KAIKŌURA
DISTRICT COUNCIL

INFRASTRUCTURE STRATEGY 2024-2053

Revision Date: 27 March 2024

Table of Contents

List of Tables

DRAFT

List of Figures

DRAFT

2024-2053 Infrastructure Strategy

1.0 Introduction

An Infrastructure Strategy is intended to outline how a council intends to manage its infrastructural assets, having regard to matters such as when assets need to be renewed or replaced, funding options and other matters, such as the need to improve health or environmental outcomes and to manage risks from natural hazards.

Section 101B of the Local Government Act 2002 requires the preparation and adoption of an infrastructure strategy for a period of at least 30 consecutive financial years. Key legislative requirements include the following:

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

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

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

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

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

(a) show indicative estimates of the projected capital and operating expenditure associated with the management of those assets—

(i) in each of the first 10 years covered by the strategy; and
(ii) in each subsequent period of 5 years covered by the strategy; and

(b) identify—

(i) the significant decisions about capital expenditure the local authority expects it will be required to make; and
(ii) when the local authority expects those decisions will be required; and
(iii) for each decision, the principal options the local authority expects to have to consider; and
(iv) the approximate scale or extent of the costs associated with each decision;

(c) include the following assumptions on which the scenario is based:

(i) the assumptions of the local authority about the life cycle of significant infrastructure assets:

(ii) the assumptions of the local authority about growth or decline in the demand for relevant services:
(iii) the assumptions of the local authority about increases or decreases in relevant levels of service; and

(d) if assumptions referred to in paragraph (c) involve a high level of uncertainty,—
(i) identify the nature of that uncertainty; and
(ii) include an outline of the potential effects of that uncertainty.

An Infrastructure Strategy must cover infrastructure provided by the local authority for roading, footpaths, water supply, wastewater and stormwater, and any other types of assets that it wishes to include.

This Infrastructure Strategy reflects the small size of the district and its infrastructure. The scope of the Strategy is limited to the essential asset classes described above, which make up the large majority of KDC's capital and operational costs.

Important Note

Unless specifically stated otherwise, all budget and cost projections in this Strategy are presented in un-escalated 2023 dollar terms.

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2.0 Summary and Significant Issues

KDC's roading assets comprise approximately 210km of roads, 52 bridges, 38km of footpaths and various associated structures.

KDC's 3 waters assets comprise 7 water supply systems (Kaikōura urban, Ocean Ridge, Fernleigh, Peketa, Oaro, Kincaid and East Coast), one reticulated wastewater system (serving Kaikōura including Ocean Ridge) and one reticulated stormwater system serving those same two areas.

Valuations of the component assets as at 30 June 2022 are presented in the tables below:

Roading Assets	**Replacement Cost**	**Depreciated Replacement Cost**
Bridges	$42,803,467	$21,033,850
Pavement Formation	$76,028,826	$76,028,826
Pavement Basecourse	$12,952,542	$5,699,119
Pavement Subbase	$30,732,475	$30,732,475
Pavement Surfacing	$10,133,447	$3,548,437
Footpaths	$6,848,776	$3,077,462
Signs / Traffic Facilities	$943,730	$431,289
Street Lights	$1,069,608	$733,275
Drainage	$7,699,265	$3,823,719
Surface Water Channels	$3,570,667	$1,907,228
Seawalls	$3,354,463	$1,649,745
Total	**$196,137,265**	**$148,665,426**

3 Waters Assets	**Replacement Cost**	**Depreciated Replacement Cost**
Water Lines	$41,432,775	$23, 397, 860
Water Point + Structures Assets	$13,586,588	$6,601,695
WasteWater Lines	$23,633,748	$8,573,727
WasteWater Points	$5,001,231	$3,334,291
WasteWater Structure Assets	$15,685,227	$11,168,267
Stormwater Lines	$9,359,501	$6,155,110
Stormwater Points	$2,614,578	$1,833,525
Total	**$111,313,648**	**$61,064,475**

Further details of assets and networks can be found in the relevant Asset Management Plans.

Because of its small population, close proximity to mountains and large separation from other substantial urban centres the Kaikoura is in a relatively unusual situation, which is in turn reflected in some fundamental challenges in respect of infrastructure provision.

Very limited potential for economies of scale, isolation from larger and potentially more competitive markets for works and services, together with a geographic setting where there is significant risk of damaging natural events, including flooding and ground instability, creates an environment where the provision and maintenance of infrastructure is often relatively expensive.

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An understandable consequence of such high costs and limited population and associated ability to pay has been that a basic 'do minimum' approach has been widely adopted in respect of both levels of service and renewal of infrastructural assets.

In the case of roading the effect of this approach has also been exacerbated by a previous practice of using renewals budgets to fund unforeseen road repairs necessitated by severe rainfall events, and the direct and indirect effects of the 2016 Kaikōura earthquake.

The resulting deferral of road asset improvements or renewals has in some cases created a need for an increased amount of such work to be conducted in the future to catch up and the commencement of a multi-year program of works to achieve this was a key feature of Council's previous 2021 to 2024 Long Term Plan.

Good progress has subsequently been made towards this catch-up, but a significant amount remains to be done and delivery of this program will continue to be a focus of Council for much of the following LTP period.

Whilst the 2016 earthquake caused extensive damage and disruption to some council assets, it was also generally beneficial to the community in respect of the management of KDC assets in the longer term, as many older or poorer condition assets were damaged to the extent that they had to be replaced, and much of this replacement was funded by central government or insurances.

These replacements significantly enhanced the inventory of Council's 3 waters assets in respect of average residual life, performance and resilience. Further recent significant enhancement of these assets has also been achieved through use funding granted by the Department of Internal Affairs to support the 3-Waters reform program proposed by the previous Labour government.

The extensive renewals that occurred since the earthquake or which are envisaged to occur within the next 5 years (potentially including a renewal of the Waiau Toa/Clarence River bridge at Glen Alton) have had a very substantial effect on projected future renewal requirements. The available data suggests there will be a long period – in excess of 30 years – during which the cost of required renewals will be less than the very long term averages, as reflected in depreciation amounts.

Council is conscious that urban areas in some parts of New Zealand are developing quickly, and that to support productive and well-functioning towns and cities, it is important that there are adequate opportunities for land to be developed to meet housing and economic needs.

Within the Kaikōura district, growth is however not expected to be much of a factor over the period of the Long-Term Plan and there appears little need to increase asset capacity or levels of service.

As and when we foresee a period of growth outside of the norm, the Council will identify and plan to address constraints in our infrastructure to ensure our systems enable growth and support well-functioning urban environments.

Despite this generally positive situation there are however some asset related challenges or risks that need to be addressed, which are summarised in Table 1. All of these issues, with the possible exception of the Waiau Toa / Clarence bridge, are considered to be relatively straightforward to manage, without placing unacceptable burdens on the community.

In general it is believed that KDC's Infrastructure Strategy at this time can be best described as an 'enhanced business as usual' approach, focussing on effective delivery of core functions, without taking any major new directions.

Table 1: Significant Infrastructure Issues

Activity	Issue Type, Decision Requirement	Issue	Principal Option(s) For Response	Implications	Certainty of Response
Roading	Renewal Decision on response required by start of 2024/25 year	Inadequate annual resealing programmes between 2010 and 2019 have created a backlog of roads with surfacing near to or beyond the end of its life, very worn or brittle. This creates a risk that under adverse conditions – for example a wet winter – there could be extensive surface failures which then result in water entry and damage to the underlying pavement, with very high repair costs	Undertake reseals at a level consistent with depreciation, only otherwise resealing roads at the point of imminent failure. Address backlog completely in 2024/25 year Undertake larger volumes of resealing work over the next 5 years to eliminate the accumulated backlog	A large backlog of roads near to failure would continue to remain, with unacceptably high risk that a large extent of roads could simultaneously fail. Cost of approximately $2.45 million in 2024/25, significant rates impact, excessively risk averse Moderate risk of road failures, mitigated by prioritisation of resealed sections	Not favoured Not favoured Likely; reflected in LTP budget estimates and programme submitted to NZTA.
Roading	Renewals & Level of Service Decision on response required by start 2024/25 year, could be revisited in future	Approximately 8km of footpaths currently assessed to be in poor or very poor condition. Negative community perceptions (41% satisfaction rating in 2022/23) of the current level of service.	Status quo renewals and maintenance budgets, constructing new footpaths in concrete. Continue renewing footpaths in concrete, but with increased budget. Increase budget, constructing most paths as asphalt overlays.	$100k capex & $60k opex. Progress limited due to higher than expected concrete path construction costs. Potential renewal of only around 4km of paths in LTP period. Work less likely to qualify for NZTA subsidy. $250k capex, $60k opex. Potential renewal of 8km of paths during LTP period. Less likely to qualify for NZTA subsidy because of path type. $250k capex, $60k opex, less expensive form of path construction and more likely to qualify for NZTA subsidy because of path type. Potential renewal of 12km of paths in LTP period.	Not favoured Not favoured Likely; reflected in LTP budget estimates

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Table 1 (Continued): Significant Infrastructure Issues

Activity	Issue Type, Decision Requirement	Issue	Principal Option(s) For Response	Implications	Certainty of Response
Roading	Emergency Works Decision on response required by start 2024/25 year	A number of district roads are potentially susceptible to severe damage during extreme natural events that would have high cost to rectify, but the forecasting of such events and their costs is extremely difficult, creating a financial planning challenge	Annual budget allocations are made with the intention of covering the full costs of emergency works in that year Use of debt funding where necessary to meet costs of extreme events	Potential large variances from these budgets have previously resulted in other important works being deferred or not undertaken Financial impact on the community is smoothed across years	Not Favoured Likely; reflected in LTP budget estimates
Roading	Renewal Decision on response required by start 2024/25 year	Inadequate area wide treatment programmes have created a backlog of roads with significantly deteriorated pavements, resulting in rough roads and high maintenance costs.	Program of area wide pavement treatment at a level equivalent to basecourse depreciation. Continuing accelerated basecourse renewals program for LTP period.	Expenditure of $259k per annum, continuing existence of small backlog of poor condition pavement. $330k per annum for period of LTP, thereafter reverting to matching depreciation.	Not favoured Likely; reflected in LTP Budget Estimates and programme submitted to NZTA.
Roading	Renewal/ Level of Service Suggested that decision on response required by start 2026/27 for next LTP	Jordan Stream bridge on Puhi Puhi Road has a very low vehicle weight limit of 1500kg making it unsuitable for most vehicles.	Install a new bridge, leaving existing bridge in place as a historic artifact Prevent access to existing bridge, leaving ford as only means of crossing stream. Do nothing until bridge is deemed inadequate for any vehicles	Estimated capital cost of $800,000 Road access is more frequently interrupted Potential hazard if drivers ignore weight restriction	Possible, not yet reflected in the LTP Possible Not favoured

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Table 1 (Continued): Significant Infrastructure Issues

Activity	Issue Type, Decision Requirement	Issue	Principal Option(s) For Response	Implications	Certainty of Response
Roading	Level of Service / Resilience Decision on response required by start 2024/25 year	Poor definition and associated limited capacity of roadside drains in rural areas contributes to increased damage to roads in heavy rainfall events. Extent of effect has increased in recent years, perhaps in response to climate change.	Retain roadside drains in current form, with increased annual budget for more frequent post-event pavement repairs. Three year programme of increased roadside drainage improvements commencing in 2024/25, then returning to previous levels	Ongoing additional annual OPEX of circa $30k Continuing or increasing level of post rainfall event damage and disruption to roads Increase annual drainage maintenance and renewal budgets by $113k & $83.5k respectively for those 3 years. Reduced future extent of pavement damage	No favoured Likely; reflected in LTP Budget Estimates and programme submitted to NZTA.
Roading	Renewal Decision timing dependent on external factors	The Waiau Toa/Clarence Bridge failed during the 2016 earthquake, resulting in a loss of all-weather access for around 15 people in the upper Clarence Valley.	Construction of a new bridge downstream of the old structure with an engineered ford over the old river channel with associated works to protect connecting roads. Status quo (access via 'Southern Access Route') Reestablishing bridge at original bridge site	Likely CAPEX upwards $13.6 million, to be 95% funded by Waka Kotahi NZTA. Range of significant legal and financial risks Broadly preferable but affordability uncertain	Uncertain; reflected in LTP budget estimates but some issues still unresolved Not Favoured Some further investigation of cost being conducted
Water	Level of Service Decision to be made by Kincaid scheme committee	Kincaid water supply disrupted by high turbidity stream intake; potentially need to shut down for several days until water clears.	Establish alternative ground water source Increase treated water storage capacity Upgrade UV treatment process to handle higher turbidity water	Potentially provides full resilient solution but technical feasibility and cost uncertain Duration of benefit depends on storage capacity and cost Circa $100k CAPEX	Not favoured Not favoured Currently favoured

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Table 1 (Continued): Significant Infrastructure Issues

Activity	Issue Type, Decision Requirement	Issue	Principal Option(s) For Response	Implications	Certainty of Response
Water	Renewals <u>Decision on response required by start 2024/25 year, but potential to revise in future in response to field observations</u>	There is approximately 9km of Asbestos Cement water main in the Kaikōura community that is currently theoretically near or beyond to the end of its useful life, though there continues to be little evidence of increased maintenance requirements or other short-term risk.	Undertake all theoretically indicated renewals immediately Reactive replacement of pipe sections in response to observations of failures or other serious deterioration Progressively increasing annual renewal program commencing in 2025/26, to have replaced >50% of pipes by 2033/34	Expenditure of approximately $4 million in 2024/25 year, which is potentially unnecessary Uncertain annual costs; greater potential for service interruptions Likely expenditure of $2.375 million over LTP period	Not Favoured Not Favoured Likely; reflected in LTP budget estimates, but schedule may potentially be revised
Water	Growth <u>Decision on response required by start of 2026/27 for next LTP</u>	Limited capacity to supply water to some areas of the Fernleigh water scheme where further development is occurring	Maintain status quo (no changes to asset capacity and restrictions only on new major connections) Not permit any further connections to scheme in affected areas Progressive upgrading of reticulation serving affected areas	Some existing and new consumers may experience inadequate supply at time of high demand. Compromises intent of scheme to support rural development. Requires additional effort to monitor and enforce. Potential expenditure in the order of $200,000 during LTP period, to be recovered through development contributions.	Not favoured Which response is most appropriate is still under consideration
Water	Demand <u>No particular timing for decision on response – likely after 2030</u>	Whilst at present there is ample water supply for Kaikōura, if a major acceleration of growth occurred capacity could be challenged. A significant contributor to this is however a lack of efficient water use in the community	Introduction of universal metered water charging for properties connected to the Kaikōura Supply and/or development of additional raw water source and associated treatment and reticulation upgrades	Potential capital cost of either option probably between $1.0m and $3.0m	Very Uncertain; A speculative allocation of $2m in 2042

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Table 1 (Continued): Significant Infrastructure Issues

Activity	Issue Type, Decision Requirement	Issue	Principal Option(s) For Response	Implications	Certainty of Response
Wastewater	Demand/ Level of Service Decision on response required by start 2028/29	Potential for overflows from the Mill Road, Hawthorne and Lyell Creek pump stations if any significant interruption of pumping because of limited storage capacity. Some further investigation required for selection of best option.	Retain status quo Install fixed back-up generators at each pump station, improve control systems. Construct additional underground storage tank at Mill Road to give additional 1 to 2 hours storage capacity.	Risk of wastewater overflows which could potentially enter stream Provides resilience against power supply failure. Likely cost around $320,000 Provides broad resilience improvement. Likely cost in the order of $400,000	Not favoured One of these two options favoured; $350k reflected provisionally in LTP for 2028/29
Wastewater	Level of Service No decision required – compliance required	Abatement notices from Environment Canterbury are currently in effect regarding the operation of the treatment plant. Most issues appear to be due to potentially inappropriate resource consent conditions.	Obtain new resource consents for the activity. Process to do so underway, but may not be completed in 2023/24 year.	Re-consenting process and cost may spill into 2024/25 year. Possible effects of new consent conditions on future CAPEX and OPEX requirements	Uncertain
Wastewater	Demand/ Level of Service Decision on response required by start 2024/25	Some sewer pump stations operating at close to full capacity during heavy rainfall events, potentially limiting further development in those catchments	Retain status quo Continuing focus on identifying and reducing direction of stormwater to sewer Progressive upgrade of sewer pumps at time of renewal to provide additional capacity	May need to restrict development in some areas, increasing overflow risk Smoke testing to locate private stormwater connections to sewer; owners to rectify, low cost to Council. Estimated additional cost of $131,000 over 10 years, proposed to be recovered through development contributions.	Not favoured Certain, ongoing Favoured; reflected in LTP
Wastewater	Demand No particular decision or response time – likely after 2030	Possibility that even once pumps upgraded & stormwater infiltration is reduced that capacity of main sewers in Esplanade/Torquay /Avoca Street catchment will offer little potential for further development	Capacity upgrading of approximately 1500 metres of trunk sewer between Brighton Street and Lyell Creek Pump Station in circa 2032	Capital expenditure of approximately $500,000, potentially largely funded from Development Contributions	Uncertain

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3.0 Strategy Context

3.1 District Geographic Context

Kaikōura is one of New Zealand's smallest territorial authority areas with a land area of 2,048 km^2. It is bounded on three sides by mountains and on the eastern side by the Pacific Ocean. To the north and south the mountains run to the coast in steep cliffs and bluffs.

The District is commonly referred to as "where the mountains meet the sea". At its centre is a relatively flat gravel outwash plain of approximately 110 km^2 which houses the majority of the population in the Kaikōura township and the surrounding areas.

Its boundaries with the neighbouring authorities of Hurunui and Marlborough are located in steep mountain ranges and difficult terrain. There are only three roads that link to the district's neighbours. SH1 North, SH1 South and Inland Road (Route 70). As such the district is geographically isolated and highly vulnerable to being cut off from the rest of the region.

This small size and geographic isolation also poses a range of other challenges in respect of the operation and management of infrastructure.

Assets associated with roads and water services make up the overwhelming majority (around 95%) of Council's infrastructural assets by value, with other asset holding activity groups such as other buildings, facilities, land and parks and reserves being of relatively minor value. Because of this this infrastructure strategy focusses only on those two largest asset groups.

3.2 Demographic Context

Over the last 40 years there has been relatively little change in the permanent resident population of the Kaikōura District, having varied only in the range between 3270 and 3730 people, with no well-defined long-term trend. An apparent increase to over 3912 recorded in the 2018 census is believed to have been a temporary effect due to the presence of a significant number of people being employed by the North Canterbury Transport Infrastructure Recovery alliance (NCTIR) to undertake post-earthquake repairs, who subsequently left the District.

With the results of the 2023 census not yet available, projections of current and future population of the District have been based on extrapolation of previous weak or inconsistent trends and as such their reliability is uncertain. These projections, such as that presented in Figure 1, do not suggest substantial change, with the medium projection almost static.

The previous trends are however considered to be so weak that even relatively modest changes in a broad range of factors influencing growth could cause significant deviation from it, and at present there are proposals for a number of relatively large new residential subdivisions which it is believed could potentially be a catalyst for increased growth of the community.

Accordingly it is currently believed that the high population projection shown in Figure 1, with annual growth of approximately 1.5% may best represent likely future growth of the community.

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Within the previous relatively stable population size there have however been other significant actual or projected demographic changes.

One such strong trend is in respect of the age distribution, as shown in Figure 2, which highlights the very large increase in the number of older (65+) residents that has occurred in the last 30 years. As shown in Figure 3 this trend is projected to continue, with more than one-third of the population forecast to be over 65 by the mid 2030's.

