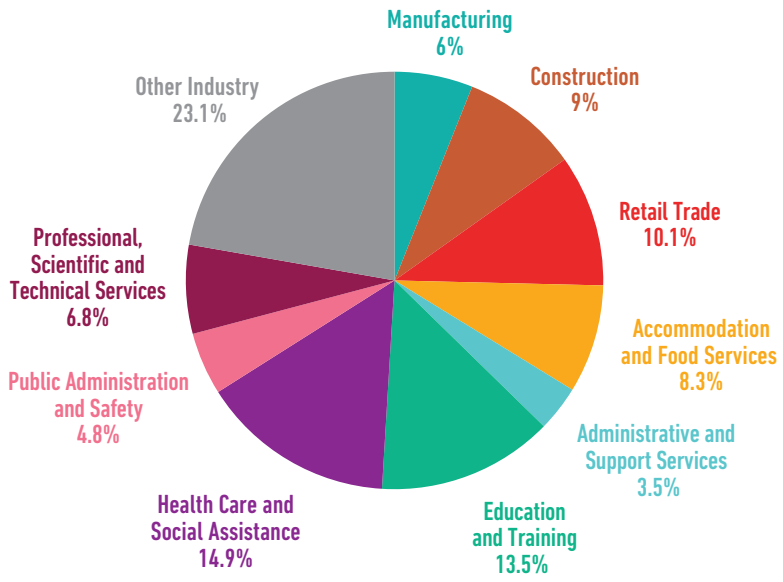
Dunedin has resettled **550** former refugees since 2016 with a majority coming from Palestine, Syria, and Afghanistan.

Just over half of Dunedin residents now no longer identify with an organised religion (**40.4%** in 2016 vs. **56%** in 2018).

Christianity remains Dunedin's largest religious identity (**32.5%** in 2018), however Dunedin is also home to followers of Buddhism (**0.8%**), Hinduism (**0.9%**), Islam (**1%**), Judaism (**0.1%**) and traditional Māori beliefs (**0.2%**).

ōhaka economy

Dunedin's major employment industries 2019



Source: StatsNZ 2018 Census

Dunedin's pre-Covid-19 economic growth was exceeding the New Zealand average. The number of people seeking unemployment support has been reducing over the past decade.

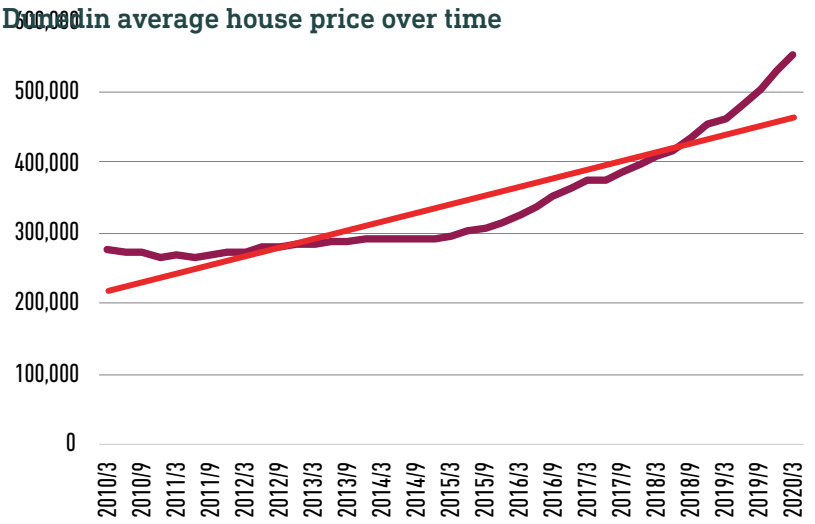
Employment in manufacturing has decreased from **9.2%** in 2009 to **6%** in 2019. Employment in construction has increased from **7%** in 2009 to **9%** in 2019.

Retail (**10.1%**), Education and Training (**13.5%**), and Health Care and Social Assistance (**14.9%**) continue to be the highest employment industries in 2019.

Unemployment rates have shown a decline from **8.1%** in the first quarter of 2010 to **5.4%** in the last quarter of 2019.

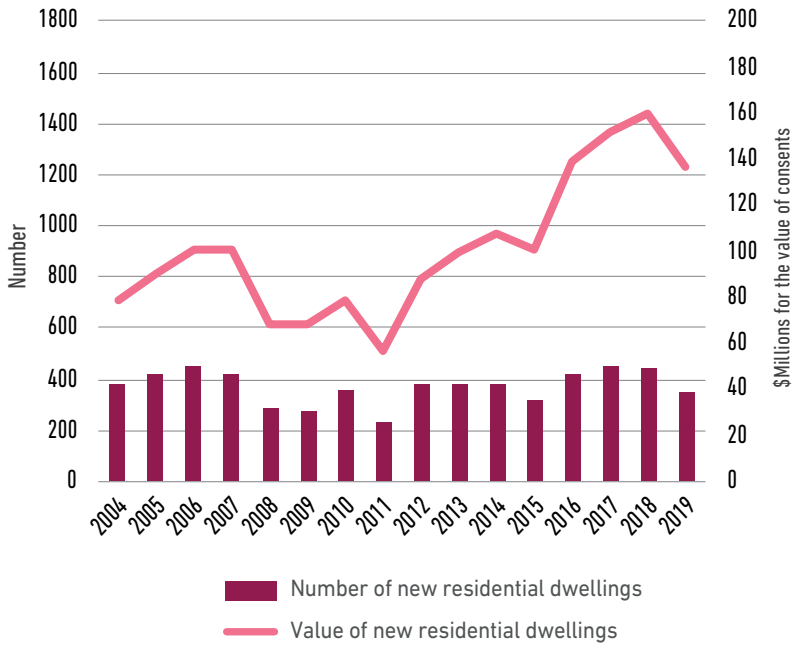
whare housing

Dunedin average house price over time



Sources: Infometrics quarterly reports

Dunedin's number and value of new residential buildings over time



Source: DCC Building Consents data

There has been a recent sharp increase in Dunedin's housing prices. Average house price in 2010 was **$276,048** versus an average in 2020 of **$552,297**.

While housing affordability has been a growing issue, Dunedin house prices are still lower (**25%**) than the NZ average.

There is an estimated need of **750** new domestic dwellings required to accommodate the city's estimated annual population growth.

Over the past 10 years, there has been an average of **372** new dwellings in Dunedin.

taiao
environment

Dunedin has the world's only mainland albatross colony

Dunedin is home to some of New Zealand's major penguin and seal colonies

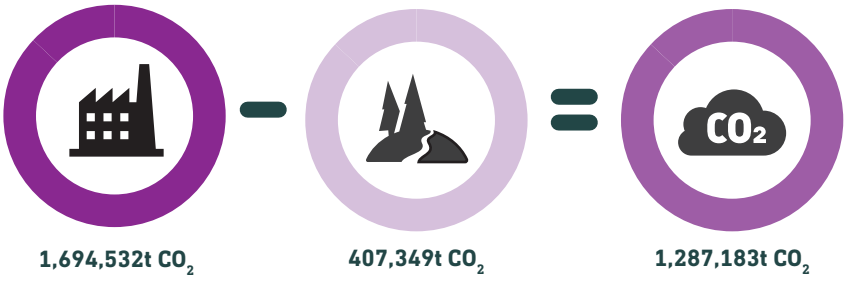
11% of Dunedin city's land is protected under conservation value, equalling to roughly 36,000 hectares.

Dunedin has **30** native plants and species that are not found anywhere else in the world.

The entire Dunedin City area is Wahi Tupuna (ancestral landscape) as it was used and valued by mana whenua. Wahi Tupuna sites include settlements, battle sites, burial places, mahika kai areas and resources, trails and significant landscape features such as peaks.

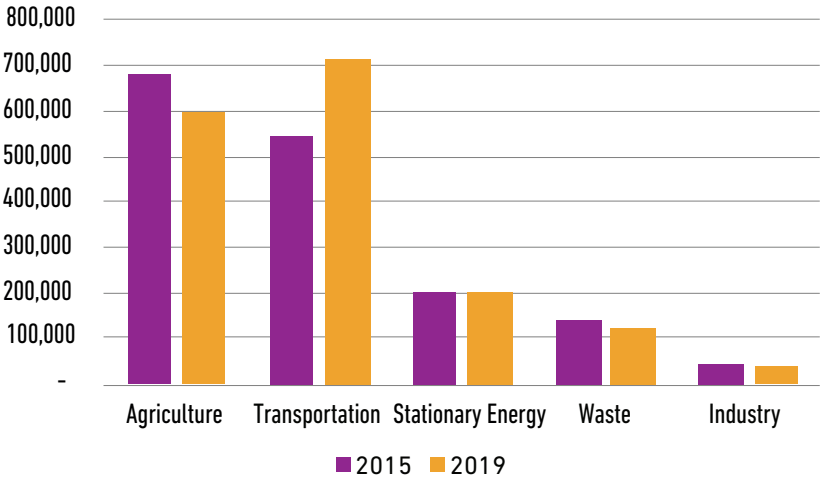
āhuaraki hurihuri climate change

Dunedin's net total emissions in 2019



Source: DCC Aecom Covenant of Mayor report 2019

Dunedin's emissions change 2015 to 2019



Source: DCC Aecom Covenant of Mayor reports 2015 and 2019

By 2090, low lying areas of Dunedin will experience at least 0.5 metres of sea level rise

By 2090, Dunedin will see a 5 to 13 percent increase in yearly rainfall

Source: Otago Climate Change predictions

In June 2019, Dunedin City Council declared a climate emergency for Dunedin with a goal of making Dunedin city net carbon neutral by 2030.

Dunedin produced roughly **1.6 million tonnes** of greenhouse gas emissions in 2018/19.

Approximately **400,000 tonnes** of greenhouse emissions are being sequestered through local forestry and native reserves.

Considering sequestration, Dunedin's total net emissions for 2018/19 is roughly **1.2 million tonnes**.

A variety of changes in temperature, rainfall and sea level rise will impact the city and natural environment in different ways that need to be prepared for.

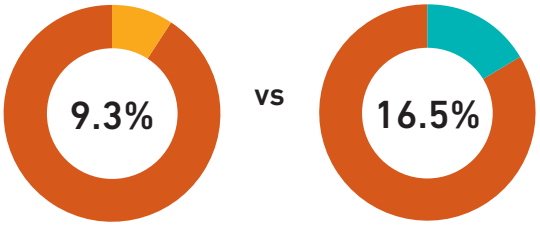
South Dunedin is a vibrant and diverse community that over 10,000 people call home. It is flat and conveniently located, and home to many businesses, schools and critical infrastructure that residents and the wider city rely on. South Dunedin was built on land reclaimed from a coastal wetland. This means that groundwater is already close to the surface and makes it hard for water to drain away when it rains.

South Dunedin has nearly 2700 homes that lie less than 50cm above the mean spring high tide mark – more than anywhere else in New Zealand – and over 70% are less than half that elevation.

ngāi māori ki ōtepoti māori in dunedin

Māori population[1]

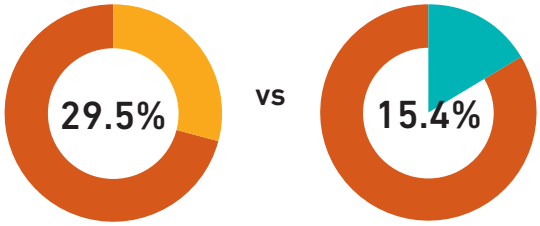
In 2018, 11,730 people living in Dunedin identified as Māori



Of people in Dunedin identify as Māori

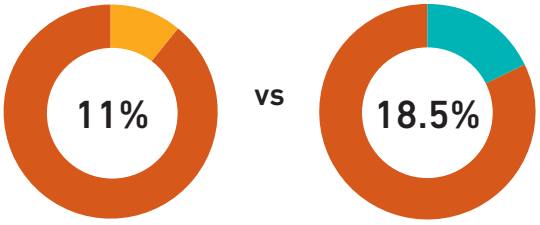
Of people in New Zealand identify as Māori

Dunedin's Māori population is younger than Dunedin's population overall



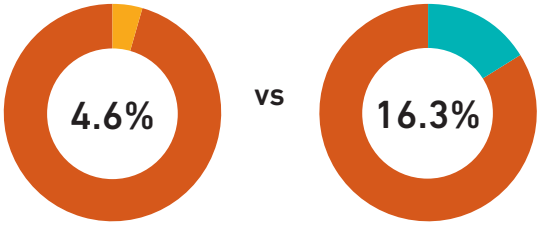
Of Māori people are aged less than 15 years

Of all Dunedin people



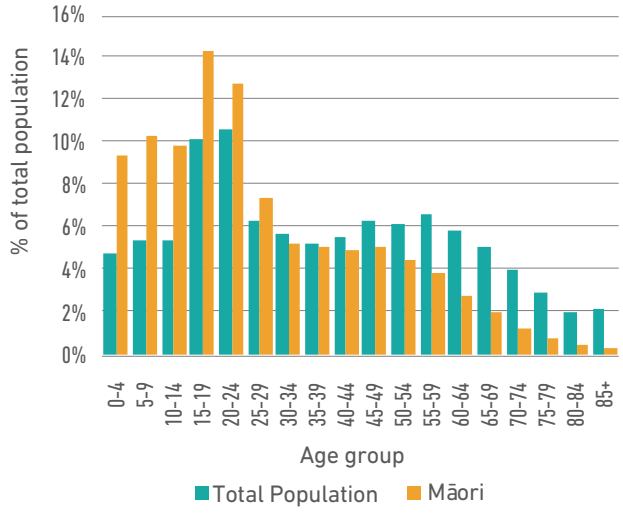
Of people in Dunedin are of Māori descent

Of all people in New Zealand are of Māori descent

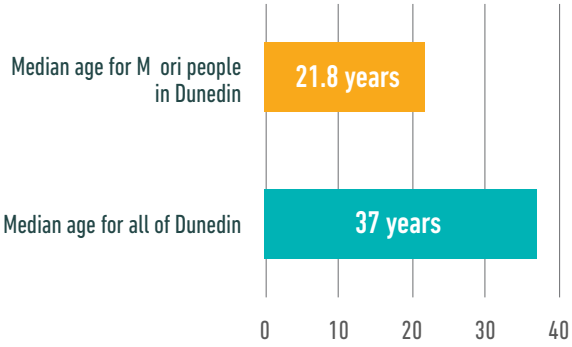


Of Māori people are 65 years and over

Of all Dunedin people



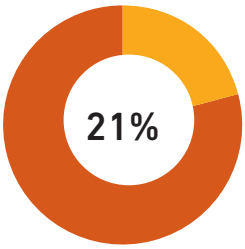
Dunedin poulation by median age (total vs M ori)



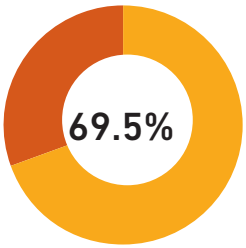
1 Source: Stats NZ, 2018 Census

Māori cultural wellbeing[2]

63.7% of Māori took part in the care of Māori sites of significance, with their whānau, in the last 12 months

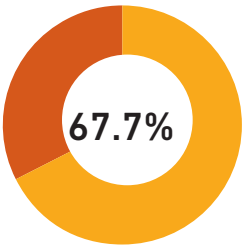


Know Marae Tupuna



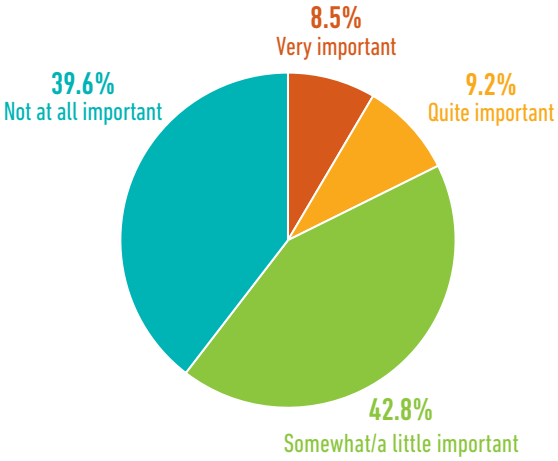
Been to Marae Tupuna in the previous 12 months

35.4% of Māori took part in caring for the health of the environment, with whānau, in the last 12 months

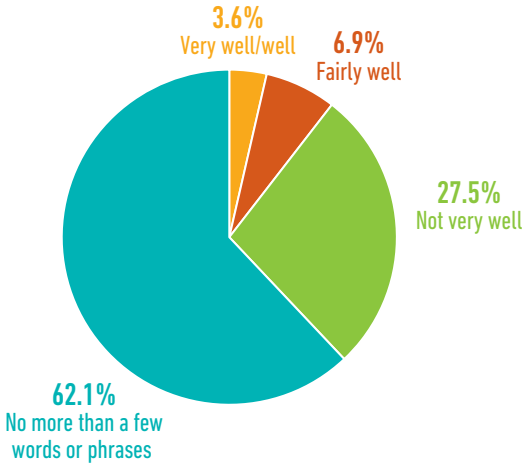


Would like to have been to Marae Tupuna more often in the previous 12 months

Importance of using Te Reo M ori in daily life

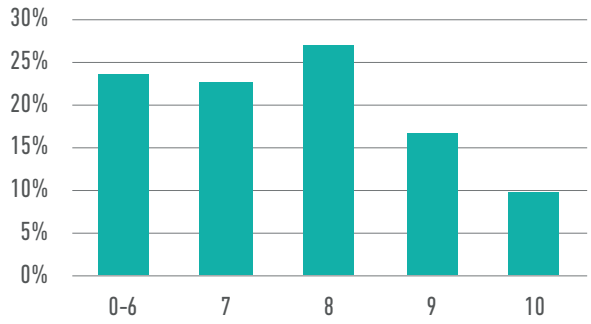


Able to speak Te Reo Māori (self-rated)

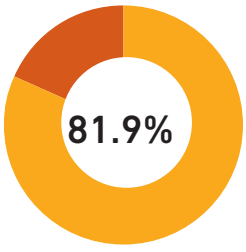


Whānau wellbeing

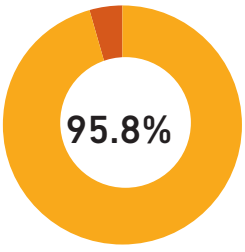
where 0 is extremely bad and 10 is extremely good



Contact with non-resident whānau



Have face-to-face contact with non-resident whānau



Have non-face-to-face contact with non-resident whānau

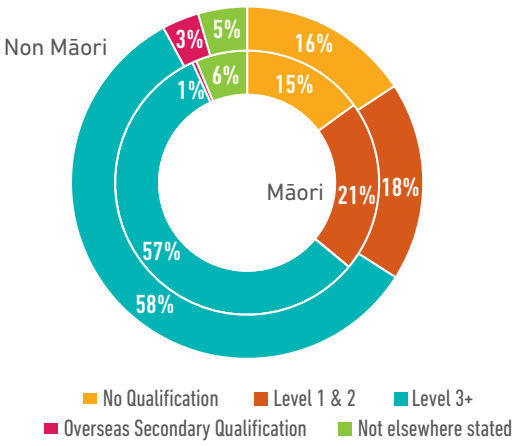
66.3% of Māori think they have the right amount of contact with whānau

31.3% of Māori think they don't have enough contact with whānau

2 Source: Te Kupenga, Stats NZ Tatauranga Aotearoa 2018 (Otago/Southland)

Māori educational achievement[3]

Level of educational attainment

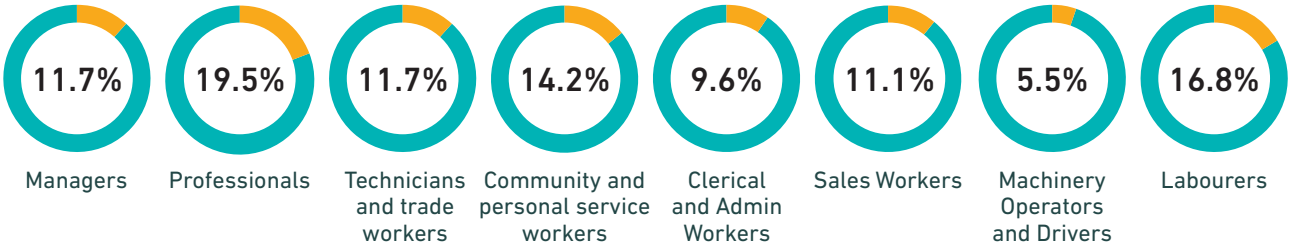


57.2% of Māori in Dunedin have attained a qualification at level 3 and higher

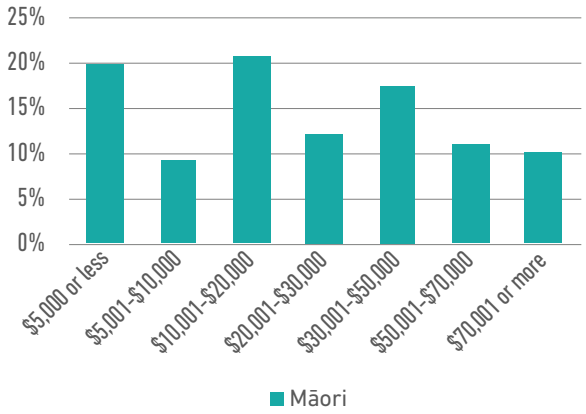
Māori economic wellbeing[4]

Māori people in Dunedin work in a variety of occupations.

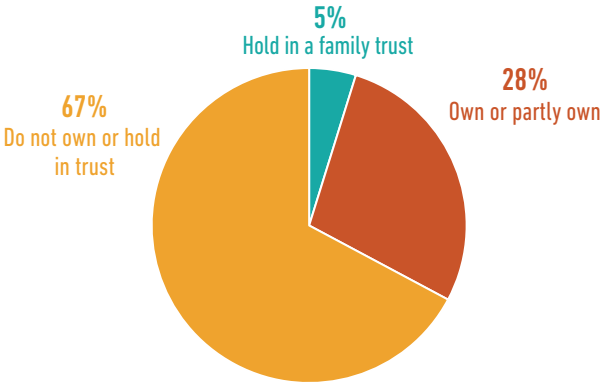
Below are some of the top occupations:



Personal Income for Māori over 15 in Dunedin 2018



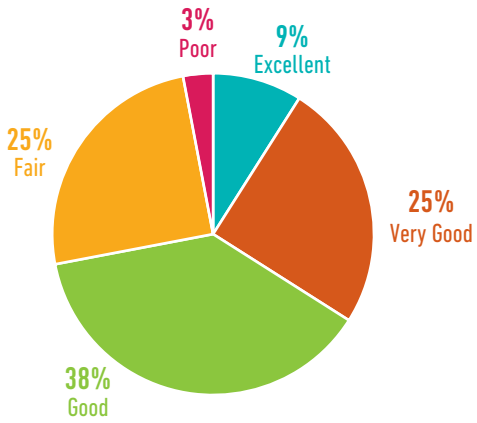
Māori home ownership in 2018



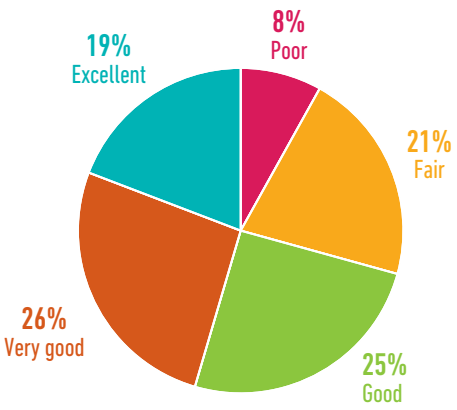
3 Source: Stats NZ, 2018 Census
4 Source: Stats NZ, 2018 Census

Māori social wellbeing

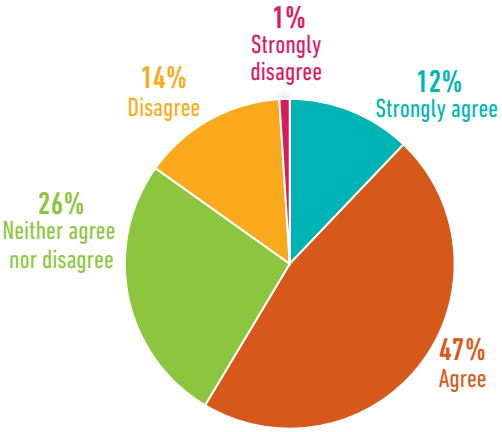
How Māori in Dunedin classify their physical health[5]



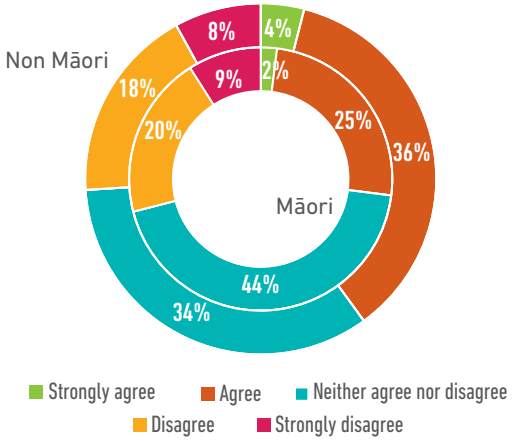
How Māori in Dunedin classify their mental health[6]



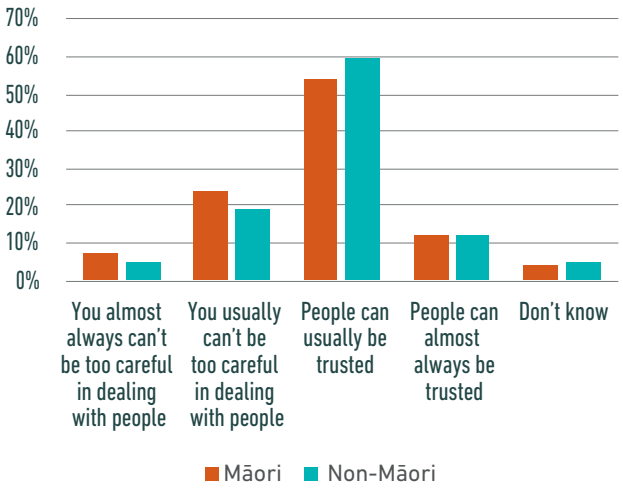
Sense of community experienced[5]



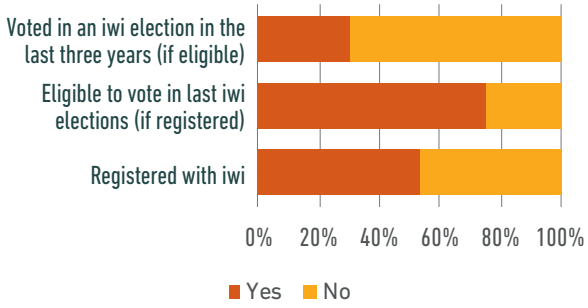
Confidence in Council decision making[5]



Trust in other people, Māori and Non-Māori[5]



Participation with iwi[7]