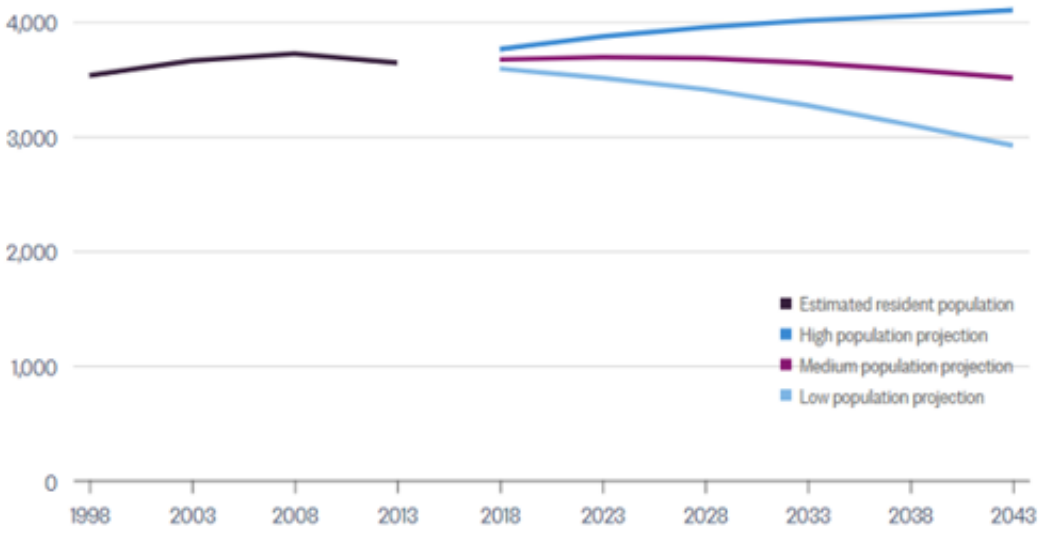

Figure 1: Projected Kaikōura District Permanent Resident Population

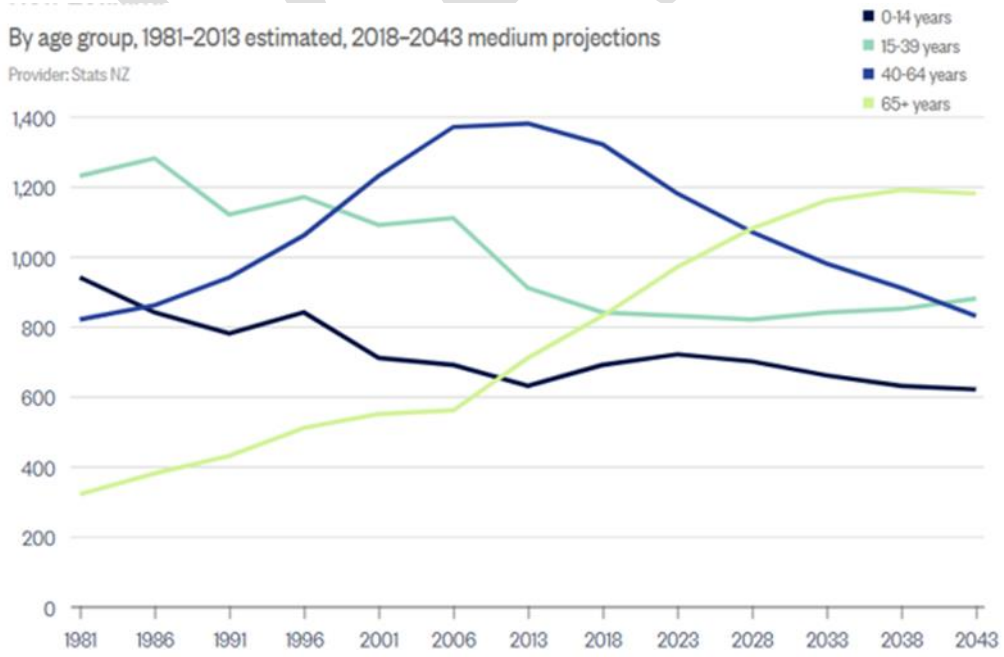

Figure 2 – Historical Age Demographic Trend

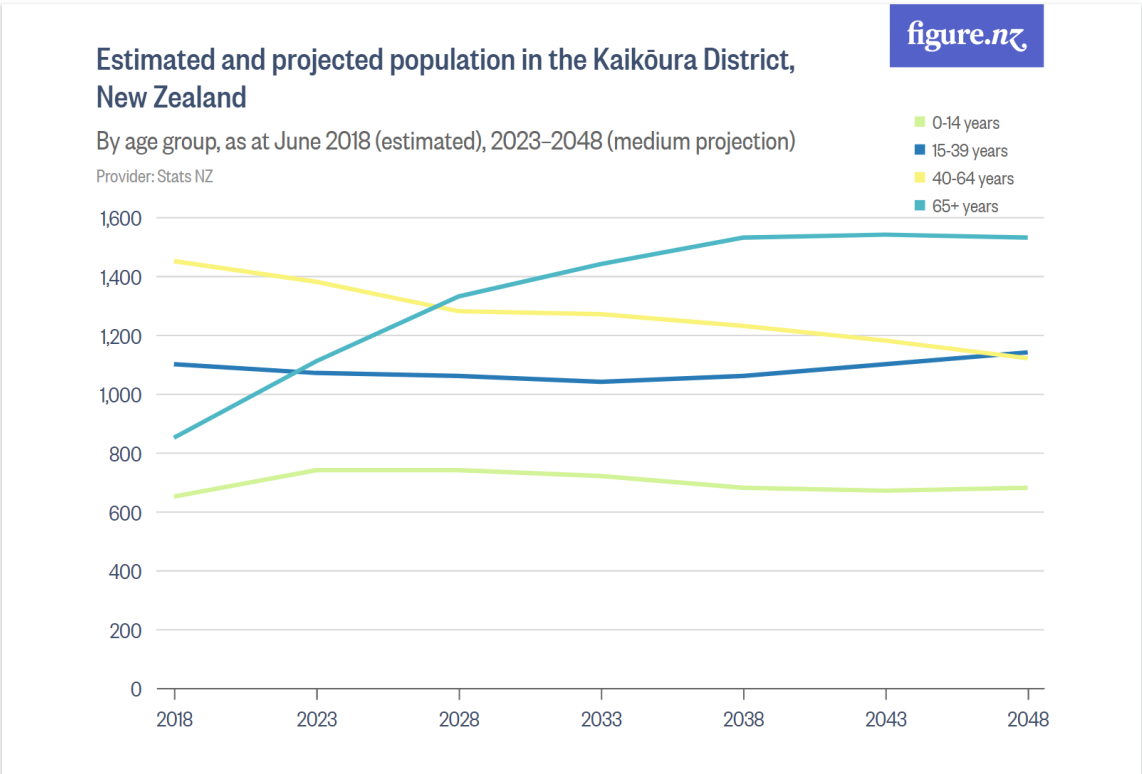

Figure 3: Predicted Kaikōura District Age Demographics

A further trend, that may further compound the increasing average age of people in the community is the high and apparently increasing proportion of dwellings within the district that are not permanently occupied, the majority of which are holiday homes. The 2018 census indicated this proportion to be just over 32%, having risen by 4% over the preceding 5 years, which appeared to be a continuation of a trend that has existed for some years.

Such high proportions of temporarily occupied properties are only found in a few districts viewed as lifestyle destinations, and likely effects include a probable compounding effect on population age (as holiday home owners are often older) and greater seasonal variations in the demand for certain services.

During the peak summer season month of January tourism bed-night statistics have indicated associated population increases of up to 1,600 persons, and this does not take account of owner occupancy of holiday homes and other unrecorded occupancy.

It appears probable that the total number of people staying in the district at these peak times can easily exceed 6000.

The increased proportion of temporarily occupied properties is one of the factors which explains why permanent resident population has remained relatively static despite some significant new property development in the last 20 years such as the Ocean Ridge and Seaview subdivisions. Another contributor to this is the increasing average age, which is accompanied by diminished average household sizes.

Whilst this aging of the resident population is likely to have significant social impacts, its effects on the roading and water services infrastructure currently operated by Council is however expected to be limited.

3.3 Development Opportunities

The demographic projections presented in the previous section are largely based on an extension of pre-existing trends, and it is recognised that the possibility could exist for entirely new trends to be established during the relatively long period covered by this strategy.

Significant changes in national or regional policy settings, changes of local or global demand for certain commodities or services and/or other major events could, over a 30 year period, potentially confer some relative advantage or disadvantage on the district, particularly in relation to population growth.

The Kaikōura District is considered to be unusual in a number of respects. Whilst its small population and relatively isolated location may disadvantage it in respect of some types of economic development it is also a place of outstanding natural beauty and it has been seen elsewhere that strong community growth can potentially be based upon such attributes, even where other logistical factors appear unfavourable.

Whilst in recent times there has been little local economic growth Council believes that there is latent potential for lifestyle led development of the district that could be transformational. The growing economic inequality of NZ society has created increased demand for properties in lifestyle locations , with associated perceptions of those locations changing, and it seems conceivable that by virtue of its outstanding natural environment that Kaikōura could, to an even greater degree, become such a place at which people wish to be.

It is believed however that such a transformation would require Kaikōura to gain sufficient critical mass in respect of population, services and activities for it to reach a tipping point after which further development is naturally attracted by a buoyant local economy creating a self-sustaining circular process with rapid growth, well above the 1.5% per annum that is currently projected.

At the present there is not yet anything to suggest that the District is close to such a tipping point, and for this reason relatively conservative growth assumptions have been made for the period of KDC's 2024-33 Long-term Plan, which include the following:

- The makeup of the Kaikōura economy will remain relatively unchanged with agriculture and tourism related activities continuing to be the dominant elements
- That average growth of permanent resident population in the district will be in the order of 1.5% per annum
- That opportunities for economic and population growth are likely to be primarily rooted in the physical environment and recreational strengths of the district
- That the most significant other demographic change will be an increase in the proportion of over age-65 residents, forecast to increase by around 30% over 10 years (an extra 230 residents in this category)
- That approximately two-thirds of dwellings in the district will be permanently occupied, with the large majority of the remainder being holiday homes
- That average property development growth will not substantially exceed 30 Household Equivalent Units (HEUs) per annum
- That at least 75% of population growth will be within the existing Kaikōura urban area or within 2 kilometres of it.

3.4 Other Assumptions

The following other assumptions have also been made in the preparation of this strategy:

- That there will be no significant change to the structural delivery of water services. Whilst the government has repealed the previous government's proposed reforms of 3 waters services and has indicated that it will be implementing some different form of model, because there is not yet clarity regarding what this model will be no change has been assumed.
- That the technical requirement for compliance with the NZ Drinking Water Standards are not further increased, but that compliance with those standards will be more vigorously pursued by the new Drinking Water Regulator
- No increased pressure from Waka Kotahi NZTA (NZTA) for increased level of service from roads. NZTA 'One Network' standards do not become mandatory
- No substantial change to NZTA Financial Assistance Rate for the District
- That the revaluation parameters of asset age and expected life used in the 30 June 2022 roading and 3 waters revaluations are sufficiently reliable overall to guide both a current valuation of the assets and future renewals schedules
- No changes to environmental standards that will significantly impact KDC's infrastructural services[1]
- No other significant changes to targeted levels of service for roads or water services other than those required for statutory compliance[2]
- No other substantial additional costs will be imposed upon Council by other legislative or regulatory changes[3]
- That climate change will not have any very major effects on the district that could realistically be mitigated by actions taken by Council[4]
- That major costs remedying damage to Council infrastructure caused by extreme events will, where necessary, be debt funded
- That there is not a resurgence of COVID19 or other pandemic [5]
- Cost inflation adjustors as per BERL 'stalled rebuild' scenario

It is however recognised that beyond the period of the LTP it becomes even more difficult to predict what might happen to the District, and that within such a 30 year time frame dramatic change could potentially occur, and an attempt has been made in this Infrastructure Strategy to recognise that this is a possibility and not make any assumptions or plans that would prevent it.

Footnotes

[1] Associated with this is the need for KDC to hold and comply with conditions of the Resource Consents required for the undertaking of its infrastructural activities. Details of the consents associated with the activities covered by this Infrastructure Strategy can be found in the relevant 2023 KDC Asset Management Plans.

[2] Further details of proposed levels of service can be found in KDC's 2023 Asset Management Plans for Transportation, Water Supply, Wastewater and Storm Water. These levels are service are in general little changed relative to what has been targeted previously. The focus in future is to more reliably achieve

these targeted levels, which in some cases will require additional resources to be applied to address backlogs of work and better coordinate responses.

[3] KDC's infrastructure activities generally have little impact on surface waters. As such the potential for water related legislation such as the National Policy Statement for Freshwater Management to have impact on KDC'S costs is believed to be limited. This is discussed further in the water services Asset Management Plans.

[4] The Council will consider climate change impacts in planning for infrastructure assets.
We assume that climate change will have significant effects on the district (such as temperature or rainfall) during the term of this Long term Plan; although not as extreme as other areas within Canterbury based on the technical reports to date; nor that any major effects could be mitigated by actions taken by the Council. We consider that the potential effects mitigated by some of the actions proposed in this infrastructure strategy (for example the improvement of roadside drainage) are minor effects.

We assume that climate change predictions do not differ materially from current expert reports.

The 2016 earthquake caused uplift of the coastal areas of the district that might otherwise have been vulnerable to rises in sea-level. The topography of the district can cause significant issues in wet weather events. It is not realistic, however, to predict where these events might occur or any potential resilience issues. The Council will consider climate change impacts in planning for infrastructure assets. Additional funding for major costs to remedy damage to Council infrastructure will, where necessary, be debt funded.

[5] KDC's essential infrastructure workers in particular those involved in providing drinking water and sanitary services have previously demonstrated the ability to operate effectively even at the highest lockdown levels – observing social distancing and hygiene rules.

3.5 Organisational Objectives

Council is working towards the delivery of five key desired community outcomes, which have originated from sources including community feedback, interactions with our partner agencies and key stakeholders, and from Reimagine Kaikōura, our Recovery Plan developed post-earthquake. These outcomes are as follows:

Community
We communicate, engage and inform our community

Development
We promote and support the development of our economy

Services
Our services and infrastructure are cost effective, efficient and fit-for-purpose

Environment
We value and protect our environment

Future
We work with our community and our partners to create a better place for future generations

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It is intended that Council's delivery of infrastructural services contributes towards all these outcomes, with particular emphasis on the 'Services' and 'Development' categories.

To do so the following objectives will be pursued:

- Gathering reliable information on the form, extent, condition, capacity, performance and criticality of existing infrastructural assets
- Understanding current and likely future demands in terms of both quality and capacity for infrastructural services
- Establishing and monitoring appropriate levels of service to ensure that current and future demands can be met
- Procuring, operating, maintaining and renewing infrastructure in a way that achieves the desired levels of service and an optimised combination of efficiency and cost effectiveness.
- Planning and implementing new or improved infrastructure to ensure that future needs can be met.

3.6 Data Quality

A consequence of the previous very lean approach to the management of KDC's infrastructural assets has been that little effort was invested in strategic asset management, including the collection of asset data. As a result, the data sets available immediately after the 2016 earthquake were neither complete nor verified.

Significant effort has however been devoted to attempts to improve the quality of the available asset data in preparation for development of Council's 2021/31 Long-term Plan. Asset assessments conducted as part of the earthquake rebuild have yielded useful data on existing assets and a further project was conducted to upgrade Council's 3-Water asset inventory, with 'ground truthing' against as-built plans or other historical records.

Work has also been conducted to evaluate the condition of pavements, road surfaces and footpaths. Details of these assessments are contained in the 2023 Transport Asset Management Plan, with results summarised in Appendix 1.

The resultant improvement in data quality has been reflected in an independent peer review of Council's asset valuation data which assigned an overall confidence rating of 'B' ('Reliable') to the data on which the valuation was based. This is a significant improvement on previous valuations, for which assigned confidence levels had ranged from 'C' (uncertain) to 'D' (very uncertain).

The asset data on which the valuation was based has also been used in the development of the Infrastructure Strategy, and it is believed that the strategy is relatively soundly based, though it is recognised that there remain a number of areas where improved data – particularly in respect of asset condition – would be desirable.

Following the 2016 Kaikoura earthquake extensive work was conducted to identify and replace assets damaged by that event. This work included widespread CCTV pipe inspections. The older and more fragile pipes were often identified as being damaged by the earthquake and were subsequently replaced, but condition data was also gathered on the other better pipes.

Whilst the general conclusion of these post-earthquake investigations (that the pipes unaffected by the earthquake are in good condition) are reflected in the relevant Asset Management Plans and

this Infrastructure Strategy, there is an opportunity for the collected pipe condition data to be used more directly in planning future asset renewals.
Another 3-waters aspect where improved condition data would be desirable is in respect of the older water treatment plants, component inventories and conditions could be usefully reviewed.

For roading the condition of pavements is currently based on subjective assessments by very experienced roading engineers, but it is recognised that it may be beneficial to compare these assessments with the results of some physical testing such a SCRIM survey, in addition to the routine roughness measurements.

3.7 Critical Assets

Critical assets are defined as those considered to have a high consequence of failure, and are often also considered as being those assets whose failure would compromise the performance of the entire network.

Some previous (and current) KDC interpretations of what are critical assets have however been inconsistent between different networks. For example on some of Council's small rural water supplies the largest diameter water pipes (supplying the whole of that system) have been considered critical on this basis, but are only of 100mm diameter or less, and a definition of criticality based on similar pipe sizes has been extended to other larger supplies which is potentially inappropriate since such pipes only serve a fraction of the network in these schemes.

It is therefore believed that a more appropriate and specific definition of critical assets would be those which, should they fail, are likely to result in a substantial number of people completely failing to obtain an essential level of service for an extended period of time.

It is suggested that an appropriate threshold for a KDC asset being considered critical is where there is potential for the asset to fail completely and the product of number of people affected and the duration of the effect exceeds 250 person-days.

Accurately assessing exactly which assets meet this criterion is difficult, in particular because of uncertainties regarding both how many people would suffer a complete loss of service rather than a reduction, and low long the effect would be likely to persist for.

In many cases even if a particular asset completely fails, some degree of service can be maintained by using other assets.

More work is required to be done to identify and manage these critical assets, but currently only the following assets are considered likely to meet the above definition of criticality:

- Water mains of diameter greater than 200mm diameter
- Trunk wastewater reticulation downstream of the Lyell Creek pump station

No roading assets are considered to meet this definition of criticality because in most cases alternative routes are available. No-exit roads such as Blue Duck and Puhi Puhi have such low numbers of residents that the 250 person-day threshold is still unlikely to be exceeded.

3.8 Infrastructure Procurement, Delivery and Management

Works on roading or 3-waters assets make up a large proportion of KDC's costs but the scale of those works is small by local authority standards and the relative isolation of the district diminishes competition for them. This is particularly so for routine operation and maintenance works, where it is necessary to maintain a certain level of human and equipment resources in the district at all times, even though the extent of work required may often be low.

Council's previous experience has indicated that for such services to be cost effective delivery needs to either be combined with other non-council works in the District, or be undertaken locally on a not-for-profit basis.

The former approach is reflected in the current arrangements for routine operation of maintenance of local roads, where Downer Ltd undertake the necessary works for KDC in conjunction with the State Highway maintenance work that they undertake for NZTA under the North Canterbury Networks Outcomes Contract.

The latter approach is reflected in the delivery of 3 waters operations and maintenance, where this work is undertaken by Innovative Waste, a Council Controlled Organisation of KDC, which also currently provides Council's solid waste services.

It appears likely that because of the lack of competition these means of delivering operation and maintenance activities – roading in conjunction with the North Canterbury NOC, and 3 waters by the CCO – will continue in the future unless there is substantial changes to the way that these services are delivered at the regional or national level.

Somewhat greater opportunities for competition do however exist in respect of non-routine capital works, and current practice is to conduct open procurement processes for these, though again it is recognised that only a small number of suppliers are likely to respond to requests for quotes or tenders.

Many of the indicated annual renewal requirements for particular groups of KDC assets are too small to interest external contractors interest and achieve cost efficiency if delivered individually, and it is therefore sometimes preferable to instead bundle multiple years of scheduled work (or multiple types of work for a particular year) into a single contract to be undertaken at the same time.

This bundling approach has been adopted for KDC's roading works in the past, but an unfortunate consequence of this may have been the resultant intermittent schedules were perhaps sometimes perceived as decreased urgency to undertake works which also contributed to the deferral of renewals that has created the current backlogs.

For this reason whilst the expenditure profiles presented in this Strategy in some cases smooth large expenditures by distributing costs over multiple years (up to a maximum of 5 years for very long life assets) in no case has the opposite – a consolidation of forecast works for multiple years into a larger single package – been undertaken.

Whilst it is recognised that there may be significant benefits in such consolidation, and that it may indeed be undertaken, the presentation of data in this strategy is intended to indicate that the need for asset renewals is an ongoing one.

In addition to minor capital renewals, Council is undertaking two more substantial infrastructure projects, these being the reconstruction of a bridge over Waiau Toa Clarence River, and works funded by the central government Infrastructure Acceleration Fund to support additional residential development in Kaikōura.

Both of these projects are of scale that makes it appropriate (and necessary) for management and delivery to be undertaken or supported by out-of-district contractors and consultants, and as such the delivery of these projects is not expected to have any adverse effect on Council's ability and resources to deliver other 'business as usual' works.

Challenges associated with the small scale and isolation of Kaikōura also exist in respect of the planning and technical management required for this infrastructure. Recruitment and retention of technical engineering staff is difficult for Council, sometimes with adverse effects on capability. Whilst at present KDC's engineering team has some significant local government engineering experience there is no assurance that this will continue in the future.

Potential delivery of engineering planning and management through means other than direct staff employment by Council have also been considered, but options such as use of contractors, consultants or shared services typically have attendant disadvantages in respect of cost, and in the case of the latter, capability. KDC will inevitably be a junior partner in a shared service arrangement and as such is unlikely to receive the services of the most able people in the larger organisation.

Further details on asset procurement and management approaches are contained in the relevant Asset Management Plans.

3.9 Strategy Funding

As stated in section 2.0 the overall strategy in respect of roading and 3-Waters can perhaps be best described as an 'enhanced business as usual' without major changes to activities or levels of service, or a need to accommodate substantial growth.

This continues the direction that was established in the previous Infrastructure Strategy.

Because of this the proposed associated funding model is also assumed to largely maintain the status quo, which is the funding of roading from the District Wide General rate and NZTA subsidy, and the funding of 3-water services through a mix of targeted rates and user charges.

Development contributions will be levied, but the level of charges will be relatively low because most of the previous growth-related projects have now been fully funded and there is currently very little planned growth expenditure in future years.

Whilst the sources of funding are proposed to be little changed, the amounts of funding indicated to be required are significantly greater than in the previous infrastructure strategy. This is primarily due to two reasons, being:

1. A comprehensive revaluation of assets at 30 June 2022 indicated asset replacement costs that were substantially higher than what had previously been assumed, in some cases almost doubling the value of particular asset groups.

2. Significant general inflationary movements in recent years, with particularly strong effects on infrastructural services.

This scenario of increasing cost is of course not unique to KDC, with severe cost pressures currently being common across the entire local government sector.

4.0 Roading Infrastructure

Council's roading network comprises 210km of roads, of which 53% (110km) are sealed. 87% of roads by length classified as rural, and 48% of the network is classified as low volume roads, carrying less than 200 vehicles per day.

4.1 Levels of Service

The levels of service provided by the local roads of the Kaikōura District are generally reflective of the relatively small population served and associated low traffic volumes, but in some cases they also reflect a previous short-term focus on their management, where the potential for immediate cost savings has been put ahead of long-term sustainability.

Even allowing for the low-volume nature of KDC's roads, the level of expenditure on them has been very low. For example, KDC's 2018-2021 sealed road maintenance program was based on annual expenditure of around $3,000 per kilometre per year, whilst the average for the Provincial Centre peer group of councils is $5,775.

In recent times this short-term focus was also exacerbated by a range of issues associated with the 2016 earthquake.

This approach has had several adverse consequences in respect of levels of service. Inadequacy of previous budgets since around 2009 combined with substantial unforeseen but unavoidable costs (for example emergency works) resulted in some scheduled renewal work not being undertaken. This has created a backlog of overdue work, which has in turn seen some assets go so far past their due renewal dates that very substantial decreases in level of service have occurred.

In doing so substantial risks were created that some assets were in such a poor condition that any further accelerating deterioration that would render them in a non-functional state.

Since 2018 significant attempts have been made to move away from this situation. Prior to this technical level of service targets set by Council in its Annual Plans had generally been achieved, but those targets were not ambitious and masked localised deficiencies.

More recently higher level of service targets have been set that are more comparable with other similar local authorities, and whilst some progress has been made towards meeting these more challenging targets, more remains to be done, as shown in Table 2.

DRAFT

	2022/2023 Target	2022/2023 Actual	Achieved?
Roads & Bridges:			
The change from the previous year in the number of fatalities and serious injury crashes on the local road network expressed as a number	0	3	No
The average quality of ride on the sealed local road network, measured by smooth travel exposure	92%	95%	Yes
The average quality of ride on the sealed road network measured by NAASRA roughness	97	91	Yes
The percentage of customer service requests relating to roading, footpath and associated faults responded to within timeframes: Urgent – 1 day Other – 1 week	> 90%	70%	No
The percentage of the sealed network that is resurfaced per annum	> 7%	8.5%	Yes
The percentage of regulatory road signs incorrect or missing during an audit of the road network (whether a full or partial audit is completed)	< 0.5%	0.0%	Yes
Footpaths:			
The percentage of footpaths that are poor condition (grade 4 or 5)	< 10%	Not available	Not available
Resident satisfaction with footpaths	Increasing by 3% per year	41%	No
Streetlights			
The percentage of streetlights not functioning during an audit of any part of the network	< 1%	< 1%	Yes

Table 2: Performance Against 2022/23 Annual Plan Targets

4.1.1 Technical Levels of Service

Significant improvements have been made in recent years in respect of road condition as reflected in roughness and smooth travel exposure (the percentage of road length that is considered to be 'smooth').

In regard to roughness (where lower values are better) very good progress has been made during the last 5 years in respect of reducing the roughness of all four categories of local roads, as shown in Figure 4.

Figure 4: Roughness Trends – KDC Roads

These improvements have resulted in KDC's roads now becoming fairly similar to (and in some cases better than) other comparable groups when assessed on a 85th percentile basis, as shown in Figure 5 below.

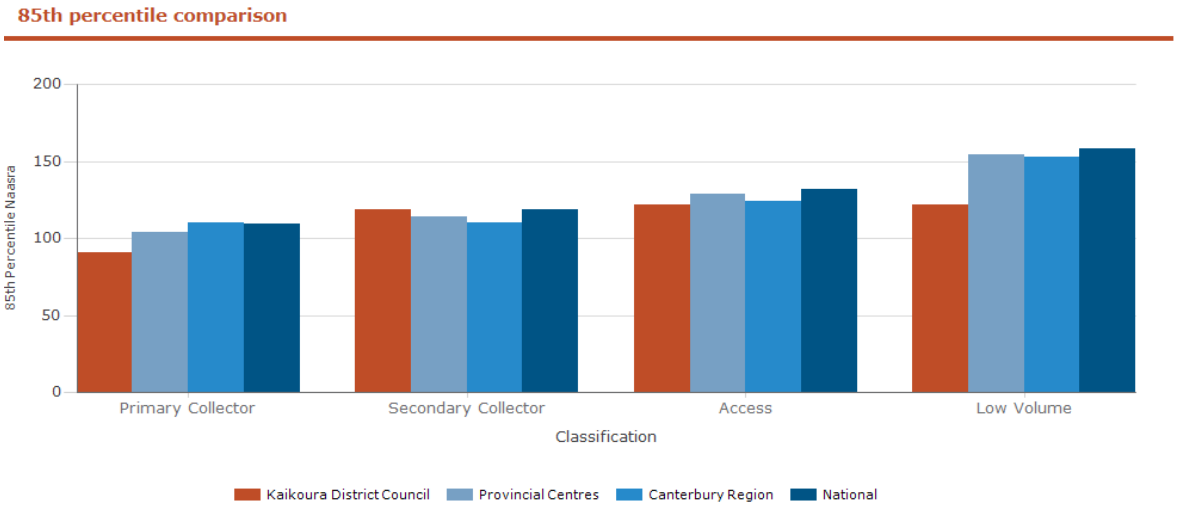


Figure 5: Roughness Comparison – 85th Percentile

Similarly good progress has been made in increasing Smooth Travel Exposure (trend shown in Figure 6 and comparison in Figure 7) with local figures now generally significantly better than these averages.

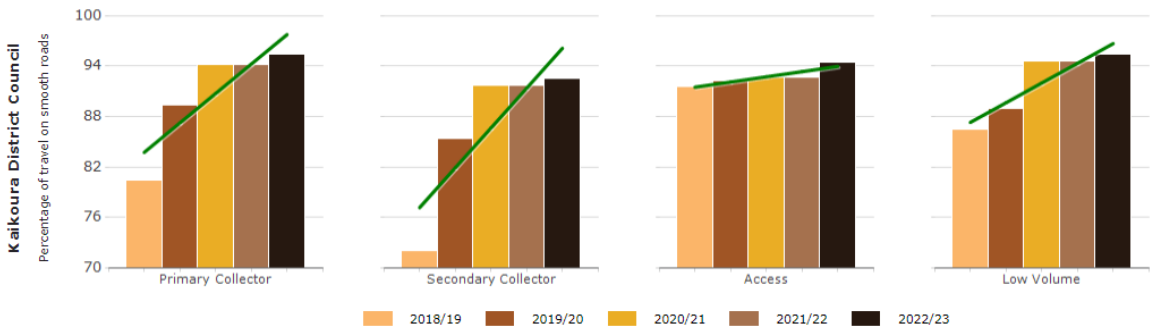


Figure 6: Smooth Travel Exposure Trends – KDC Roads

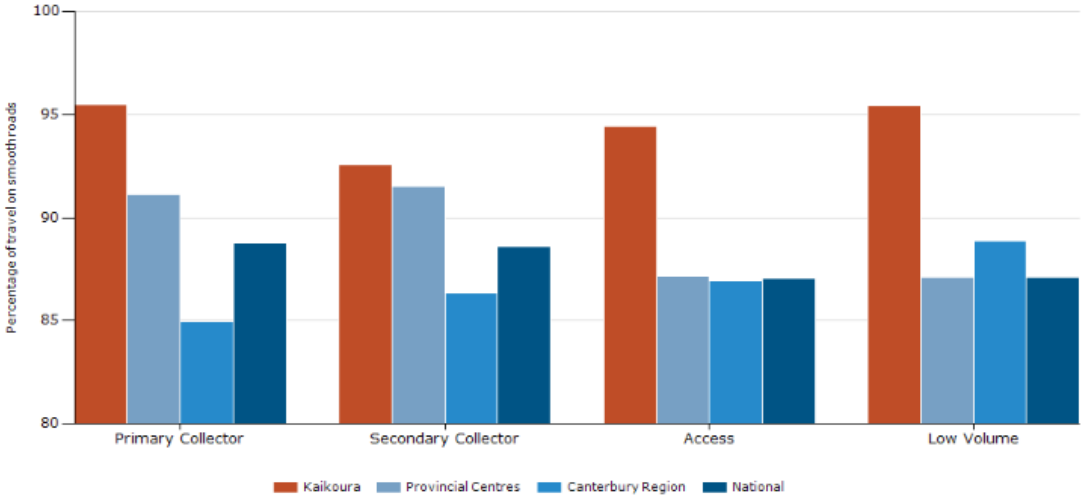


Figure 7: Smooth Travel Exposure Comparison – KDC Roads

Whilst the overall smoothness of KDC's roads has much improved over the past 5 years, it should however be noted that there are still many sections of road that have very old surfacing, which whilst currently able to provide smooth travel will be entering the latter stages of life, and as such could deteriorate rapidly.

Until these very old sections are all replaced the potential remains for overall network smoothness to decline despite the conduct of a strong renewal programme.

4.1.2 Road Safety

In part because KDC's network is small, it has a low incidence of fatal and serious injury (DSI) crashes on its network when measured on an absolute number basis as reflected in Table 3 and it is statistically inaccurate to determine trends as the number is less than 6 / year.

As shown in Table 4, whilst the Collective Risk (the number of reported serious crashes against the length of roads for particular road categories) is typically low in comparison to broader averages, the converse applies in respect of Personal Risk, which reflects the number of fatal and serious injuries against the total number of kilometres travelled on the network roads by road users.

DSI Counts	Primary Collector	Secondary Collector	Access	Low Volume	Total
2013/14			1		1
2014/15		2	2		4
2015/16		2			2
2016/17	1				1
2017/18					0
2018/19	1				1
2019/20		1			1
2020/21					0
2021/22					0
2022/23		2		1	3

Table 3: Fatal and Serious Injuries 2013 to 2023 – KDC roads

The locations and causes of the relatively few serious crashes which occur on local roads are very variable, and road factors are seldom identified as a primary causal factor, making effective targeting of safety responses difficult.

There are however a few locations where there is considered to be significant latent risk, such as certain rural intersections and works to address some of these are planned to be undertaken.

Classification		Personal Risk per 100M VKT	Collective Risk
Primary Collector	Kaikoura District Council	7.586	0.013
	Provincial Centres	5.374	0.040
	Canterbury Region	5.053	0.048
	National	5.739	0.048
Secondary Collector	Kaikoura District Council	5.975	0.007
	Provincial Centres	6.796	0.016
	Canterbury Region	5.398	0.012
	National	6.912	0.016
Access	Kaikoura District Council	10.785	0.004
	Provincial Centres	7.422	0.006
	Canterbury Region	6.596	0.004
	National	8.360	0.006
Low Volume	Kaikoura District Council	0.000	0.000
	Provincial Centres	9.088	0.002
	Canterbury Region	7.770	0.001
	National	11.210	0.002

Table 4: Personal and Collective Risk – KDC Roads, 2013-2022

The statistics are therefore not considered to provide a clear indication of the relative safety of KDC's network, but there are considered to be few safety hazards on local roads that are substantial and

practically reduceable. In making this statement it is recognised that because of the topography of the district there are some roads in the district – and a notable case would be the Puhi Puhi Road– that are always likely to have the potential for serious injury if not driven with proper regard to the conditions.

In somewhat similar vein it is also recognised that significant safety issues exist for cyclists on the section of Beach Road (State Highway 1) between Hawthorne Road and West End, but despite extensive previous consideration there no practical solution has been identified because of other constraints that exist at that location.

For these reasons, only relatively modest annual budget allocations have generally been made throughout the period of this strategy to address safety issues as they arise.

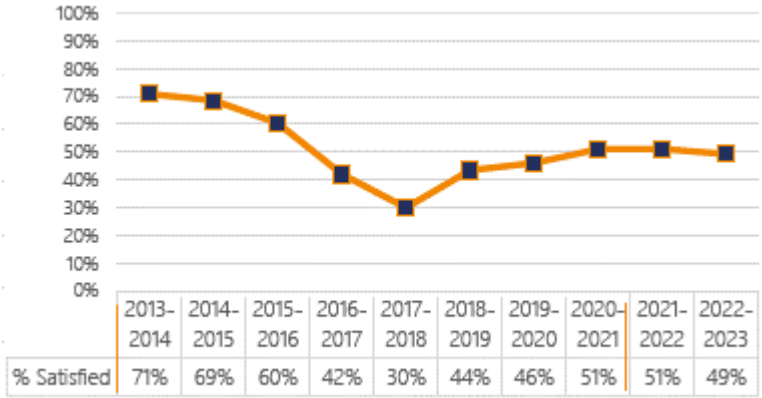
4.1.3 Customer Perceptions

Technical measures of levels of service do not always reflect customer perceptions.

Some of KDC roads (and sealed rural roads in particular) have deteriorated to the point where their deficiency is very obvious to users, and whilst the proportion of the network that is in this very poor state is relatively small, this inevitably shapes perceptions of the network as a whole.

Works undertaken on roads to remedy damage caused by the 2016 earthquake (including replacement of 3-Waters reticulation) and other disturbances such as the recent laying of the broadband fibre network in the Kaikōura community, have also contributed to negative perceptions of the network as a whole.

The levels of community satisfaction with KDC roads over the past 10 years is shown in Figure 8 below.

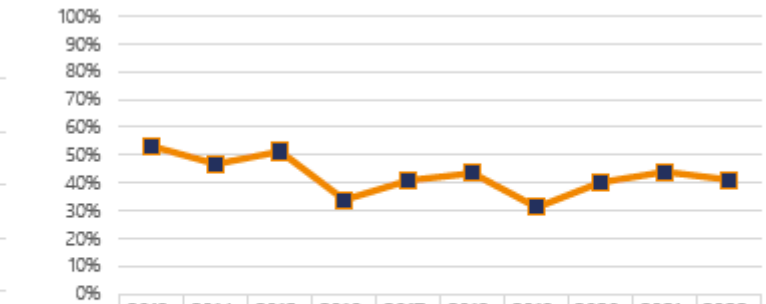


	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
% Satisfied	71%	69%	60%	42%	30%	44%	46%	51%	51%	49%

Figure 8: Community Satisfaction Levels (Roads)

It is believed that the progressive (and accelerating) decline of levels of community satisfaction between 2013/14 and 2016/17 shown in Figure 8 may be reflective of the fact that the condition of many roads was so poor that they were commencing rapid deterioration towards complete failure.

As shown in Figure 9 community satisfaction in respect of footpaths show a similar though less pronounced decline from 2013/14 to 2016/17, and have since remained at relatively low levels.



	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
% Satisfied	53%	47%	51%	34%	41%	43%	31%	40%	44%	41%

Figure 9: Community Satisfaction Levels (Footpaths)

Whilst a structural assessment of KDC's footpaths conducted in May 2019 indicated that a very large proportion (over 92%) of the network length was physically in a good or excellent physical condition, it is believed that this assessment was seriously flawed as it did not recognise the existence of some footpaths because they were so severely deteriorated or overgrown.

A recent visual condition rating has instead indicated that 20% of the network (around 8km in total) is in poor or very poor condition and needs urgent replacement.

The proposed strategy in respect of roading levels of service is therefore primarily to promptly address the most significant current deficiencies (which are particularly in respect of severely deteriorated pavement surface, structure and footpaths) and thereafter to ensure that sound levels are consistently maintained.

In essence, the overall strategy for roading levels of service is considered to be one of restoration and maintenance of sound basic levels of service rather than ongoing improvement. Roading is, and will remain, a very substantial cost to ratepayers of the district, and substantial improvement of levels of service beyond sound basic levels is not considered to be realistically affordable (or necessary) with such a small population.

4.2 Demand

Relatively low levels of previous or forecast population and economic growth in the district have created little pressure on the capacity of Council's roading assets.

Data from NZTA on vehicle kilometres travelled in the district (including State Highways) shown in Figure 10 also fails to indicate a strong trend of increasing traffic volumes.

Under normal circumstances there is almost no traffic congestion on these roads, with the only location where minor congestion occurs being in the Kaikōura town centre, where the presence of State Highway 1, the railway, Lyell Creek, Ludstone Road and existing developments greatly constrain the options available to manage this.

Potential development or extension of significant subdivisions such as Ocean Ridge, Seaview and Vicaage Views would only be expected to result in modest increases to traffic volumes and upgrading of immediately connecting roads is in some cases going to be undertaken by the subdivision developer with financial support from central government.

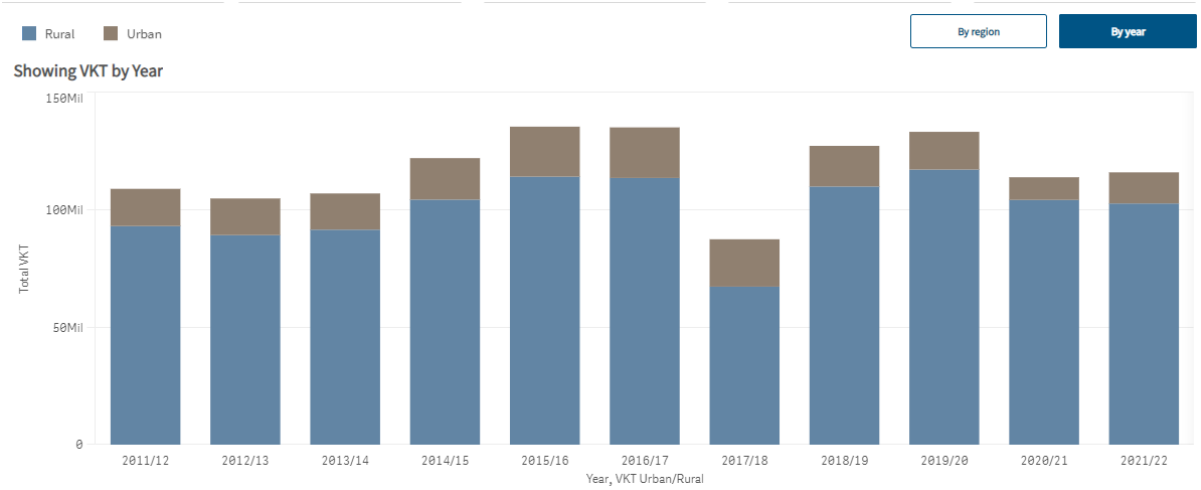


Figure 10: Annual Vehicle Kilometres Travelled in Kaikōura District (includes State Highways)

As noted in section 3.3 it is however considered possible that in the longer term there could be a significant acceleration of growth in the district, driven by its natural attributes. This is however currently only speculation, and no expenditure is at this time proposed to accommodate it.

4.3 Asset Condition and Renewals

Undertaking an appropriate program of asset renewals in response to deteriorating asset condition is key to maintaining levels of service, and a previous failure to do so in respect of Council's roading assets is believed to have been the primary contributor to customer dissatisfaction with the network.

Broad assessments of the condition of the main categories of KDC's roading assets can be found in the 2024 Roading Asset Management Plan (AMP). The following sections outline these condition assessments and expected renewal issues and requirements for these assets.

4.3.1 Sealed Pavement Surfaces

This category represents the top layer of a road, with which vehicles are directly in contact. The total replacement value of these assets for KDC is $10.13 million, which is 10.9% of the total value of depreciable roading infrastructure.

For the sealed roads of the district this normally takes the form of a thin chip seal surface.

Relatively good information is held on this category of assets, which is helpful since because of their relatively short operating lives (typically 5 years for an unsealed metal running course or 14 to 25 years for a sealed surface depending on the type of surface and the road traffic volume) the associated level of depreciation is high, representing 28.6% of the total for roading. The visibility of pavement surfaces also simplifies condition assessment and associated renewals planning.