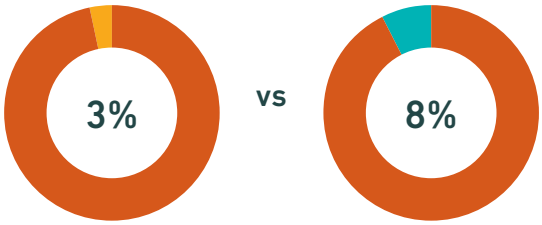


5 Source: 2018 Quality of Life Survey
6 Source: 2020 Quality of Life Survey
7 Source: Te Kupenga, Stats NZ Tatauranga Aotearoa 2018 (Otago/Southland)

ngāi pāsifika ki ōtepoti pāsifika in dunedin

Pāsifika population[1]

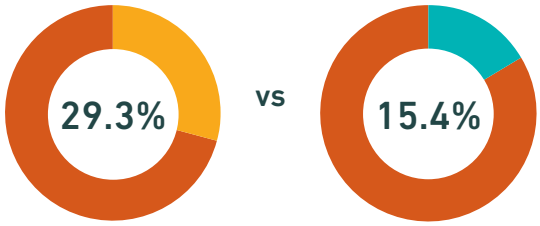
4,026 people living in Dunedin in 2018 identified as Pāsifika



Of people in Dunedin identify as Pāsifika

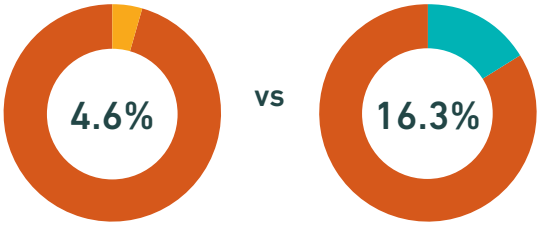
Of people in New Zealand identify as Pāsifika

Dunedin's Pāsifika population is younger than Dunedin's population overall



Of Pāsifika people are aged less than 15 years

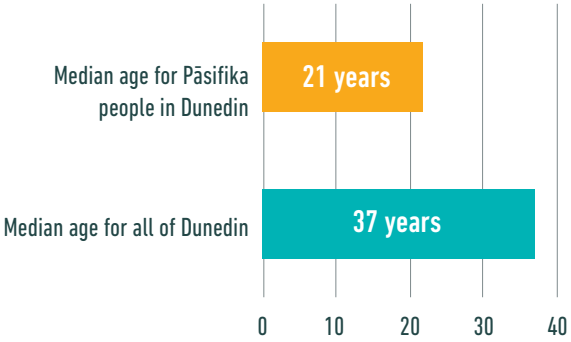
Of all Dunedin people



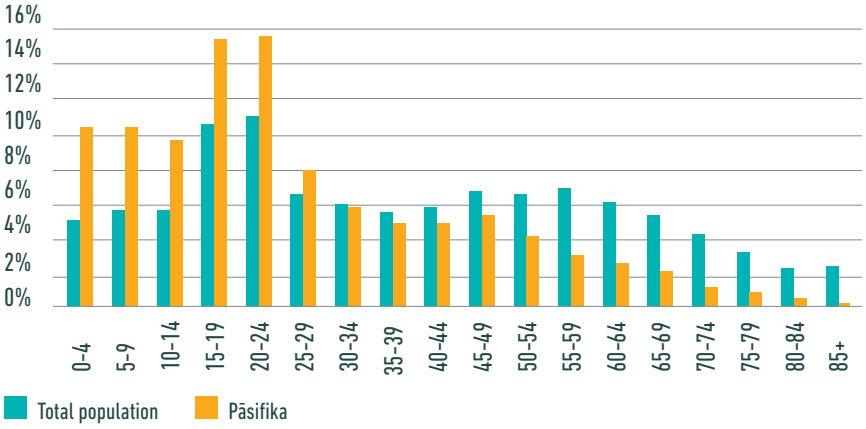
Of Pāsifika people are 65 years and over

Of all Dunedin people

Dunedin population by median age (total vs Pāsifika)



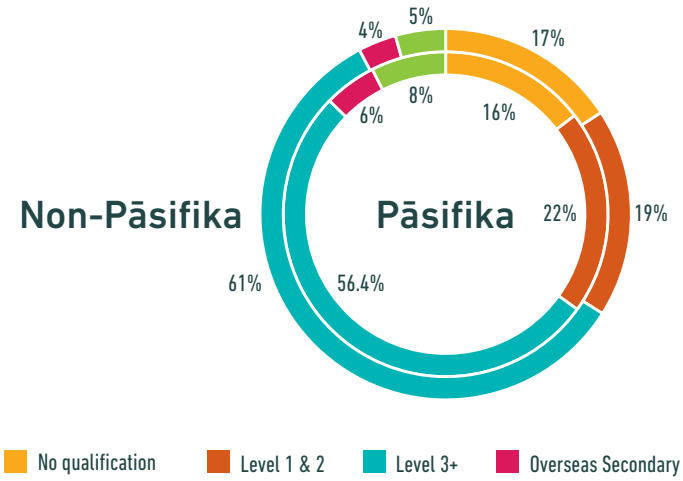
Dunedin population in 2018 by age group (total vs Pāsifika)



1 Source: Stats NZ, 2018 Census

Pāsifika educational achievement[2]

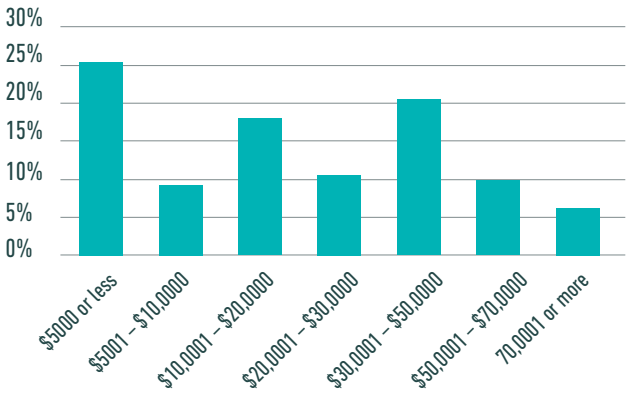
Highest qualifications obtained by Pāsifika and non-Pāsifika



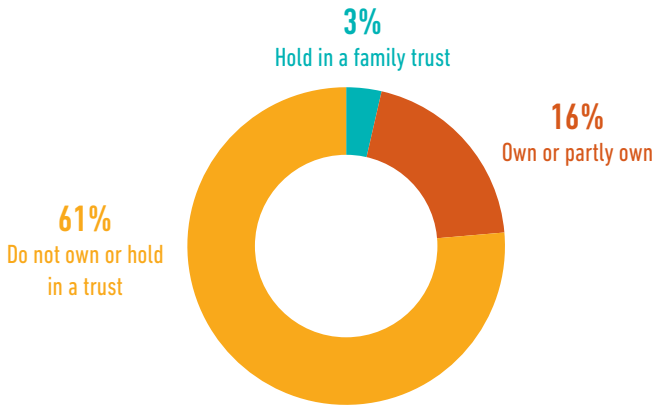
56.4% of Pāsifika in Dunedin have attained a qualification at level 3 and higher

Pāsifika economic wellbeing[3]

Personal income of Dunedin Pāsifika



Dunedin Pāsifika home ownership in 2018



2 Source: Stats NZ, 2018 Census
3 Source: Stats NZ, 2018 Census

he rautaki pūtea financial strategy

At a glance

Gross Debt Limit: 250% of revenue

Rate increases limited as follows:

Year 1: limited to no more than 10%

Years 2-10: limited to 6.5% on average annually over the period

Average Dunedin rates for Dunedin residents will be less than the national average for city councils around the country.

Forecast total operating surplus is greater than zero for each year of the plan

Council aims to ensure everyday costs of running the city can be funded from the everyday revenue (excluding any non-recurring/non-cash items) consistently by the end of the 10 years

The following liquid assets held by Council will be retained as a partial hedge against the gross debt:

- Waipori Fund
- Investment Property Portfolio
- Interest-bearing shareholder advance to Dunedin City Holdings Limited (DCHL).

Income from Group companies is limited to $5.9 million annually, being the current interest earned from the interest-bearing shareholder advance to Dunedin City Holdings Limited ($112.0 million)

The financial landscape

In 2018, Council's Financial Strategy focused on investing in our great small city, with plans to invest in infrastructure, both above and below ground, to build resilience and enhance and improve our city. It recognised the competing tensions of affordability, maintaining assets and investing for the future.

The focus has not changed, but Dunedin's environment has. For example, Dunedin city is now predicted to have higher population growth over the next 10 years – compared to estimates in 2018 that predicted low to medium growth. We are now living through a pandemic – the impacts of COVID-19 have been and continue to be felt throughout New Zealand. The serious challenges of climate change and its impacts are forefront in everyone's minds, and our response to reduce emissions and adapt to climate change needs to speed up.

This Financial Strategy does not change the direction of the 2018 strategy but builds on it. The Council has an important role to play in the economic and social recovery of the city from COVID-19, by investing in both services and capital projects for our city. At the same time, the Council needs to help foster social wellbeing and stimulate economic activity at a local level.

A lot of planning has been undertaken over the last three years, and now it is time to deliver. The Council is planning to invest $1.5 billion on capital projects over the next 10 years, compared with $878 million in the last 10 year plan. Of this, $919 million is dedicated to renewals, primarily replacing key 3 Waters and transport infrastructure, building the resilience of these essential assets. $526 million will be invested in new capital projects that will improve the city, and $90 million will be used to build new 3 Waters and other infrastructure needed for the growth that is being experienced.

To fund this level of capital investment, the debt limit has been reviewed. The last 10 year plan had a fixed debt limit of $350 million. This Financial Strategy has changed the debt limit, setting it at 250% of revenue. This revised debt level will be responsive to change and will move in line with the level of activities.

What might impact us over the next 10 years

There are a number of factors that may have an impact on what and how much Council does, and how services are delivered over the next 10 years. These are discussed below.

COVID-19

Since February 2020, the New Zealand economy has undergone a significant period of upheaval due to the COVID-19 pandemic. This has created uncertainty around Dunedin's growth and economic performance into the future.

Growth projections that were developed prior to COVID-19, have been reviewed to assess what impact COVID-19 may have had on those projections. These are discussed below in "Changing population, land use and rating base".

The review also concluded that the Dunedin economy is expected to hold up and recover reasonably well. Dunedin has the new Hospital rebuild and other major infrastructure projects that will stimulate job opportunities. Tourism is expected to recover and return to pre COVID-19 levels by 2031.

These outcomes are of course based on many assumptions. While New Zealand is currently experiencing no community transmission of COVID-19, and is living at Alert level 1, there is no certainty of the path that COVID-19 may take, and any possible further impacts on Dunedin and the rest of New Zealand.

Climate change and zero carbon

During 2019, Council declared a climate emergency and established a dedicated work programme to meet climate change mitigation and adaptation planning needs. It also set 2030 as the target for achieving zero carbon. Council's focus is mirrored at a national level, with the government making changes including increased carbon prices, and growing expectations of local government to work with communities on solutions.

The climate change work programme has two work streams, Climate Change Adaptation and Zero Carbon 2030 (the later focused on climate change mitigation).

In terms of adapting to climate change, we face significant risks, especially relating to sea level rise and adverse weather events causing flooding.

Of particular concern is the South Dunedin area, which sits on reclaimed land, has high groundwater levels, and is extremely vulnerable to sea level rise from climate change. It has around 4,500 homes, housing 10,000 people. As part of the Climate Change Adaptation work, the "South Dunedin Future" programme is being developed with the Otago Regional Council, to respond to these issues. This is also being done in consultation with the community, central government and other stakeholders.

The Zero Carbon 2030 work programme has targets in two parts as follows:

- net zero emissions of all greenhouse gases other than biogenic methane by 2030, and
- 24% to 47% reduction below 2017 biogenic methane emissions by 2050, including 10% reduction below 2017 biogenic methane emissions by 2030.

While the target is for the whole city, it also includes reducing emissions from Council's own activities, which have been measured since 2013/14.

To achieve this target, the way services are delivered needs to change. The focus to date has been on developing policies and processes to ensure that emissions are considered in all decision making on major projects, and in the Council's procurement practices. For this 10 year plan, transport and waste have been identified as priority areas for investment to reduce emissions. While the cost of capital is likely to be higher for solutions that will reduce emissions, it is anticipated that there will be savings in the ongoing associated operating costs.

Council's Zero Carbon 2030 target will only be achieved by the whole community working together. A key focus during 2021/22 will be the development of a Zero Carbon Plan for Dunedin, where the community and key stakeholders will help Council decide how to invest and partner to achieve its target. Until the Zero Carbon Plan has been developed, an assumption has been made that the target will be able to be met without the need to purchase carbon offsets. Potential implications of not achieving this are discussed in the Significant Forecasting Assumptions section of the 10 year plan.

3 Waters reform

In July 2020, the Government launched the 3 Waters Reform Programme, a three-year programme to change the way three waters service (drinking water, wastewater and stormwater) are delivered.

Rather than having 67 individual councils providing three water services, the Government plans to have a small number of larger regional entities that would provide these services, to realise economic, public health, environmental, and other benefits.

In July 2020, the Government announced a $761 million stimulus funding package to maintain and improve three waters infrastructure, support the three-year reform programme, and support the establishment of Taumata Arowai, the new Water Services Regulator.

Funding has been given to those councils that have agreed to participate in the first stage of the reform programme. This included Council signing a Memorandum of Understanding with the Government, agreeing to work together to help identify an approach to the delivery of water services.

The Council's share of the stimulus funding is being used to improve Dunedin's three waters pipeline infrastructure networks.

At this time there is not enough information to meaningfully engage on what the reform means for Dunedin, and so this 10 year plan provides for the Council to continue to provide three waters services throughout the 10 year period. This approach is being taken by all Councils as recommended by the local government sector.

Changing population, land use and rating base

We have undertaken a review of growth projections that we had developed prior to COVID-19. That review suggests that net migration (international and domestic) is expected to be near zero during 2020 – 2024 because of COVID-19 border restrictions. Domestic migration is expected to be relatively resilient with strong inflows of students moving to Dunedin to go to study. Dunedin's population is predicted to grow at a higher rate from 2024 until 2038, when it could reach 142,318. From 2038 onwards, the population rate is predicted to return to a medium growth rate.

Dunedin's population is ageing, with 21% of the population projected to be 65 years or over by 2068, compared to 16% in 2018. Most of the growth in this population group is forecast to occur between 2018 and 2038.

Housing is projected to grow from 52,747 in 2018 to 60,511 in 2038, as a result of population growth, an ageing population and the changing make up of families and households.

Land use changes are expected to allow for housing growth. Investment of $77 million for essential services to enable growth has been provided for in the 10 year plan, for water assets. The work on transport growth has yet to be factored in.

Any impacts of these projections being different are discussed in the Significant Forecasting Assumptions section of the 10 year plan.

Ability to deliver on the planned capital programme

The Council's planned capital expenditure programme represents a significant uplift from the last 10 year plan, with renewals a key area of focus. The challenge for Council will be its ability to deliver this programme, acknowledging that the annual targets are higher than previous achievements, and the lead time for delivery is always longer than anticipated. These risks will be managed through improved forward planning, early contractor engagement, innovative procurement strategies, and strong disciplines around project management and monitoring to ensure progress is on track.

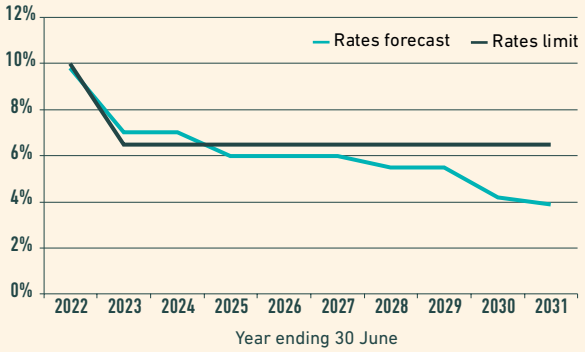
Strategic financial limits

Rates

The Council recognises that rates need to be at an affordable level overall, and that it needs to balance affordability with increasing costs of delivering core services. This strategy assumes that affordability will be maintained, and that the Dunedin average residential rates are below the national average for city councils around the country.

The Council will limit the rate increase to 10% for the first year of the 10 year plan and an average of 6.5% per annum across years 2 to 10. These increases are due to the operating impacts of the capital expenditure programme, inflationary pressures on Council costs and ensuring the Council has a sustainable operating result after removal of non-recurring/non-cash revenue items.

Forecast rates increase 2022-2031



As part of this 10 year plan, we consulted on an enhanced kerbside waste collection service. This will come at an additional cost and recovery from rates revenue is included in the limits discussed above.

Residents on low incomes will continue to be encouraged to access the rates rebate scheme offered by central government as a means of offsetting the cost of rates. We will also continue to maintain our rates remission and rates postponement policies.

Debt

The use of debt allows the financial burden of new capital expenditure to be spread across a number of financial years, recognising that the expenditure is on intergenerational assets, i.e., the assets have a long life and generate benefits both now and to future generations.

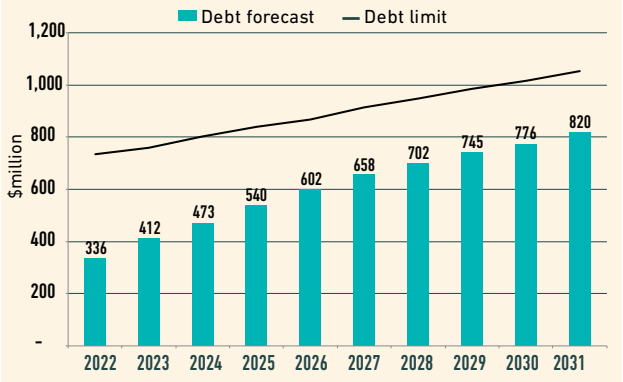
Debt is also used to fund the portion of capital renewals that is not covered by funded depreciation.

In the last 10 year plan, the debt limit was fixed at $350 million. This limit is not sufficient to fund planned investment in capital projects and does not recognise the impact of changing costs and/or activity.

In response to this, Council approved changing the debt limit from a fixed amount to a variable amount calculated as a percentage of revenue. The gross debt limit for this 10 year plan is set as 250% of revenue. This means that our debt level will be responsive to change and will move in line with the level of our activities. This revised debt limit will allow flexibility to deliver the planned capital expenditure programme, while also having capacity to fund potential unplanned events.

The following chart shows the forecast 10 year borrowing from 2021 to 2031.

Forecast borrowing for the years ending 30 June 2022-2031



Over the 10 year period, the debt required to fund the planned capital investment does not reach the 250% of revenue limit.

This debt limit is considered financially prudent, as it sits within the lending limits set by the Local Government Funding Authority (LGFA). The LGFA equivalent metric is based on net debt, where net debt is defined as gross debt less liquid financial assets and investments.

The Council has significant liquid assets and investments to provide a partial offset to gross debt. As at 30 June 2020, these included the Waipori Fund of $94.2 million, an investment property portfolio of $95.7 million, and a Dunedin City Holdings Ltd interest-bearing shareholder advance of $112.0 million.

Operating surplus

The Local Government Act 2002 requires councils to have a balanced budget unless it is prudent to do otherwise. This Financial Strategy will ensure that each year of the 10 year plan has a positive operating surplus.

Further to this requirement, the Council needs to ensure that the everyday costs of running the city can be funded from the everyday revenue. For the purposes of achieving this, everyday revenue excludes some capital expenditure funding items (e.g., Development Contributions, Non-Recurring Waka Kotahi NZ Transport Agency capital subsidies) and any non-cash income (e.g., Vested Assets, fair values gains related to the Waipori Fund investments) as these items are not 'everyday revenue' and/or cash generating. The 10 year plan will aim to achieve this requirement within the period of the plan and ensure it is sustainable into the future.

Surplus funds

In general, any surplus funds will be used to repay debt, invest in Dunedin, and help pay for priority projects.

In deciding to dispose of an asset, the Council may consider the option of using the proceeds to invest in an income generating asset (e.g., Waipori Fund) rather than pay down debt. The Council would elect to do this at the time of the approval to dispose.

Security for debt

Council's policy is to give rates as security for our debt. Most of our borrowing will be done through our group company Dunedin City Treasury Limited.

Strategic asset investment

Council will prioritise funding maintenance and renewals as per its Asset Management Plans. These are regularly updated to reflect changing needs and emerging risks that will ensure resilience of Council assets and services. Asset management planning focuses on asset condition, risk assessment, planning and delivery opportunities, and long term asset solutions that provide value for residents, businesses and the environment.

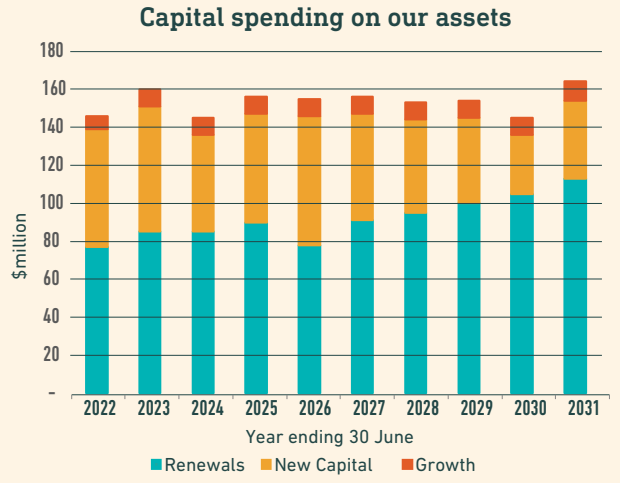
This Financial Strategy is closely linked to the Infrastructure Strategy so significant issues such as these can be properly considered. Updated information has been used to make decisions about assets that need renewing over the 10 year plan. The Infrastructure Strategy expands this timeframe out to 50 years and gives greater confidence around how this work can be paid for in the longer term.

The Council is planning to invest in projects that will provide resilience for our city and enhance amenity levels. Some of the significant projects to upgrade or continue to improve services include:

- improving the resilience of Dunedin's transport system, water supply and stormwater infrastructure
- responding to infrastructure needs for our growing population
- minimising transport disruption during and after the construction of the new Dunedin Hospital
- upgrading the central city area

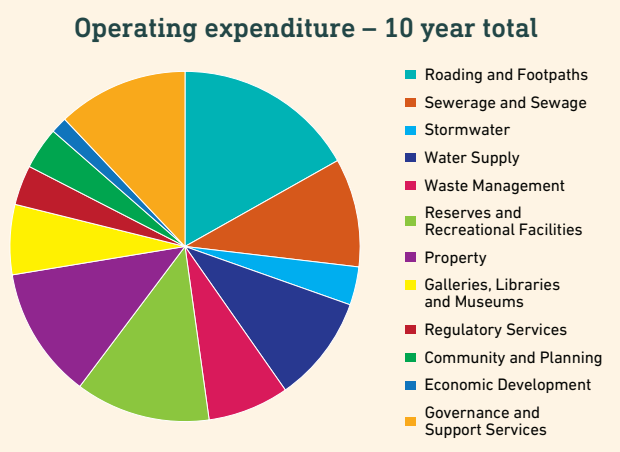
- investing in flood alleviation in South Dunedin
- investing in reducing our carbon emissions through waste minimisation initiatives
- investing in a new modern landfill to replace the current facility at Green Island

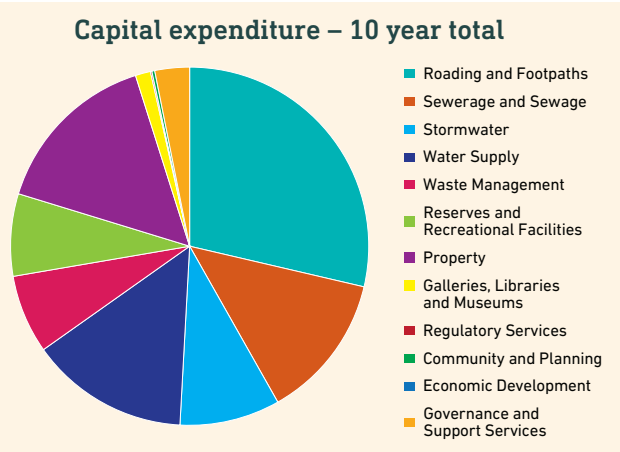
The graph below shows planned capital investment over the next 10 years.



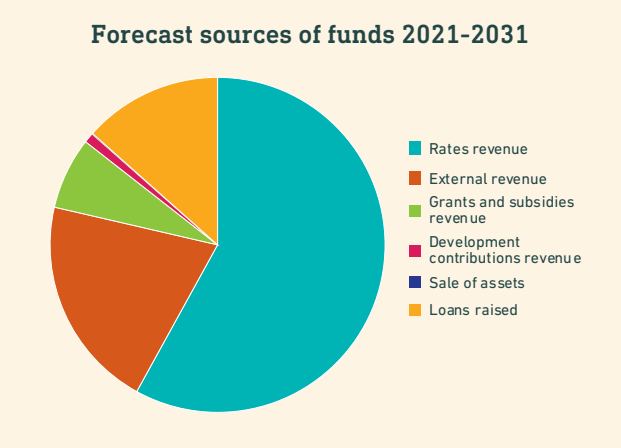
Maintaining services

The Council will continue to fund and deliver the full range of services currently being offered, maintaining current levels of service over the 10 year period. In some areas, there will be some increased levels of service with planned investment in new projects, building resilience and preparing for future growth.





The Council's activities and services provided, and investment in infrastructure will be paid for using the following sources of funds over the 10 year period.



Financial resilience

The Council needs to have the ability to respond to unplanned events, such as natural disasters, civil defence emergencies and pandemics. These events can result in significant unplanned operating and capital costs.

If a significant event occurs, the Council has a range of options for funding unbudgeted expenditure within the financial strategy limits, including rates, debt, insurance, Government funding for infrastructure assets, financial assets and reprioritisation of existing budgets.

Managing investments and Council-owned companies

The Council holds a range of investments, including Council-owned companies, investment property and the Waipori Fund. These investments are designed to provide ongoing non-rates income over the medium to long term as well as a partial offset to gross debt as discussed above.

Investments

Waipori Fund

Established in 1999, using proceeds from the sale of the Waipori electricity generation assets, the Waipori Fund is a diversified investment portfolio comprising both fixed interest deposits and equity investments.

The Fund is managed by Dunedin City Treasury Limited on behalf of Council, using the Statement of Investment Policy and Objectives (SIPO) approved by Council. The SIPO defines the primary objectives of the fund to be:

- Maximise its income, subject always to a proper consideration of investment risk and;
- Grow the Fund's base value, while maintaining an agreed cash distribution to Council.

The fund value at 30 June 2020 was $94.2 million.

Investment property portfolio

Council owns an investment property portfolio comprising a mixture of property types, including a number located outside of Dunedin.

The minimum target return from Council's investment properties is to be greater than the weighted average cost of funds.

The portfolio value at 30 June 2020 was $95.7 million, broken down as follows:

Investment property	$ million
Dunedin retail	28.500
Dunedin parking	25.000
Dunedin other	10.690
Christchurch	7.900
Wellington	15.400
Auckland	8.250
Total	95.740

Shareholder Advance
Council has provided an interest-bearing shareholder advance to Dunedin City Holdings Limited of $112 million, which has an associated annual income stream of $5.9 million.