Details of the condition assessment of KDC's pavement surfaces can be found in the 2024 Transport Asset Management Plan, with a summary of this assessment provided in Appendix 1. Good progress

has been made in addressing the backlog of deferred renewals that developed during the previous decade, with most of the surfacing that was in the poorest condition having now been replaced.

The current long-term surfacing renewal requirements based upon RAMM data are shown in Figure 11. For practical purposes some smoothing of this indicated expenditure is however likely to be conducted, particularly in later years.

As noted previously some surfacing does however remain that is very old (20 years plus) and as such is likely to have become weathered into a brittle and fragile state, making it at risk of rapid deterioration even if the traffic volumes on the road are relatively low.

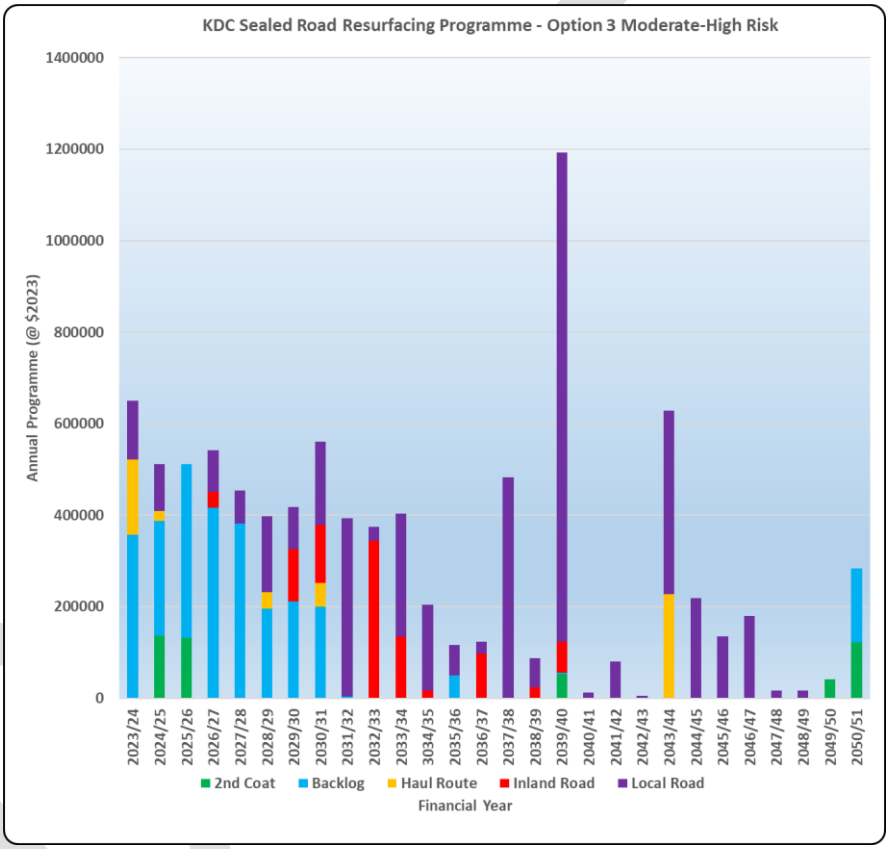


Figure 11 – Historic and Projected Annual Sealed Pavement Renewal Expenditure

4.3.2 Basecourse Renewals

This is the structural layer of the road immediately below the pavement surface, typically between 100mm and 150mm thick, which is very firmly compacted to provide a stable base on which the surface can be applied. The total replacement value of this asset group for KDC is $12.92 million, 14.6% of the depreciable total.

Unlike the pavement surface, relatively little information is available to guide future basecourse renewal requirements, and some significant assumptions have therefore been made.

Sealed road construction commenced in the urban areas of Kaikōura in the 1940s and in the rural areas in the early 1950's. Significant sealing of rural roads continued until well into the 1980s. The age of Council's sealed pavements appears to range from 30 to 80 years. It is suspected that the majority would be in the 35- to 70-year range.

In the Kaikōura District (and with the notable exception of the earthquake rebuild) traffic volumes and loads on local roads are generally relatively low (60% of roads by length have traffic of less than 200 vehicles per day). Good road building aggregates are readily available and (again with a few exceptions) underlying ground conditions are generally quite favourable.

Prior to the intense traffic loadings caused by the earthquake rebuild there had been relatively limited observable deterioration of subsurface pavement layers, even on roads on the Kaikōura Flats which were built on softer ground conditions. That there had been little evidence of pavement failure prior to the earthquake rebuild loadings suggests that most local basecourse (even if not laid in the most effective way, for example where seal extensions would have been simply an application of seal to an previously unsealed road without reconstruction of the pavement) must have a life of at least 70 years and potentially significantly longer, up to 100 years. In the development of our Roading Asset Management Plan it was assumed that the average basecourse life was this upper figure of 100 years.

Unfortunately even though it appears that only a limited amount of pavement deterioration had occurred prior to the earthquake, little if any rehabilitation work was undertaken to remedy this, and as was the case with reseals, a backlog of pavements requiring area wide pavement treatment was created, which has been exacerbated by the heavy vehicle loadings following the earthquake.

A RAMM pavement rating survey of our local roads was undertaken in March 2020, details of which are contained in the 2021 Transport AMP, with a summary of this assessment provided in Appendix 1 . Based on this survey, the following guideline assessment was made of the condition of KDC's pavements by proportions of network area:

Condition 1 (Minor faults only)	79%
Condition 2 (Satisfactory)	9%
Condition 3 (Acceptable)	3%
Condition 4 (poor)	2%
Condition 5 (Very poor)	7%

Of the 9% of length that is in conditions 4 or 5, 4% was subsequently remedied in 2022 as part of the remediation works to the NCTIR haul routes that was fully funded by NZTA. The remaining 5% backlog of condition 4 and 5 pavement was proposed to be reconstructed over 5 years with a total cost of approximately $1.65 million.

Accordingly budgets of $330,000 per annum are proposed for each of these 5 years.

Whilst it would be hoped expected that once this backlog is addressed renewal requirements would be reduced, because of the lack of information available it is proposed that a conservative approach would be the retain this same level of annual renewal budget for the full 10 years of the LTP, after which renewal budgets are set at the level of annual depreciation for these assets indicated by the 2022 valuation, which is $259,051.

It is recognised that because of the apparently favourable profile of the pavement condition expenditure at this lower level may not even be necessary, but this can be reviewed in future years.

4.3.3 Sub-Base Renewals

The lowest structural layer of the road is the sub-base, which lies between the road formation (natural ground) and the basecourse. The total replacement value of this asset group for KDC is estimated to be $30.7 million

The sub-base is subjected to smaller loads than the basecourse, and typically has a longer operating life. In the case of KDC's roads, that means a life greater than 100 years.

It is not believed that any renewal of sub-base on KDC roads has yet been undertaken or is envisaged to be undertaken within the period of this Infrastructure Strategy.

In practice sub-base materials are not physically replaced but are instead substituted by the existing basecourse above it at the time that this is renewed. For that reason the renewal of sub-base is not a real financial cost, and whilst basecourse is assigned a value for accounting purposes it is not depreciated. Unless the road network is extended it does not have any financial impact on Council.

4.3.4 Drainage Renewals and Improvements

Road culverts, kerb and channel and other associated drainage features have a total replacement value of $7.7 million - approximately 8 % of the depreciable total replacement cost for roading.

All these assets are expected to have long expected lives of between 80 and 90 years, with an average across the group of 84 years. The associated annual depreciation is $90,040.

Council does not have reliable records of the ages of many of these assets, and assumptions have been made that existing assets for which ages are not known are in the middle of their operating lives. An assessment of the condition of assets in this group taken from the 2021 Transport AMP is provided in Appendix 1.

A lack of extensive failures or other evidence that a substantial proportion of drainage assets are in a poor condition supports the assumption that most assets still have significant residual life, with extensive replacement not required until the late 2050's. A small exception to this exists in the case of kerb and channel, for which there are some sections in Kaikōura (in particular along the Esplanade) where these assets are severely deteriorated and replacement is currently required.

Whilst few drainage assets appear to require renewal in the near future some improvements are proposed, in particular to roadside drains in the rural areas, and $155,000 per annum has been budgeted for this purpose over the first three years of the LTP period, with $77,050 per annum proposed for the following 7 years, after which expenditure has been aligned with indicated renewal dates.

4.3.5 Bridge Renewals

Council owns and maintains 47 structures classed as bridges (which includes culverts over 1.2 metres in diameter). These assets collectively have an estimated replacement value of $42.8 million, 46% of the depreciable roading asset total. It is the second most valuable asset group after pavement formation.

Because road formation is non-depreciating bridges are however Council's most valuable group of depreciating assets.

A broad assessment of the condition of assets in this group taken from the 2021 Transport AMP is provided in Appendix 1. A large proportion of Council's bridges were constructed in the 1960s and 1970s and are in the middle stages of their expected lives. The 2016 earthquake resulted in the replacement of a number of bridges that were relatively fragile. The projected renewal profile for Council's bridges based on 'raw' inventory age data is shown in Figure 12, with little renewal expected to be required during the period of this strategy.

Whilst this age data suggests that renewals of the small Humbug, Black Stream, Smiths, Ote Makur & McInnes bridges are required within the LTP period, practical justification for such replacements does not appear to exist.
It is however believed that consideration does need to be given to replacing the bridge over the Jordan Stream on Puhi Puhi Road and a provisional budget allocation of $800,000 for this has been indicated for the 2029/30 year, though other options do exist.

A first renewal of a large bridge (Kahutara on the Inland Road) is indicated by this data to be required in 2050.

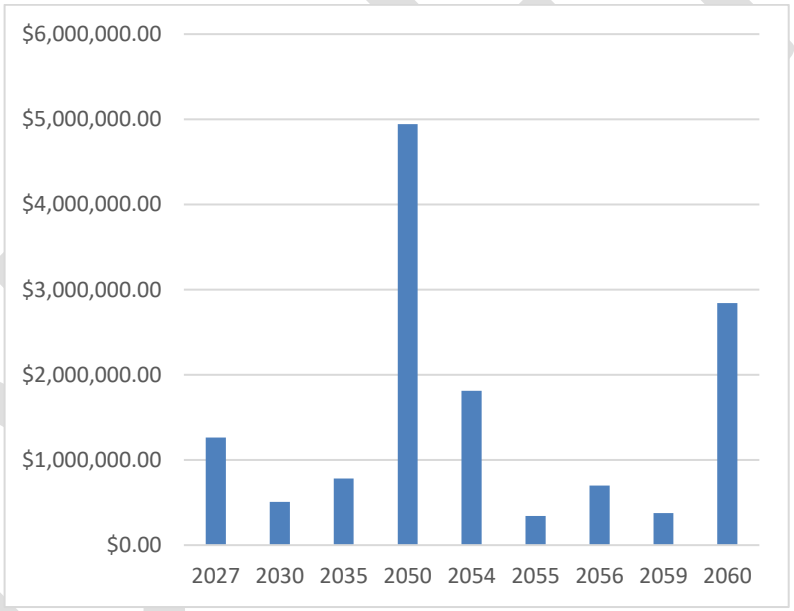


Figure 12: Bridge Renewal Requirements based on Raw Inventory Data

The foregoing discussion and figures do however not include the potential replacement of the former bridge over the Waiau Toa / Clarence River at Glen Alton.

The replacement of this bridge, which was destroyed in the 2016 earthquake, is currently proposed, but significant uncertainty remains regarding the form, cost, affordability and timing of the works.

An initial estimate of the cost of replacing the bridge was $12.6 million, but NZTA has subsequently approved financial subsidy of the project at a rate of 95% up to a maximum project cost of $13.65 million.

Recently it has become apparent that the actual project cost may exceed this value, and that other questions regarding the project need to be answered.

In addition to its construction being a very large capital expenditure, a new bridge at Glen Alton has potential to create substantial additional ongoing maintenance costs.

Because of the high level of uncertainty that currently exists regarding this project, and the potential for the quantum of these costs (in particular the capital cost) has potential to dominate the early years of the Infrastructure Strategy financial projections, those costs have not been included in overall projections.

4.3.6 Footpath Renewals

As noted in section 4.1.3 footpaths in Kaikōura have suffered from previous under-investment and as a result in the order of 20% of Kaikōura's 38km of paths are considered to be overdue for replacement.

It was initially hoped that these replacements could be in the form of concrete paths, but it has subsequently been found that costs for such paths were higher than expected and it is now proposed that the majority of renewals are instead conducting using lower cost asphalt overlays.

It is currently proposed that footpath renewal budgets are set at $250,000 per annum for the period of the LTP, and thereafter reflect theoretical replacement needs.

The $250,000 budget allocations are being proposed based on an assumption that NZTA subsidy at 51% will be applicable, and that such budgets should enable the identified 8km backlog of renewals to be largely addressed by the end of 2028/29.

As is the case with some other activities these budgets and the associated scope of works may have to be revised based on the extent of NZTA subsidy provided.

4.3.6 Overall – Roading Renewals

With roading assets comprising such a large part of KDC's overall infrastructure inventory, renewal expenses could potentially have a major impact on Council and the community.

As observed in previous sections, limited data on some asset classes makes accurate projection of future renewal expenditures difficult. In some instances valuations have been based on assumptions of a common average age for a large number of individual assets, which cannot reasonably be used directly to generate a useful renewal profile.

Pavement basecourse has the greatest deficiency in this respect, being a relatively high value asset for which there is very little reliable age data. Attempting to define any renewal profile for this material therefore requires some significant assumptions.

Other asset classes for which comprehensive and reliable age or condition data does not exist are retaining and sea walls and traffic facilities and streetlights, but these have much lower values and it seems reasonable to assign uniform annual renewal expenditure equal to depreciation or some multiple of it, though in the case of streetlight luminaires, all of which will be replaced with new units in 2021, a progressive increase of renewal cost has been assumed for the earlier years of the strategy.

Potential renewals expenditure over the next 30 years (excluding the potential replacement of the Waiau Toa / Clarence River Bridge at Glen Alton, for the reasons set out in section 4.3.5) is shown in Figure 13. This incorporates a degree of smoothing to reflect that there is a significant degree of 'bulking' in the available asset inventory data, where multiple assets have been assumed to have common installation years, and it is believed that a more realistic renewal schedule would be one based on a smoothing of some of the associated peaks of renewal activity.

A large peak in this projection exists in 2050, largely due to a forecast cost of $4.9 million to renew the Kahutara Bridge on the Inland Road.

Except for that peak, there are only 5 years in the 30 year Infrastructure Strategy period when total annual roading renewals exceed $2 million, these being in 2029/30 (driven by $800,000 replacement of Jordan Stream Bridge), 2042/43/44 (driven by 'echos' of the substantial amount of resealing work undertaken in the years following the earthquake) and a theoretical $1.8 million replacement of the Linton Creek Bridge on the Inland Road in 2054.

It is stressed that the timing of this latter bridge replacement is very much a theoretical figure, because the bridge is being very much affected by gravel migration from slips created during the 2016 earthquake, which could potentially necessitate other substantial activities at an earlier date.

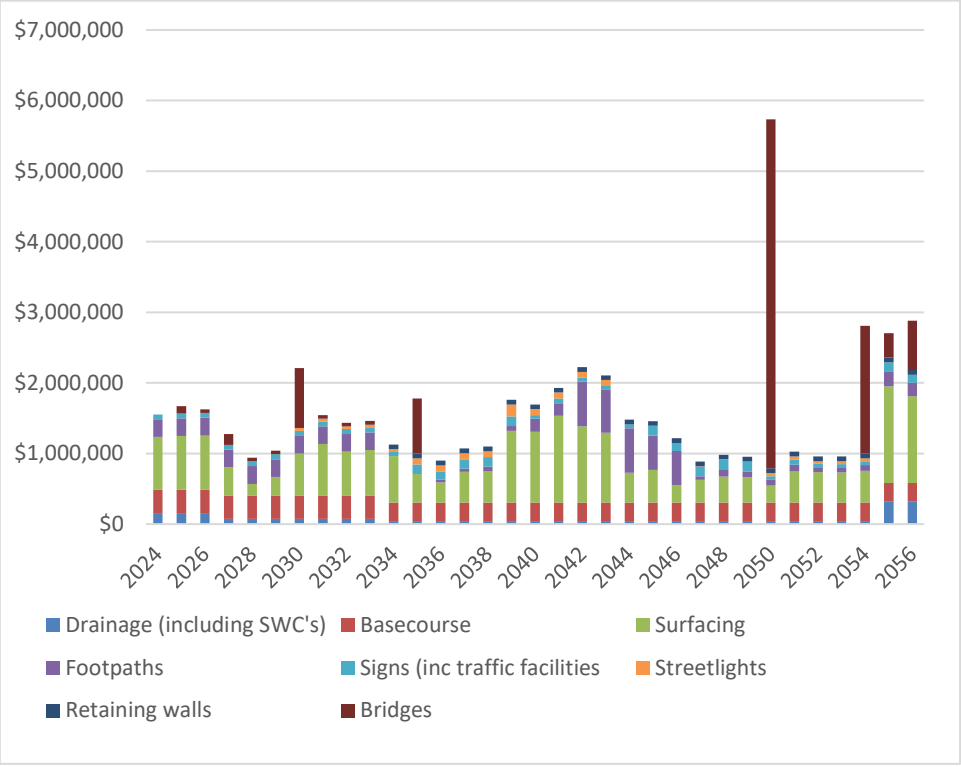


Figure 13: Smoothed Roading Asset Renewal Cost Projection
(2023 Dollar Terms, excluding Waiau Toa/ Clarence Bridge)

Such an expenditure profile appears relatively easily manageable. Details of the assumptions underlying these projections, including factors such as estimated renewal costs and expected asset lives can be found in the valuations conducted of KDC roading and 3-waters assets as at 30 June 2022.

4.4 Resilience Issues

The resilience of council's roading assets is variable, but in some cases low.

Many areas of the district are potentially prone to flooding or landslides in an extreme rainfall event, and the extent of damage caused to roads may be very large.

Roads such as Puhi Puhi, Blue Duck and the Waiau Toa/Clarence Southern Access Route have precipitous sections where slips or dropouts could be extremely difficult and expensive to remedy, whilst roads such as Clarence Valley may be subject to severe erosion by very dynamic rivers.

Substantially reducing these risks is generally not economically viable since doing so would require extensive major realignments or very large protective structures, the cost of which are difficult to justify for roads which have such low traffic volumes.

With the exception of some limited improvements to roadside drainage as described in section 4.3.4, it is believed that the most practical approach is generally to remedy damage as it arises. Planning for this is also difficult however because of the uncertainty regarding event frequency and extent, and other funding sources may also become available in an extreme event.

In the past annual operational budget allocations have been made for roading emergency works with the intention that all associated costs would be expensed in the year that they were incurred. A consequence of this approach has been that in years where severe events have resulted in very high costs that exceeded the allocated budget, the shortfall was recovered by reducing expenditure of other roading budgets. This is one of the factors that has contributed to the backlog of resealing work that is currently faced.

Because of the difficulty in reliably budgeting for responses for these events it is proposed that where very large costs are incurred the impact of these costs will be smoothed using debt funding.

Debt funding does of course have to be repaid, and these repayments have to be incorporated in long-term planning. In this respect an assumption has been made that on a long-term average basis $50,000 per annum will be spent on roading emergency works. In making this assumption it is recognised that whilst this will initially reduce the financial impact on ratepayers, that over time those costs will rise, and this is reflected in the financial projections contained in this strategy.

This debt funding of emergency works has at this time been assumed to only commence in 2025/2026 since there is at present, approximately $200,000 held in a reserve fund that could initially be used to fund such works.

The potential effects of climate change have not been factored into financial projections, largely because of high levels of uncertainty. The topography of the district and its surrounds can make the water draining from the mountains a powerful force, but also a very unpredictable one, and attempting to make meaningful predictions of potential resilience issues that also take account of possible climate change is not considered realistic.

The 2016 earthquake also caused uplift of the coastal areas of the district that in an instant offset any potential sea level rise over the next century, therefore coastal climate change effects have not been incorporated into this Strategy.

4.5 Operating and Maintenance Costs

With only relatively minor changes to proposed levels of service, little change to routine operation and maintenance costs other than adjustments for inflation are expected during the period of this strategy, as shown in Figure 14.