Council-owned companies
Council-owned companies (CCOs) are an important component in this Financial Strategy.

While they are valuable assets in terms of their capital value, the income they generate can be used to keep down the levels of funding required from ratepayers. In more recent years, the revenue Council has expected to receive from the companies has been unrealistic. This, coupled with stadium-related debt pressure and the need for group companies to re-invest, has created a degree of financial uncertainty for the Council when trying to adopt budgets and set rates.

Group companies are in a rebuilding phase and investing in their own infrastructure – particularly important in the case of lines company Aurora Energy which has infrastructure that needs to be replaced.

In addition, Dunedin City Holdings Limited (DCHL), which owns the companies on behalf of the Council, continues the process of building financial headroom so that the Council can receive a steady income stream in the future. Any volatility in group annual earnings will be absorbed by DCHL so that the Council can be certain about the money it will receive.

The 10 year plan assumes income from CCOs of $5.9 million per annum being the current interest on the shareholder advance to DCHL ($112.0 million). In the event the interest rate is renegotiated down, it is anticipated any difference to the $5.9 million would be made up by a compensating dividend stream.

The 10 year plan does not include any additional revenue in the form of dividends from group companies. The Council will continue to work with Dunedin City Holdings Limited to explore the option of a dividend stream in the future, on the basis that any dividend delivered can be sustained.

DUNEDIN CITY COUNCIL

Financial Strategy Information

	Budget 2022 $000	Budget 2023 $000	Budget 2024 $000	Budget 2025 $000	Budget 2026 $000	Budget 2027 $000	Budget 2028 $000	Budget 2029 $000	Budget 2030 $000	Budget 2031 $000	Overall 2022-31 $000
Debt											
Debt forecast	335,948	411,769	473,028	539,579	601,960	657,530	702,430	745,429	776,413	820,252	
Debt limit (at 250% of revenue)	735,965	759,818	801,598	838,755	866,650	913,358	949,615	986,088	1,015,940	1,053,218	
Total revenue	294,386	303,927	320,639	335,502	346,660	365,343	379,846	394,435	406,376	421,287	
Gross debt limit (less than 250% of revenue)	114.1%	135.5%	147.5%	160.8%	173.7%	180.0%	184.9%	189.0%	191.1%	194.7%	
Target Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	
Rates Increase											
Rates revenue	179,124	191,664	205,077	217,372	230,421	244,239	257,666	271,826	283,234	294,293	2,195,792
Increase	9.80%	7.00%	7.00%	6.00%	6.00%	6.00%	5.50%	5.50%	4.20%	3.90%	5.68%
Limit (less than 10% in 2022 then 6.5% on average for 2023-2031)	10.00%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%
Target Achieved	Achieved										Achieved
Operating Surplus											
Operating surplus greater than zero	8,117	8,141	7,197	10,300	8,902	13,914	16,640	14,911	14,288	15,813	
Target Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	
Balanced Budget											
Operating surplus	8,117	8,141	7,197	10,300	8,902	13,914	16,640	14,911	14,288	15,813	
Less:											
Development Contributions	(3,467)	(3,544)	(3,622)	(3,702)	(3,785)	(3,868)	(3,718)	(3,801)	(3,885)	(3,973)	
Vested Assets	(3,000)	(3,000)	(3,000)	(3,000)	(3,000)	(3,000)	(3,000)	(3,000)	(3,000)	(3,000)	
External Subsidies for new capital projects	(14,405)	(8,293)	(10,655)	(9,635)	(6,296)	(9,588)	(7,344)	(5,434)	(3,978)	(4,641)	
Gain on fair value of investments	(1,026)	(1,063)	(1,102)	(1,142)	(1,183)	(1,226)	(1,271)	(1,317)	(1,365)	(1,415)	
Balanced budget surplus/(deficit)	(13,781)	(7,759)	(11,182)	(7,179)	(5,362)	(3,768)	1,307	1,359	2,060	2,784	
Target Achieved	Not achieved	Not achieved	Not achieved	Not achieved	Not achieved	Not achieved	Achieved	Achieved	Achieved	Achieved	
Group Financial Income											
Dividend received – Dunedin City Holdings Limited	–	–	–	–	–	–	–	–	–	–	
Shareholder Advance Interest received – Dunedin City Holdings Limited	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	
Total income from group companies	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	
Target Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	

he rautaki haka infrastructure strategy

Executive summary

This document sets out the Dunedin City Council's (DCC) strategy for managing drinking water, wastewater and stormwater (3 Waters) and transport infrastructure for the next 50 years. The strategy covers infrastructure assets operated by the DCC.

The purpose of this strategy is to:

- identify the significant infrastructure issues facing the DCC for the next 50 years
- identify how the DCC will manage the issues identified and any implications
- set out the most likely scenario for managing the city's network infrastructure to 2071.

Projects identified in the first 10 years of the strategy are funded as part of the DCC's 10-year plan. The 10 year plan provides for approximately $1.5 billion of capital spend over the 10 year period, and of this, approximately $1 billion is for 3 Waters and transport infrastructure. There is less certainty around the issues and options for the period 2031 to 2071 and projects identified beyond the first 10 years of the plan are currently unbudgeted.

Strategic priorities for network infrastructure

3 Waters

The strategic priorities for the 3 waters network are:

- meeting the water needs of the city for the next 50 years from existing water sources
- adapting to a variety of future scenarios for climate change and fluctuations in population
- reducing our reliance on non-renewable energy sources and oil-based products
- improving the quality of our discharges to minimise impacts on the environment
- ensuring that, as a minimum, key service levels are maintained into the future
- limiting cost increases to current affordability where practical
- adopting an integrated approach to management of the 3 Waters and embracing the concept of kaitiakitaka.

Transport

The strategic priorities for Dunedin's transport network are:

- improving Dunedin's road safety record
- providing safe, viable transport choices
- strengthening connections to, within and between Dunedin's centres
- supporting safe and efficient freight movement
- ensuring the ongoing resilience of Dunedin's transport system and key infrastructure.

The current state of Dunedin's network infrastructure

Water supply

Due to significant investment in the city's water supply assets over the past two decades, Dunedin City has high quality drinking water that complies with the Ministry of Health Drinking Water Standards. However, there are capacity issues in some areas of the network and some of the smaller, rural plants need work to improve reliability of treatment standards. In addition, as the infrastructure has been developed over a long period of time, some infrastructure does not meet today's requirements such as required fire flow pressures.

Wastewater

While the majority of the city's wastewater treatment plants are generally in good condition, there are many mechanical and electrical plant items that are reaching, or have reached, the end of their asset life. There are also some areas of the network and that are in poor condition due to the age of the pipes, resulting in stormwater and groundwater infiltrating the network, which can lead to wastewater overflows and 'wash-out' of the treatment plant process, particularly during heavy rainfall events and high tide. The condition and reliability of the rural wastewater systems vary across the five schemes.

Stormwater

The provision of stormwater services across the city includes the DCC, Otago Regional Council (ORC) and private watercourse (both open and piped) infrastructure. During heavy or prolonged rainfall, the drainage network no longer copes with flows in some areas, resulting in damage to property. Flows have increased due to changing climate and rainfall intensities, but also from development of the surrounding land. Issues can arise when a private watercourse has not been maintained or when private pipes are no longer of a size to safely convey flows.

Transport

There has been limited increases in renewals investment in the Dunedin transport network over the past five years, however, the cost of delivering renewals has increased by approximately 50%. The network has deteriorated as a result. Footpaths are generally in poorer condition than the roads. The city suffers from high crash statistics, particularly between motor vehicles and vulnerable roads users (i.e. cyclists and pedestrians). Resilience in the transport network infrastructure is under increasing pressure as many assets are becoming more at risk from flooding, erosion and king tides. Generally, the network has sufficient capacity with congestion only experienced in short morning and afternoon commuter peaks. Gaps still exist in the cycling network across the city with approximately 50% of the strategic cycleway network currently implemented.

Significant infrastructure issues and options for Dunedin

Regulatory, legislative and service delivery changes

The New Zealand Government is undertaking a substantial change programme that is expected to impact Dunedin's infrastructure services in the coming years. This includes reform of three waters regulatory and service delivery arrangements, freshwater reforms, review of the resource management system, changes to the way we provide for and manage urban growth, and reform of government and industry procurement systems. In addition, the Government Policy Statement on land transport, which sets out the Government's strategic direction for the land transport system over the next 10 years, is issued every three years.

3 waters regulatory and service delivery reform

The 3 waters industry is entering a period of significant change:

- there is a drive to improve the environmental performance of wastewater and stormwater systems
- drinking water regulation is changing
- a new water services regulator, Taumata Arowai, has been established
- the Government has proposed substantive reform of the 3 waters service delivery model, including the establishment of public, multi-regional water services entities, in response to affordability and capability challenges facing the sector.

More stringent regulation of 3 waters activities means that current levels of service will need to increase. Government funding for accelerating investment in 3 waters assets has already begun in connection with the Government's Three Waters Reform Programme.

Essential Freshwater Programme

The Government has also introduced changes to freshwater regulation through the Essential Freshwater Programme, which relate to the environmental regulation of stormwater and wastewater discharges and protection of drinking water sources.

The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) came into effect in September 2020. Regional councils are required to notify new or amended regional plans that give effect to the NPS-FM 2020 by 31 December 2024. These changes will have significant flow-on effects for 3 waters activities, through anticipated changes to permitted activities and more stringent requirements around discharges. Changes to engagement requirements are also expected which will promote tangata whenua involvement in freshwater management and decision making, and to ensure Māori freshwater values and the principals of Te Mana o te Wai are identified and provided for.

Resource management system review

In 2020, an independent panel appointed by the Minister for the Environment completed a comprehensive review of New Zealand's resource management system. The review's scope included looking at the Resource Management Act 1991 and its interfaces with the Local Government Act 2002, the Land Transport Management Act 2003, and the Climate Change Response Act 2002. The review recommended that the current Resource Management Act be replaced with three new pieces of legislation; a Natural and Built Environments Act, a Strategic Planning Act and a Managed Retreat and Climate Change Adaptation Act. The panel's report is expected to be followed in 2021 by consultation to develop government policy and a framework to link together the key pieces of legislation.

Urban Growth Agenda

The Urban Growth Agenda is a Government work programme that aims to remove barriers to the supply of land and infrastructure and make room for cities to grow up and out. It has five interconnected focus areas: infrastructure funding and financing; urban planning; spatial planning; transport pricing; and legislative reform.

The National Policy Statement on Urban Development 2020 (NPS-UD 2020) came into effect on 20 August 2020. The NPS-UD contributes to the Urban Growth Agenda by addressing constraints in New Zealand's planning system to ensure it enables growth and supports well-functioning urban environments. The NPS-UD 2020 categorises Dunedin as a tier 2 urban environment, bringing into effect a range of provisions relating to the amount of development capacity required to be serviceable with infrastructure.

Government Policy Statement on land transport

The Government Policy Statement on land transport (GPS) sets the Government's priorities on land transport investment over the next 10-year period.

The strategic priorities for GPS 2021 are:

- Safety – developing a transport system where no-one is killed or seriously injured
- Better Travel Options – providing people with better transport options
- Improving freight connections
- Climate Change – developing a low carbon transport system that supports emission reductions.

Investment in the transport network is typically co-funded by Waka Kotahi New Zealand Transport Agency (Waka Kotahi). Co-funding levels in DCC transport investment are generally linked to the level of alignment with the GPS.

The DCC's response

The DCC is managing the regulatory and legislative issues for 3 waters by undertaking strategic planning for network and treatment assets and progressing a proactive and comprehensive transition work programme to prepare for 3 waters reform. These projects include:

- asset management and policy improvements
- asset ownership options
- strengthening regulation
- servicing growth
- contract and capital delivery improvements
- system planning.

Replacing and renewing Dunedin's ageing infrastructure

Some assets of the 3 waters and transport networks require replacement based on their age and the likelihood they will not be able to maintain service levels in the future. Issues include cracked earthenware sewers letting in groundwater and causing overflows, and the transport network becoming unsafe. Without continued spending on renewal of these assets they are likely to deteriorate further. The DCC will increase spending on renewals over time. In some circumstances, 'like-for-like' renewals may no longer be enough to meet the needs and expectations of the community and regulators. This means it is likely the proportion of new capital against renewals funding will increase to allow for upgrades, particularly as the Government's 3 waters regulatory reform programme is implemented over the coming years.

The DCC will manage the renewal and replacement of ageing infrastructure by planning to renew assets as they reach the end of their useful lives or are in poor condition and to increase the level of renewal delivery year on year. There is also the ability to re-allocate funding from later years through the Annual Plan process to accelerate renewals if increased delivery is achieved. Renewals are targeted in areas with the highest risk and where possible are programmed to enable efficiencies between 3 waters and transport projects.

Responding to changes in demand for infrastructure

The DCC growth projections indicate Dunedin's population will increase from 126,255 (2018 Census) to be 144,249 by 2068. This will have an impact on the city's infrastructure.

3 waters and transport are planning for growth through specific capacity assessments and targeted capital works to meet projected demand.

The DCC is seeing growing diversity of travel choice across Dunedin; public transport, walking and cycling continue to be increasingly attractive options for people to get around the city or to and from work. The DCC will continue to invest in infrastructure to support and enable all transport modes across the city.

The Dunedin City District Plan controls what people can do on their land and how it can be developed. The main goal of the District Plan is to sustainably manage the natural and physical resources of Dunedin to meet the needs of current and future generations and to provide for their social, economic and cultural wellbeing and for their health and safety.

Under the Resource Management Act 1991, the DCC is required to review the District Plan every 10 years. A full review of the first Plan started in 2012. This review produced the Proposed Second-Generation Dunedin City District Plan, known as the 2GP. The 2GP is an entirely new plan, with a new format, new zones, objectives and policies, and many rule changes. The DCC must provide infrastructure to service relevant areas within the 2GP. The DCC initiated variation 2 to the 2GP on 12 February 2019. The purpose of the change was to identify targeted actions to address the shortfall in housing capacity over the next 10 years, in order to meet the DCC's obligations under the National Policy Statement for Urban Development.

The DCC will manage the response to changes in demand for infrastructure by planning and investing for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onwards. The 2021-31 capital programme is funded to investigate, and design new infrastructure required for the 2GP and Variation 2. The delivery of new infrastructure for 2GP and Variation 2 will be undertaken within the first 10 years of the programme and will be prioritised on demand in different areas. Remaining lower demand areas for 2 GP and Variation 2 infrastructure will be delivered over a longer period.

Public health and environmental outcomes

The 3 waters and transport networks provide important public health benefits to the community and deliver services which can impact on the natural environment. The provision of drinking water, wastewater and stormwater services directly affect public health and environmental outcomes through providing safe drinking water and management of wastewater and stormwater discharges. The provision of a safe and reliable transport network that supports the use of active transport modes directly affects public health through reduced road trauma and connected communities that are fit and healthy.

The DCC will manage the response to public health and environmental outcomes by increasing investment over time through existing renewals programmes and planning for changes to regulation and legislation.

Resilience to natural hazards

Natural hazards pose a lesser risk when infrastructure networks are resilient. Flooding, drought, catchment fire, landslides, rising groundwater and liquefaction in the event of an earthquake pose the most significant risks to Dunedin's infrastructure. The DCC is working to improve it's understanding of natural hazards and to develop options for resilient infrastructure networks into the future, including route resilience.

The DCC will manage this issue by ensuring investment in renewals and new capital specifically considers reducing the risk arising from natural hazards and where possible considers adaptive planning. Renewing aging infrastructure in flood prone and coastal erosion areas will reduce some risks arising from natural hazards. The DCC will continue to fund projects to improve the resilience of the water supply, wastewater, stormwater and transport network. Alpine Fault Quake Resilience and Lifelines resilience projects will also improve help resilience of the 3 waters and transport networks.

Planned increases or decreases in levels of service

The 3 waters industry is entering a period of significant change. The Government's reform programme is likely to require an increased level of service over time. Through strategic planning and improving asset management, the DCC will assess the costs and benefit of projects to meet new levels of service to ensure the best practicable options are implemented.

The transport levels of service for this 10 year plan demonstrate alignment with the GPS on Land Transport. Infrastructure investment to support active transport modes and public transport will continue to be invested in to improve levels of service in these areas. There are also opportunities to make amenity and service improvements in the central city through the Central City Plan projects to make the city more vibrant, support growth and to attract people to Dunedin.

The DCC will manage this issue by focusing on renewing infrastructure to reduce the risk of declining service levels and to increase resilience, while also investing in improving strategic service levels as planning and delivery capacity allows.

Zero Carbon 2030 target

In June 2019, the Council declared a climate emergency. The 'Zero Carbon 2030' target seeks to achieve city-wide net carbon neutrality (excluding biogenic methane) by 2030. The transport sector is Dunedin's most significant, and fastest growing, source of emissions. Emissions from this sector are closely linked to urban form, which in turn is greatly influenced by the provision of transport and 3 waters network infrastructure. Trends suggest that with increasing investment in infrastructure to improve the levels of service for active and public transport modes, there is a slow increase in uptake, and with increasing intensification of urban form, these trends are likely to continue.

Alignment of infrastructure provision with the Zero Carbon 2030 target will focus in the first instance on improving data quality, and amending internal policy and processes to ensure emissions reduction is central to strategic urban planning. In parallel, immediate capital investment in the transport network will be focused on projects that support mode choices.

The plan to address Dunedin's network infrastructure issues over the next 50 years

Dunedin is planning and investing for a medium-high growth scenario over 2021-28 and a medium growth scenario from 2029 onward. Because of this, significant work is required to enlarge and expand Dunedin's existing infrastructure. Renewals programmes and specific projects are also needed to address risks to health and safety, public health, levels of service and the environment, and to respond to new regulatory requirements.

In the short term, major renewals are needed at water treatment plants to ensure they continue to meet the Ministry of Health Drinking Water Standards and major renewals within the wastewater network and treatment plants are needed to ensure discharges will remain compliant and to provide a safe working environment for operational and maintenance staff. As 3 waters resource consents expire, investigations into the capacity of infrastructure, effects on the environment and working in partnership with Iwi will allow best practicable options for new resource consents to be achieved. The DCC will invest in flood alleviation in South Dunedin and Mosgiel, increase water supply resilience via the Port Chalmers and Water Supply projects and improve wet weather flow management on the wastewater networks.

In the medium term, water treatment plants will be upgraded as budgets allow to meet ongoing anticipated improvements in standards. Major renewals of water supply pipelines will also be undertaken to improve drinking water system resilience.

Large scale 3 waters projects are difficult to anticipate in the longer term due to a number of unknowns on how 3 waters reform and increased regulation will progress. However, within the timeframe of this Infrastructure Strategy, most 3 waters buildings and structures will require replacement or significant upgrades to ensure service levels are maintained. Some specific major projects are identified for post-2031 such as the Deep Creek/Deep Stream pipeline renewal and servicing the Variation 2 to the 2GP to enable growth. Further changes to the 3 waters networks may also be required depending on demographic changes within the city. Ongoing strategic planning within 3 waters will produce long-term strategic investment plans for the 2024-34 10-year plan.

The level of investment in transport renewals and maintenance across the city aims to maintain existing levels of service but does assume some transport mode shift associated with growth occurs to mitigate traffic congestion. In the short to medium term, improved planning and increased investment is required for assets such as sea walls, retaining walls and drainage assets in light of changing weather patterns. Overall, the mid to long-term, budgets are set with the aim of maintaining assets at their current condition. The nature and extent of capital programmes required over the longer term is more uncertain, however the impacts of climate change are likely to place pressure on the network's capacity to remain resilient in coastal, flood-prone, low-lying areas and will likely require some mitigation.

Long term investment in the Transport network will need to focus on resilience to natural hazards (e.g. St Clair sea-wall), and consider efficiency and movement of freight and people (Mosgiel heavy vehicle bypass and central city bypass) and an increased level of service in public transport for our city's main commuting populations.

To support the Council's Zero Carbon 2030 target, projects will aim to minimise carbon emissions both in the construction and operational phases. In addition, tight integration of land use, infrastructure and transport system planning will be essential, particularly in the implementation of the National Policy Statement – Urban Development and the development of a Future Development Strategy.

The DCC will continue to invest in relationships with professional and local government bodies such as Water New Zealand, Local Government New Zealand, Society of Local Government Managers, Institute of Public Works Engineers Australasia and Central Government to avoid duplication of effort and identify approaches used by other groups that can be applied in a local context.

Why our infrastructure is important

This section covers the purposes of our various infrastructure networks and explains how they work.

Water supply

Purpose of the water supply network

The purpose of the water supply network is to protect public health by delivering adequate quantities of safe water to water users. Clean drinking water is essential for public health and for the safe and productive operation of many businesses. The DCC provides drinking water services to protect the health of its residents and visitors and to support economic activity.

What's involved in supplying water?

The DCC manages the collection, supply, treatment and distribution of water to domestic and commercial residents in Dunedin. The below list covers the main aspects of the water supply system.

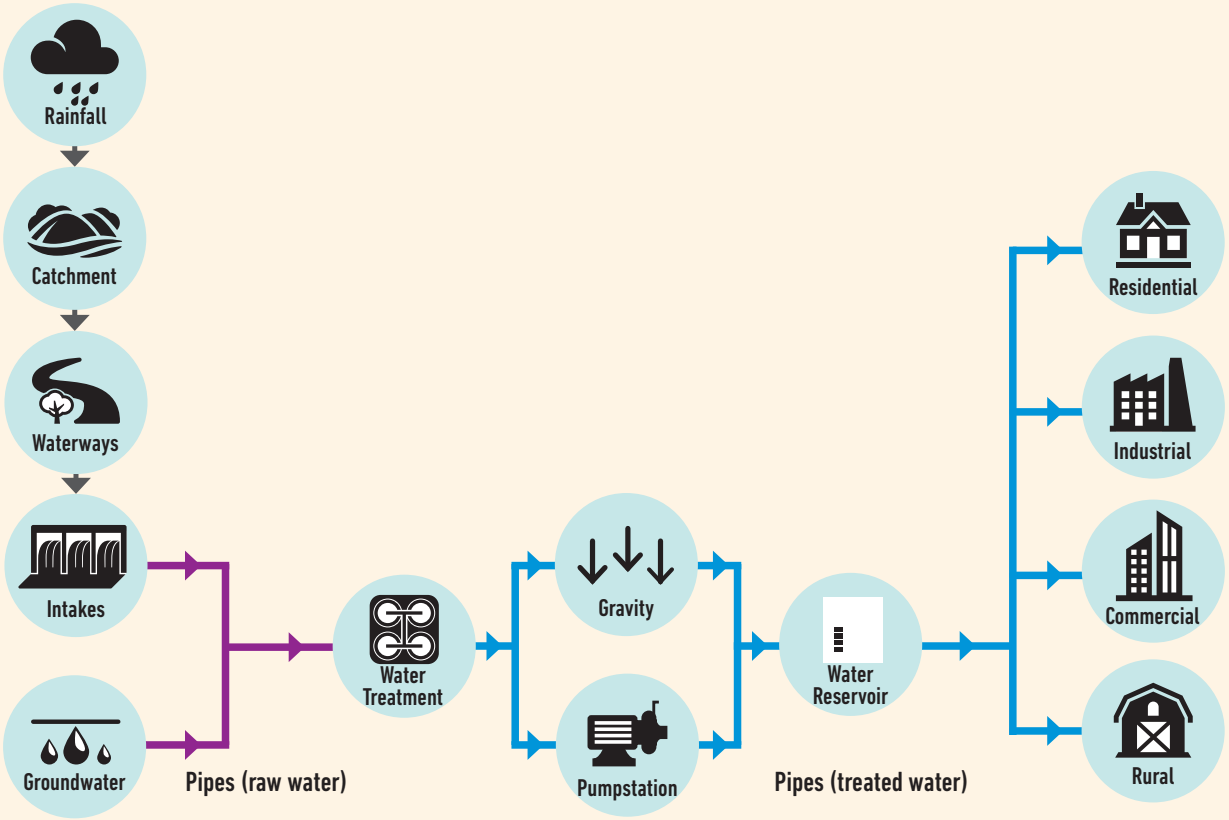
- Catchment: an area where water is collected by the natural landscape. The DCC holds 21,000ha of water catchment within its territory, and most of this land is in the protected Deep Stream and Deep Creek catchments.
- Untreated (raw) water: water that is collected from the catchments.
- Water supply: the main supply pipelines that carry raw water from the catchments to the raw water reservoirs or directly to the treatment plants.
- Treatment: raw water is treated at one of Dunedin's six water treatment plants.
- Distribution: the main pipelines between the treatment plants and the treated water reservoirs.
- Reticulation: pipelines that distribute water from the treated water reservoirs to the property boundary.

Water supply level of service measures

The water supply network provides the following levels of service:

- the water is safe to drink
- service calls are responded to promptly
- the water tastes and looks pleasant
- water is supplied at adequate pressure
- the water supply is reliable
- the Council is responsive to customer concerns
- water resources are used efficiently and sustainably.

How our water supply infrastructure works



Wastewater

Purpose of the wastewater network

Wastewater is taken from commercial and domestic properties via pipes and pumps to one of seven waste water treatment plants in the district. The wastewater system aims to protect the health of the community by providing cost effective, reticulated wastewater services throughout the urban area, and to treat wastewater to a high standard before it is discharged into the environment.

What's involved in the wastewater network?

The DCC manages the collection, treatment and disposal of wastewater from residential and commercial customers across Dunedin. The below list covers the main aspects of the wastewater system.