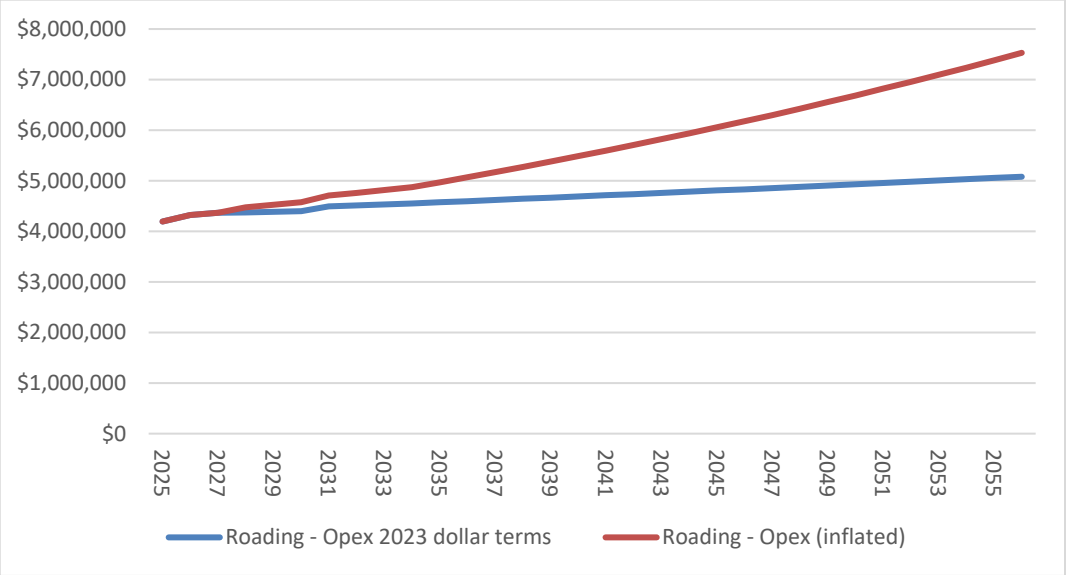


Figure 14: Projected Annual Roading total OPEX Costs

4.6 Funding

A very significant but uncertain impact on KDC's delivery of roading activities is the extent of Financial Subsidy from NZTA, for which the current Funding Assistance Rate is 51%.

At the time of preparing this Infrastructure Strategy Council has not been advised of the extent of subsidy that will be granted for KDC's submitted 2024-27 NLTP roading program, and there appears to be a strong possibility that what is granted will fall well short of what was requested, since NZTA has advised that its available funding for that period falls well short of what has been applied for in the Canterbury region.

A particular challenge that our Council faces is to escape the previous local underfunding of roading that occurred prior to the 2016 earthquake. To do so requires expenditure to be significantly lifted, which in turn would be hoped to be accompanied by similar proportional lifts in NZTA subsidy.

KDC made a very strong application for such an uplift in subsidy when it submitted it proposed program for 2021-24, which was supported by an expertly prepared Activity Management Plan which was understood to be considered as an exemplar by the Agency.

Unfortunately this application proved to be unsuccessful, with KDC understood to have received a similar proportion of requested funding to all other councils in the region, with little apparent regard to the particular situations of each authority. The result of this has been that currently KDC is meeting over 70% of the cost of roading activities which is considered unsatisfactory.

In its current application KDC is again seeking that the full subitizable extent of it proposed program is funded at 51%, reducing the local share to 49%. To achieve this in an overall programme that is slightly larger than that for 2021-24, and which has also been adjusted for inflation would require the NZTA subsidy to be increased by 67% and it is considered very unlikely that such an increase would be approved.

An assumption does however need to be made for the LTP in regard to what level of subsidy will be provided, and that initial assumption is currently that the overall level of NZTA subsidy will increase by 35% relative to that for the 2021-24 NLTP.

It is stressed that this is a very tentative assumption that will remain subject to considerable uncertainty for some time, probably until after the LTP has been adopted.

Should it be found that the subsidy granted falls well short of the assumption consideration will have to be given to the affordability of increased local funding or reduction of some programme elements, though the latter would be considered very undesirable as the works are core functions.

5.0 Water Services Infrastructure

Council's water services comprise the following:

- Water supplies serving the Kaikōura, Ocean Ridge, Oaro and Peketa urban communities and the Kaikōura Suburban, Kincaid, Fernleigh and East Coast rural areas.
- Wastewater drainage and treatment systems serving the Kaikōura and Ocean Ridge urban areas
- Stormwater drainage systems serving the Kaikōura and Ocean Ridge urban areas

The assets associated with these activities have a total replacement value of $111.3 million, comprising water supply ($55 million). Wastewater ($44.3 million) and stormwater ($12 million).

5.1 Levels of Service

KDC's proposed levels of service for water services are presented in Appendix 3.

5.1.1 Technical Issues

The technical levels of service provided by these services are generally satisfactory, with treatment facilities and reticulation functioning as they are intended to. Significant improvements to these services in respect of performance and resilience has been recently achieved using funding made available through the Department of Internal Affairs (DIA) 3-Water Reforms.

This investment combined with previous renewal and improvement works undertaken as part of the earthquake rebuild and a lack of growth pressures is considered to have left KDC's 3-Water services in a strong position for the future.

5.1.2 Public Health Issues

In part using financial assistance from the Department of Internal Affairs, all of the previous significant public health issues in respect of Council's water services have now been resolved, with the water treatment plants of the Fernleigh and East Coast rural water supplies upgraded so that they are able to achieve compliance with the NZ Drinking Water Standards (DWS).

The boil water notices that were previously permanently in place for these schemes have been uplifted.

Whilst council's water infrastructure is now better able to achieve regulatory compliance it should be noted that with the introduction of the water regulator, Taumata Arowai, water supply activites are now being conducted in an environment where there is ongoing increased emphasis on compliance being maintained.

5.1.3 Environmental Issues

Resource consents relevant to 3 waters activities are listed in Appendix 4.

A previous belief that no significant environmental issues were associated with any Council water services has been somewhat undermined by Environment Canterbury's issuing of abatement notices to KDC in respect of non-compliance with conditions for operation of the Kaikōura wastewater treatment plant.

It does however continue to be the belief of Council staff that the very unusual nature of the Kaikōura wastewater treatment system, where effluent is discharged to land rather than water and the potential effects on the environment are extremely limited and should be assessed with regard to this rather than on a more administrative basis as happens under the current consents.

Despite this view it is recognised that Council will need to find a path towards compliance that is acceptable to ECan, and this appears likely to require obtaining a new set of resource consents for the activity, which may have a significant cost.

5.1.4 Customer Perceptions

A number of issues with regard to water supply in the period since the 2016 earthquake diminished satisfaction with these services This has since improved with the most recent resident survey seeking feedback on these activities (in 2021) indicating satisfaction ratings of 70% for water, 79% for wastewater and 66% for stormwater.

Since those issues were resolved there has been little evidence of community interest in or dissatisfaction with these services. As tends to occur, when water services are operating effectively they are largely taken for granted by the community and little thought is given to them.

Accordingly it was not felt useful to include questions on water services in the most recent community satisfaction surveys conducted by Council.

It is believed that the only significant community-perceived issue in respect of Council's water services are the supply interruptions that occur to properties served by the Kincaid rural water scheme, which are related to highly turbid water in the Waimangarara Stream source of the supply during heavy rainfalls, which can require the treatment plant to be shut down.

The Kincaid scheme is however distinct amongst the water supplies administered by KDC in that it has both an active management committee comprised of customers and some significant financial reserves, and as such the resources to make a decision and implement measures to address this issue are present.

5.2 Demand

There are no well-defined trends in growth of demand for 3-Water services. Generally generous system capacities, combined with low levels of previous and projected population growth and the expectation that the majority of growth will be in Kaikōura or its immediate surrounds leads Council to believe that there are no substantial immediate demand issues in respect of these services, though some additional reticulation capacity would be desirable on two rural water supplies and the Kaikōura wastewater system

The ground water source supplying Kaikōura and its surrounds has capacity and is consented to draw water continuously at a rate of 100 litres per second. Its theoretical capacity is in excess of 8000m^3 per day, which is a very substantial supply quantity for an area that would typically have a population (including temporary residents) of less than 4000 and does not include many significant water-using businesses.

An apparent consequence of the relative abundance of supply capacity in Kaikōura and elsewhere has been relatively high – and in some cases wasteful – use of water. Whilst annual average quantities of water supplied to the community are around 3000m^3 per day, peak takes approaching 7000m^3 per day have been recorded in periods of drought, which are believed to be attributable to extensive lawn and garden irrigation.

These are very high levels of consumption on a per-capita basis and it is believed that there is substantial potential for increasing the efficiency of water use through implementing controls on excessive water use, reducing system leakage and greater application of user-pays charging principles.

While this potential exists it is not considered necessary to otherwise increase water treatment or reticulation capacity, and it is suspected that an increase of Kaikōura's resident population by up to 50% could be easily accommodated by current means.

Efforts have recently commenced through measures such as education and the implementation on controls on the wastage of water through a Water Services Bylaw to improve the efficiency of water use in the community, though it is recognised that in the longer term further action might be required to free up the water supply capacity need to support substantial growth (possibly implementation of universal metered water charging). Such growth is however at present considered aspirational, and for this reason no associated budget for major initiatives have been included in the Long-term Plan.

A provisional budget allocation of $2 million has been provided in 2045 to support universal water metering of the community and/or development of a new water source for Kaikōura if that was needed to support growth.

Generally similar comments apply in respect of wastewater. The wastewater system that serves Kaikōura was substantially rebuilt and upgraded following the 2016 earthquake and the resultant treatment infrastructure has capacity to handle a load well in excess of that currently generated by the community.

This excess capacity has been recently reflected in the need to deactivate some elements of the treatment system because the available biochemical loading was insufficient to make operation of the fully commissioned system efficient. It is believed that the wastewater treatment system could effectively accommodate at least a 50% increase in population.

A lesser degree of confidence exists in respect of the ability of some elements of the wastewater reticulation system to accommodate greater flows.

A key feature of the infrastructure rebuild work that was conducted following the 2016 earthquake was that gravity sewers along Beach Road and adjacent areas were replaced with pressure sewers. In doing so the storage capacity that previously existed - in particular in the large diameter trunk sewer that fed the Mill Road pump station - was lost, leaving only the capacity of the pump station wells to buffer flows.

This new configuration functions effectively providing all components of the system are working properly, but there is a very small margin of safety in the event of any failure of pumping, because the limited well storage capacity that exists will quickly be filled, after which an overflow may occur.

Some initial mitigation of this risk is proposed to be achieved by providing a back-up electrical generator at Mill Road, but a better and more resilient solution would be to provide additional well storage capacity, and a provisional allocation of $500,000 has been provided in the 2028/29 year to achieve this.

Another area of concern regarding wastewater reticulation capacity is the Esplanade/Torquay/Avoca Street catchment.

Information collected from pump operation during severe rainfall events suggest that at these times the pumps in this area are operating almost continuously, and that there is limited capacity to accommodate additional development in this area without some upgrading of the wastewater system.

It is however believed that some capacity upgrading for this area could be relatively easily achieved by progressively installing more powerful pumps when the existing pumps become due for renewal. Such an approach would have a very modest additional cost, and for this reason has not been identified as a significant issue in this strategy, though it is believed that a proportion of the pump renewal costs could reasonably be recovered through development contributions.

Stormwater infrastructure is only provided by Council in Kaikōura and Ocean Ridge. The networks are of relatively limited scale, with no substantial deficiencies observable at present, though the Ocean Ridge system has greater maintenance requirements associated with the incorporation of wetlands, retention ponds and vegetated swales which require periodic management.

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The capacity of some low-lying parts of the network have also been significantly increased by the 2016 earthquake, which lifted most of the land in and around the town by at least 1.0 metre relative to sea level.

The most significant effect of this is that the gradient and associated flow-carrying capacity of Lyell Creek has been increased, which in turn lowers water levels in the creek, enabling easier full pipe flow into it during storms.

It is believed that the benefit to stormwater drainage of the land rise caused by the 2016 earthquake will in effect largely offset any likely climate change associated sea-level rise to 2100, even under the most adverse internationally envisaged greenhouse gas emission scenario (Representation Concentration Pathway 8.5) or an exaggerated variant ('H^+') both of which are shown in Figure 15.

For these reasons no significant expenditure to increase stormwater system capacity is envisaged to be required during the period of this strategy.

Further details on proposed levels of service for KDC's 3 waters activities can be found in the relevant 2024 Asset Management Plans.

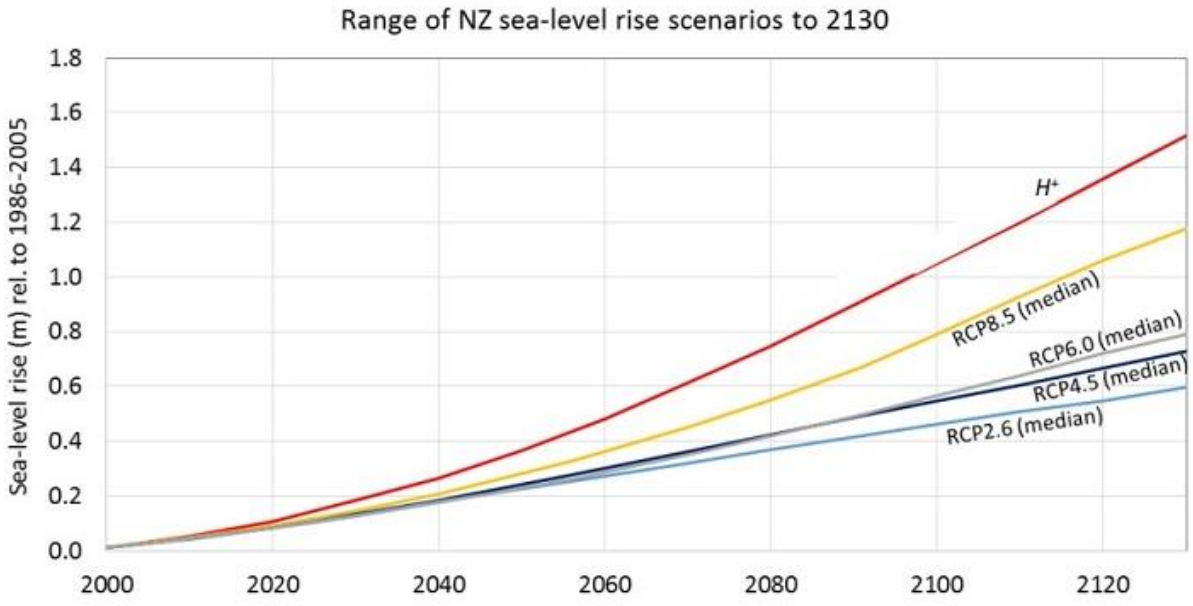

Figure 15: Sea Level Rise Predictions

5.3 3-Waters Asset Condition and Renewals

The earliest Council water infrastructure in the district (water mains in Kaikōura from the 1920s) has now all been replaced, and most of the other pipe infrastructure was put in place between the late 1950's and late 1980's, and hence is generally in the mid-stages of its expected life.

The overall condition of 3 waters reticulation was also improved by the replacement of sections of more fragile pipe damaged by the 2016 earthquake. As discussed in section 3.5 some good pipe condition data has been collected but this has not yet been effectively used for planning purposes, and long-term renewal forecasts have instead be largely based on asset ages and expected residual lives.

Possible relationships between the theoretical residual life proportions of water and wastewater assets and their likely condition, such as that shown in Figure 16, align relatively well with actual observations of limited significant pipe deterioration. 100% of stormwater assets are currently believed to be in condition 1. Further comments on asset condition are contained in the relevant Asset Management Plans.

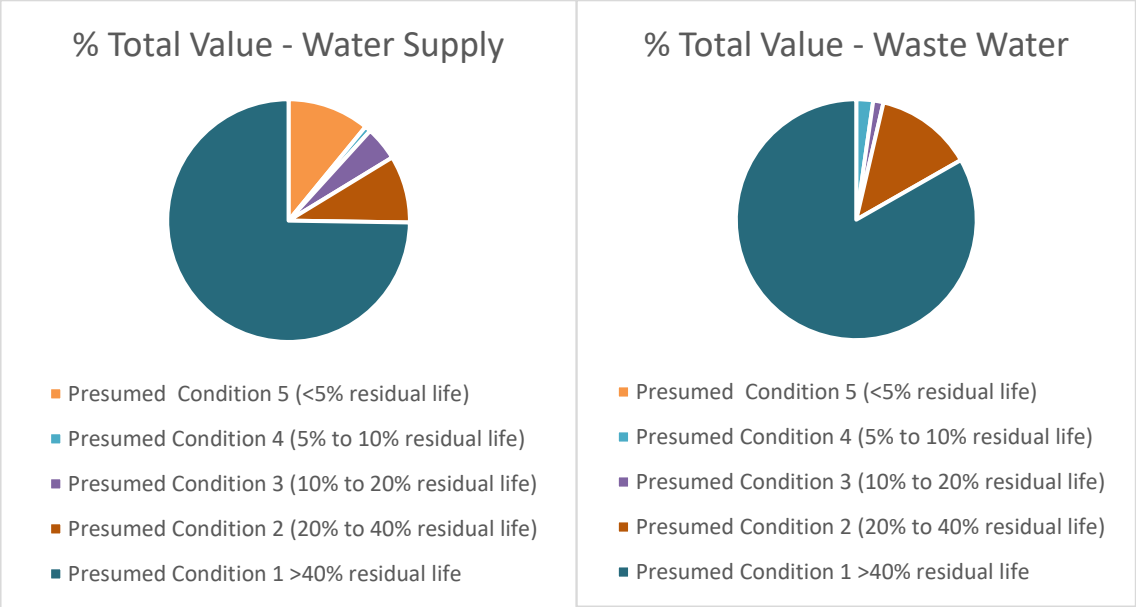

Figure 16: Potential Indicative Condition Distributions (by % total value) for water and wastewater assets.

As identified in the significant issues section of this Strategy a significant length of Asbestos Cement water main is theoretically at the end of its life, and it is this which contributes most of the water asset value indicated to be at Condition 5 in Figure 16, but practical experience and some recent physical testing suggests that all of this length does not yet require replacement, and it is instead currently budgeted to be progressively renewed over the next 15 years.

Some examples of long-term forecast annual renewal expenditure profiles for the higher value asset categories are provided in the following figures. For reticulation assets relatively little renewal or than that of the Asbestos Cement water mains is expected to be required in the term of this strategy, with associated expenditure typically well below the associated annual depreciation. Substantial reticulation asset renewal phases are instead forecast to commence in the late 2050's

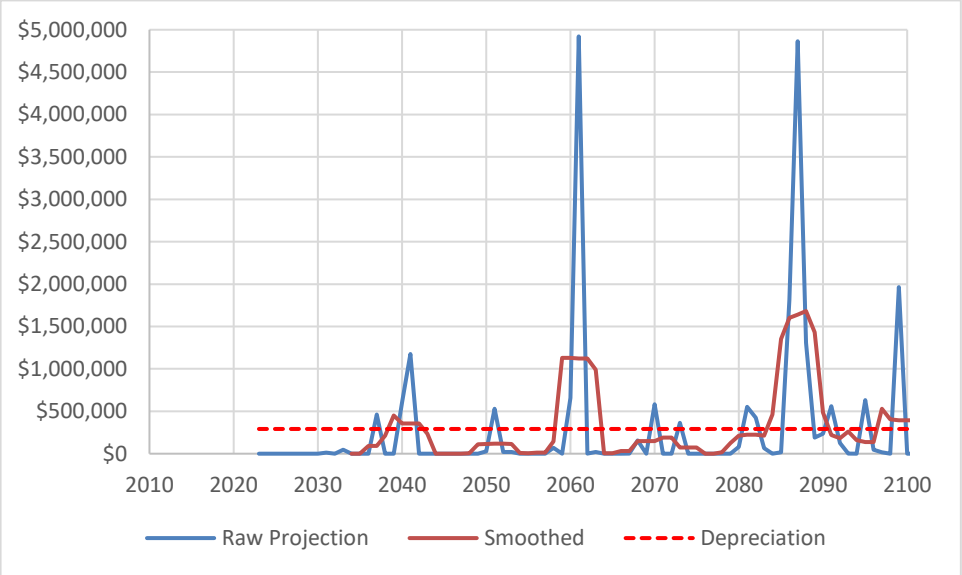

Figure 17: Long-term Annual Renewal Cost Profile – Wastewater Pipes

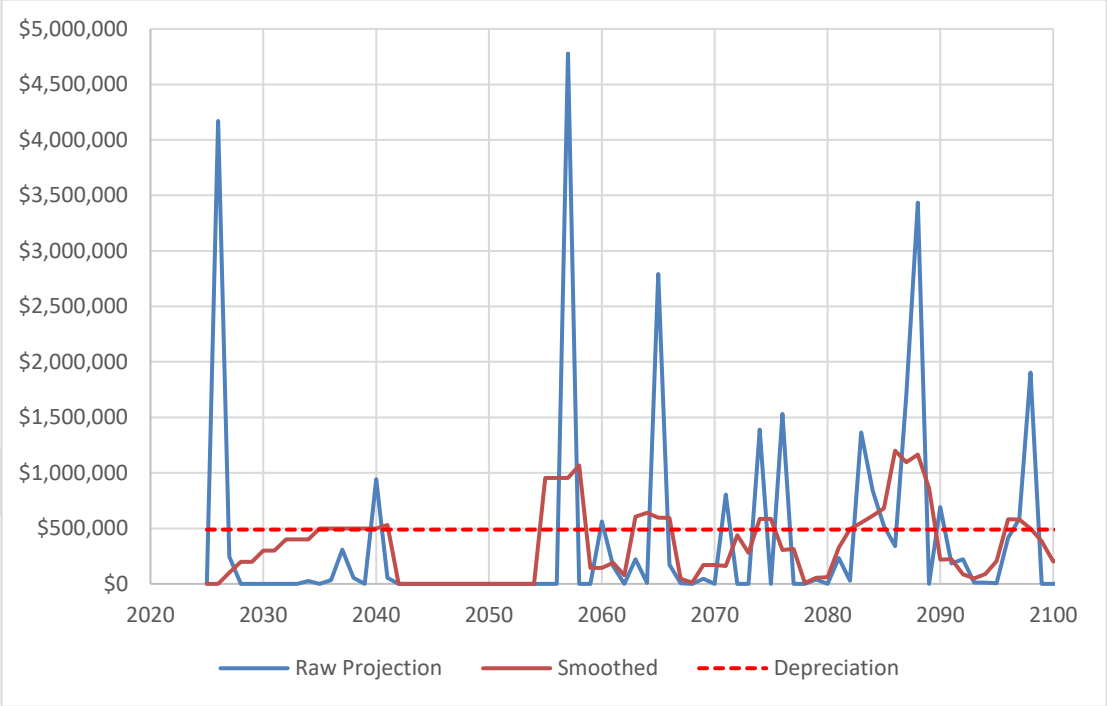

Figure 18: Long-term Annual Renewal Cost Profile – Water Pipes

For structure asset classes which include shorter life equipment profiles are predictably more regular, with annual expenditures closer to depreciation, as exemplified by Figure 19 and 19A.