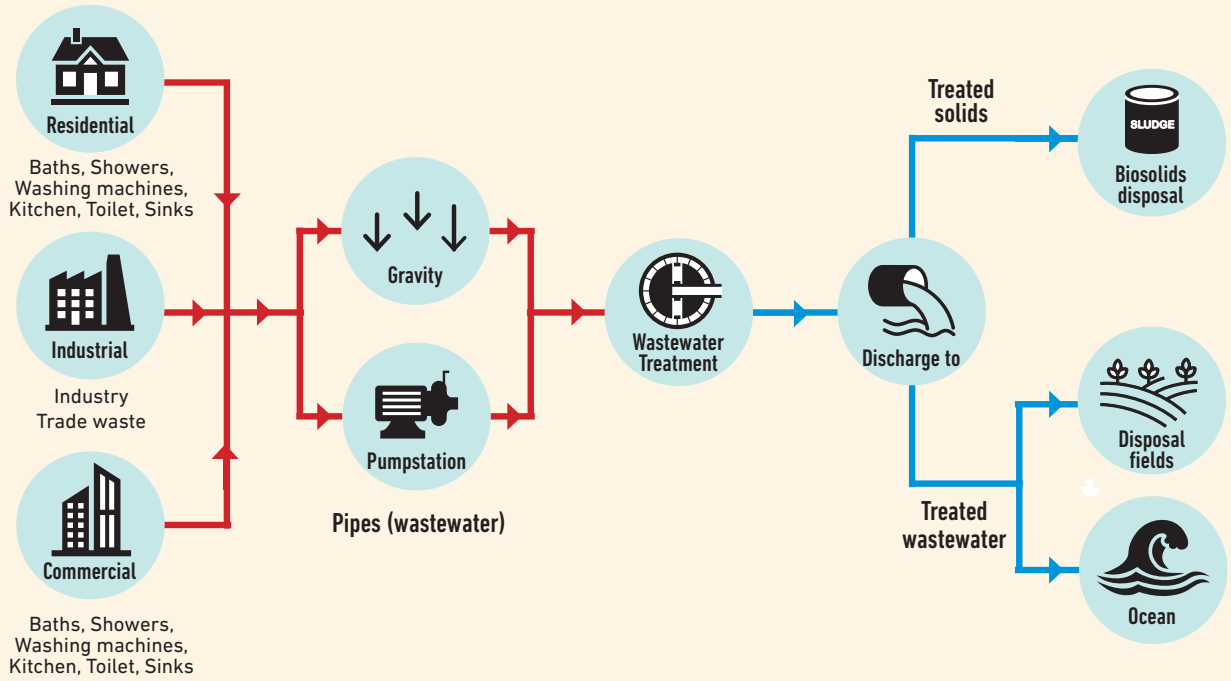
- Reticulation: the network collects wastewater from domestic and commercial private lateral connections. The majority of the 918km of publicly owned wastewater reticulation system operates via gravity, with pipe size varying from 150mm to 1800mm in diameter.
- Pump stations: there are 79 wastewater pump stations throughout the reticulated network that pump wastewater from low points back into the gravity network. A critical pump station located at Musselburgh accounts for half of the wastewater pump station asset base (by value).
- Treatment: the DCC owns seven wastewater treatment plants. The population served by each plant varies from fewer than 100 for the smallest plant (Seacliff) to more than 83,000 for the largest plant (Tahuna). Treated wastewater is then returned into the environment.
- Biosolids: (or sludges) are the major by-product of the wastewater treatment process. They are the organic material that remains after sludge is treated. The vast majority of biosolids are generated by 3 waters wastewater treatment processes (with a small amount from the drinking water treatment process). Currently, Dunedin's biosolids are incinerated at the Tahuna wastewater treatment plant or disposed of at Green Island Landfill.

Wastewater level of service measures

The wastewater network provides the following levels of service:

- sewage is managed without adversely affecting the quality of the receiving environment
- service calls are responded to promptly
- the wastewater service is reliable, and the Council is responsive to customer concerns.

How our wastewater infrastructure works



Stormwater

Purpose of the stormwater network

The stormwater network collects rainwater from the roofs of houses and buildings, footpaths and roads and diverts it to the ground, into waterways or the ocean. Effective management of stormwater is essential to prevent flooding of properties and businesses. Controls are necessary to ensure stormwater does not become excessively contaminated leading to pollution of watercourses, the harbour or the ocean. The DCC is not engaged in flood protection and control works except where it relates to stormwater or to protect assets such as roads.

What's involved in the stormwater network?

The DCC provides reticulated stormwater services to the city and to most areas that also receive reticulated wastewater. When an area is developed, stormwater generally increases due to runoff from impermeable surfaces (e.g. roofs, roads, car parks, or compacted soil). It flows naturally from higher to lower ground, and ultimately discharges into natural watercourses such as wetlands, creeks, rivers or the sea. Land development results in the creation of both private and public stormwater systems. These networks exist co-operatively to collect and transfer stormwater to waterways, and in some cases the marine environment, efficiently minimising damage to downstream assets.

The below list covers the main aspects of the stormwater system.

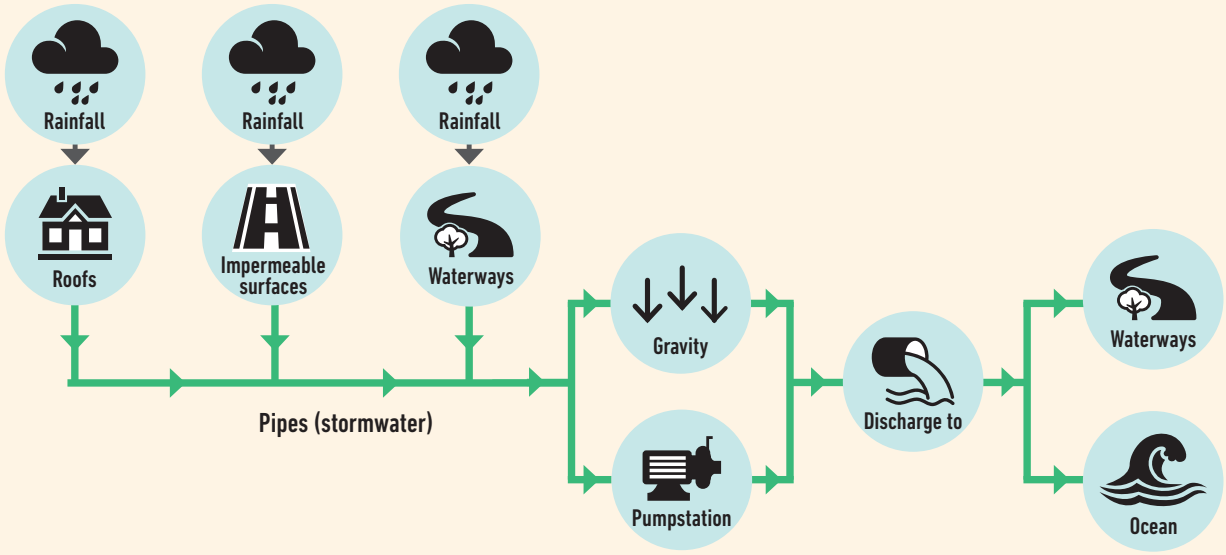
- Reticulation: the reticulated network collects stormwater from domestic and commercial connections, mud tanks and some watercourses, and discharges stormwater into watercourses, streams and the sea. Most of the 378km of publicly owned stormwater reticulation system operates via gravity, with pipe size varying from 100mm to 2700mm in diameter.
- Pump stations: there are 11 stormwater pump stations throughout the reticulated network that pump stormwater from low points back into the gravity network or to discharge points. The most critical pump stations are in South Dunedin and Mosgiel.
- Overland flow paths: structures such as swales direct and convey stormwater overland into the stormwater system.

Stormwater level of service measures

The stormwater network will provide the following major levels of service:

- stormwater services perform adequately and reliably
- stormwater is managed without adversely affecting the quality of the receiving environment
- service calls are responded to promptly.

How our stormwater infrastructure works



Note: Impermeable surfaces include: Footpaths, Driveways, Road surfaces (via Mudtanks) etc.

Transport

Purpose of the transport network

The role of a transport network is to provide access to move people and goods to destinations such as centres of employment, services, and amenities. Transport assets allow people choice about how they move around the city for either commuter or recreational purposes. Roading infrastructure also connects Dunedin to national and international road, rail, shipping and air transportation networks. Land transport investment promotes keeping people in employment, improves productivity, and supports economic growth and connected communities.

What's involved in the transport network?

The DCC manages a large network of transport infrastructure which includes roads (both sealed and unsealed) footpaths, cycle ways, streetlights, traffic signals, signs and road markings, retaining walls, bridges, culverts and seawalls.

The list below covers the main aspects of the transport network

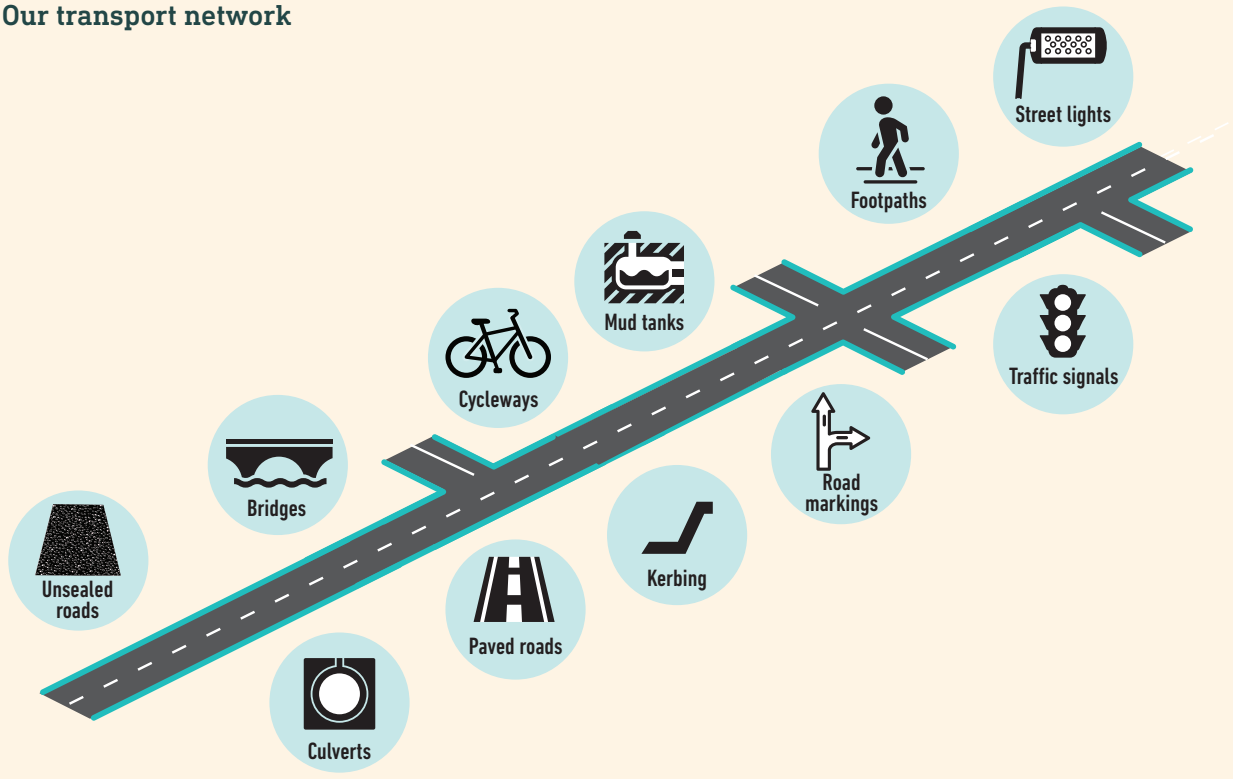
- 1071km of sealed roads
- 695km of unsealed roads
- 968km of footpaths
- 261 bridges
- 42km of seawall
- 8478 mud tanks
- 5742 culverts.

Transport levels of service

The transport network provides the following levels of service:

- the transport network facilitates safe travel
- the transport network facilitates active travel
- the transport network facilitates comfortable travel
- the transport network facilitates accessibility
- the transport network facilitates efficient travel
- the transport network facilitates sustainable maintenance
- the transport network is maintained in a responsive manner
- the use of electric vehicles (EV's) is supported
- minimising transport disruption during and after the construction of the new Dunedin Hospital rebuild will be supported through the Shaping Future Dunedin project.

Our transport network



How the infrastructure strategy contributes to Dunedin's community outcomes

Investing in Dunedin's water and transport infrastructure will contribute to achieving the city's community outcomes and the vision of making Dunedin one of the world's great small cities.

This table shows how key projects link to Dunedin's community outcomes.

Community outcome	Infrastructure projects contributing to the community outcomes
A supportive city with caring communities and a great quality of life	The central city upgrade will improve safety, support growth, support mode choice and contribute to a more vibrant and thriving central city environment for people to enjoy. The tertiary precinct upgrade will enhance safety and accessibility in this area while supporting growth and mode choice, creating a better quality of life through health benefits. The Dunedin urban cycleways will improve road safety for cyclists and continue to close the gaps of the cycleway network across the city. Providing active modes of transport is directly linked to health outcomes. The minor safety improvements programme will support safety and accessibility, particularly around schools and known areas where safety and accessibility are known issues. This will lead to better safety outcomes. The series of major centres upgrades will increase amenity in our major town centres across the city outside of the Central Business District (CBD), which will provide support for retail.
A healthy city with reliable and quality water, wastewater and stormwater systems	Upgrades and replacing ageing assets at the water treatment plants will ensure compliance with drinking water standards to supply adequate safe water to the community. The South Dunedin Flood Alleviation and Mosgiel Stormwater Network Improvement projects will reduce the risk of flooding by improving stormwater management in these areas. Port Chalmers water supply improvements will boost year-round reliability of drinking water to residents of Port Chalmers. Targeted renewals of the 3 waters networks will have a range of improvements in the water system such as supply aesthetics, increased fire flows and reduced supply interruptions. Inflow and infiltration to the wastewater network will be reduced. Upgrades and replacing ageing assets at the Metropolitan wastewater treatment plants will improve treatment reliability and wet weather flow management. Interventions to reduce wet weather wastewater overflows in Kaikorai Valley and South Dunedin will prepare the DCC for anticipated new standards for wastewater treatment and discharges. Rural wastewater scheme upgrades will ensure compliance with regulatory standards and reduce flooding risks. Development and implementation of a long-term Biosolids Strategy will provide sustainable, lower carbon solutions for dealing with Dunedin's waste sludges.
A sustainable city with healthy and treasured natural environments	A series of projects are programmed to improve the resilience of Dunedin's metro water supply for now and into the future. Assessing the ability of 3 waters networks and treatment plants to ensure compliance with new environmental standards and developing best practicable options. The Peninsula connection improvements will increase resilience to high tides and weather events. The LED street lighting upgrade will reduce energy needs.

Community outcome	Infrastructure projects contributing to the community outcomes
An active city with quality and accessible recreational spaces and opportunities	The Peninsula connection improvements will provide for walking and cycling along the Peninsula. Further development of Dunedin's urban cycle ways will encourage cycling uptake. The tertiary precinct upgrade will enhance the pedestrian and cycling environment in this area. The city to waterfront connection will improve accessibility and amenity in the waterfront area and contribute to a more vibrant and thriving city environment. The Shaping Future Dunedin Transport suite of works will improve how people move into, out of and around central Dunedin.
A successful city with a diverse, innovative and productive economy	Investing in increased capacity in 3 waters systems to enable growth in the city. Increasing and maintaining the level of asset renewals within 3 waters will support local and regional infrastructure providers. The central city upgrade will contribute to a more vibrant and thriving central city environment attracting more people to live, work, study and visit Dunedin. The central city upgrades aim to create retail prosperity in the CBD. The city to waterfront connection will improve accessibility and amenity in the waterfront area and contribute to a more vibrant and thriving city environment. The series of major centres upgrades will increase amenity and investment in our major town centres outside of the CBD. The tertiary precinct upgrade will improve the amenity and vibrancy of the streets around Dunedin's tertiary institutions and encourage and support active and public transport use.
A creative city with a rich and diverse arts and culture scene	The Art and Creativity in Infrastructure Policy will embed art and creativity into infrastructure projects.
A connected city with a safe, accessible and low-carbon transport system	The Peninsula connection improvements will improve safety, resilience and walking and cycling options. Further development of Dunedin's urban cycle ways will encourage cycling uptake and close the gaps in the Dunedin network for cycling. The city to waterfront connection will improve accessibility and amenity in the waterfront area and contribute to a more vibrant and thriving city environment. Ongoing annual programme of renewals will maintain existing levels of service across the transport network, including pavement reseals, pavement rehabilitations, seawalls, retaining walls, bridges, footpaths and kerb and channels. The minor safety improvements programme will improve safety and accessibility. The series of major centres upgrades will increase the level of service in our major town centres outside of the CBD.

Where are we now? Dunedin's water and transport infrastructure

This section covers the current condition and situation of the city's 3 waters and transport infrastructure.

3 Waters

As one of the country's earliest metropolitan centres, Dunedin's 3 waters infrastructure pre-dates that of other centres. Some assets are older than 150 years and still operate as essential pieces of the network today. As Dunedin has grown, so have the 3 waters networks, resulting in widely distributed networks with a broad range of pipe materials, diameters and construction methods. As areas were connected to the different networks at different times, there can be wide variation in age, condition and capacity of assets in the same location. As a result of age, many assets need repair and/or replacement. We mainly deliver our operational services in house, but some specialist resources are outsourced such as specialist maintenance providers, consultant services, design services and capital delivery contractors across 3 waters. This strategy does not look to change the service delivery approach as there is little benefit while the 3 Waters reform programme is unfolding.

Water supply

Today, most of the water supply needed for the city comes from the Deep Stream and Deep Creek catchments. This is then treated at Dunedin's two major treatment plants – Mount Grand and Southern – before being distributed for public consumption. In addition, the DCC operates four smaller community water treatment plants: Waikouaiti, Outram, West Taieri and Port Chalmers. The Port Chalmers water treatment plant is only operated during periods of high demand, such as cruise ship season, to supplement the main metropolitan supply.

Wastewater

Dunedin's Main Interceptor Sewer was constructed between 1903 and 1908. This sewer, which has gradually increased in size, is still in use today, running from the Dunedin Railway Station to the Tahuna wastewater treatment plant. It takes wastewater from a large part of the Dunedin metropolitan area, the West Harbour catchment as far as Port Chalmers and the East Harbour as far as Portobello. The second largest wastewater system collates flows from the north-west and west of the city, Brighton and Waldronville and is treated at Green Island wastewater treatment plant. In addition, the DCC operates wastewater networks and treatment plants at Mosgiel, Middlemarch, Warrington, Seacliff and Waikouaiti/Karitane.

As time has progressed, and community expectations around wastewater discharges have changed, treatment plants have been consolidated and upgraded. The most recent major upgrade, completed in 2016, was to the Tahuna wastewater treatment plant, with minor upgrades underway at Seacliff wastewater treatment plant.

Stormwater

Stormwater infrastructure in Dunedin consists of public and privately owned open and piped watercourses, the DCC owned reticulated stormwater networks and Otago Regional Council owned or managed drainage schemes, streams and river systems. As Dunedin has grown, the stormwater network has grown with it.

Increases in the scale and frequency of rainfall events and growing public expectations about the quality of stormwater discharges to the environment are significant challenges to be met by all those who own or manage stormwater infrastructure.

Due to the complex nature of stormwater systems, addressing stormwater issues can be expensive, require specialist skills and a catchment-based approach with the coordination of many individual watercourse owners. The current requirement for private infrastructure owners to maintain their watercourses does not always result in the best overall outcomes for the city and may be better managed by one entity. However, the DCC's drainage rates do not currently make any allowance for maintaining infrastructure identified as privately owned.

Transport

Dunedin's transport network is relatively complex in comparison to most provincial centres. It is made up of a diverse range of assets and has an equally high mix of urban and rural roads within a varied topography. Footpaths are generally in poorer condition than the roads. Maintaining transport levels of service is supported by the funding arrangements with Waka Kotahi year on year.

Resilience in the road network is an ongoing issue as many roads across the city are at risk from flooding, erosion and king tides. Heavy vehicle movements continue to put pressure on road pavements and deterioration of roading assets is being observed. This is particularly evident on roads from the south to the Port and the inner harbour. Certain routes across Dunedin are seeing congestion in short commuter peak travel windows.

In addition, the city suffers from the social cost of road trauma with reasonably high crash statistics across the city. Crash statistics are particularly high between motor vehicles and vulnerable road users such as pedestrians. Gaps exist in the strategic cycling network with approximately 50% of the network currently implemented across the city.

Maintenance services are outsourced via a 10 year maintenance agreement with Fulton Hogan. Other capital works and structure inspections are also outsourced to contractors.

Managing Dunedin's water and transport infrastructure

Today, Dunedin's water and transport infrastructure are worth $4.1 billion (gross asset replacement cost).

3 Waters

Several factors are considered when managing Dunedin's water infrastructure:

- asset age, condition and performance[1]
- changing weather patterns (such as rainfall intensity and drought frequency)
- changes to population or land use
- changes to legislative and regulatory requirements, such as drinking water standards and national policy statements.

When infrastructure assets are not performing as required, or are unable to meet new standards, capital projects are scoped so deficiencies can be addressed. These projects are prioritised based on the criticality of the assets and the likely impact of any loss of service and programmed into 3 waters budgets. Strategic Planning is currently underway for water and wastewater, and will soon commence for stormwater, in the form of system planning. For wastewater it considers from the source (e.g. residential, commercial and industrial customers) to disposal (e.g. the ocean) and for drinking water it considers from the catchment (e.g. a river) to the customer's tap. Long-term optimal solutions can be developed by looking holistically at factors such as capacity, performance, growth, new standards, overflows, and storage.

Funding for infrastructure is categorised in two ways. Renewals funding is targeted at maintaining existing service levels, whereas new capital funding can both maintain existing service levels (where current assets can no longer achieve required outputs e.g. raw water quality changes require increased treatment to maintain standards) or be targeted at increasing levels of service in order to meet modern standards. These standards include new consent conditions for water take and discharge permits, changes to the drinking water standards, health and safety improvements, increasing capacity to meet additional demand and improvements to operational efficiency.

Both renewals funding and new capital funding are often used together on specific projects. The renewal of an undersized pipe will use renewal funding in the 'like for like' replacement portion of the works, while an incremental change in pipe diameter is considered 'new capital'.

Transport

Several factors are considered when managing Dunedin's transport infrastructure:

- asset age, condition and performance
- changes to population and land use
- changes to GPS on land transport
- maintenance to repair defects and preserve remaining life.

Most of the transport network's maintenance, renewal and new capital programmes are subsidised by Waka Kotahi at a funding assistance rate of 53% – 51%. Every year a funding bid is submitted to Waka Kotahi for co-funding the transport network programmes. In recent years construction prices have increased significantly, creating financial pressures in delivering renewal and maintenance programmes with limited Waka Kotahi funding and corresponding DCC share.

This Infrastructure Strategy assumes that there will be constraints in Waka Kotahi funding (partly driven by the impact of the COVID-19 pandemic and current income shortfalls in petrol tax) along with changing priorities for Waka Kotahi funding. In the short term at least, renewals co-funding from Waka Kotahi will be limited to $7 – $8 million per annum, short of the $10 – $14 million per annum based on standard Waka Kotahi subsidy rates of 51% – 53%. Investing in the renewal of the network will continue, to ensure levels of service are maintained. It is anticipated that in the short term at least there will be an additional funding requirement from the DCC. This will be financed through a combination of debt and rates funding over the course of the 10 year plan.

The Dunedin Integrated Transport Strategy 2013 is an overarching strategy covering the whole of Dunedin's transport system and is designed to enable the DCC to review its investment priorities and ensure they are relevant to the current and future needs of Dunedin. It identifies and outlines areas of focus developed from several transport challenges and issues that Dunedin faces. The Strategy focuses on transport choice whilst maintaining the levels of service for road users. A corresponding asset management plan determines a condition-based asset maintenance and renewal programme that sets the level of investment required to maintain the existing transport infrastructure across Dunedin City.

1 3 waters level of service measures are set out in the 10-year plan.

How does the DCC assess the condition of water supply assets?

Methods for assessing the condition of the DCC's 3 waters infrastructure vary by asset type but typically involve visual or physical inspection. Water pipes are more difficult to assess due to the continual flow of water through them. Instead, small sections of pipe must be taken out for inspection. The condition of treatment plants is routinely inspected by DCC staff to ensure assets are appropriately maintained. Specialist engineering advice is used as required. The DCC 3 Waters Group is currently undertaking a series of improvements to water treatment asset condition assessments.

Summary of water supply assets

Asset condition

Significant number of assets in poor condition
Some assets in poor condition
No or few assets in poor condition

Asset capacity

Significant capacity issues currently experienced
Capacity issues in some areas and/or capacity issues can be expected
No or minor capacity issues and none are currently expected

Asset group and type		Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Metropolitan Water Systems including the Dunedin City (Mount Grand, Southern and Port Chalmers) and Mosgiel supplies						
Raw Water Supply	Bore pumps and intake structures	Extract raw water from surface sources – from Deep Creek, Deep Stream (supplying Mount Grand Treatment Plant), Silverstream and tributaries (supplying Southern Treatment Plant), Cedar Farm Creek and Brosnahan's Creek (supplying the Port Chalmers Treatment Plant).	18	3,326	Intakes and pumps in active service are maintained in good condition.	Current risks in supply demand within the network are planned for remedial action within the short – medium term, while longer-term risks will be addressed as part of water system planning to inform the 2024-34 10 year plan. The recent refurbishment of the Ross Creek Reservoir is one of several projects aimed at increasing the security of raw water supply to the Dunedin metropolitan area. Existing capacity, while good, is susceptible to drought and the failure of critical assets. The ability to supply water in such events will be improved when the Ross Creek Reservoir is able to supply Mount Grand Water Treatment Plant via the building of a new supply pipeline.
	Raw water pipelines and pump stations	Take untreated water from source to treatment plants. This includes the Taieri River pipe bridge carrying water from Deep Creek and Deep Stream, and the Puddle Alley and Silverstream pump stations, pushing water from the Taieri bores and Silverstream respectively, up to the Southern Reservoir.	157km pipelines one pipe bridge two pump stations	232,528	The majority of the raw water pipelines are in good condition, however sections of the Deep Stream and Deep Creek pipelines upstream of the Taieri River pipe bridge are in poor condition, with specific concerns relating to the joints between sections of pipe. Enabling supply from the Ross Creek Reservoir will make these pipelines less critical, enabling the renewal of the pipelines to be pushed out while various long-term options are considered. Repairs to the pipelines are made as required.	

Asset group and type		Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Raw Water Supply	Raw Water Reservoirs	Raw water storage for supply to treatment plants (dams), including Port Chalmers (Cedar Farm and Rossville), Mount Grand and Southern reservoirs as 'live' supplies, with Ross Creek and Sullivan's Dam not currently live supplies.	Six	21,454	Raw water reservoirs are managed in accordance with the Dam Safety Assurance Programme (DSAP) overseen by the consenting authority. All raw water reservoirs are in good condition, however ongoing work will be planned as required by the DSAP.	
Water Treatment	Treatment Plants	Plant and equipment used to screen, filter, pH adjust, and disinfect water to meet the Drinking Water Standards New Zealand (DWSNZ), and plant and equipment used to monitor and control individual processes.	Three plants (Mt Grand, Southern and Port Chalmers)	77,319	Plant and equipment at the water treatment plants are maintained in good condition to ensure water produced meets drinking water standards. Recent condition assessments have produced a plan of renewals over the period of the plan to ensure the treatment plants can continue to supply drinking water which meets national standards.	Recent process capacity assessments showed most of the water treatment plants can cope with current and future demand. Where future demand risks have been identified, system planning will produce the best practicable option, which may include plant rationalisation. The Port Chalmers Treatment Plant runs seasonally (October to April), when peak demand from cruise ships is unable to be met by the Dunedin city supply alone. This is an expensive water supply arrangement. Rationalisation of this supply is planned on completion of feasibility studies, which is expected to result in water supply from Mount Grand Water Treatment Plant and a new supply pipeline.

Asset group and type		Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Treated Water Distribution	Treated Water Pipelines and Pump Stations	Transport water from treatment plants around the network, with pump stations boosting water to areas of the network unable to be reached by gravity feed alone. Includes the 25km treated water pipeline connecting the northern water schemes of Waitati, Warrington and Seacliff to the Dunedin City water supply.	989 km pipelines 18 pump stations 23,626 minor point assets (valves, hydrants and meters)	456,364	As with some other 3 waters networks, areas of the network are in excellent condition while other areas are in poor or very poor condition, which affects flow and pressure to customers. Ongoing renewals are targeted at areas of very poor condition. Renewals of flow meters have been stepped up since 2010 but many are still outside their expected lives and are likely to be in poor condition for assets of this type.	Capacity in the treated water network is defined as being where the flow rate of water supplied by an individual fire hydrant within the network meets the requirements of the NZ Fire Service Code of Practice for Fire Fighting Water Supplies (Standards NZ reference NZ PAS 4509:2008). For the Dunedin City and Mosgiel water supplies, some of hydrants across the city are non-compliant with the standard. This generally relates to water mains installed before 1960, where the 100mm diameter pipes were appropriately sized at the time of installation but are undersized for today's demand. In peak summer demand, some pipelines do not meet sufficient capacity and so these are targeted for replacement. A programme of renewals and new capital works targeting these areas is underway, with targeted pipeline renewals as the next package of works, aimed at improving pressure management and fire flows.
	Treated Water Reservoirs	Treated water storage within the network to meet peak demand and ensure supply in the event of network outages.	44	33,159	Regular maintenance means that most city reservoirs are in good condition. Some reservoirs will require replacement within 50 years and have been accounted for as part of the forecast renewals.	
	Service connections	Service lines, tobies, manifolds and backflows preventers connecting private properties to the water network in a safe manner.	44,132	111,597	A significant proportion of service connections in the metropolitan area are older style 'toby' connections. These will be replaced with modern manifold connections when capital works are being undertaken in an area.	
Rural Water Supplies						
Rural Water Supplies	Waikouaiti/ Karitane/ Merton	Extract water from Waikouaiti River, treat to drinking water standards and pump or gravity feed to properties in the Waikouaiti urban water supply area, and the Karitane and Merton rural water supply areas.	one plant 96 km pipelines three pump stations 2,638 minor point assets (valves, hydrants and meters)	28,485	The Waikouaiti water treatment plant is in generally good condition though some assets with shorter lifespans (filter membranes) are nearing the end of their useful lives and in correspondingly average to poor condition. There is a scheme which will extend into the early years of the plan which renews these assets. Condition of water mains in Karitane is of concern with a high number of breaks per kilometre being an indicator of poor asset condition. This will be addressed through the current renewal work in this area.	There are identified capacity issues in the Waikouaiti and Karitane treated water networks. Recent capital works have been completed in Waikouaiti to address some of these issues; further works are programmed within the Karitane township and from the Waikouaiti Reservoir to the Waikouaiti township in the near future to improve capacity. There are still known capacity issues in the Edinburgh Street (Waikouaiti) area, which will not be completely alleviated by the recent and planned upgrade works. Further work will be programmed in year 7-10 of the strategy to improve capacity in this area. The Merton supply is a restricted rural scheme with enough capacity for the foreseeable future. Upgrades to the Waikouaiti Water Treatment Plant will improve taste and aesthetics.

Asset group and type		Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Rural Water Supplies	Outram	Extract water using a bore pump located adjacent to the Taieri River, treat to meet drinking water standards, and gravity fed to properties within the Outram water supply zone.	One plant 17 km pipelines one pump station 961 minor point assets (valves, hydrants and meters)	6,359	Condition within the Outram network is generally good to excellent. Recent condition assessments of the treatment plant have produced a plan of renewals over the period of the plan to ensure the plant can continue to supply drinking water which meets national standards.	Recent capacity assessments have shown that work is needed to meet future demand within the treatment plant. The strategic investment plan for longer term upgrades are part of the water system planning.
	West Taieri Rural Scheme (Restricted)	Water extracted from the Waipori River, treated to meet drinking water standards, and pumped to Dunedin Airport and privately-owned tanks within the West Taieri water supply zone.	One plant 127 km pipelines five pump stations 392 minor point assets (valves, hydrants and meters)	8,921	The West Taieri water treatment plant is in generally good condition, although some shorter lifespan assets are nearing the end of their useful lives and are in correspondingly average to poor condition. The piped network is also generally in good condition with a relatively small number of breaks per kilometre.	There is sufficient capacity within the West Taieri Rural Scheme to meet demand for the foreseeable future.

How does the DCC assess the condition of wastewater assets?

Visual inspection methods, such as closed-circuit television (CCTV) filming, are used to assess the condition of wastewater pipes. The results from these CCTV inspections are used to determine if assets need to be repaired or replaced.

DCC staff undertake visual and physical inspections of the condition of treatment plants and pump stations to ensure assets are appropriately maintained. Specialist engineering advice is used as required. Data on material /unit type, age, condition, performance, location, capacity, criticality and remaining life is collected for 3 waters assets. Confidence in the condition information about the DCC's wastewater network and treatment assets ranges varies. The DCC 3 Waters Group is currently undertaking a series of improvements to wastewater treatment asset condition assessments.

Summary of wastewater assets

Asset condition

Significant number of assets in poor condition
Some assets in poor condition
No or few assets in poor condition

Asset capacity

Significant capacity issues currently experienced
Capacity issues in some areas and/or capacity issues can be expected
No or minor capacity issues and none are currently expected

Asset group and type		Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Tahuna catchment						
Metropolitan Wastewater Systems	Wastewater Network	Transport untreated wastewater from customers' point of discharge to Tahuna wastewater treatment plant.	618 km pipelines (including 4.5 km main interceptor sewer) 39 pump stations 14,176 network access points (manholes, lampholes etc.)	520,352	With a high proportion of early 20th century pipework, much of the network feeding the Tahuna WASTEWATER TREATMENT PLANT is in poor condition. A large portion of the network is older earthenware pipe with more joints than modern equivalents. As they deteriorate, these joints allow considerable volumes of water to infiltrate into the network, exceeding network capacity during heavy rainfall events and resulting in wastewater overflows downstream. Pipeline renewals are focussed on areas of high inflow and infiltration.	High intensity rainfall events can lead to inflow and infiltration entering the network with wastewater systems becoming overwhelmed and overflowing, while at the treatment plants wash out can occur which severely disrupts treatment processes. Incapacities upstream in the Tahuna wastewater catchment overflow into stormwater catchments flowing into the South Dunedin area, further exacerbating flooding issues in the area. The performance and possible solutions to wet weather flow management will continue, by undertaking flow monitoring and incorporating the ground water model information. The best practicable solutions will be assessed for cost and their ability to deal with growth, resilience and carbon impacts.

	Asset group and type	Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Metropolitan Wastewater Systems	Wastewater Treatment and discharge to ocean outfall	Treat wastewater to meet discharge consent conditions.	One treatment plant 1.1 km outfall pipe off Middle Beach	136,251	The upgrade of the Tahuna wastewater treatment plant means parts of the plant are in good to excellent condition. Some sections or the original building will require some further remedial works in the short to medium term. The condition of the rising mains from the Musselburgh pump station to Tahuna wastewater treatment plant are poor, with investigations into options starting in 2020 to inform remedial action in the short-medium term.	The recent process capacity assessments have shown the Metropolitan treatment plants have capacity to treat to current environmental standards now and in the future, but small-scale renewals are needed to continue capacity as the assets age. As with most city plants, wet weather flows can overwhelm the system and solutions will be developed as part of the wastewater system planning.
Green Island catchment (excluding Mosgiel)						
Metropolitan Wastewater Systems	Wastewater Network	Transport untreated wastewater from customers' point of discharge to Green Island wastewater treatment plants	121 km pipelines 26 pump stations 2,037 network access points (e.g. manholes lampholes.)	117,419	The Green Island network is generally in good condition given its age, however the plant does receive high wet weather flow volumes due toinflow and infiltration problems in the catchment.	Some treatment capacity is available within the Green Island network, however wet weather flows can overwhelm the system. Solutions will be developed as part of system planning.
	Wastewater Treatment and discharge to ocean outfall.	Treat wastewater to meet discharge consent conditions.	one treatment plant 850m outfall off coast at Waldronville	26,962	The Green Island wastewater treatment plant is in average condition given its age. Smaller scale renewals and process changes are needed to continue to meet levels of service and implement short-term wet weather flow management operational processes.	The recent process capacity assessments have shown the Metropolitan treatment plants have capacity to treat to current environmental standards now and in the future, but small-scale renewals are needed to continue capacity as the assets age. As with most city plants, wet weather flows can overwhelm the system and solutions will be developed as part of the wastewater system planning project.
Mosgiel catchment (includes Allanton)						
Metropolitan Wastewater Systems	Wastewater Network	Transport untreated wastewater from customers' point of discharge to wastewater treatment plants	113km pipelines six pump stations 2,226 network access points (manholes, lampholes etc.)	87,354	Some areas of the Mosgiel wastewater network are in excellent condition, while other areas are in poor or very poor condition. While the overall network is a similar age to the Green Island network, the way in which the Mosgiel network was constructed means that it experiences significantly higher infiltration during rainfall events. During heavy rainfall events groundwater levels become elevated which increases the amount of groundwater infiltrating into the wastewater network.	There are significant incapacities in the network servicing the Mosgiel wastewater treatment plant catchment. High levels of inflow and infiltration result in wastewater overflows to roads, homes and properties during heavy rainfall events. Preliminary investigative work has shown that large-scale pipeline and pump station upgrades are needed to reduce the risk of flooding.

Asset group and type		Purpose and description	Number/Length	Value $000	Asset condition	Asset capacity
Metropolitan Wastewater Systems	Wastewater Treatment and transfer to Green Island	Treat wastewater to remove solids and organic matter, transfer to Green Island Wastewater for UV treatment prior to discharge.	one treatment plant 20 km transfer line to Green Island	25,812	The Mosgiel wastewater treatment plant has some mechanical, electrical and civil plant items in poor condition resulting in increased operations and maintenance costs. Renewals will be stepped up to improve overall plant condition to maintain service while awaiting long term options from system planning.	While there is sufficient capacity within the Mosgiel wastewater treatment plant for dry weather flows, the pipeline that transfers effluent from the Mosgiel wastewater treatment plant for final treatment at the Green Island wastewater treatment plant is at capacity during heavy rainfall events, resulting in a bottleneck at the treatment plant. Investigative work is underway to determine the most appropriate solution long term.
Waikouaiti (including Karitane), Seacliff, Warrington and Middlemarch catchments						
Rural Wastewater Schemes	Wastewater Network	Transport untreated wastewater from customers' point of discharge to wastewater treatment plants	43 km pipelines 10 pump stations	29,002	Rural wastewater network assets vary between 'very good' and 'poor' condition. The Karitane portion of the network is in very good condition having been installed as an entirely new network in 1983. Renewal of older assets is incorporated as part of forecast renewals as assets reach the end of their useful lives.	There is incapacity in the Waikouaiti/Karitane network which show up as minor wastewater overflows at the Karitane No. 1 pump station during heavy rainfall events. There are no known network capacity issues in Seacliff or Warrington. There are known capacity issues in Middlemarch due to inflow and infiltration issues evidenced by minor network overflows in wet weather, work is underway to understand the best 'whole of system' solution for the area.
	Wastewater Treatment and discharge to land	Treat wastewater to meet discharge consent conditions.	four treatment plants and associated disposal areas	4,297	The rural wastewater treatment plants are generally in good condition, with renewals planned over the next 10 years as discharge consents expire. Treatment options will be considered as renewals are planned, with Seacliff being the first of the northern wastewater treatment plants programmed for renewal.	There is enough capacity within the existing wastewater treatment plants for current and forecast flows in the short term. The plants will be upgraded over the next 10 years prior to their discharge consents expiring, with any forecast capacity changes accounted for as the upgrades are planned.

How does the DCC assess the condition of stormwater assets?

The condition of stormwater pipes is primarily assessed through CCTV filming. The results from CCTV inspections are used to determine whether assets need repair or replacement, and when this needs to happen. The condition of pump station assets is routinely inspected by DCC staff to ensure assets are appropriately maintained. Specialist engineering advice is used as required. Data on material /unit type, age, condition, performance, location, capacity, criticality and remaining life is collected for 3 waters assets. The DCC 3 Waters Group is currently planning to undertake a series of improvements to stormwater asset condition assessments.

Summary of stormwater assets

Asset condition

Significant number of assets in poor condition
Some assets in poor condition
No or few assets in poor condition

Asset capacity

Significant capacity issues currently experienced
Capacity issues in some areas and/or capacity issues can be expected
No or minor capacity issues and none are currently expected

Area	Asset type	Purpose/ description	Number/ Length	Value $000	Asset condition	Asset capacity
South Dunedin (includes the individual stormwater catchments of Orari Street, St Clair, Portsmouth Drive, and South Dunedin)	Pipe network	Transport stormwater water to pump stations or outlets	97km pipelines 2,454 network access points (manholes, lampholes etc.)	155,861	Condition of the pipe network in the wider South Dunedin stormwater catchment area varies widely based on the age, diameter and construction materials of individual pipes. Older large diameter pipes are generally in sound condition, due to the construction methods of the era.	In heavy rainfall events the stormwater network in South Dunedin can become overwhelmed, resulting in flooding of roads, homes and properties. This is exacerbated by areas of high ground water, particularly around high tide. Hydraulic modelling indicates the stormwater network is performing below the expected level of service. The DCC is working with the ORC and GNS Science to develop and incorporate groundwater into the hydraulic model for the area. Significant capital works are proposed to bring these assets up to currently accepted design standards.
	Pump stations	Pump storm-water during times of significant inflow	three pump stations	5,120	The majority of pump stations are in average condition with some requiring attention to wet wells, pipes and pumps.	Pump station capacity is generally good; issues relate to incapacity within the wider network.
Mosgiel, East Taieri and Outram	Pipes	Transport stormwater water to pump stations or outlets	57km pipelines 1,023 network access points (manholes, lampholes etc.)	66,442	Condition of the pipe network in the Mosgiel, East Taieri and Outram area varies widely based on the diameter and construction materials of individual pipes.	Mosgiel is a very sensitive stormwater catchment; the area is the flood plain for the Taieri River and Silverstream and is underlain by the extensive Taieri Aquifer which is responsive to river levels. The DCC stormwater network discharges into the Taieri River, Silverstream and other tributaries, and when those waterways are high stormwater discharge is impeded. Mosgiel frequently experiences catchment-wide nuisance flooding in small rainfall events. Deep flooding and property flooding are experienced in some areas. Capital works are proposed after modelling improvements have assessed the best practicable option to bring areas of the network with capacity issues up to currently accepted design standards.

Area	Asset type	Purpose/ description	Number/ Length	Value $000	Asset condition	Asset capacity
	Pump stations	Pump stormwater during times of significant inflow	five pump stations	1,284	Many pump stations are in average condition with some requiring attention to wet wells, pipes and pumps.	Pump station capacity is generally fair; issues have tended to be with incapacity within the wider network. Capital works are planned to enhance pump station performance in conjunction with pipe improvements above.
Centre City (includes the individual catchments of Halsey Street, Mason Street, Kitchener Street and Ravensbourne Road) **Outlying areas: Port Chalmers, Brighton/Waldronville, Green Island, Waikouaiti/ Karitane and Warrington.**	Pipes	Transport stormwater water to pump stations or outlets	233km 7,406 network access points (manholes, lampholes etc.)	265,152	Condition of the pipe network in the Centre City area varies widely based on the age, diameter and construction materials of individual pipes. Older large diameter pipes are mostly in sound condition, due to the construction methods of the era. Capital works are proposed via the Central City, Tertiary Precinct and general renewals projects.	Capacity issues exist in small discrete areas of the network. These issues will be addressed through focused capital works. The DCC is working with the ORC and GNS Science to develop and incorporate a groundwater model for the central city area. Northern area – there are limited networks installed in the townships of Waikouaiti, Karitane and Warrington. Both – stormwater system planning will be developed in the early years of this 10-year plan and will provide a basis for future investment.
	Pump stations	Pump stormwater during times of significant inflow	three pump stations	1,541	Many pump stations are in good condition with some attention required on specific wet wells, pipes and pumps. The pump station renewals projects target these issues.	Pump station capacity is generally good.

How does the DCC assess the condition of transport assets?

Assessing the condition of above ground infrastructure like roads, cycleways and footpaths is more straightforward than assessing the condition of pipes and other underground infrastructure. The transport team uses a rolling programme of condition assessments to inform its maintenance and renewals decisions which translates into the Asset Management plan which enables co-funding with Waka Kotahi. The level of confidence in the knowledge of the DCC's transport assets is high.

Summary of transport assets

Asset condition

Significant number of assets in poor condition
Some assets in poor condition
No or few assets in poor condition

Asset capacity

Significant capacity issues currently experienced
Capacity issues in some areas and/or capacity issues can be expected
No or minor capacity issues and none are currently expected

Asset group and type	Number/ Length	Value $000	Asset Condition	Asset capacity
Paved roads	1,071 km	824,880	Road pavements are in decline. Most of Dunedin's sealed pavements have a theoretical useful life ranging from 60 – 100 years. 57% of pavements are aged 60 years and over. Based on condition assessment road condition is in decline. Smooth travel exposure for urban roads has sat below target for the past 11 years and has slowly declined.	In capacity terms the Dunedin urban network is experiencing congestion at certain parts of the day. With the hospital re-build coming congestion will increase so intervention such as the Harbour Arterial bypass are required. In addition, offering Transport choices will be necessary to avoid congestion in the future.
Unsealed gravel roads	693km	28,284	Gravel roads are maintained in a good condition; however, dust suppression methods have changed meaning potentially gravel roads will see higher volumes of dust.	In capacity terms the Dunedin transport network is fit for purpose and can cope with traffic demands.
Footpaths & Cycleways	976 km	177,700	There are a high percentage of footpaths that have exceeded their life, or are nearing the end of their economic life. Asphalt footpaths, that represent 76% of footpaths, have approximately 23% of the network at the end or nearing the end of their expected economic life. Concrete footpaths, that make up 6% of footpaths, have approximately 48% exceeding their expected economic life. Slurry seals, that represent 9% of footpaths, has 84% exceeding or nearing the end of their expected economic life. In the past 3 years 18% of the network have shown signs of deteriorating with a higher proportion moving to average condition from good to very good.	In capacity terms Dunedin's footpaths are fit for purpose and can cope with pedestrian demands.
Road drainage Kerbing		175,571	Kerb and channel condition are showing signs of decline. In 2019/20 6% of the network was in poor to very poor condition and without sustained investment this is expected to rise as more reach the end of their economic lives.	Good
Signs, road markings and signals	20,403 signs 79 signalled intersections	10,721	Signs, road markings and signals are maintained to a good condition.	Good
Street lights	13,656 streetlights, 5 base stations, 3,313 tele-cells	27,900	LED rollout will be complete by the middle of 2021	Good

Asset group and type	Number/ Length	Value $000	Asset Condition	Asset capacity
Bridges and large culverts	243 bridges 61 large culverts	100,217	Bridges are in largely good condition.	Good
Culverts and mud-tanks	5,734 culverts 8,331 mud-tanks	72,127	Culverts have 5% in poor condition, 35% in average condition, 36% in good condition and 20% in very good condition. 4% are awaiting condition rating. The expected age for mud-tanks is 80 years. 74% are aged between 70-79 years thus nearing the end of their estimated lives, however in terms of their structural condition (which is largely unknown) as long as mud-tanks are adequately maintained it would be expected they would live well beyond their estimated lives.	Given changing weather patterns, emphasis has been placed on ensuring culverts and mud-tanks are maintained to a high standard. Capacity may become an issue in the face of significant adverse conditions.
Seawalls	41 km	35,480	Seawalls have 6% in very poor condition, 13% in poor condition, 23% in average condition, 39% in good condition and 19% in very good condition.	Isolated areas of the network are compromised during significant weather events and will require future investment.
Retaining walls	31 km	27,832	Many of Dunedin's retaining walls were made many years ago and do not meet the current design requirements. Many provide resistance to surface erosion, rain and weathering but are not able to retain saturated retained material. As such many may be at risk of failure during high rainfall events and are routinely inspected and monitored for movement and condition.	Given changing weather patterns and the age of some retaining walls capacity may become an issue.
Minor structures		9,950	Minor structures are maintained regularly and are in good condition.	Good

Significant infrastructure issues and opportunities for Dunedin

This section sets out the key infrastructure challenges and opportunities for Dunedin and the main options and implications for managing these over the next 50 years.

Regulatory, legislative and service delivery changes

The Government is undertaking a substantial change programme that is expected to impact Dunedin's infrastructure services in the coming years. This includes reform of 3 waters regulatory and service delivery arrangements, freshwater reforms, review of the resource management system and changes to the way we provide for and manage urban growth. In addition, the Government Policy Statement on land transport, which sets out the Government's strategic direction for the land transport system over the next 10 years, is issued every three years.

3 Waters regulatory and service delivery reform

The Government's Inquiry into the Havelock North water supply contamination event of 2016 recommended a suite of changes to improve the safety of drinking water in New Zealand. Three key issues were identified – regulatory weakness, funding and financing challenges, and capability and capacity challenges.

In 2017, the Government established the Three Waters Review. The Review acknowledges multiple challenges facing 3 water services, including funding pressures, ageing infrastructure, rising environmental standards, climate change, seasonal pressure from tourism, and an industry-wide shortage of skilled and qualified people. From the outset, the Government made it clear that it would explore a variety of possible interventions to lift the performance of these services, including changes to both regulatory and service delivery arrangements.

The Government has begun implementing a package of 3 waters regulatory reforms designed to:

- improve national-level leadership, oversight, and support relating to the 3 waters through the creation of Taumata Arowai, the new, dedicated water services regulator
- significantly strengthen compliance monitoring and enforcement relating to drinking water regulation
- manage risks to drinking water safety and ensure sources of drinking water are protected
- improve the environmental performance and transparency of wastewater and stormwater networks.

In July 2020, the Government introduced the Water Services Bill to Parliament. The Bill, if passed, would implement system-wide reforms to the regulation of drinking water and source water, as well as introducing new national-level reporting and monitoring requirements for wastewater and stormwater. Parliament also passed legislation establishing Taumata Arowai as a new Crown entity.

Taumata Arowai is currently being built and will take up its regulatory responsibilities after Parliament passes the Water Services Bill. This is expected to occur in the second half of 2021. From that point, Taumata Arowai will oversee, administer and enforce the regulatory system for drinking water and perform national-level oversight and advisory functions relating to wastewater and stormwater. Regional councils will still regulate wastewater and stormwater discharges to the environment under the Resource Management Act 1991.

Further regulatory reforms may include the introduction of national environmental standards for wastewater discharges and overflows.

In addition to regulatory reforms, the Government has launched a suite of 3 waters service delivery reform proposals. The Government intends to transfer 3 waters service delivery functions from councils to new,

Major decision: participation in Government 3 waters service delivery reform programme

The DCC agreed to 'opt in' to the first stage of the Government's 3 waters service delivery reform programme in August 2020.

In December 2020, the Government decided that participation in the service delivery reform programme would continue to be voluntary, and that councils would be asked to make a second decision on participation in late-2021. All councils will be included in one of the new water services entities by default but will have the option to decide not to continue to participate.

The Government will promote an amendment to the Local Government Act 2002 that, if passed, will enable councils to transfer ownership of 3 waters assets and services to new entities. The proposed amendment will also provide a fit-for-purpose consultation process that sets out how local government will engage with communities and iwi/Māori about the reform proposals and make decisions.

This decision is only for service delivery reform. Council is unable to opt out of the regulatory elements of 3 waters reform.

public multi-regional water entities. Participation in the service delivery reform programme is voluntary, but the Government has made its preference for full participation by councils clear. In July 2020, the Government provided an indicative timeline for a three stage service delivery reform work programme, with each stage accompanied by a tranche of stimulus funding, and the DCC agreed to 'opt in' to the first stage in August 2020. Councils will be asked to make a second decision on participation in late-2021. All councils will be included in one of the new proposed water services entities by default but will have the option to decide not to continue to participate. According to an updated reform timeline published in December 2020, the proposed water services entities would commence operation in about 2023.

Through voluntary participation in stage 1, the DCC received Tranche 1 stimulus funding totalling $15.84 million in November 2020 to be spent by 31 March 2022. The purpose of the funding is to support the Government's reform objectives, stimulate economic recovery through job creation and increase and/or accelerate investment in 3 waters infrastructure.

Essential Freshwater Programme

The Government has also introduced changes to freshwater regulation through the Essential Freshwater Programme. The Essential Freshwater Programme aims to:

- Stop further degradation of New Zealand's freshwater
- Start making immediate improvements so water quality improves within five years
- Reverse past damage to bring New Zealand's waterways and ecosystems to a healthy state within a generation.

There are overlaps between the Essential Freshwater Programme and the Three Waters Review, which relate to the environmental regulation of stormwater and wastewater discharges and protection of drinking water sources.

The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) came into effect in September 2020. The NPS-FM 2020 requires regional councils to manage freshwater in a way that gives effect to Te Mana o te Wai, a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment and the mauri of the water itself. Regional councils are required to notify new or amended regional plans that give effect to the NPS-FM by 31 December 2024.

The Essential Freshwater Programme has also included introduction of new National Environmental Standards for Freshwater and amendments to existing regulations for the measurement and reporting of water takes. Further regulatory changes proposed include amendments to the NES for Sources of Human Drinking Water, which would strengthen the ability of regional councils and territorial authorities to manage risks to drinking water posed by activities in drinking water catchments.

Overall, the changes made through the Essential Freshwater Programme will have significant flow-on effects for 3 waters activities, through anticipated changes to permitted activities and more stringent requirements around discharges. Changes to engagement requirements are also expected in order to promote active tangata whenua involvement in freshwater management and decision making, and to ensure Māori freshwater values are identified and provided for.

Resource management system review

In 2020, an independent panel appointed by the Minister for the Environment completed a comprehensive review of New Zealand's resource management system. The review's scope included looking at the Resource Management Act 1991 and its interfaces with the Local Government Act 2002. The review recommended the current Resource Management Act be replaced with three new pieces of legislation: a Natural and Built Environments Act, a Strategic Planning Act and a Managed Retreat and Climate Change Adaptation Act. The panel's report is expected to be followed in 2021 by consultation to develop government policy and a framework to link together the key pieces of legislation.

Urban Growth Agenda

The Urban Growth Agenda is a Government work programme that aims to remove barriers to the supply of land and infrastructure and make room for cities to grow up and out. It has five interconnected focus areas: infrastructure funding and financing; urban planning; spatial planning; transport pricing; and legislative reform.

The National Policy Statement on Urban Development 2020 (NPS-UD 2020) came into effect on 20 August 2020. The NPS-UD contributes to the Urban Growth Agenda by addressing constraints in New Zealand's planning system to ensure it enables growth and supports well-functioning urban environments. The NPS-UD 2020 categorises Dunedin as a tier 2 urban environment, bringing into effect a range of provisions relating to the amount of development capacity required to be serviceable with infrastructure.

Government Policy Statement on Land Transport

The Government Policy Statement on land transport (GPS) sets the Government's priorities on land transport investment over the next 10-year period. It sets out how money is spent on activities such as public transport, state highway improvements, local roads and road safety. The GPS is reviewed and updated every three years. Changes to priorities in the GPS impact on the DCC's renewal and capital programmes.