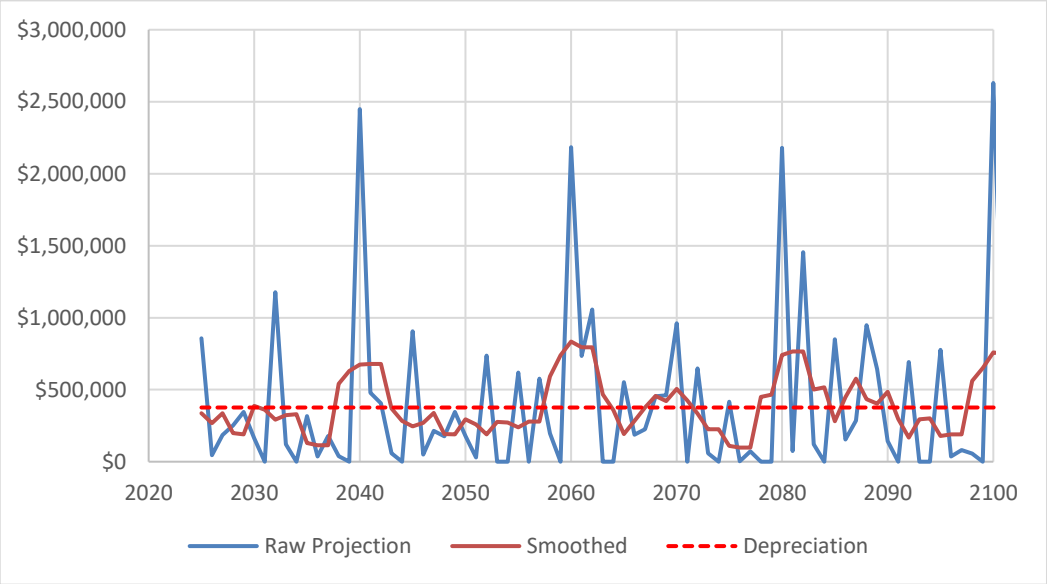

Figure 19: Long-term Annual Renewal Cost Profile – Wastewater Structures

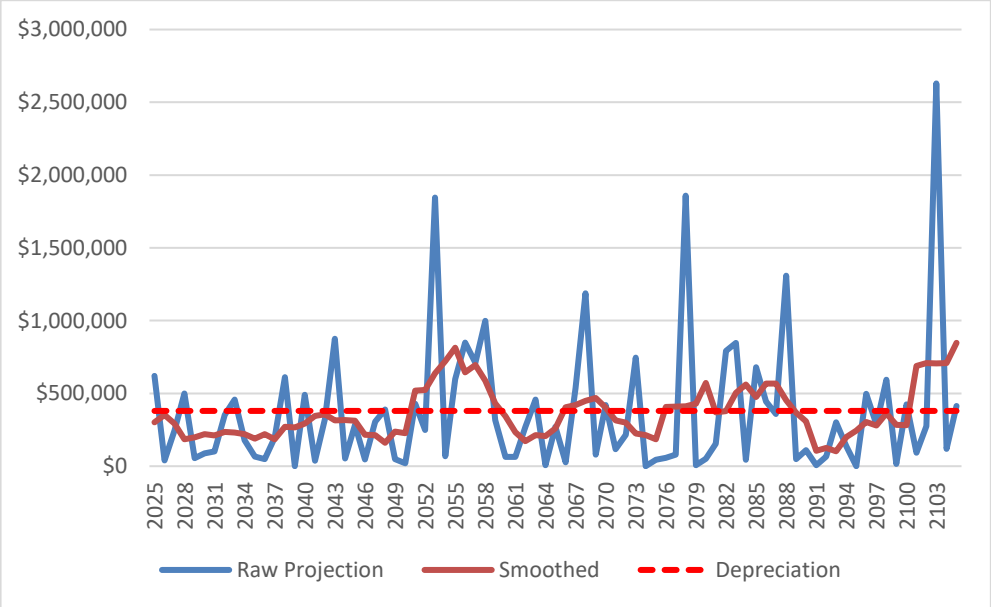

Figure 19 A: Long-term Annual Renewal Cost Profile – Water Supply Structures

Figure 20 shows projected annual renewal expenditure on all KDC water services assets (water, wastewater and stormwater) and associated current depreciation over the 2025-2057 period, with a small degree of smoothing applied. The first half of this period sees a notably low level of renewals required, and whilst there is some increase over the final half of the period, expenditure generally remains below depreciation.

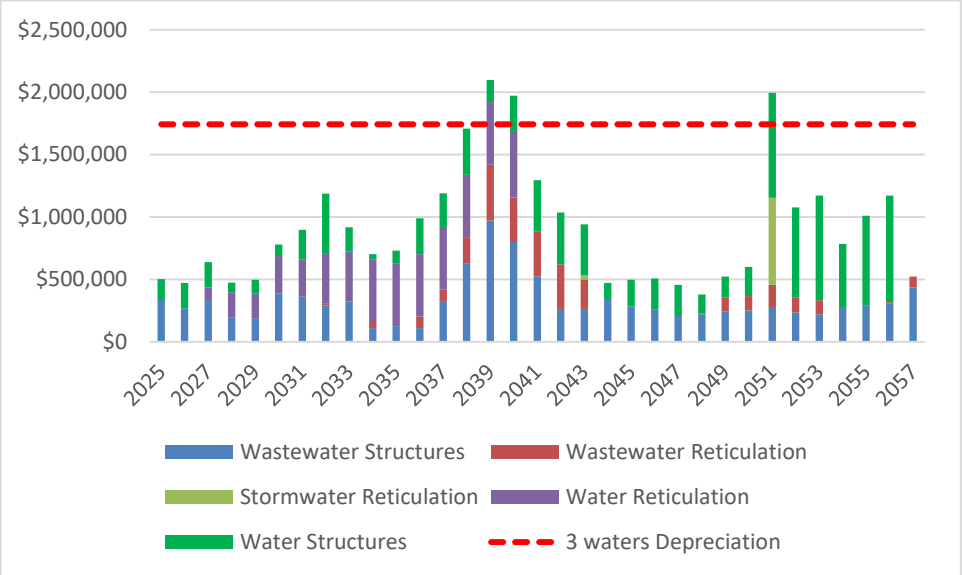

Figure 20: Forecast Annual Renewal Cost – All 3 Water Services (Raw Data)

Figure 21 shows total 3 waters CAPEX and its purposes, including some limited expenditure to improve levels of service or to accommodate growth.

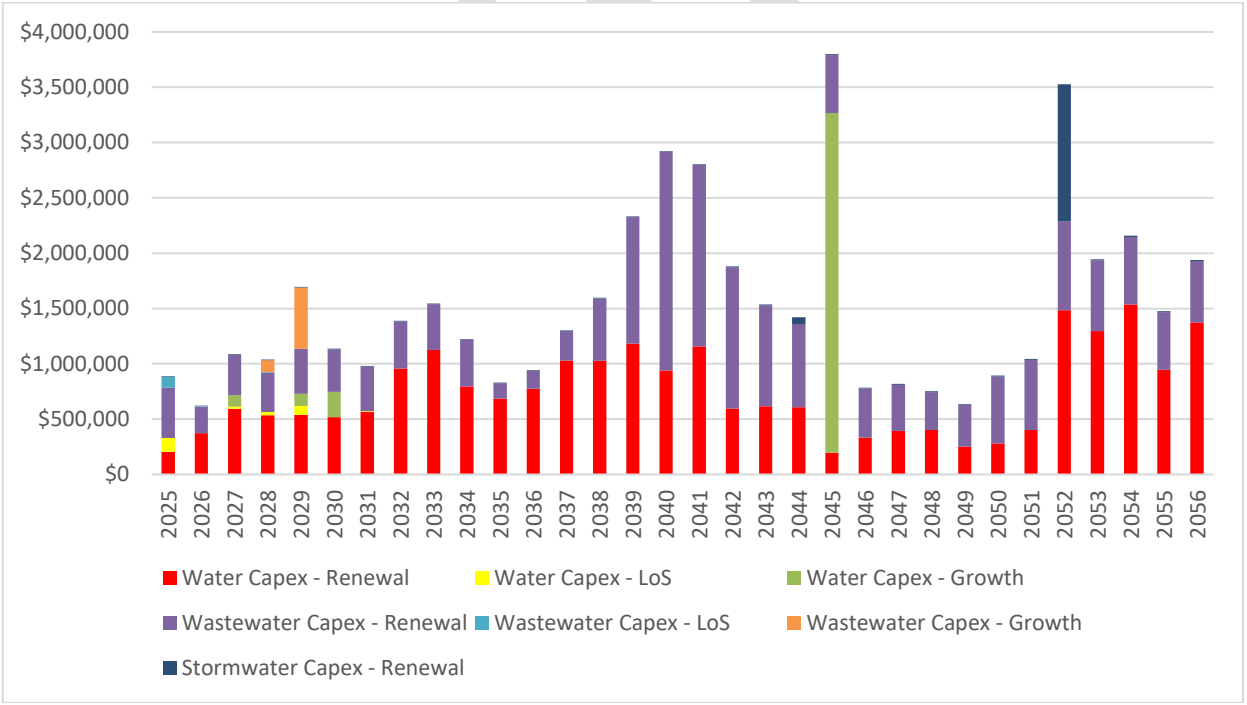

Figure 21: Forecast Annual 3-Waters CAPEX and Purpose (2023 Dollar Terms)

5.4 Resilience

In general, the level of resilience of Council's water services infrastructure is considered to be relatively high, with the works undertaken using the DIA's 3-Waters Reform funding having further improved this.

Whilst the 2016 Kaikōura earthquake caused significant damage to some of KDC's 3-Waters infrastructure, it proved possible to restore essential services very quickly, and the subsequent rebuild resulted in replacement of several fragile assets.

Most of the water supplies draw water from groundwater sources that are not vulnerable to flooding, and water storage tanks are of wind and earthquake resistant construction.

Earthquakes are considered to remain the main threat to 3-Waters infrastructure, and it is recognised that a more damaging event than that of 2016 could potentially occur.

Council does however have insurance to cover associated losses in these circumstances, and it would be expected that some form of temporary arrangement to restore essential water services could again be relatively easily put in place after such an event.

5.5 Operating and Maintenance Costs

As was the case with roading, with only relatively minor changes to proposed levels of service little change to routine operation and maintenance costs other than adjustments for inflation are expected during period of this strategy.

Expected total OPEX costs for these activities are shown in Figures 22 and 23. These totals include costs of debt and overheads and as such are subject to some complex minor variations.

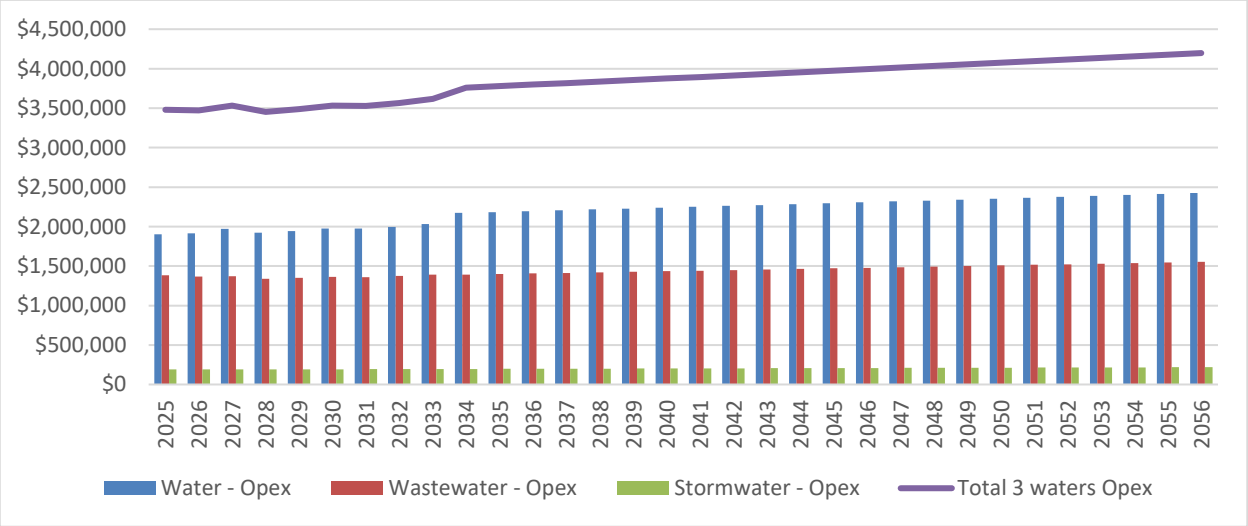

Figure 22: Forecast Annual 3-Waters Total OPEX Costs (2023 Dollar Terms)

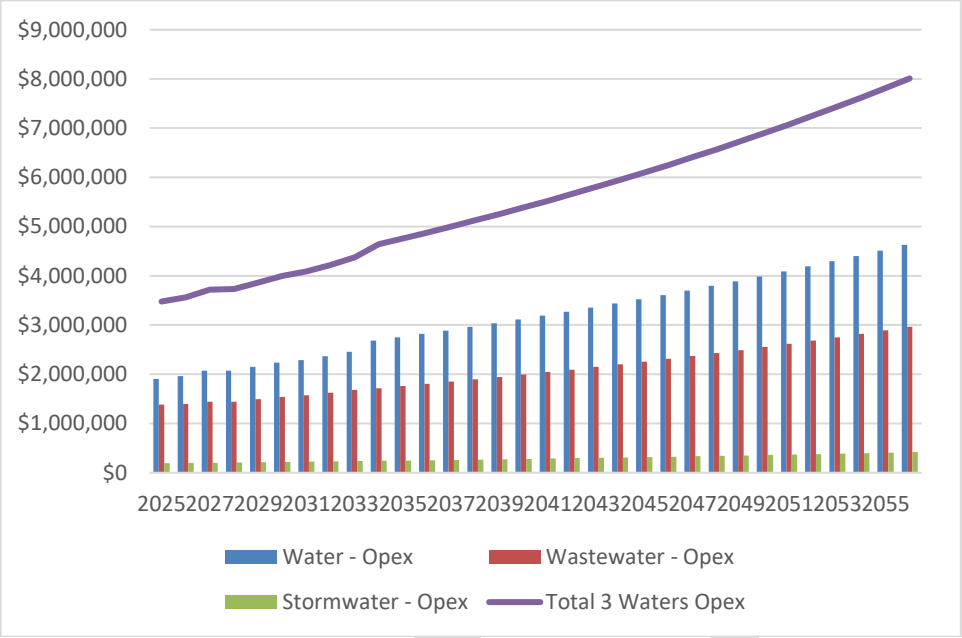

Figure 23: Forecast Annual 3-Waters Total OPEX Costs (Inflated)

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6.0 Overall Infrastructure Investment Program

Estimated total capital and operational expenditure on roading and water services over the 30 years period of this strategy are listed in the table below in 2023 Dollar and inflated 'money of the day' terms.

	Uninflated	Inflated
Stormwater - CAPEX	$1,113,000	$1,512,000
Stormwater - OPEX	$6,296,000	$8,929,000
Wastewater - CAPEX	$13,925,000	$19,394,000
Wastewater - OPEX	$44,583,000	$63,242,000
Water Supply - CAPEX	$19,397,000	$27,490,000
Water Supply - OPEX	$68,034,000	$97,013,000
Road & Footpaths - CAPEX	$53,750,000	$75,101,000
Roads & Footpaths - OPEX	$145,142,000	$173,704,000

Table 5: Capital and Operational Expenditure

The breakdown of operational and capital expenditure on a year by year basis in 2023 dollar terms is presented in Figure 24, and in inflated terms in Figure 25.

Further breakdowns of CAPEX by purpose for roading and 3-Waters activities are provided in 2023 Dollar terms in Figures 26 and 27.

As explained previously the growth or demand related capital expenditure is very limited, being largely confined to some enhancement of reticulation capacity for the Kaikōura wastewater system and parts of the Fernleigh and Kincaid rural water supplies, and possible development of an additional water source for Kaikōura if the need was to arise, for which as yet there are no supporting signals.

Capital expenditure associated with level of service improvements is also very modest, being largely confined to a small continuing program of road improvements. As such overall expenditure is dominated by operating and renewal costs.

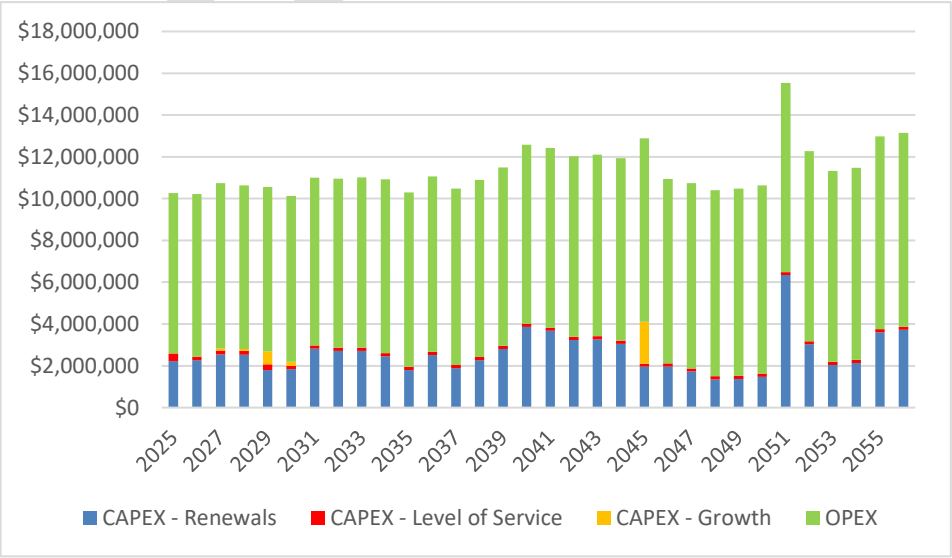


Figure 24: Forecast Total Expenditures – Roading and Water – 2023 Dollar Terms

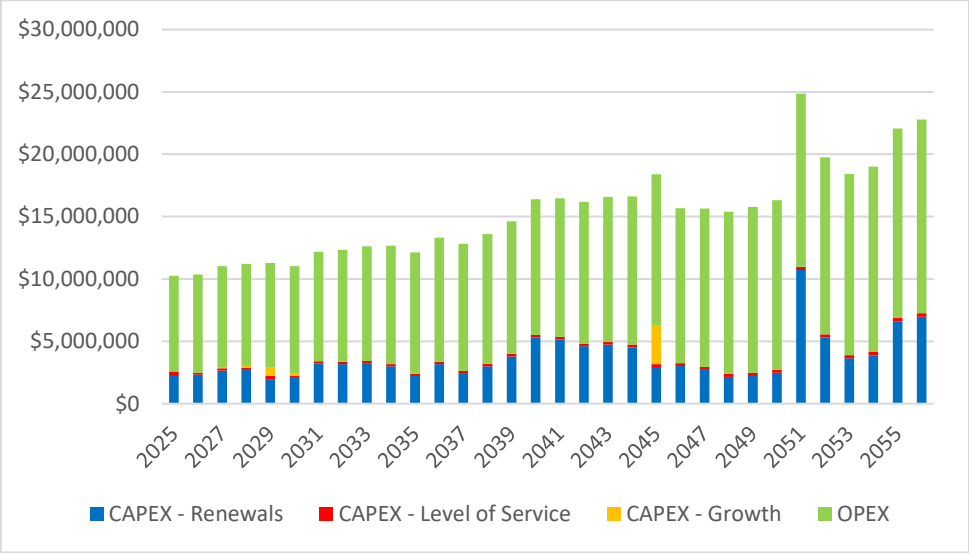


Figure 25: Forecast Total Annual Expenditures - Roading and Water – Inflated

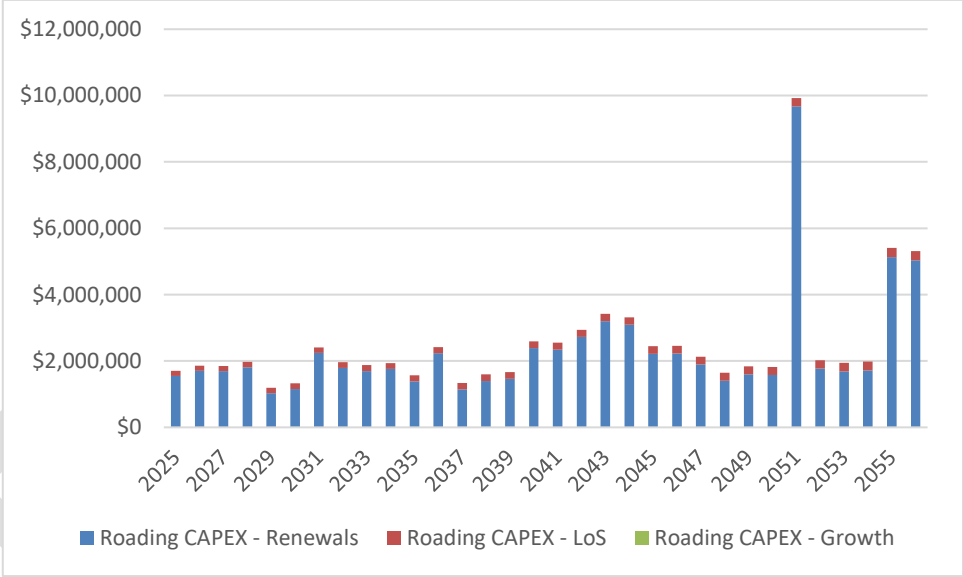


Figure 26: Forecast Annual Roading CAPEX and Purpose (2023 Dollar Terms)

Forecast OPEX profiles in uninflated and inflated terms are shown in Figures 27 and 28.