The strategic priorities for GPS 2021 are:

- Safety – developing a transport system where no-one is killed or seriously injured
- Better Travel Options – providing people with better transport options
- Improving freight connections
- Climate Change – developing a low carbon transport system that supports emission reductions.

The Land Transport (Rail) Legislation Act 2020 (the Rail Act) came into force on 1 July 2020. The Rail Act amends the Land Transport Management Act 2003 (the LTMA) and

the Land Transport Act 1998 to implement a new long-term planning and funding system for the heavy rail track network owned by KiwiRail.

The new framework brings the planning and funding of the rail network under the land transport planning and funding regime set by the LTMA. This will allow local authorities to have input into how the rail network influences the movement of freight and people in their areas.

Principal Options and Implications of responding to regulatory, legislative and service delivery changes: 3 waters

While a decision whether to transfer the DCC's 3 waters assets and service delivery functions to a new entity will not be made until late-2021, the DCC 3 Waters Group has initiated a series of projects that will assist with preparation for regulatory, legislative and service delivery changes. These projects focus on organisational impacts, which have potentially large financial implications for the DCC and so all options must be carefully considered. System planning is also key to preparing for reform.

Some projects have already commenced to better understand the capability and capacity of the water, wastewater and stormwater systems to meet current and future anticipated standards. This is complemented by projects to assess the impacts of wastewater and stormwater discharges on the receiving water environments and an assessment of the treatment plants to meet anticipated future treatment standards.

The 2021-31 capital programme does not fund any improvements needed to meet anticipated new regulatory standards in drinking water, wastewater or stormwater as these are not yet confirmed. However the current workplan will assess the ability of the systems to meet a range of new, enhanced standards as well as the baseline investment needed to address more urgent operational risks to maintain current service levels. Longer term strategic investment plans and enhancements needed from system planning will be incorporated into the 10 year plan 2024-34 as the outputs of system planning become available.

Principal options and implications to respond to 3 waters reform

The option that the DCC has decided to take is highlighted in green.

Option	1-10 years (2031)	10-30 years (2051)	30-50 years (2071)
Continue current 3 Waters Group work programme (status quo)	Passive approach to reform, responses to the Government's reform programme would be reactive and any change in direction would have to be manged within existing budgets and staffing levels.	High likelihood of unplanned investment needs to meet new anticipated standards, which will negatively impact other capital investment projects and could affect service levels.	Unknown as yet.
Proactive, moderate scope transition work programme	Staff are prepared for potential transition into a new water services entity, the DCC has prior understanding of the impacts of reforms and options to manage transition. Projects within the programme aim to reduce risks and ensure a favourable balance sheet position at the time of any potential asset transfer. Timeline targets the 2024-24 10-year plan and some projects may not be complete prior to a potential transition.	Medium–long term investment plans based on improved evidence; any enhancements needed have been programmed via the best practicable solution method. Impacts on rates for various service level provision available.	As previous.
Proactive, comprehensive transition work programme	As above, but with accelerated delivery of key outputs and a wider scope of improvement activities.	As above, but with additional planning and data to produce robust long-term investment plans and a thorough understanding of further planning, policy and delivery improvements needed.	As previous.

Section 6.3 (Responding to changes in demand for infrastructure) includes further detail on how the DCC will respond to changes that arise out of the Government's Urban Growth Agenda.

Section 6.4 (Public health and environmental outcomes) includes further detail on how the DCC will respond to changes arising from 3 waters regulatory reforms and the Essential Freshwater Programme.

Replacing and renewing ageing infrastructure

Dunedin has $4.1 billion in water supply, wastewater, stormwater and transport assets.

The DCC's planning is increasingly focused on sound asset condition and risk assessment, planning and delivery opportunities, and long-term asset solutions that provide lasting value for residents, businesses and the environment. Asset management planning is most efficient and effective when all options, including renewals and upgrades, are considered holistically. This can identify opportunities to make more systemic improvements. Systematic improvements can extend network life while maintaining levels of service or in some cases improve levels of service where that would be of value to the community and the environment.

In the next 10 years, DCC has identified opportunities to address some infrastructure issues by investing in a combination of renewals and new capital. Projects such as the Central City Plan and Tertiary Precinct upgrades will replace ageing 3 waters and transport infrastructure and deliver public realm improvements to support a thriving tertiary and retail sector.

3 Waters

The DCC 3 waters assets have a value of $2.4 billion, with assets depreciating by approximately $30.7 million annually. The renewals spend profile within this plan is a significant increase from previous plans due to the ageing asset base and the risk of not meeting stated levels of service. Budget increases year on year will enable a higher rate of renewals as the plan progresses. Annual budgets may be brought forward through the annual plan process if an increased rate of delivery is successful (as described in section 9). In order to deliver an increased programme, 3 waters has set up new delivery models and longer-term programme contracts. The stimulus funding grant received as part of the Government Three Waters Reform Programme has accelerated network renewals in year 1 of the plan. Proposed future grants are an opportunity to uplift the renewals programme further.

Assets do not always need replacing as they reach their theoretical life. Performance or condition can indicate that the asset can continue to run beyond the asset life within acceptable levels of risk (e.g. non-critical assets such as tobies) or alternative approaches to asset management may be adopted. For example, the largest and oldest of Dunedin's sewer pipes are actively monitored by CCTV to assess when renewal or replacement is needed. This allows 3 waters capital expenditure to be focussed on the renewal of assets not performing as required or unable to meet new standards, based on the criticality of those assets and the likely impact of any loss of service.

Transport

Dunedin's transport network is made up of a diverse range of assets. They are revalued annually and in 2020 had a total replacement value of $1.7 billion. Assets depreciate by approximately $23.4 million annually. Careful management of these assets is paramount to ensure investment is prioritised where most needed. Emphasis is therefore placed on regular inspections and ongoing condition assessments. This information helps guide renewal investment to the right place at the right time.

Many of the city's transport assets are ageing with a number nearing or having exceeded the end of their useful economic lives. When an asset reaches about 75% of its service life, deterioration will accelerate. For example, if a road pavement is left beyond this point without maintenance, the cost to renew the asset could be 4-5 times higher. Maintenance and renewal interventions are interlinked. Timely repairs can extend the time until a reseal is required on a road, resealing at the right time will extend the life of the pavement structure beneath. Routine maintenance deals with defects such as cracks and potholes before more serious problems develop.

In addition, certain renewals are considered as part of the Major Projects Programme, namely the Central City upgrade and the Tertiary Precinct. Both projects require significant transport and 3 water renewals so delivering them together creates efficiency and minimises disruption. Where opportunities exist to combine these types of renewals activities and they are large enough in dollar value, they are delivered through the Major Projects Programme.

Principal options and implications of replacing and renewing ageing infrastructure

The option that the DCC has decided to take is highlighted in green.

Option	1-10 years (2031)	10-30 years (2051)	30-50 years (2071)
Renewals delivery continues at current rates, with no plans to increase internal or external delivery capacity	Transport and 3 waters renewals continue to be prioritised in accordance with known asset condition and performance within existing budgets, however ageing assets mean risk to service levels increase. Gravel road re-metaling, pavement rehabilitation, pavement renewals, traffic service renewals and structures have a static spend in the 10 year plan to meet asset management requirements.	The value of renewals required versus those undertaken is expected to increase until at least 2048 based on the increasing age of assets and inflation. The programme will be regularly reviewed to determine whether strategic upgrades would be preferable.	The value of renewals undertaken is expected to flat line in the long-term. The design and delivery of renewals will become more effective in maintaining service levels over the longer term, as internal and external capacity to deliver is increased.

Option	1-10 years (2031)	10-30 years (2051)	30-50 years (2071)
Renewals delivery is increased over time as internal and external capacity to deliver is increased.	As above, however renewals delivery will be gradually increased year by year as internal and external delivery capacity allows. For 3 waters in particular, this will allow the renewals backlog to be partly reduced and allow strategic upgrades to be undertaken at the same time as renewals as well as planning for anticipated new standards. The bulk of asset renewals for 2021-2023 target the highest risk issues at treatment plants that impact on health and safety and levels of service. For transport, footpath renewals increase over the 10 Year Plan to improve the condition of the asset to help facilitate active modes of transport. Drainage spend over the 10 Year Plan gradually increases to reflect that the city will be under increasing pressure with increased weather events and sea level rise.	The renewals programme will be more effective in reducing maintenance and operating expenditure and reducing the risk of deteriorating service levels. Non-critical issues, or those that affect a limited number of customers, can be addressed more quickly than they otherwise would.	As above, however infrastructure risk profiles will be reduced as delivery of the renewals programme begins to outpace the rate at which asset age and condition deteriorates. Operations and maintenance costs can be reduced, and issues will become less prevalent.
Renewals delivery is accelerated in the early years of the plan, increased overall renewals budgets.	As above, but with significant budget moved to years 1-6 to address priority renewals. Increased overall budget to allow deferred or removed projects to be completed, to reduce further reduce risks to service levels and health and safety. There is a high likelihood this option is not deliverable.	The renewals programme will be most effective in reducing maintenance and operating expenditure and has the lowest risk of deteriorating service levels. Budgets in these years are not affected by any deferrals in the previous 10 years.	The value of renewals undertaken is expected to flat line at a much faster rate than in other options.

Responding to changes in demand for infrastructure

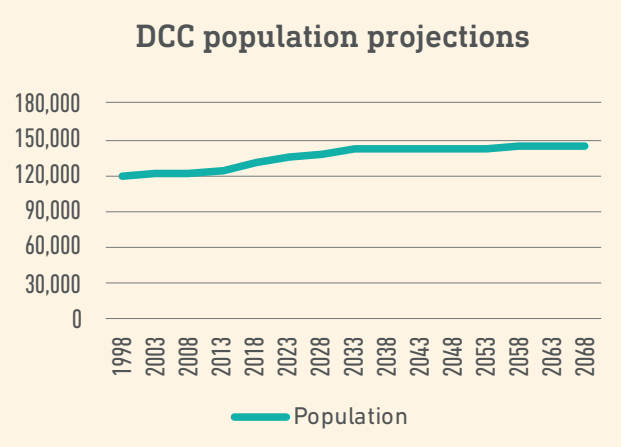
Factors such as population growth, the rate and type of economic growth, the rate of growth in dwellings and where future housing developments occur will have an impact on the demand for infrastructure. An important part of good asset management is enabling sustainable growth by undertaking investments that address both service levels and future capacity at the same time, while taking opportunities to rationalise the complexity of networks that have grown over many decades. This can also reduce future repair and maintenance costs.

Population and dwelling growth

The COVID-19 pandemic has created uncertainty around Dunedin's future growth. Dunedin's population is projected to be relatively resilient in the near term, despite the impact of COVID-19. Current projections indicate the population will continue to grow sharply until 2033, reaching 141,417. From 2034 onwards, the population rate will begin to taper off returning to a medium growth scenario. By 2038, the 65 years and over demographic will be Dunedin's second largest age group (behind 25 and under).

Dunedin's dwelling numbers will experience similar trends to the Dunedin population, experiencing a sharp rate of expansion until 2038 reaching a total of 60,511 dwellings. Projections then indicate that dwelling expansion will slow. This is likely to be a result of an ageing population and the changing make up of families and households.

Variations to the 2GP will define where forecast growth might occur across Dunedin.



Planning for growth in housing and business development

Under the National Policy Statement for Urban Development 2020, Dunedin is categorised as a tier 2 urban environment (the requirements of which are in the table below). This brings into effect a range of provisions relating to the amount of development capacity that is required to be serviceable with infrastructure. 2GP Variation 2 comprises a number of discrete changes that will add additional housing capacity into the 2GP.

National Policy Statement on Urban Development 2020[2]

Term	Infrastructure requirements
Short-term (within the next three years)	Development capacity must have: • adequate existing development infrastructure to support the development of the land.
Medium-term (3 – 10 years)	Development capacity must have either: • adequate existing development infrastructure to support the development of the land, or • funding for adequate infrastructure to support development of the land identified in a long-term plan.
Long-term (10 – 30 years)	Development capacity must have either: • adequate existing development infrastructure to support the development of the land, or • funding for adequate infrastructure to support development of the land identified in a long-term plan, or • development infrastructure identified in an infrastructure strategy.

Visitor growth

Dunedin's successful tourism marketing, which attracted large cruise ships and major stadium events, resulted in Dunedin's 'peak day' visitor numbers growing steadily from 2013 to 2018. However, with the impact of COVID-19 on tourism, 'peak day' visitor numbers are expected to drop sharply in the short term, with a recovery period between 2023-2028 as tourism markets re-establish. Pre COVID-19 levels of growth are projected by 2031, with peak day visitor numbers reaching 27,886 by 2033.

Economic growth

The COVID-19 pandemic has created uncertainty around Dunedin's future growth and economic performance. As detailed above, the impact on visitor numbers will have an impact on Dunedin's tourism economy.

The changing make up and rate of growth in the economy may impact on demand for network infrastructure. For example, Port Otago at Port Chalmers is New Zealand's 5th largest port (by value) and a key link in New Zealand's international supply chain as a regional hub for the export of high value products including meat, dairy, timber, fish, horticulture and other agriculturally based products. Reduced international demand for export products will reduce heavy vehicle movements accessing the port, which will put less pressure on road pavements and network congestion.

2 https://www.mfe.govt.nz/about-national-policy-statement-urban-development

Principal Options and implications for responding to changes in demand for infrastructure

StatsNZ guidance issued in June 2019 recommended the use of the medium-high projections scenario for Dunedin until 2028, and the medium growth scenario from 2028 until 2043. While a pre-COVID single set of projections was developed, reflecting the most probable growth scenario, there is significant uncertainty in any projections. There is a particularly high level of uncertainty for projections over the longer term (e.g. 2028-68).

The option that the DCC has decided to take is highlighted in green.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Plan and invest for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onward (target high demand 2GP and Variation 2 areas in 2021-31 for delivery, remaining 2GP and Variation 2 areas over a longer period)	Existing network infrastructure capacity will be adequate in currently serviced areas, with augmentation required in localised areas. 3 waters budgets allow for network growth required under high demand 2GP and Variation 2 areas. If actual growth is higher than the medium scenario, infrastructure will more quickly reach capacity and there is a risk of insufficient infrastructure in areas where assets are at or near capacity. Decisions on where and how to augment infrastructure in localised areas in response to growth will occur once Variation 2 to the 2GP has been adopted.	Existing network infra-structure capacity will need to be augmented in localised areas in both current and newly serviced areas, provide remaining capacity for 2GP and Variation 2. If actual growth is higher than the medium scenario, infrastructure capacity will be exceeded in localised areas and require additions to the capacity of some major assets.	The majority of the 3 waters and transport renewal programme will be complete, resulting in a lower average age for assets and increased network capacity. Major assets will be due for replacement or modernisation at this time. A decline in population may have funding consequences. Technological change may improve asset efficiency.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Plan and invest for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onward (target 2GP and Variation 2 in 2021-31)	As above, however budgets allow for infrastructure growth required under the 2GP and Variation 2, with adequate budgets to accommodate investment. If actual growth is higher than the medium scenario, servicing of Variation 2 will require an accelerated response. There is a high likelihood this option is not deliverable as investigation work is still underway and ability to undertake work is constrained by budgets, internal resource, contractor and material availability.	Planned growth has been serviced and so infrastructure capacity is not a limiting factor to development. Lower growth investment is needed in this period. If actual growth is higher than the medium scenario, infrastructure capacity will be exceeded in localised areas and require additions to the capacity of some major assets.	As above.

Public health and environmental outcomes

The 3 waters and transport networks provide important public health and safety benefits to the community and deliver services which can impact on the natural environment.

3 Waters

With 3 waters reform, it is likely capital improvements will be required to meet enhanced protection of drinking water sources, water management practices and new standards for drinking water, wastewater and stormwater services. In anticipation of the reforms and the potential transition into a new entity (if the DCC does not opt out of the Government's service delivery reform programme), the DCC is undertaking a programme of work to strengthen regulation policies and improve asset ownership, asset management and delivery processes. The DCC is also underway with a project to update drinking water safety plans to better align with the new regulatory system. The DCC will continue with water system planning processes to guide capital investment strategies which will support the continued provision of safe drinking water to serviced communities.

Under the Local Government Act 2002 (LGA), the DCC is required to undertake a Water and Sanitary Services Assessment (WSSA) from time to time. The purpose of the assessment is to assess, from a public health perspective, the adequacy of water and other sanitary services available to communities in terms of five specified factors. The DCC is considering the best way to carry out the next reviews, and it may be most efficient to undertake it as part of system planning.

The Health Act 1956 requires the DCC to comply with the criteria set out in the Drinking Water Standards for New Zealand. The standards set maximum amounts for substances, organisms, contaminants or residues that may be present in drinking water, requires monitoring, and prescribes remedial actions in the event of non-compliance. Drinking water suppliers must also have approved Water Safety Plans for large supplies to identify and manage risk – from the raw water catchment to the treatment plant and within the distribution network – and operate in accordance with those plans.

Resource consents to discharge treated effluent to the environment are held for each of Dunedin's seven wastewater treatment plants, except for Mosgiel where effluent is transferred to Green Island for ultraviolet disinfection treatment before discharge. Three of the resource consents are due to expire within the next 10 years and so projects are planned to investigate best practicable options for new consents and the impact of anticipated new standards. System planning will address future consent changes and investment plans to address improvements needed.

The DCC currently has six constructed wastewater overflows consented by the ORC. These overflows are designed to manage the public health risk in heavy rainfall events by allowing discharge of diluted wastewater at specific points of the network, rather than in an uncontrolled manner at low points in the network (including into private property). The consented overflows are signposted to alert the public to the potential risk of exposure to diluted wastewater in the event of heavy rainfall. As wastewater assets are renewed and upgraded, these overflows will activate less often with smaller discharges. Under water reform, it is anticipated the quantity and quality of wastewater discharges will also have to meet new standards.

The DCC holds resource consents to discharge stormwater to the coastal marine area. Those consents expire in 2048. Key stormwater discharges are part of the environmental monitoring programme and work is underway to improve the stormwater hydraulic models for key areas. The 3 Waters Group plans to undertake stormwater system planning for all areas in the early years of the plan, starting with a review and improvement of the hydraulic models. Under the current rules of the Regional Plan: Water, most of Dunedin's stormwater discharges are permitted, subject to certain provisions. The wider implications of water reform mean tighter regulation on quality and quantity of stormwater discharges is likely.

The DCC's long-held approach has been to enable property owners to build and maintain their own pipes or open watercourse infrastructure. Roughly half the city is serviced by private pipes and streams, many of which are 100+ years old and in poor condition, with confusion

over ownership and responsibility. Developing solutions to the complex stormwater problems is often beyond the means of most landowners. Failure of these assets can lead to flooding, sinkholes and landslips. A new approach to dealing with hazards from privately-owned stormwater assets was approved in 2019 (known as the watercourse programme), which aims to reduce these risks on the highest priority sites. Through the programme of work to prepare for reform, 3 waters will review the policy on watercourse asset ownership and the financial impacts of this on the DCC.

Transport

Waka Kotahi's Road to Zero aims to have a 40% reduction in deaths and serious injuries from 2018 – 2030 and sets out a series of initiatives to address road safety. The city's accident statistics show limited improvement in Dunedin with the death and serious injury numbers static over recent years. Safety initiatives are developed around our transport infrastructure for both motorists and vulnerable users such as pedestrians and cyclists.

An analysis of crash statistics indicates factors which contribute to Dunedin's safety record are: intersections; young drivers; older drivers; and distractions. Dunedin also has a diverse network ranging from busy urban roads through to quiet rural roads. In some cases, the transition between urban and rural is very abrupt. The central city is also compact and needs to cater for a wide range of user groups, such as cyclists, pedestrians, cars and heavy freight vehicles. State Highway 1 runs through the University of Otago, Otago Polytechnic and the CBD. Improving network safety is a key issue to be addressed through specific safety improvement programmes, major capital projects and in considering safety improvements when undertaking renewal works.

Safety interventions undertaken by the Transport group include:

- upgrading pedestrian facilities
- upgrading major arterials with priority bus routes
- implementing road safety education campaigns to raise awareness of road safety, public transport safety and pedestrian safety
- using fixed safety cameras at intersections and other high-risk areas
- implementing a prioritised programme of safety engineering projects
- providing separated cycling infrastructure.

The ability to be able to move around easily across a variety of modes is linked to health, social and economic benefits. Providing transport choices will have health benefits as more active modes of transport are taken up. A goal of the Integrated Transport Strategy is to increase the percentage of people who walk, cycle, and take public transport to work from 16 percent to 40 percent by 2024. Committing to the goal of increasing active/sustainable transport will also contribute to the city's environmental commitments of carbon zero 2030, reduce congestion and improve the health of those incorporating physical activity into their daily commute. Investment in providing safe and attractive infrastructure for active modes is expected to increase the desirability of active transport modes.

Principal Options and implications for responding to public health and environmental concerns

The option that the DCC has decided to take is highlighted in green.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Existing public health and environmental impacts are not prioritised	Compliance with DWSNZ is not prioritised and water and wastewater treatment plants are not upgraded in a timely manner to keep pace with changing standards. Incidence and volume of wastewater overflows to the environment will likely increase as will incidences of habitable floor flooding. For Transport, limited network safety improvement packages are implemented, resulting in no decreases to the numbers of serious injury or death statistics on the Dunedin transport network.	Water treatment plants are not upgraded to meet DWSNZ changes and treatment processes fall short of increased standards. Wastewater discharges to the environment and the volume of discharges continue to increase. Consents required to continue to discharge to environment would be unlikely to be renewed resulting in prosecution and fines. Incidence of habitable floor flooding will increase. No specific investment to decrease the number of serious injuries or deaths on the Dunedin transport network.	Water treatment plants are not upgraded to meet DWSNZ changes and treatment plant processes become so outdated that compliance would not be able to be achieved without significant widespread large scale capital works. Wastewater discharges to environment likely to become the norm with the associated degradation of receiving waters. Discharges likely to have no consents and incur fines in each instance where a discharge occurs. No specific investment to decrease the number of serious injuries or deaths on the Dunedin transport network.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Improve public health & environmental outcomes by investing in public transport, road safety and 3 waters upgrades and renewals programmes. Investment is increased over time.	Water treatment plants meet DWSNZ standards and prepare for new standards and regulation by the newly established Taumata Arowai. Wastewater discharges reduce as renewals remove inflow and infiltration from wastewater networks. A long-term investment plan to address wet weather flows is developed. Stormwater discharge impacts are understood, best practicable solutions to flooding are implemented and system planning provides a long-term investment plan. Transport investments are focussed on reducing deaths and serious injury in high risk transport corridors. Public Health outcomes are also achieved by continued investment in active transport modes such as walking and cycling.	Water treatment plants continue to meet DWSNZ measures and are updated as required to meet any changes in standards. Best practicable option for all wastewater overflows implemented. New sustainable solutions to stormwater management are implemented. Continued investment in road safety and active transport modes results in decreased road trauma on the transport network and a healthy connected community.	Water treatment plants continue to meet DWSNZ measures and are updated as required to meet any changes in standards. New sustainable solutions to stormwater management are implemented. Continued investment in road safety and active transport modes results in decreased road trauma on the transport network and a healthy connected community.
Prioritise public health and environmental concerns over other considerations. Investment is prioritised in the earlier years of the plan.	As above, however budgets moved to years 1-6. Improvements to drinking water resilience, wastewater discharges and stormwater overflows can be addressed more quickly however lost opportunities to benefit from the synergies obtained through aligning cross-network renewals. Reducing the number of deaths and serious injury is achieved by additional investment in road safety. The strategic cycleway network is delivered earlier and expanded. There is a likelihood this option is not deliverable and may result in increased disruption to residents due to construction projects not being well aligned across 3 waters and transport assets and other asset providers.	As above.	As above.

Resilience to natural hazards

Flooding, landslides, drought, catchment fire, rising groundwater and the risk of liquefaction in the event of an earthquake pose the most significant risks to Dunedin's infrastructure. It is anticipated these risks will increase over time as a result of climate change.

Climate change

Climate change impacts include more extreme rainfall events, causing increased frequency and severity of flood events, while experiencing less rainfall overall can impact on water supply. Dry periods increase the risk of drought and catchment fire (which impacts on drinking water quality). Rising groundwater as a result of sea level rise in low-lying areas is the one of the most significant risks facing Dunedin from climate change. High groundwater can cause problems such as increased frequency of flooding, boggy ground and surface ponding, damage to infrastructure and buildings, and a risk of liquefaction in earthquakes along with associated social wellbeing issues.

Dunedin has significant low-lying areas that are within 0.5m of the current spring high tide mark (estimated at 2,684 Dunedin homes, 116 business and 35km of roads)[3]. Older people and vulnerable populations find it more challenging to manage the impacts of natural hazards.

3 Parliamentary Commissioner for the Environment (2015) Rising Seas

South Dunedin has an increasingly aged population and one of the lowest decile demographics in the country.

The DCC will respond to climate change by following the Dynamic Adaptative Policy Pathways model that is embedded within the Coastal Hazards and Climate Change Guidance published by the Ministry for the Environment. DCC is currently focusing on, particularly through the South Dunedin Futures Project, broadening the community's understanding of the climate change risks that will affect them in the coming decades. In doing so, DCC want the community to be well informed and engaged in the investment decisions that will be needed to secure a prosperous future for the city. While many Dunedin communities want to see tangible actions to respond to climate change events, DCC's current focus is on preparing well rather than rushing and risk maladaptation outcomes.

Because of the complex nature of managing climate change risks, DCC is also developing partnerships with stakeholders to ensure the appropriate expertise is involved to make wise investment decisions for the future. These partnerships include: regional council, other local authorities, central government agencies including the Ministry for the Environment, the Climate Change Commission, the community, academics, the Infrastructure Commission and professionals such as engineers and lawyers.

Earthquakes

Seismic activity can cause widespread damage to network infrastructure. Destruction of critical built infrastructure and displacement of piped infrastructure can render 3 waters systems inoperable and unable to deliver clean drinking water or to transport and treat wastewater safely. Liquefaction can cause more damage to underground pipes than ground movement and is a significant contributor to pipe failure in earthquakes. Dunedin has several areas with moderate to high likelihood of liquefaction in an earthquake.

Seismic activity could also cause isolation across the transport network if certain areas are cut off due to rubble, slips, liquefaction or land displacement. Dunedin is vulnerable to isolation given the limited number of routes in or out of the city. Dunedin is predominately serviced by a motorway in from the north and a motorway in from the south with the alternative route from the north on Mt Cargill road. Dunedin's Akatore fault has potential to disrupt the network to the south of the City.

Flooding and landslides

Some parts of Dunedin are susceptible to flooding and landslides during heavy rainfall events. Flooding and landslides can damage homes, business and infrastructure. Flood risks are due to several factors including:

- Rainfall events exceeding design tolerances.
- Limited capacity in parts of the wastewater network as a result of rainwater and groundwater infiltration to the wastewater network from ageing and cracked pipes and inflow to the wastewater network from direct stormwater connections
- Low-lying areas where the groundwater is close to the surface so rainwater cannot drain away.
- Sea level rise, more extreme rainfall events and storm surges increasing the frequency of flood events in the future.
- Mud-tanks can become blocked and creating a flooding hazard
- The low elevation of some roading infrastructure can cause roads to become flooded and cut off.

Manhole surcharging can create a safety hazard in flood events on the Transport corridor when manholes covers become dislodged. Communities in low-lying coastal areas serviced by septic tanks (rather than a reticulated wastewater system) may be at higher risk of groundwater contamination during flood events. More extreme rainfall events and storm surges may lead to larger and more frequent slips and damage to 3 waters and transport infrastructure including sea walls, bridges and culverts.

As weather events become more frequent and severe, the infrastructure networks and community's ability to recover will continue to be put under increasing pressure.

Drought, higher mean temperatures and catchment fires

Prolonged periods of drought pose a risk to Dunedin's water supply. Furthermore, drier water catchments yield less water and are more prone to large scale fires. Catchment fires can result in highly turbid water that that is more expensive to treat or is unable to be treated by existing treatment processes. Higher mean temperatures increase the risk of algal blooms within raw water reservoirs, which may require expensive treatment. In addition, odour issues at wastewater treatment sites and within the network are more likely at higher temperatures.

From a transport perspective, higher temperatures can cause degradation in the roading infrastructure. Droughts can also present a fire risk for roadside vegetation.

Building resilience to natural hazards

The DCC has improved its understanding of natural hazards to assist in developing options for a resilient infrastructure network into the future. The DCC are working in partnership with other agencies such as GNS Science and ORC to further enhance our understanding of groundwater and impacts of sea level rise, particularly in South Dunedin.

The Peninsula Connection project is an example of building a more resilient asset by raising the road to allow for predicted sea level rise while widening the transport corridor (for safety purposes) and creating a shared path (for mode choice purposes).

System planning for 3 waters is focussed on an adaptive approach to investment, planning for natural hazards and ensuring resilient solutions are implemented. Long-term investment plans will be ready for the 2024-34 10 year plan, however early work to increase resilience to some water supplies and targeted metro wastewater treatment plant wet weather flow management are budgeted within the 2021-31 capital programme.

Planning is also underway to look at the resilience of the Transport network in the case of a seismic event, specifically around the supply chain and getting goods to and from Dunedin. Planning is also underway for any Alpine Fault activity. In a seismic event involving the Alpine Fault, Dunedin would likely be the least affected so may have to become a recovery hub for the lower South Island.

Principal options and implications for building resilience to natural hazards

The option that the DCC has decided to take is highlighted in green.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Planned renewals and projects will reduce some risks arising from natural hazards	Renewing pipes and other infrastructure in flood prone areas will reduce some risks arising from natural hazards. Continue to fund projects to improve the resilience of the water supply network. AF8 (Alpine fault quake resilience)[4] and Lifelines resilience projects will improve resilience of 3 waters network. Existing transport infrastructure is renewed like for like. Significant weather events will remain a problem for isolated areas of the network; largely in coastal, slip prone and low-lying areas.	Renewing pipes and other infrastructure in flood prone areas will reduce some risks arising from natural hazards. Existing transport infrastructure renewed like for like. Significant weather events will remain a problem for isolated areas of the network; largely in coastal, slip prone and low-lying areas.	Natural hazard risks fully considered when renewals are planned. Updated design tolerances incorporated into asset renewals. Existing transport infrastructure renewed like for like. Significant weather events will remain a problem for isolated areas of the network; largely in coastal, slip prone and low-lying areas.
Invest in new capital to specifically reduce the risk arising from natural hazards	As above, however investment is made in specific new projects to minimise the risks from natural hazards, in particular climate change and the risk to assets. Projects such as South Dunedin Flood Alleviation assess the future impacts of climate change (such as sea level rise, rainfall patterns and flooding) and looks for solutions to mitigate these risks. We will also undertake adaptive planning pathways – events are uncertain and so infrastructure planning will need to be agile and adapt to various scenarios.	New capital incorporated into renewals where a known hazard requires mitigation.	New capital incorporated into renewals where a known hazard requires mitigation.

Planned increases or decreases in levels of service

The DCC upgrades assets in response to growth or higher service demands. These include improving taste and odour of drinking water and making improvements to roads to improve transport choice and safety.

3 Waters

The highest priority service levels for 3 waters are: water quality and supply reliability, the adequate performance of networks and the impacts of 3 waters discharges and overflows on the environment, plus internal service measures such as health and safety.

The upcoming 3 waters reform will require further improvements to drinking water supplies; such as quality, quantity and management, and require improvements in wastewater and stormwater management. No funding allowance has been made in the 2021 – 31 10 year plan for enhanced standards in water, wastewater or stormwater as at the time of writing these are unknown.

A large part of the work programme within 3 waters in the shorter term is to prepare for anticipated new standards associated with reform. This will include: increased monitoring of assets, assessing internal capability and capacity to undertake the projects proposed in the capital expenditure programme (including the tranche 1 stimulus funding) and improving asset and compliance management practices.

Water

Some capital projects to upgrade water treatment capability have been initiated to improve drinking water aesthetics and taste and provide enhanced monitoring. At the water treatment plants, a programme of work to improve wet weather flow management has begun and additional monitoring has been installed to assist in understanding what investment will be needed to meet any national standards introduced through 3 waters reform.

4 DCC is an active participant in the Alpine fault quake resilience (AF8) programme. This is a scenario-based planning project, managed by the Ministry of Civil Defence and Emergency Management, with the intention of preparing plans in response to a major earthquake on the Alpine Fault.

Wastewater

Ageing pipes and sewers are creating 'nuisance' level problems for some residents. The larger issues are caused by inflow and infiltration into the wastewater systems which can lead to surcharge, flooding and hydraulic pressures at the wastewater treatment plants. Renewal programmes on the network are focussed on reducing inflow and infiltration to reduce wet weather overflows and treatment plant wash-out. At pump stations the aim is to increase reliability to maintain network performance and at the treatment plants assets are to be renewed to maintain compliance with resource consents and reduce health and safety risks.

Stormwater

Sea level rise leading to rising groundwater in low-lying parts of Dunedin will make it more difficult to meet current stormwater levels of service. As groundwater rises, additional investment will be required in wastewater and stormwater infrastructure to maintain existing service levels. To support this, the DCC will remain focused on the renewal of assets with new projects to address areas where levels of service issues currently exist. Following previous floods, investment in an expanded stormwater network, in addition to focused improvements in the most heavily affected areas (South Dunedin, Mosgiel), is anticipated.

Transport

The priority service levels for the transport network are:

- Safety – all users of the transport network are catered for in a safe network.
- Resilience – The availability and restoration of the network function when there is a weather or emergency event
- Accessibility – The ease with which people can reach key destinations and the transport networks available to them.
- Travel time reliability – The reliability of travel time on key routes during peak use
- Cost efficiency – The relative costs and efficiency of the network compared with other networks.

There are a number of projects in the 2021 – 31 capital programme, including the Shaping Dunedin Future Transport (SFDT) programme, that aim to respond to levels of service across the city in light of the hospital rebuild and growth in the city, some of which are detailed below.

- Harbour arterial improvements: The harbour arterial route would run along Wharf St and Thomas Burns St to provide an alternative route bypassing the city centre, avoiding the new hospital during and after construction.
- Park and Ride facilities at Mosgiel and Burnside: Parking areas, where people can leave their car and catch a city-bound express bus service.
- Central city parking management: Implementation of a plan to improve the parking experience, wayfinding of parking and a review of the pricing structure of parking.
- Strategic cycleway network: To fill the gaps and expand the existing cycling network across the city to provide a safe and connected cycle network.
- Central City bike hubs: Hubs where cyclists can lock their bikes in sheltered lockers and other facilities, such as repair and charging services, in North Dunedin, Central City and South Dunedin/Oval.
- Bus priority measures and safety improvements: Providing infrastructure to prioritise buses and safety improvements for pedestrians in and around the CBD.

ORC are investing in additional bus hubs and improved public transport and Waka Kotahi is investing in enhancing the state highway, intersections and other cycleways as part of the SDFT programme.

Principal options and implications for increasing or decreasing levels of service

The option that the DCC has decided to take is highlighted in green.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Plan and invest to maintain service levels	Focus on renewing network infrastructure to reduce the risk of declining service levels. Do not plan or invest for changes to service levels.	Maintain capacity to manage current risk, however no increases in service levels may undermine growth in future. Does not plan for regulatory and legislative changes, which will see an increase in required levels of service for 3 waters, of which the impact upon rates is currently unknown.	Demographically driven decline in population may mean costs directly linked to service level delivery are borne by fewer residents if growth does not occur.

Option	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Plan and invest to maintain and increase some strategic service levels	Renew infrastructure to reduce the risk of declining service levels and to increase resilience, while also investing in improving strategic service levels. Planning for 3 waters regulatory and service delivery reforms continue. Increase investment in active and public transport modes to contribute to carbon zero 2030 goals.	Balance our ability to manage future demands, with strategic investments aimed at encouraging sustainable growth through improved service levels. Planning and implementation to deal with the longer-term impacts of regulatory and legislative changes such as the anticipated wastewater and stormwater service level enhancements.	If investing in infrastructure to attract more people to live and study in Dunedin results in higher than projected growth, this may improve ongoing affordability of service level increases. A long-term investment programme is built up from enhanced monitoring and investment can be phased to deliver maximum benefits and efficiencies.
Plan and invest to increase some strategic service levels through enhanced projects	Renew infrastructure to reduce the risk of declining service levels and to increase resilience, while investing strongly in significantly improving strategic service levels through new and enhanced projects. High likelihood this option is not deliverable.	If strong growth does not occur, a higher cost will be borne by existing residents. This may limit the ability to maintain and operate changes to service levels. The impact on rates of any changes in strategic service levels are currently not understood, and so best practicable options cannot be chosen. There is the risk that abortive work will be undertaken and additional spend needed to meet new standards.	If investing in infrastructure to attract more people to live and study in Dunedin results in higher than projected growth, this may improve ongoing affordability of service level increases.

Zero Carbon 2030 target

In June 2019, Council declared a climate emergency and brought forward the city's emissions reduction target by 20 years. The 'Zero Carbon 2030' target seeks to achieve city-wide net carbon neutrality (excluding biogenic methane) by 2030. For biogenic methane, the target aligns with central Government, aiming to achieve a 24% to 47% reduction below 2017 levels by 2050, including 10% reduction below 2017 levels by 2030.

Current impact of 3 waters infrastructure on city-wide emissions

3 waters infrastructure impacts on city-wide emissions in a number of ways.

- Biological processes from wastewater treatment were assessed as being responsible for approx. 0.2% of the city's emissions in 2018/19.
- Some sludge generated in wastewater treatment processes is currently sent to landfill, contributing to solid waste emissions.
- Diesel, LPG and electricity used in distribution, treatment and disposal processes associated with 3 waters networks all contribute to stationary energy sector emissions.
- The availability of servicing in various parts of the city shapes urban form, which in turn impacts on transport sector emissions.
- Construction and maintenance processes associated with the 3 waters network also contribute to the city's emissions profile.

Historically, carbon emissions have not been a key consideration in the design of 3 waters plant and network infrastructure. As a result, neither existing plant nor network configuration is optimised to minimise emissions. In addition, the current need to prioritise reactive operational expenditure, to address process challenges and compliance risks, hinders significant immediate investment in aligning these facilities and assets with Zero Carbon ambitions. Another key consideration is service delivery reform and increasing treatment standards for water and wastewater – these are very likely to result in more intensive treatment processes, which in turn are likely to drive increases in energy demand. The extent to which these requirements may undermine emissions reduction efforts is currently unknown, but may be significant.

In terms of 3 waters' impact on urban form, urban intensification (particularly around the CBD, centres and along public transport routes) is preferable to urban expansion, because it is more likely to support and promote low emission transport systems. The DCC's overall urban form objective of a 'compact city with resilient townships' is intended to be achieved through urban consolidation and prioritising use of existing capacity within existing urban areas. Rules in the 2GP currently restrict development in some new medium density areas due to constraints in

the 3 waters network, and the degree to which additional intensification is achievable is similarly limited in some locations by 3 waters network capacity.

Current impact of transport infrastructure on city-wide emissions

The transport sector is Dunedin's most significant, and fastest growing, source of emissions. In 2018/19, transport was assessed as contributing 39% of Dunedin's total gross emissions, with the largest proportion of this (27% of gross emissions) stemming from land transport. The configuration of the local road network, and the relative levels of service for different modes, shape residents' travel choices and therefore the city's emissions profile.

Dunedin has a reliance on cars, which has constrained the uptake of alternative modes of travel. According to the 2018 census data, 68.5% of the community within Otago used private or company vehicles as the means of travelling to work. Global and national trends suggest, however, that with increasing investment in infrastructure to improve the levels of service for alternative modes, there is a slow increase in uptake of these modes. This is reflected in cyclist numbers on monitored routes, and in bus patronage data in Dunedin.

In March 2019, a central city bus hub was established and in 2020 the ORC implemented a cheaper and simpler fare and card system for public transport. Both initiatives appear to have encouraged further uptake of public transport with patronage steadily increasing.

Aligning infrastructure work programmes with the Zero Carbon 2030 target

For both transport and 3 waters, improvements in data quality has been identified as a key step in supporting efforts to reduce emissions.

In the transport network, investigations into the end use of fuel purchased within Dunedin, and residents' travel choices, will help the Transport team prioritise and tailor emissions-reducing interventions.

For the 3 waters network, an emissions baseline for existing plant and network operations needs to be established, to help identify and prioritise opportunities for emissions reduction.

Development of policies, processes and guidance to support the integration of the Zero Carbon 2030 target into infrastructure teams' planning and day-to-day operations, is underway. This includes revision of the DCC's existing Carbon Management Policy (2017) for the organisation (which will assist to align all infrastructure projects, including renewals, with emissions reduction ambitions). Clearly defining the outcomes sought to give effect to the Zero Carbon 2030 target will ensure these can be embedded in strategic planning, including 3 waters system planning. It is considered that this will, in turn, clearly align transport and 3 waters expenditure with Zero Carbon ambitions from 2024 onwards.

Looking forward, there is also provision in the 10 year plan to embed Zero Carbon-related considerations in the DCC's performance management framework, asset management and procurement processes, and reporting.

For transport, the speed and depth of changes required to achieve the Zero Carbon 2030 target represent a very significant departure from business-as-usual. Provision for these alternative modes, and residents' use of them, will need to increase substantially over the decade to 2030. This will rely not only on DCC investment, but also on the degree to which partner agencies focus their investment on facilitating a rapid transition to a low emission transport system – and the extent to which this is supported by the community. The development of a Zero Carbon Plan for the city, scheduled for 2021, is anticipated to assist with this process.

For both transport and 3 waters, the need to cater for population growth, discussed in section 6.3, is both a challenge and an opportunity in achieving alignment with the Zero Carbon 2030 target. City Development, in consultation with transport and 3 waters, is developing an approach to provide for Dunedin's growth. Variation 2 is considering additional changes to address the shortfall in medium-term housing capacity.

Major projects and decisions

This section shows the major infrastructure projects and key infrastructure decisions over the next 50 years. Significant future decisions are subject to the DCC's Policy on Significance and Engagement, and significance will be determined by the DCC in the context of decisions about the 10 year plan.

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
3 Waters Reform							
Decision on participation in Three Waters Reform Programme+ (+service delivery reforms –proposed transfer of local government 3 waters assets and service delivery functions to new water services entities)	Regulatory, legislative and service delivery changes	The DCC will decide whether to continue participating or 'opt out' of the Government's 3 waters service delivery reform programme in late 2021. The Government will promote an amendment to the Local Government Act 2002 that, if passed, would enable councils to transfer ownership of 3 waters assets and services to new entities. The proposed amendment will also provide a fit-for-purpose consultation process that sets out how local government will engage with communities and iwi/Māori about the reform proposals and make decisions. This decision is only for service delivery reform. Council is unable to opt out of the regulatory elements of 3 waters reform.	Option 1: agree to continue DCC participation in the Three Waters Reform Programme. This is expected to lead to the transfer of DCC 3 waters assets and service delivery functions to a new water services entity in about 2023. Option 2: 'opt out' of the Three Waters Reform Programme. Retain 3 waters assets and service delivery functions within the DCC.	Council decision.	Costs relating to making this decision, including costs related to running a public consultation process, are yet to be determined.	Late 2021	Likely no effect on emissions
Projects to prepare for regulatory, legislative and service delivery changes	Regulatory, legislative and service delivery changes Planned increase in levels of service	Prepare the 3 Waters Group, the wider DCC and Dunedin for implementation of changes to 3 waters regulatory systems, and the potential transition to a new entity for 3 waters service delivery. The purpose of these projects is to establish certainty on the impact of reform and reduce associated risks. Other benefits include enabling a co-operative exit, leveraging value for Dunedin and setting up a new water services entity for success. The focus areas are contract and capital delivery, asset ownership, system planning, asset management, strengthening regulation and servicing growth.	Options to be developed via the various projects currently in planning stages.	To be determined	Costs will be determined based on strategic need and deliverability.	2021 – 23	Likely no effect on emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
System Planning	Regulatory and Legislative Changes Planned increase in levels of service, Response to growth in demand, Public health and environmental outcomes Renewing and replacing assets Resilience to natural hazards	3 Waters 'whole of system' strategic planning to develop baseline and long-term investment plans. Identify current and future issues, develop objectives and levels of service and create long and short list options for the systems. In the short term, the baseline stage of this work informs the Metro WWTP Resilience Project. Long-term, strategic capital investment plans are produced. These will inform the 2024-34 10-year plan.	Options to be developed via the various projects currently in planning stages. A decision will be made on long term investment plans in the 2024-34 10 year plan.	Majority of planning is OPEX, produces CAPEX plans, amount to be determined.	Costs will be determined based on strategic need, affordability and deliverability.	2021 – 51	Unknown
Network infrastructure							
The need for new capital expenditure will be reassessed following decisions on areas for new development in the 2GP and then Variation 2	Response to growth in demand Public health and environmental outcomes	Using a medium growth scenario, demand is estimated at 4,000 new dwellings between 2021 and 2031 and 7,000 new dwellings by 2071. Growth funding has been allocated to allow for substantial planning and design within the first 12-18 months, followed by a steady programme of capital delivery over the remaining term of the 10 year plan. Detailed planning is in progress, with the initial planning focussed on high priority areas that have been identified in consultation with developers. As the planning and design develops, the phasing of capital works may change through the annual plan process to meet development requirements.	Options for responding to increase in demand will be developed once the 2GP and Variation 2 appeals process is completed. The costs included in the 10 year plan are an estimate of the 3 waters and transport network infrastructure requirements to meet the growth needs of 2GP and Variation 2.	To be determined	$104 million to be funded by development contributions and debt financing where appropriate.	2021 – 36	Likely increase in emissions
Water and Sanitary Services assessment	Public health and environmental outcomes	The Water and Sanitary Services Assessment is a district-wide assessment of the provision of water and sanitary services (such as wastewater, stormwater, public toilets and cemeteries). The assessment reviews the adequacy of existing systems in serviced communities and any health risks arising from the absence of systems in un-serviced communities. The most recent assessment was completed in 2007.	Options will be considered in the Water and Sanitary Services assessment.	To be determined	Costs will be determined based on the outcomes and associated Council decisions from the Water and Sanitary Services Assessments.	2021-23	Possible increase in emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Other Network Renewals	Renewing and replacing assets Public Health and environmental outcomes	These are ongoing pipeline renewals projects (not already identified below) across all 3 waters network assets. These renewals will be focused on: areas of high inflow and infiltration rates, aged assets, high break rates and customer complaints. This will address risks in water supply reliability and pressure, water quality, wastewater overflows, flooding and pipeline collapse.	The preferred option is a steady spend over the 10-year period.	Renewals	$57 million (note the remainder of the renewals budget is allocated to specific network renewals identified elsewhere in the table).	2021 – 31	Likely no effect on emissions
Minor Network Renewals	Renewing and replacing assets Public Health and environmental outcomes	Reactive, smaller scale network renewals and repairs across all 3 waters, mostly undertaken by the network contractor.	Reactive work is undertaken as required.	Renewals	$50 million	2021 – 31	Likely no effect on emissions
Water supply							
Water supply resilience	Response to growth in demand Public health and environmental outcomes Renewing and replacing assets Resilience to natural hazards	Projects intended to improve the ability of the water supply network to provide adequate safe potable water regardless of forecast changes in climate and population, and in the event of a natural disaster. Activities include the Ross Creek to Mount Grand transfer line, water treatment plant renewals and upgrades and pump station renewals and upgrades. Some minor renewals and monitoring work have commenced as part of the 3 waters reform tranche 1 funding.	Further work is needed on detailed design and deliverability, plus risks may materialise which would change the timing of some projects. Options are in development.	New Capital and Renewals	$76.7 million	2021 – 31	Likely no effect on emissions
Dam Safety Action Plan	Renewing and replacing assets Resilience to natural hazards	Physical works required in order to continue to comply with Dam Safety requirements. Some work has commenced as part of the 3 waters reform tranche 1 funding.	Physical works are undertaken as required in order to meet dam safety requirements.	Renewals	$4.0 million	2021 – 31	Likely no effect on emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Water take reporting	Regulatory and Legislative Changes Public health and environmental outcomes	Recent amendments to the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 make real-time collecting and transmitting of water use to regional councils mandatory. Implementation is required by 2022 for takes ≥20 litres/second (20 of the DCC's 29 takes). For takes ≥10 but <20 litres/second (eight of the DCC's 29 takes) real-time monitoring is required by 2024. For takes ≥5 but <10 litres/second (one of the DCC's 29 takes), implementation is required by 2026. The DCC currently downloads and supplies water take data to the regional council on a monthly basis. Work is underway to investigate adjustments and/or upgrades needed to meet the new real-time reporting requirements.	Work is underway to respond to regulatory changes.	New Capital	$750,000	2028/29 – 2030/31	Likely no effect on emissions
Smart Metering	Renewing and replacing assets	Replacement of existing manual read meters on commercial premises with 'smart' meters capable of being read remotely and connection to the Internet of Things allowing the DCC and customers to view consumption in real time.	Work is underway with completion expected in 2026.	New Capital	$1.4 million	2021 – 25	Likely no effect on emissions
Port Chalmers Water Supply	Renewing and replacing assets Response to growth in demand	Investigate options to rationalise water supply to Port Chalmers year-round from the metropolitan supply. Funding is based on this being feasible, however, if not, it will be redirected towards renewal/upgrade of Port Chalmers water supply infrastructure to meet demand. This will reduce water quality risks, improve supply reliability and reduce operational costs Renewals are needed at the treatment plant if it is not to be decommissioned in the near future as part of the Water Supply Resilience project.	This project is currently programmed for 2027 but if delivery capacity can be increased this project can be brought forward.	New capital	$14.4 million	2027 – 31	Likely decrease in emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Deep Stream and Deep Creek raw water pipeline renewals	Renewing and replacing assets Resilience to natural hazards	Renew Deep Creek and Deep Stream pipelines to Mt Grand Water Treatment plant (which provide majority of Dunedin's water) to increase resilience and renew ageing pipes. Investigation of options and design will commence in the final year of the 2021-31 plan with construction to commence after 2031. Seismic and geotechnical assessments undertaken and construction with seismically resilient materials where necessary.	Timing of project will be confirmed by a formal condition assessment within the next 5 years. The renewal date will be brought forward if the pipe condition warrants it.	Option dependent	$80 million	2030 – 36	Likely no effect on emissions
Water network renewals – Waikouaiti/Karitane	Renewing and replacing assets Public Health and environmental outcomes.	Renewal of water assets to mitigate increasing asset failure rates. This work was accelerated as part of the 3 waters reform tranche 1 funding.	Design underway with construction to commence once design completed.	Renewals	$6.5 million	2020 – 22	Likely no effect on emissions
Network renewals Kaikorai Valley / North East Valley	Renewing and replacing assets Response to growth in demand	Renew water network assets to improve water supply fire flows. Renewals for all three networks in these areas will be undertaken as part of the new pipeline renewals contract.	This is an ongoing project. Renewals will be focused on areas with aged assets, high break rates and customer complaints.	Renewals	$17 million (over water supply and wastewater renewals)	2019 – 23	Likely no effect on emissions
Network renewals Careys Bay	Renewing and replacing assets Public Health and environmental outcomes.	Renewal of water assets to mitigate increasing asset failure rates. Renewal of wastewater assets to reduce wet weather flows to the downstream network. Construction of stormwater network where required.	Construction underway.	Renewals and new capital.	$5.5 million across all three networks.	2021 – 24	Possible increase in emissions
Network renewals Sawyers Bay	Renewing and replacing assets Public Health and environmental outcomes.	Renewal of assets across all 3 waters networks to decrease wet weather overflows in the wastewater network, improve the ability of the stormwater network to deal with forecast future flows and aged water infrastructure. This work was accelerated as part of the 3 waters reform tranche 1 funding.	Design underway with construction to commence once design completed.	Renewals and new capital	$5.9 million across all three networks	2020 – 23	Likely no effect on emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Central City renewals	Renewing and replacing assets Public Health and environmental outcomes.	Renewal, rationalisation and upgrade of 3 waters infrastructure in the area covered by the central city plan (George Street, Stuart Street, Bath Street, Princes Street, Rattray Street and associated streets).	Options are still being considered for 3 waters approach in these areas but range from full replacement of all assets in certain areas to replacement of aged, failing or under capacity assets only. The scale of investment needed from 3 waters is a significant portion of the overall budget in years 2-3 and so benefit compared to other risks needs to be considered in the options.	Renewals	$37.9 million across all three networks	2021 – 27	Likely no effect on emissions
Tertiary Precinct renewals	Renewing and replacing assets Public Health and environmental outcomes	Renewal and upgrade of 3 waters infrastructure in the area covered by the Tertiary Precinct Project (Harbour Terrace, Union Street East, Clyde Street and Albany Street).	Options are still being considered for 3 waters approach in these areas but range from full replacement of all assets in certain areas to replacement of aged, failing or under capacity assets only.	Renewals	$11.2 million across all three networks.	2031 – 35	Likely no effect on emissions
Wastewater							
Metro WWTP resilience	Response to growth in demand Public health and environmental outcomes Renewing and replacing assets Resilience to natural hazards	Renewals and new capital at the metropolitan wastewater treatment plants and Musselburgh pumping station to: maintain levels of service, ensure ongoing compliance with, and renewals of, resource consents, and biosolids treatment, removal and disposal. Most urgent elements are prioritised for years 1-3 Some minor renewals and monitoring work have commenced as part of the 3 waters reform tranche 1 funding. This work targets risks to H&S, plant reliability, sludge treatment reliability and compliance issues from inadequate wet weather flow management.	Further work is needed on detailed design and deliverability, plus risks may materialise which would change the timing of some projects. Options are in development.	New capital and renewals	$114 Million	2021 – 33	Likely no effect on emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Rural wastewater schemes	Public Health and environmental outcomes Renewing or replacing assets Planned increase in levels of service Resilience to natural hazards	Network and WWTP investigation to inform upgrades to the rural networks prior to the discharge consents expiring to ensure they can meet current and anticipated enhanced effluent quality targets and minimise the effect the effluent has on the environment. These projects also assess the capability and capacity of the wastewater systems to meet current and future demands and levels of service.	Design for Seacliff and planning for Middlemarch WWTPs renewals is underway. Options for Warrington and Waikouaiti will be developed as plant consents become due in 2024 and 2027 respectively.	Renewals	$9.9 million	2021 – 27	Likely no effect on emissions
Pump station renewals	Renewing or replacing assets	A programme of risk-based renewal and upgrades to wastewater pumping stations to maintain levels of service and replace ageing assets.	This project is to address pump stations that have been identified as requiring urgent attention.	Renewals	$2 million	2021 – 25	Likely no effect on emissions
Stormwater							
Stormwater Hydraulic Models	Public Health and environmental outcomes Planned increase in levels of service Resilience to natural hazards	This project is part of the baseline stage for stormwater system planning. Capital work is associated with the creation, calibration and/or updating of stormwater network models which will allow investment options to be tested and compared.	The level of model development will be assessed as part of the gap analysis stage. Development of a stormwater system plan will provide the 3 Waters Group with the tools necessary to ensure the greatest return on future investment.	Renewals and/or new capital	$1 million	2021 – 24	Likely no effect on, or a decrease in emissions
South Dunedin Flood Alleviation	Public health and environmental outcomes Planned increases in levels of service Renewing or replacing assets Response to growth in demand Resilience to natural hazards	Capital works to mitigate flooding in South Dunedin and mitigate risks from climate change. Solutions are informed through the work on existing hydraulic models, flow monitoring and incorporation of groundwater models and climate change predictions. This project forms part of the larger South Dunedin Futures programme which aims to effectively respond to the climate-driven challenges facing South Dunedin, whilst potentially resolving other issues such as poor-quality housing at the same time.	Hydraulic model enhancements and calibrations are underway, which will inform the capital investment options and enable decisions on the best way forward. These models will be supported by information on environmental effects, ensuring that constructed infrastructure meets community expectations. It is possible further funding changes will be needed as options progress to minimise the flooding risk.	New capital and renewals	$36.7 million	2021 – 31	Likely no effect on emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Mosgiel stormwater network improvements	Public health and environmental outcomes Renewing or replacing assets Planned increases in levels of service Resilience to natural hazards	Improvement of hydraulic models to enable optimal options. Improvements to Reid Avenue swale to reduce flooding. Identify and undertake where needed, optimal infrastructure investment to reduce flooding.	Updating of hydraulic models allowing for targeted renewals and replacement.	Renewals	$19.5 million	2021 – 28	Likely no effect on emissions
Watercourse Programme (New Capital)	Renewing or replacing assets Public health and environmental outcomes Resilience to natural hazards Planned increases in levels of service	New approach to watercourse related flood and landslip problems, resolving priority issues caused by watercourse asset failure under private ownership within current budgets. This results in minor extension of DCC's network with localised benefits in management of stormwater and meeting stated levels of service. Reduces other hazard risks such as sinkholes and landslips.	Projects are prioritised based on a standard multi-criteria tool and managed via a set delivery framework. Budget requests to be made each year as part of the annual plan process. The asset ownership policy for watercourses is planned for review, along with assessing financial impacts to the DCC, to enable to longer-term strategy for managing these assets.	New capital	$3.5 million annually	2021 – 22	Likely no effect on emissions
Transport							
Central City upgrade	Public health and environmental outcomes Renewing or replacing assets Planned increases in levels of service	Renewal, rationalisation and upgrade of transport infrastructure to improve safety, accessibility and amenity in the area covered by the central city plan (George Street, Stuart Street, Bath Street, Princes Street, Rattray Street and associated streets).	Options will be considered through indicative and detailed business cases. The George St upgrade detailed business case will commence in early 2021.	New capital and renewals	$60 million	2020 – 31	Likely decrease in emissions
Dunedin urban cycle ways	Public health and environmental outcomes Planned increase in levels of service	Arterials Cycleway: Close the gaps in the existing cycleway network.	Options are being considered through a detailed business case expected to be completed in 2021.	New capital	$9 million	2021 – 23	Likely decrease in emissions
		North East Valley Cycleway: Provide a cycleway to connect North East Valley with the city	Work on a business case will be started in 2021.		$11 million	2023 – 36	
		Tunnels Trail Cycleway: Provide a cycleway connecting Dunedin and Mosgiel through chain hills area and the Caversham tunnel.	Preferred alignment options and a single stage business case are in development.		$27 million	2023 – 41	