The first 10 years of these profiles are based on budgets in Council's 2021-31 Long-term Plan, whilst the later years are the budget allocations for year 10 of that plan adjusted for inflation and should be only considered as indicative.

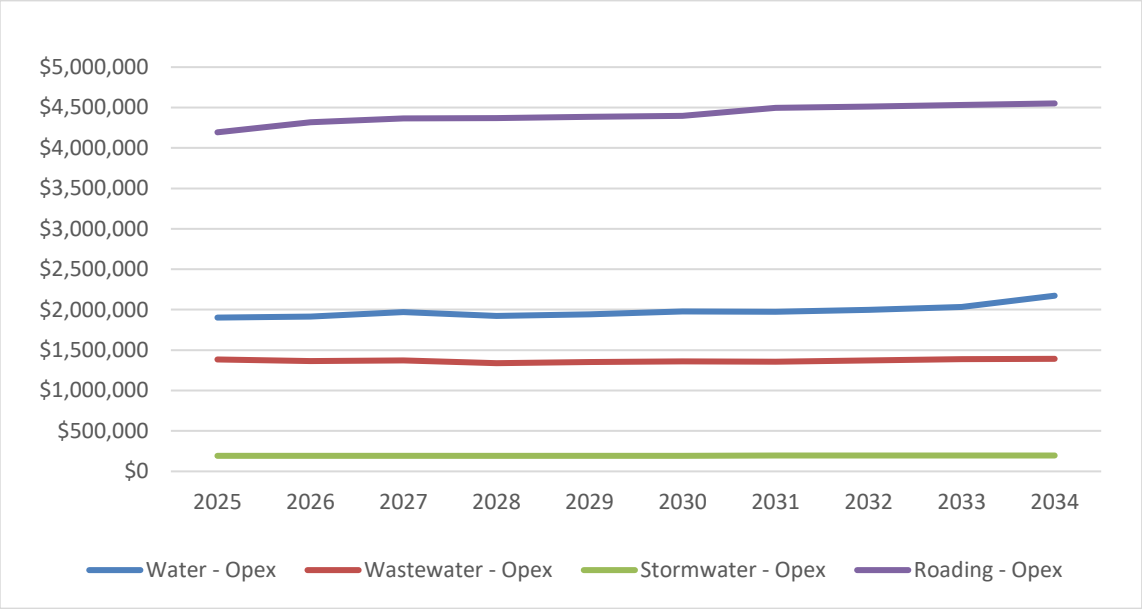


Figure 27: Forecast Annual OPEX (2023 Dollar Terms)

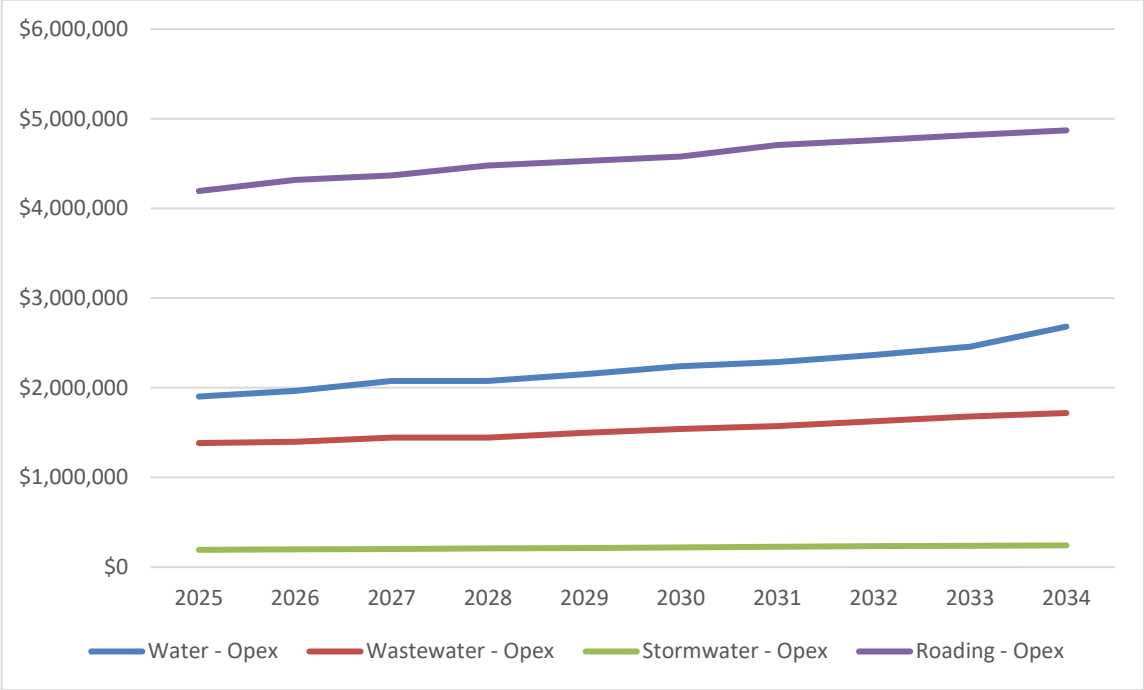


Figure 28: Forecast Annual OPEX (inflated)

Combining all operational and capital cost components together yields the Figure 29.

This overall expenditure profile (achieved with only a small amount of smoothing between years) is very uniform, with indicated renewal requirements after 2024 (when the Waiau Toa/Clarence bridge is assumed to be completed) being regular and generally less than depreciation

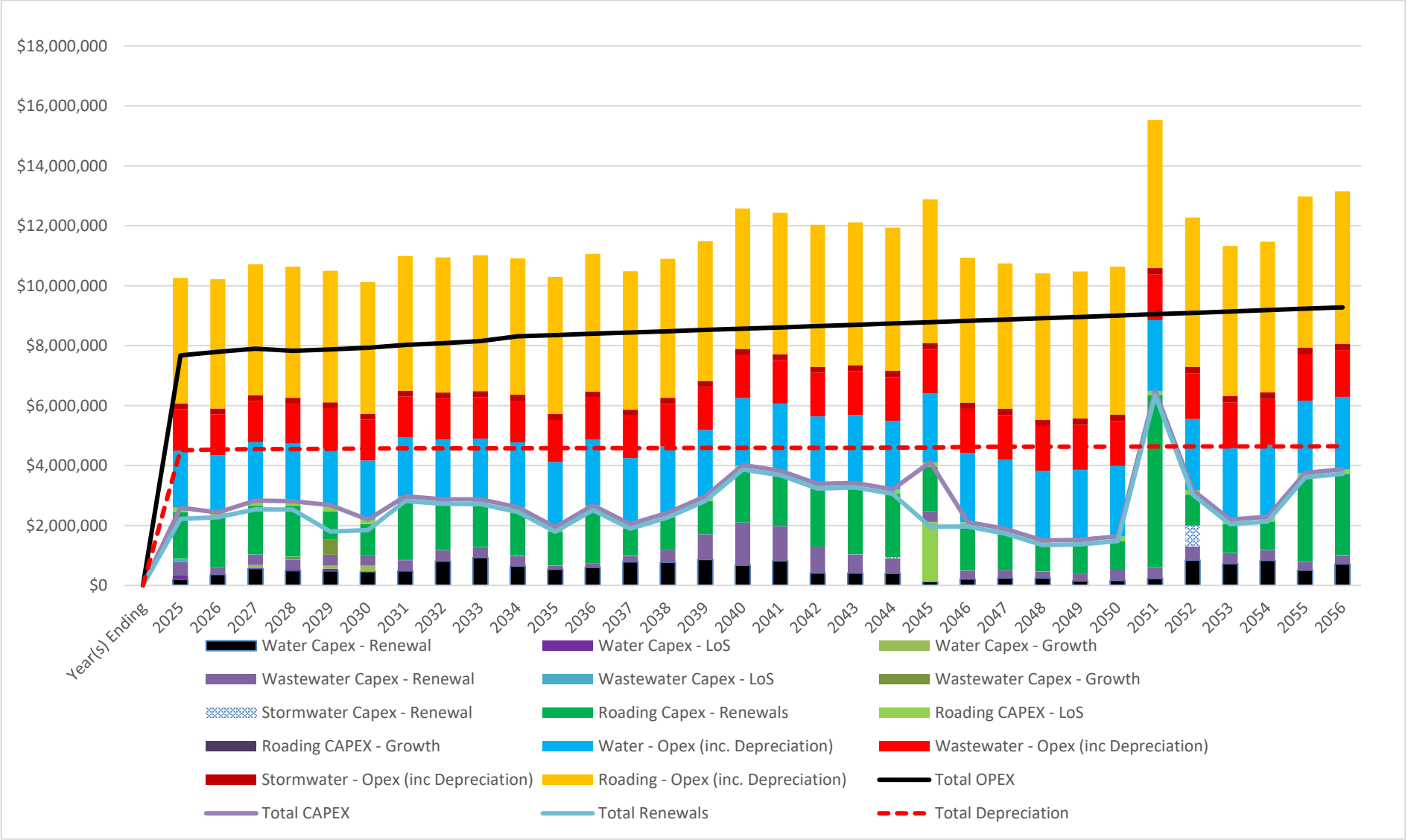


Figure 29: Projected Total Annual Costs, Roading and 3-Waters

This profile strongly suggests that if Council manages these assets appropriately (particularly not deferring renewals) that it should be affordable for the community during this period. This is in contrast with many other districts where pronounced peaks of required renewal expenditure are predicted in the 2030s and 2040s, and this profile lends no support to previous suggestions that Kaikōura District Council is unsustainable, even in the relatively long-term.

Greater challenges do however appear to lie ahead for future generations. A sense of this can be obtained from Figure 33 below. This figure is a 100-year projection of future renewal requirements for some groups of long-life assets for which relatively good likely asset age and expected life information is believed to be available. These asset groups are as follows:

- Bridges
- Water Supply Reticulation, Plant and Structures
- Wastewater Reticulation Plant and Structures
- Stormwater Reticulation

These asset groups in total account for approximately 70% of the replacement value of the depreciable assets held by Council, and hence their requirements for renewal significantly shape overall expenditure.

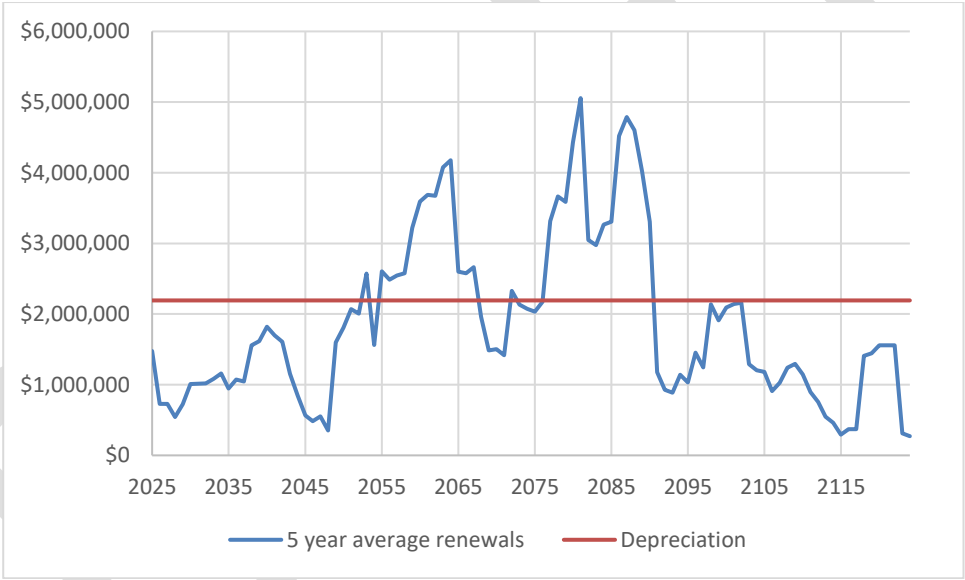


Figure 30: 100-year projection of annual renewal requirements for bridges and all 3-Waters infrastructure and comparison with associated annual depreciation. (2023 Dollar Terms)

The figure clearly defines the position that Council is currently in, being in a significant renewal 'trough' for the duration of the 30-year infrastructure period, but with an intense period of replacements likely to commence in around 35 years' time.

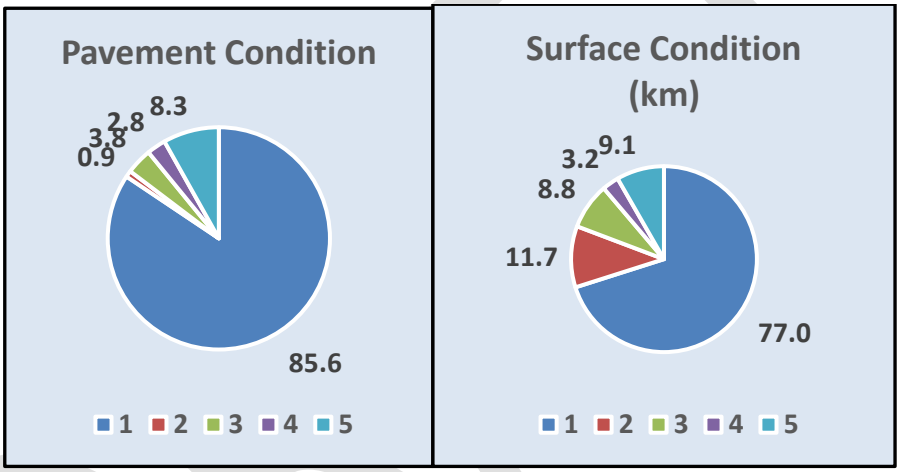
It is suspected that this future peak of renewal requirements may be even more intense than the figure suggests because it is likely that other asset groups on which KDC has less reliable data such as road drains and pavement basecourse will to a large extent have been commissioned between the 1950s and 1970s, and typically having lives of 100 years are also likely to require renewal at around the same time as the first peaks in Figure 33.

A prudent management strategy might therefore include building of significant financial reserves in the period prior to these peaks, but it is recognised that this need is far in the future and that many other factors might change in the interim.

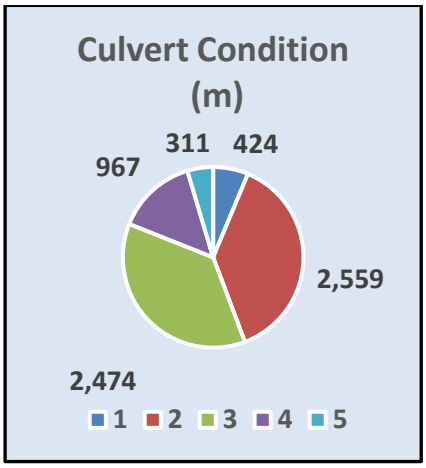
Appendix 1

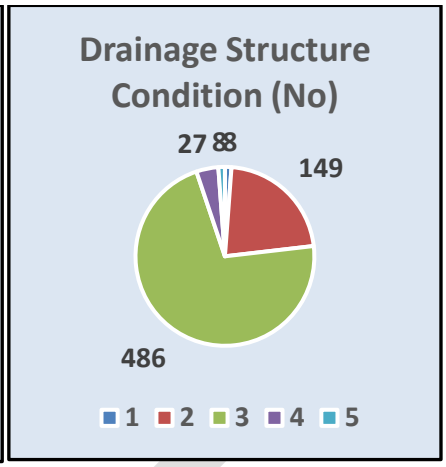
Condition Assessments of Major Roading Asset Groups

Condition	Pavement (km)	Surface (km)
1	85.6	77.1
2	9.4	11.7
3	3.8	8.8
4	2.8	3.2
5	8.3	9.1
Total	109.9	109.9

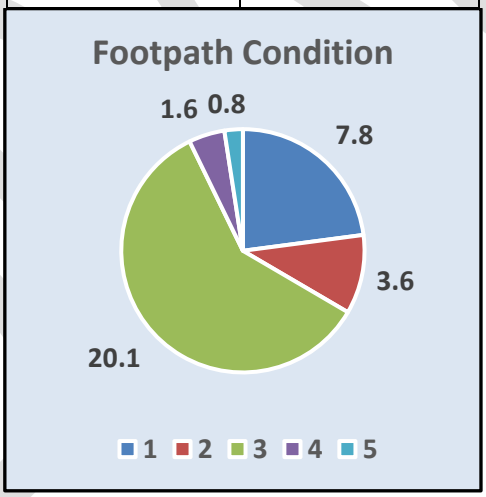


Condition	Culvert (m)	Structures (No)
1	424	8
2	2,559	149
3	2,474	486
4	967	27
5	311	8
Total	6,734	678





Condition	Footpath(km)
1	7.8
2	3.6
3	20.1
4	1.6
5	0.8
Total	33.9



Condition	Bridges/Large Culverts (No)
1	6
2	8
3	24
4	8
5	2
Total	48

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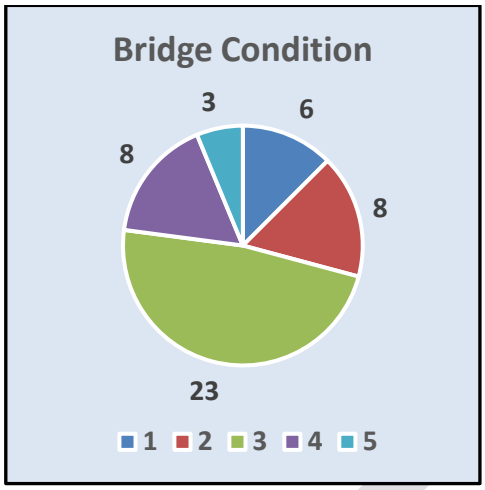