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Tertiary precinct improvement	Public health and environmental outcomes Renewing or replacing assets Planned increase in levels of service	Renewal, rationalisation and upgrade of transport infrastructure to improve safety, accessibility and amenity in the area covered by the Tertiary Precinct Project (Harbour Terrace, Union Street East, Clyde Street and Albany Street).	Options are being considered through an indicative business case that is currently underway.	New capital and renewals	$20 million	2031 – 36	Likely decrease in emissions
City to waterfront cycling / pedestrian connection	Public health and environmental outcomes Planned increase in levels of service	New cycling and pedestrian bridge connecting the city centre and waterfront. Existing connections (i.e. level crossing at St Andrews Street, heritage pedestrian over bridge behind Railway Station and route across Castle and Wharf Street) have a number of issues including accessibility for cyclists and mobility impaired users, directness of route and safety issues.	Concept options have been considered through an indicative business case. The project was put on hold following the COVID-19 pandemic. Detailed design options will be explored through the detailed business case phase.	New capital	$20 million	2024 – 28	Likely decrease in emissions
Major centres upgrade	Public health and environmental outcomes Renewing or replacing assets	Improve the safety and accessibility of main streets within Dunedin's commercial shopping centres.	Design and phasing options are still to be determined	New capital and renewals	$9.4 million	2024 – 31	Likely no effect on emissions
St Clair Seawall	Renewing or replacing assets Resilience to natural hazards Public Health and environmental outcomes	Renew and upgrade the existing coastal defences at St Clair Beach to build resilience and to benefit public safety, access and environmental outcomes at the coast.	Design options are still to be determined. The project is likely to include replacement of the existing sea wall and/ or supplementary protection with sand retention structure(s) or similar.	New capital	100.3 million	2032 – 36	Likely no effect on emissions
Mosgiel heavy Vehicle by-pass	Public health and environmental outcomes Planned increase in levels of service	Re-routing heavy vehicles along another route rather than through Mosgiel town centre.	Route and design options are still to be determined.	New capital	15 million	2042 – 51	Likely increase in emissions
Dunedin central city bypass	Public health and environmental outcomes Planned increase in levels of service.	Re-routing state highway traffic away from the central city.	Route and design options are still to be determined.	New capital	35 million	2032 – 41	Likely increase in emissions

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
Harbour Arterial corridor	Planned increases in levels of service. Response to growth in demand.	Improvements to the Harbour Arterial corridor to improve safety and efficiency to provide an alternative to accessing the CBD from the south. The route will utilise the following roads (south to north): Caversham Motorway (SH1)/Andersons Bay Road intersection – Andersons Bay Road – Strathallan Street – Wharf Street – Thomas Burns Street – Ward Street – Ward Street overbridge – Frederick Street/Anzac Avenue intersection.	Single stage business case to be started in early 2021.	New capital	$16.3 million	2021 – 27	Likely increase in emissions
Parking Management	Planned increases in levels of service Response to growth in demand.	Technology for wayfinding of parking, replacing parking meters with more efficient technology, consolidation of off-street parking, installation of technology to assist more reliable parking and a review of the parking costs across the city.	A parking management policy is in development. A single stage business case assessing options to improve the parking experience will begin in 2021.	New capital	$10.9 million	2021 – 26	Likely decrease in emissions
Mosgiel and Burnside Park & Ride	Planned increases in levels of service Response to growth in demand.	Installation of a park and ride at Mosgiel and Burnside to enable people to take the bus into the CBD.	A single stage business case will need to be developed.	New capital	$10.2 million	2023 – 29	Likely decrease in emissions
Corridor Safety Improvements and bus priority measures	Public health and environmental outcomes Planned increases in levels of service Response to growth in demand.	Safety improvements for pedestrians in the CBD and bus priority measures especially around Princess Street.	A single stage business case will need to be developed.	New capital	$6.4 million	2021 – 24	Likely decrease in emissions
Central cycle and pedestrian safety	Public health and environmental outcomes Planned increases in levels of service Response to growth in demand.	Safety improvements and provision for pedestrians and cyclists on St Andrew Street from Anzac Avenue to Great King street, George Street to Cumberland Street, Anzac Avenue to the Harbour Circuit via Minerva Street.	A single stage business case will need to be developed.	New capital	$4.8 million	2021 – 26	Likely decrease in emissions
Bike Hubs	Public Health and environmental outcomes. Planned increase in levels of service.	Creation of bike hubs where people are cycling particularly to work.	A single stage business case will need to be developed.	New capital	$2.45 million	2022 – 27	Likely decrease in emissions
Capital renewal programme	Renewing or replacing assets.	Planned renewals to pavements, seawalls, retaining walls, footpaths and kerb and channel to maintain existing levels of service in the transport network.	Range of design options will be considered subject to alignment with NZTA's One Network Road Classification system.	Renewals	$245.8 million	2021 – 31	Likely no effect on emissions

Approach to delivering the new capital and renewals programme

The Infrastructure Strategy is closely linked to the Financial Strategy. The Financial Strategy considers affordability for ratepayers and the DCC as a whole. The DCC has attempted to balance the competing tensions of affordability, maintaining assets and investing for the future, while addressing the financial challenges of increasing costs, delivering large capital projects and increasing network renewals. The Financial Strategy provides strategic financial limits for rates and debt and discusses other funding sources. The budgets increase rates and debt requirements, but do not exceed the limits over the next ten years.

Ability to deliver on the planned capital programme

Our planned capital expenditure programme represents a significant uplift from the last 10 year plan, with renewals a key area of focus. The challenge for the DCC will be the ability to deliver this programme, acknowledging that the annual targets are higher than previous achievements, and the lead time for delivery is always longer than anticipated. These risks will be managed through improved forward planning, early contractor engagement, innovative procurement strategies (such as those outlined in SOLGM Agile Procurement in the Water Sector document), and strong disciplines around project management and monitoring to ensure progress is on track.

COVID-19 represents a risk to delaying the planned capital and renewals programme. Planning and design work for the programme is able to progress under any alert level through remote working arrangements. DCC will therefore continue to develop the forward work programme during any ongoing COVID-19 alert level restrictions. However, contractor resources are impacted in alert levels. Reduced productivity is expected in alert levels 2 and 3, and only essential projects can progress under alert level 4. The DCC will work closely with its contracting partners to define essential services and look for opportunities to manage supply chain and programme delivery risks. This is likely to include ensuring diversified supply chains from a geographic and supplier perspective, having strong COVID-19 protocols in place and enhanced workforce and labour planning.

Debt

The use of debt allows the financial burden of new capital expenditure to be spread across a number of financial years, recognising that the expenditure is on intergenerational assets, i.e., the assets have a long life and generate benefits both now and to future generations.

Debt is also used to fund the portion of capital renewals that is not covered by funded depreciation.

In our last 10 year plan, the debt limit was fixed at $350 million. This limit is not sufficient to fund planned investment in capital projects and does not recognise the impact of changing costs and/or activity.

The gross debt limit for this 10 year plan is set as 250% of revenue. This means that our debt level will be responsive to change and will move in line with the level of our activities. This revised debt limit will allow flexibility to deliver the planned capital expenditure programme, while also having capacity to fund potential unplanned events.

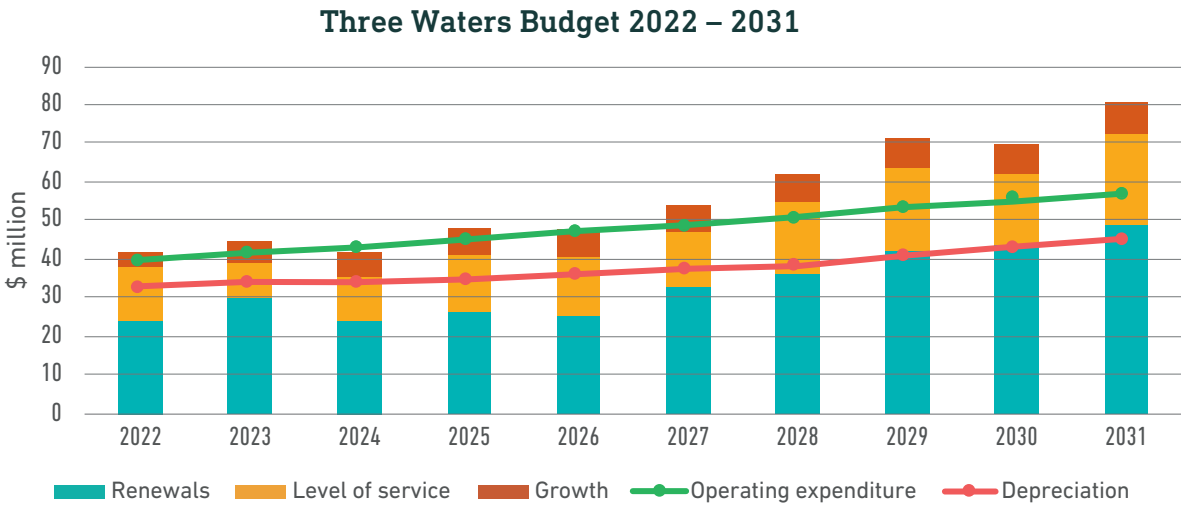
This debt limit is considered financially prudent, as it sits within the lending limits set by the Local Government Funding Authority (LGFA). The LGFA equivalent metric is based on net debt, where net debt is defined as gross debt less liquid financial assets and investments.

This section shows the planned capital, operating expenditure and depreciation for the first ten years.

Inflation

Inflation has been applied to the capital estimates in line with the DCC's significant forecasting assumptions adopted for the 10 year plan 2021-31, and extrapolated out across the 50 year period of this strategy.

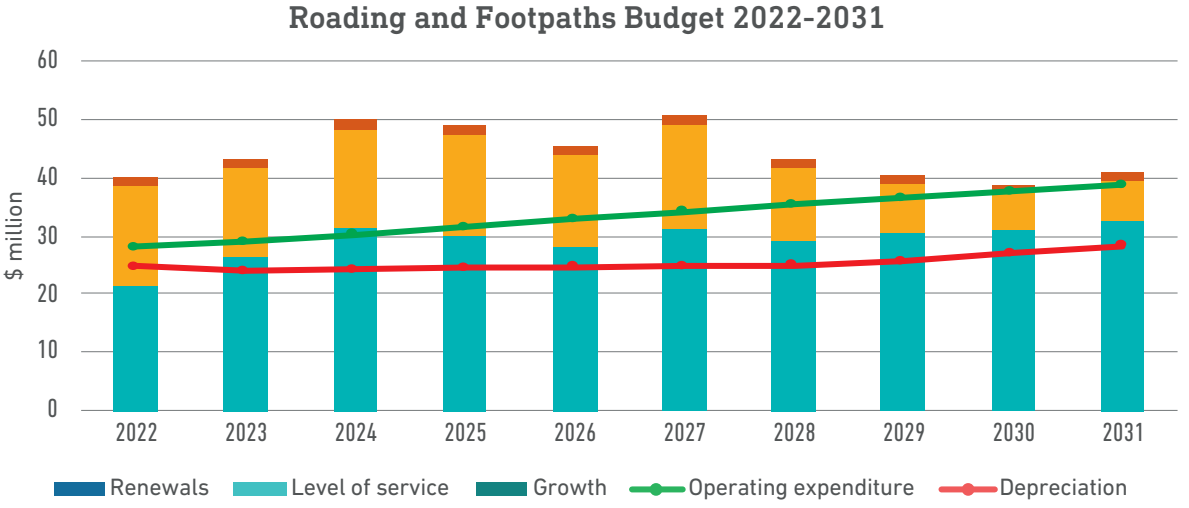
Three waters budget



3 Waters capital and operating expenditure budget

$ million	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Operating expenditure	40.4	41.6	43.1	44.9	46.9	48.6	50.8	53.3	55.4	57.7	482.7
Depreciation	32.8	34.2	34.4	35.6	37.2	38.6	39.7	42.0	44.2	46.2	384.6
Total operating expenditure	**73.1**	**75.8**	**77.5**	**80.6**	**84.1**	**87.2**	**90.4**	**95.3**	**99.5**	**103.8**	**867.3**
Renewals	24.1	29.9	23.9	26.7	25.2	32.9	36.4	42.0	43.9	48.8	333.7
Level of service	14.0	9.4	11.3	14.8	15.5	14.2	18.3	21.7	18.2	23.8	161.2
Growth	3.7	5.6	6.4	6.5	6.9	6.9	7.3	7.8	7.4	8.2	66.8
Total capital expenditure	**41.8**	**44.9**	**41.6**	**48.0**	**47.5**	**54.0**	**62.0**	**71.5**	**69.5**	**80.8**	**561.7**

Transport budget



Roading and footpaths capital and operating expenditure budget

$ Million	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Operating expenditure	28.3	28.9	30.2	31.5	32.8	34.1	35.3	36.4	37.5	38.6	333.6
Depreciation	25.0	24.2	24.4	24.6	24.6	24.9	25.0	25.7	27.0	28.3	253.7
Total operating expenditure	**53.2**	**53.1**	**54.6**	**56.1**	**57.4**	**59.0**	**60.3**	**62.1**	**64.6**	**66.9**	**587.3**
Renewals	21.4	26.3	31.4	30.0	28.1	31.1	29.3	30.5	31.0	32.4	291.5
Level of service	17.2	15.2	16.7	17.1	15.6	17.6	12.3	8.5	6.5	7.1	133.8
Growth	1.4	1.5	1.8	1.7	1.5	1.6	1.4	1.2	1.2	1.2	14.4
Total capital expenditure	**40.0**	**43.0**	**49.8**	**48.9**	**45.2**	**50.4**	**43.0**	**40.1**	**38.6**	**40.7**	**439.6**

The 50 year plan for network infrastructure

This strategy acknowledges that there is an infrastructure renewals backlog, especially in 3 Waters. Renewals funding has significantly increased in the current 10 Year Plan for 3 Waters (an approximate 57% increase from the 2018-28 plan) in order to begin to address this shortfall, however the budget is still constrained due to affordability pressures, market and internal delivery capacities.

The value of theoretical deferred renewals in the 2021/22 year is estimated at approximately $400M. This represents assets still in operation whose theoretical maximum useful lives have been exceeded. At present, renewals are based on the assessed condition and performance of assets. Assets performing well and in good operable condition despite reaching their theoretical maximum useful lives are not automatically replaced.

The DCC has identified work to address the highest priority risks and activities in most need of investment in years 1 to 5 of this 10 Year Plan. However, affordability pressures, market capacity and DCC project delivery capacity and capability mean investment trade-offs have been made. In this plan, renewals funding matches depreciation from 2027 due to affordability and deliverability. Renewals investment will be prioritised in the most need and highest risk areas while market and the DCC delivery capacity is established. The aim is to increase project delivery year on year and if an improved delivery rate is achieved, there is the option to re-allocate funds from later in the plan to earlier years through the Annual Plan process, providing further opportunities to tackle the renewals backlog. Under existing affordability and deliverability constraints, it is anticipated that the DCC would not be able to catch up on the theoretical renewals backlog until 2045.

The aim of the first three years is to increase the delivery market capacity, alongside improving the capability and capacity of internal DCC delivery functions to begin to address the renewals backlog. As detailed design of projects provides more clarity on scope, the estimated costs of renewal projects will become clearer and costs may change. As more clarity on regulatory changes emerges, alongside the capacity issues and cost constraints, the 2024 – 2034 programme will act as a 're-set' for both renewals and new capital. This programme will be based on addressing renewal backlogs as well as meeting enhanced treatment and discharge standards.

Large scale projects are difficult to anticipate in the longer term due to an increasing number of unknowns However, within the timeframe of this 50 Year Plan, most 3 waters buildings and structures will require replacement or significant upgrades to ensure service levels are maintained. Further changes to the 3 waters and transport networks may also be required depending on demographic changes within the city. The impacts of climate change are likely to place pressure on the transport network's capacity to remain resilient in coastal, flood-prone, low-lying areas and will likely require some mitigation.

3 Waters investment in the short – medium term is to continue pipework renewals and large-scale plant renewals and focus on wet weather capacity upgrades at the WWTPs. These projects are listed in section 7. More clarity on regulatory changes and the outputs of the system plans will be available for the 2024-34 10 Year Plan and so it is expected that the medium to long term capital projects will evolve for the larger treatment plants.

Longer term, the replacement of the Deep Creek and Deep Stream raw water pipelines (including replacing the Taieri River pipe bridge) are planned, with design starting in the medium term. The replacement of these two pipelines is particularly significant as both carry significant risk in terms of the DCC's ability to supply water. Failure to address these assets in this timeframe would expose the assets to increasing risk of failure denying the city of its two primary water sources.

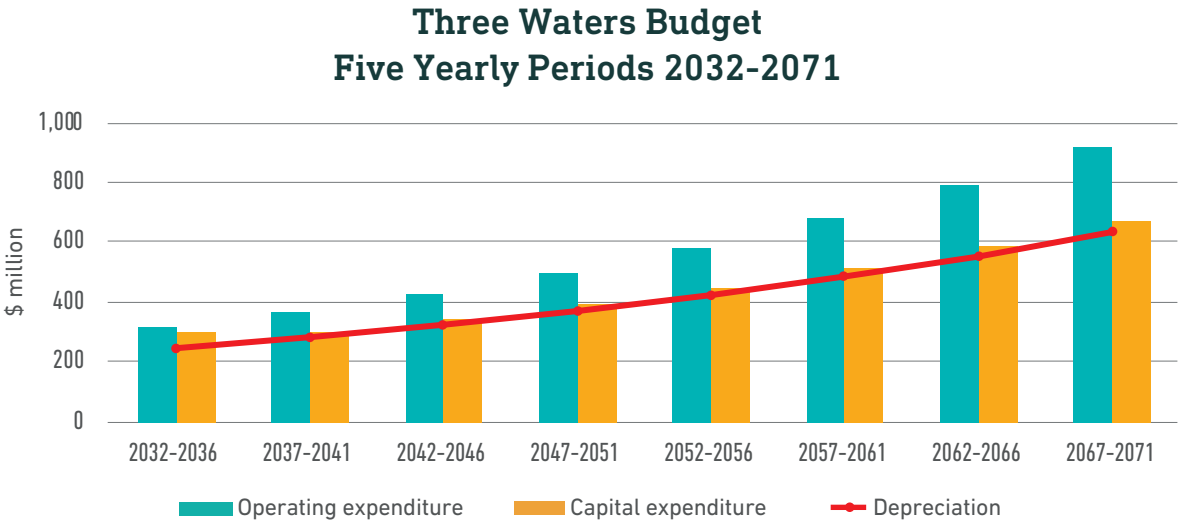
Significant 3 waters investment is required to service growth within the city, mainly within the networks. Most of the treatment plants have capacity to deal with forecast population changes, however some of the smaller water treatment plants will need upsizing. The solutions to the water treatment plants will be considered as part of the water system plan which may result in rationalising of plants to ensure they are able to comply with any new, more stringent water quality standards introduced through 3 Water's reform.

Transport renewals in the short – medium term will remain focused on maintaining the road network to appropriate levels of service. Investment decisions will be backed by condition assessments and prioritised according to the function of the road. Improved planning and increased investment will be required for assets such as sea walls, retaining walls and drainage assets in light of changing weather patterns. Larger projects look to address safety issues, improve the networks capacity and to provide transport choice for different modes that will facilitate a decrease in transport carbon emissions and a healthy connected city.

The DCC will continue to invest in relationships with professional and local government bodies such as Water New Zealand, Local Government New Zealand, Society of Local Government Managers, Institute of Public Works Engineers Australasia and Central Government to avoid duplication of effort and identify approaches used by other groups that can be applied in a local context.

3 Waters 50 year budget

Projected 3 waters capital and operating expenditure in 5 year bands for the 11 to 50 year period.

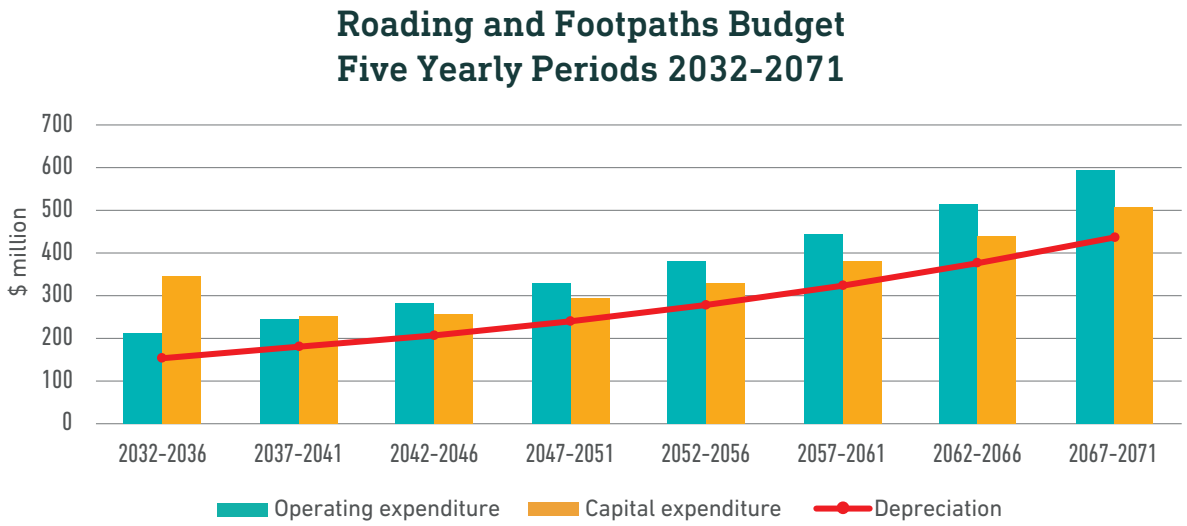


3 Waters capital and operating expenditure budget, five year bands for the 11 to 50 year period

$ million	2032-2036	2037-2041	2042-2046	2047-2051	2052-2056	2057-2061	2062-2066	2067-2071	Total
Depreciation	250.2	285.8	326.6	373.1	426.2	487.0	556.4	635.7	3,340.9
Operating Expenditure	316.2	368.3	429.1	499.8	582.3	678.3	790.2	920.5	4,584.6
Capital Expenditure	301.8	301.9	345.0	394.1	450.3	514.4	587.7	671.5	3,566.6

Transport 50 year budget

Projected transport capital and operating expenditure in 5 year bands for the 11 to 50 year period.



Transport capital and operating expenditure budget, five year bands for the 11 to 50 year period

$ million	2032-2036	2037-2041	2042-2046	2047-2051	2052-2056	2057-2061	2062-2066	2067-2071	Total
Depreciation	154.8	179.4	208.0	241.1	279.5	324.0	375.6	435.5	2,197.9
Operating Expenditure	211.2	244.9	283.9	329.1	381.5	442.3	512.7	594.4	3,000.1
Capital Expenditure	345.1	251.8	255.5	293.4	329.8	380.7	439.8	508.2	2,804.3