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Appendix 2

OPEX and CAPEX Breakdown
Combined Overview – 30 Years

Year(s) Ending	2025 $000	2026 $000	2027 $000	2028 $000	2029 $000	2030 $000	2031 $000	2032 $000	2033 $000	2034 $000	2035-2039 $000	2040-2044 $000	2045-2049 $000	2050-2054 $000
Water Capex - Renewal	206	363	563	495	486	458	489	808	931	644	3571	2725	986	2799
Water Capex - LoS	123	0	20	28	73	0	5	0	0	0	0	0	0	0
Water Capex - Growth	0	0	100	0	100	200	0	0	0	0	0	0	2000	0
Wastewater Capex - Renewal	454	235	346	330	368	342	349	361	342	342	1700	4580	1324	1868
Wastewater Capex - LoS	100	5	0	3	0	0	0	0	0	0	0	0	0	0
Wastewater Capex - Growth	0	0	0	100	500	0	0	0	0	0	0	0	0	0
Stormwater Capex - Renewal	5	5	5	5	5	5	5	5	5	5	25	61	25	723
Stormwater Capex - LOS	5	5	25	5	55	5	5	5	5	5	25	25	25	25
Roading Capex - Renewals	1553	1669	1626	1695	941	1039	1973	1545	1436	1460	5980	9718	6023	9631
Roading CAPEX - LoS	150	150	150	150	150	150	150	150	150	150	750	750	750	750
Roading CAPEX - Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water - Opex (inc. Depreciation)	1902	1916	1971	1922	1944	1977	1974	1996	2032	2173	11029	11307	11593	11885
Wastewater - Opex (inc Depreciation)	1383	1365	1370	1338	1352	1361	1358	1373	1390	1392	7066	7245	7428	7615
Stormwater - Opex (inc Depreciation)	192	192	193	192	193	193	196	196	196	196	996	1022	1047	1074
Roading - Opex (inc. Depreciation)	4194	4320	4367	4372	4386	4399	4495	4513	4532	4551	23100	23683	24281	24895
Total OPEX	7672	7793	7901	7824	7874	7931	8024	8079	8150	8313	42192	43257	44349	45469
Total CAPEX	2597	2432	2834	2812	2677	2199	2976	2874	2869	2606	12051	17860	11133	15796
Total Renewals	2219	2272	2539	2526	1799	1844	2816	2719	2714	2451	11276	17085	8358	15021
Total Depreciation	4510	4531	4549	4553	4556	4566	4571	4573	4575	4576	22910	22957	23104	23176

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Capital Projects Years 1 to 10

	LTP CAPEX EXCLUDING ROADING - CONSOLIDATED 4 DECEMBER - COPY TO FINANCE (002)												
Potential Recovery Via Development contributions?			Orange shaded lines are for comparitive purposes only										
		Item #'S	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10yr total
Urban Water													
Control and data system upgrades	LoS	Includes items 2,3,4,7,9,10,1	$20,000			$5,000	$45,000		$5,000				
Improved chlorination control at low flows - Mackles with low flow valving at Fords	LoS	23			$20,000								
Supply and install chlorine analyser at Fords Reservoir	LoS	24					$12,500						
Update SCADA and connect chlorine analyser at Fords Reservoir	LoS	25				$5,000							
Spare boost pump and Hydrovar controller - Maui Street	LoS	26					$5,000						
AC Pipe Replacement Takahanga Ter -200 metres of 150mm	Renewal	29		$75,000									
Rorrisons Road new main to remove temporary connection to Beach Road (from old sewer pla	Renewal	30							$40,000				
Replace 170m of 50mm water main, 62 Torquay St, asset ID 100134	Renewal	31		$30,000									
Miscellaneous Scheduled Water Line Renewals	Renewal	Ex Valuation			$100,000	$200,000	$200,000	$300,000	$300,000	$400,000	$400,000	$400,000	$2,300,000
Miscellaneous Scheduled Water Point and Structures Renewals	Renewal	Ex Valuation	$140,976	$140,976	$178,852	$177,000	$50,000	$81,993	$65,611	$210,961	$456,831	$170,657	$1,673,856
Miscellaneous Scheduled Toby, Toby Box & Meter Renewals	Renewal	Ex Valuation	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$250,000
Scheme Total Renewals			$185,976	$270,976	$323,852	$412,000	$337,500	$406,993	$435,611	$635,961	$881,831	$595,657	$4,486,356
Lines Annual Depreciation (from valuation)			$557,365	$557,365	$557,365	$557,365	$557,365	$557,365	$557,365	$557,365	$557,365	$557,365	$5,573,650
Point & Structures Annual Depreciation			$415,790	$415,790	$415,790	$415,790	$415,790	$415,790	$415,790	$415,790	$415,790	$415,790	$4,157,900
Total Depreciation													$9,731,550
Peketa Water													
New chlorine analyser connected to SCADA	LoS	35					$10,000						
Replace outdated UV (use old kincaid uv unit???)	Renewal	36					$10,000						
Miscellaneous Scheduled Renewals - Points and Structures	Renewal	Ex Valuation	$2,998	$2,998	$2,998	$2,998	$2,998	$2,998	$2,998	$2,998	$2,998	$2,998	
Scheme Total Renewals			$2,998	$2,998	$2,998	$2,998	$12,998	$2,998	$2,998	$2,998	$2,998	$2,998	$39,976
Total Depreciation			$6,353	$6,353	$6,353	$6,353	$6,353	$6,353	$6,353	$6,353	$6,353	$6,353	$63,530
Fernleigh Water													
Auto reset after power outage	LoS	38	$2,500										
Main reservoir outgoing flowmeter	LoS	41				$3,000							
Main reservoir increased storage	LoS	42				$15,000							
Pipe replacements size increased for increased demand (lower priority)	Growth	43					$100,000						
Pipe replacements size increased for increased demand (highest priority)	Growth	44			$100,000								
Miscellaneous Scheduled Renewals - Points and Structures	Renewal	Ex Valuation	$10,000	$59,656	$59,656	$59,656	$19,447	$19,447	$19,447	$33,609	$10,000	$10,000	$300,916
Scheme Renewal Total			$10,000	$59,656	$59,656	$59,656	$19,447	$19,447	$19,447	$33,609	$10,000	$10,000	$300,916
Lines Annual Depreciation (from valuation)			$44,592	$44,592	$44,592	$44,592	$44,592	$44,592	$44,592	$44,592	$44,592	$44,592	$445,920
Point & Structures Annual Depreciation			$28,906	$28,906	$28,906	$28,906	$28,906	$28,906	$28,906	$28,906	$28,906	$28,906	$289,060
Total Depreciation			$73,498	$73,498	$73,498	$73,498	$73,498	$73,498	$73,498	$73,498	$73,498	$73,498	$734,980

		Item #'S	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033		10yr total
Oaro Water														
SCADA and sampling improvements	LoS	49,51	$3,000											
Miscellaneous Scheduled Renewals - Points and Structures	Renewals	Ex Valuation	$6,922	$6,922	$6,922	$38,278	$6,302		$32,811					$98,156
Depreciation - Points and Structures			$6,589	$6,589	$6,589	$6,589	$6,589	$6,589	$6,589	$6,589	$6,589	$6,589		$65,890
Kincaid Water														
Configure raw water tanks as clarifier	LoS	18	$10,000											
High rate UV	LoS	19	$80,000											
Failsafe shutdown and alarms UV, FAC	LoS	20	$7,500											
Pipe replacements size increased for increased demand - Esp Hapuku	Growth	22						$200,000						
Miscellaneous Scheduled Renewals - Points and Structures	Renewal	Ex Valuation	$13,119	$13,119	$21,746	$21,746	$21,746	$20,000	$27,106	$27,106	$27,106	$27,106		
Miscellaneous Toby, Toby Box & Meter Renewals	Renewal	Ex Valuation	$8,675	$8,675	$8,675	$8,675	$8,675	$8,675	$8,675	$8,675	$8,675	$8,675		
Scheme Total Renewals			$21,794	$21,794	$30,421	$30,421	$30,421	$28,675	$35,781	$35,781	$35,781	$35,781		$306,649
Depreciation - Points and Structures			$22,066	$22,066	$22,066	$22,066	$22,066	$22,066	$22,066	$22,066	$22,066	$22,066		$220,660
East Coast Water														
Redevelop existing bore to remove iron bacteria sludge	Renewal	16		$7,500										
Galvanised iron water main replacement	Renewal	Ex Valuation			$145,793									
Miscellaneous Scheduled Renewals - Points and Structures	Renewal	Ex Valuation	$5,000		$20,165		$147,826							
PVC Pipe Replacements - lives reduced by high pressures	Renewal	Contingency								$100,000				
Stormwater														
Lower Ward St culverts and channels upgrade (excludes Avoca St culvert, done by roading)	LoS	81			$20,000									
Greys lane swale and cross-stree piping	LoS	83					$50,000							
Sundry improvements	Los	Added	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000		
Sundry Renewals	Renewal	Added - Contingency	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000		

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		Item #'S	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033		10yr total
Kaikoura Wastewater														
Ocean Ridge Pump Station - Replace Variable Speed Drives	Renewal	57			$20,000									
Esplanade pump station - corrosion repair	Renewal	58			$50,000									
Churchill St pump station - corrosion repair	Renewal	59	$75,000											
Ludstone Rd pump station - corrosion repair	Renewal	60					$50,000							
Hawthorne Rd pump station - corrosion repair	Renewal	61	$120,000											
Esplanade pump station - corrosion repair	Renewal	62		$75,000										
Sewer pump renewals and overhauls	Renewal	Smoothed valuation data	$100,000	$49,804	$49,804	$46,250	$46,250	$46,250	$46,250	$46,250	$46,250	$46,250		
Odour Control Renewals	Renewal	65	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000		
Sewer line under town (SH1) bridge	Renewal	67		$25,000										
Treatment Plant - screening handling improvement	LoS	69				$3,000								
Changes to South Bay boat park to stop stormwater going to sewer	Growth	72				$100,000								
Wakatu pump station - replace pump plinths	Renewal	73							$7,500					
Treatment Plant - camera or other means of recording septic discharges	LoS	71		$5,000										
Fixed back-up generator - Mill Road pump station (IAF project funded?)	Growth	74												
Treatment Plant - Replace paddle wheel aerator	Renewal	Late addition	$120,000											
Treatment Plant - replace dissolved oxygen sensor	Renewal	76						$12,000						
Treatment Plant - Total Cost for Remedy of Abatement Notice (assume $300k spent in 2023	LoS	Separate estimate required	$100,000											
Mill Road Pump Station - additional buffer tank storage capacity	Growth	Added to list as provisional					$500,000							
Miscellaneous Scheduled Wastewater Line and Point Renewals	Renewal	Ex Valuation					$5,855			$19,125				
Miscellaneous Scheduled Wastewater Structures Renewals (excluding pumps)	Renewal	Ex Valuation	$34,425	$46,041	$186,393	$244,350	$226,242	$3,781		$1,154,724	$120,866			
Total Scheme Renewals			$454,425	$200,845	$311,197	$295,600	$333,347	$55,031	$58,750	$1,225,099	$172,116	$51,250		$3,157,660
Depreciation - Points and Structures			$487,723	$487,723	$487,723	$487,723	$487,723	$487,723	$487,723	$487,723	$487,723	$487,723		$4,877,230
Depreciation - Lines			$291,717	$291,717	$291,717	$291,717	$291,717	$291,717	$291,717	$291,717	$291,717	$291,717		$2,917,170
Total Depreciation														$7,794,400

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Operating Costs (Excl depreciation and overheads) Years 1 to 10 (2025 dollar terms)

Roading	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Roading - Roads and Bridges										
Time Sheet Cost Capture	196,100	196,100	196,100	196,100	196,100	196,100	196,100	196,100	196,100	196,100
Minor Events 140	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Level Crossing Warning Devices	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020
Sealed Pavement Mtce 111	212,000	212,000	212,000	212,000	212,000	212,000	212,000	212,000	212,000	212,000
Unsealed Pavement Mtce 112	189,540	189,540	189,540	189,540	189,540	189,540	189,540	189,540	189,540	189,540
Routine Drainage Mtce 113	240,000	240,000	240,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000
Structures Maintenance 114	58,500	58,500	58,500	58,500	58,500	58,500	58,500	58,500	58,500	58,500
Environmental Maintenance 121	238,244	238,244	238,244	238,244	238,244	238,244	238,244	238,244	238,244	238,244
Traffic Services Mtce 122	90,558	90,558	90,558	90,558	90,558	90,558	90,558	90,558	90,558	90,558
Network & Asset Management 151	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000
Cycle Path Maintenance	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680
	1,606,642	1,606,642	1,606,642	1,506,642	1,506,642	1,506,642	1,506,642	1,506,642	1,506,642	1,506,642
Roading - Footpaths & Cycle Lanes										
Maintenance	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Roading - Streetlights										
Electricity	31,800	31,800	31,800	31,800	31,800	31,800	31,800	31,800	31,800	31,800
Maintenance	10,600	10,600	10,600	10,600	10,600	10,600	10,600	10,600	10,600	10,600
Telecommunictions - Internet	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000
	51,400	51,400	51,400	51,400	51,400	51,400	51,400	51,400	51,400	51,400
Roading Total	**1,718,042**	**1,718,042**	**1,718,042**	**1,618,042**	**1,618,042**	**1,618,042**	**1,618,042**	**1,618,042**	**1,618,042**	**1,618,042**

Water Supplies	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Water Supplies - Kaikōura Urban										
Electricity	135,000	135,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000
Insurance	47,380	47,380	47,380	47,380	47,380	47,380	47,380	47,380	47,380	47,380
Planned Mtce - Reticulation	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Unplanned Mtce - Reticulation	88,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Planned Mtce - Facilities	93,000	93,000	93,000	93,000	93,000	93,000	93,000	93,000	93,000	93,000
Unplanned Mtce - Facilities	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Rates	35,830	35,830	35,830	35,830	35,830	35,830	35,830	35,830	35,830	35,830
Water Meter Reading Expenses	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Management icnl. Water Testing	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
	490,210	492,210	512,210	512,210	512,210	512,210	512,210	512,210	512,210	512,210

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Water Supplies - Ocean Ridge										
Electricity	2,040	2,040	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380
Insurance	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500
Planned Mtce - Reticulation	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unplanned Mtce - Reticulation	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Planned Mtce - Facilities	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
Unplanned Mtce - Facilities	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Resource Consent Expenses	200	200	200	200	200	200	200	200	200	200
Management incl. Water Testing	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
	69,740	69,740	70,080	70,080	70,080	70,080	70,080	70,080	70,080	70,080
Water Supplies - East Coast Rural										
Electricity	43,000	43,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Insurance	4,831	4,831	4,831	4,831	4,831	4,831	4,831	4,831	4,831	4,831
Planned Mtce - Reticulation	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unplanned Mtce - Reticulation	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Planned Mtce - Facilities	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unplanned Mtce - Facilities	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	59,831	59,831	66,831	66,831	66,831	66,831	66,831	66,831	66,831	66,831
Water Supplies - Kincaid Water										
Electricity	4,124	4,124	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Insurance	5,668	5,668	5,668	5,668	5,668	5,668	5,668	5,668	5,668	5,668
Planned Mtce - Reticulation	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,300
Planned Mtce - Facilities	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000
Unplanned Mtce - Facilities	18,000	18,000	26,000	18,000	18,000	26,000	18,000	18,000	26,000	18,000
Management incl Water Testing	21,400	21,400	21,400	21,400	21,400	21,400	21,400	21,400	21,400	21,400
	75,492	75,492	84,368	76,368	76,368	84,368	76,368	76,368	84,368	76,368
Water Supplies - Fernleigh Water										
Electricity	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Insurance	5,887	5,887	5,887	5,887	5,887	5,887	5,887	5,887	5,887	5,887
Planned Mtce - Reticulation	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Unplanned Mtce - Reticulation	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Planned Mtce - Facilities	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000
Unplanned Mtce - Facilities	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000
Management incl. Water Testing	20,400	20,400	20,400	20,400	20,400	20,400	20,400	20,400	20,400	20,400
	127,287	127,287	127,287	127,287	127,287	127,287	127,287	127,287	127,287	127,287

Water Supplies - Peketa Water										
Electricity	3,700	3,700	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300
Insurance	945	945	945	945	945	945	945	945	945	945
Planned Mtce - Reticulation	14,500	14,500	14,500	14,500	14,500	14,500	14,500	14,500	14,500	14,500
Unplanned Mtce - Reticulation	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Management incl. Water Testing	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500
	43,645	43,645	44,245	44,245	44,245	44,245	44,245	44,245	44,245	44,245
Water Supplies - Oaro Water										
Electricity	4,124	4,124	4,124	4,124	4,124	4,124	4,124	4,124	4,124	4,124
Insurance	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711
Unplanned Mtce - Reticulation	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Planned Mtce - Facilities	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
Unplanned Mtce - Facilities	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Management incl. Water Testing	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200
	56,035	56,035	56,035	56,035	56,035	56,035	56,035	56,035	56,035	56,035
Water Supplies - East Coast Village										
Insurance	4,630	4,630	4,630	4,630	4,630	4,630	4,630	4,630	4,630	4,630
Unplanned Mtce - Reticulation	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Planned Mtce - Facilities	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000
Unplanned Mtce - Facilities	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Management incl. Water Testing	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
	89,130	89,130	89,130	89,130	89,130	89,130	89,130	89,130	89,130	89,130
TOTAL WATER	**1,011,370**	**1,013,370**	**1,050,186**	**1,042,186**	**1,042,186**	**1,050,186**	**1,042,186**	**1,042,186**	**1,050,186**	**1,042,186**
Wastewater/Sewerage	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Wastewater/Sewerage - Kaikōura Urban Wastewater										
Consultancy	20,000	-	-	-	-	-	-	-	-	-
Electricity	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000
Insurance	87,225	87,225	87,225	87,225	87,225	87,225	87,225	87,225	87,225	87,225
Planned Mtce - Reticulation	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Unplanned Mtce - Reticulation	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Planned Mtce - Facilities	172,000	172,000	172,000	172,000	172,000	172,000	172,000	172,000	172,000	172,000
Unplanned Mtce - Facilities	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Rates	36,300	36,300	36,300	36,300	36,300	36,300	36,300	36,300	36,300	36,300
Resource Consent Expenses	10,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Management incl. Water Testing	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	480,525	454,525	454,525	454,525	454,525	454,525	454,525	454,525	454,525	454,525

Wastewater/Sewerage - Stock Effulent										
Electricity	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Maintenance	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Management incl. Water Testing	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	39,400	39,400	39,400	39,400	39,400	39,400	39,400	39,400	39,400	39,400
TOTAL WASTEWATER/SEWERAGE	**519,925**	**493,925**	**493,925**	**493,925**	**493,925**	**493,925**	**493,925**	**493,925**	**493,925**	**493,925**
Stormwater	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Insurance	7,934	7,934	7,934	7,934	7,934	7,934	7,934	7,934	7,934	7,934
Planned Mtce - Reticulation	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unplanned Mtce - Reticulation	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Planned Mtce - Facilities	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Unplanned Mtce - Facilities	500	500	500	500	500	500	500	500	500	500
Rates	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830
TOTAL STORMWATER	**52,264**	**52,264**	**52,264**	**52,264**	**52,264**	**52,264**	**52,264**	**52,264**	**52,264**	**52,264**

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Appendix 3

3 Waters Levels of Service

Level of Service (what we do)	We know we are succeeding when:	Performance Measure	Target
Efficiently supply potable water to consumers.	The pipe network is well-maintained and does not leak.	Percentage of real water loss from the networked reticulation system	< 30%
We monitor water consumption through our water telemetry systems and enforce water restrictions when these are appropriate. We enforce the Water Supply Bylaw to prevent wasteful water use.	Users treat reticulated potable water as a valuable resource, avoid unnecessary wastage and where appropriate reduce their consumption through changes to use practices or use of non-potable water from other sources.	The average consumption of drinking water per day per resident	< 400 litres
We endeavour to respond to water supply issues within defined timeframes depending on the urgency of the issue.	Information from our water services contractor indicates initial responses to water supply issues (typically an initial attendance at the site) are being consistently provided within defined timeframes.	The median attendance time for urgent callouts, being service failure, supply fault or contamination, from the time that the local authority receives notification to the time that service personnel reach the site. The median attendance time for non-urgent callouts: from the time that the local authority receives notification to the time that service personnel reach the site.	Urgent within 2 hours Non-urgent within 48 hours

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We endeavour to resolve water supply issues within defined timeframes depending on the urgency of the issue.	Information from our water services contractor indicates resolution of water supply issues is achieved within defined timeframes:	The median resolution time for urgent callouts, being service failure, supply fault or contamination, from the time that the local authority receives notification to the time that service personnel confirm the issue has been resolved. The median resolution time of non-urgent callouts: from the time that the local authority receives notification to the time that service personnel confirm the issue has been resolved	Urgent within 12 hours Non-urgent within 7 days
We provide supplies of water that generally meets the expectations of people and businesses in respect of water clarity, taste, odour, pressure or flow and continuity of supply	There is a low level of complaints received regarding Council water supplies.	The total number of complaints received by the local authority (expressed per 1000 connections to the local authority's networked reticulation system) about any of the following: (a) drinking water clarity (b) drinking water taste (c) drinking water odour (d) drinking water pressure or flow (e) continuity of supply, and (f) the local authority's response to any of these issues	18
We provide adequate quantities of potable water that is safe to drink	Our supplies comply with NZ Drinking Water Standards in terms of bacteria.	The extent to which the drinking water supplies comply with part 4 of the drinking water standards (bacterial compliance criteria)	100% all supplies
	Our supplies comply with NZ Drinking Water Standards in terms of protozoa.	The extent to which the drinking water supplies comply with part 5 of the drinking water standards (protozoal compliance criteria)	100% all supplies
Provide wastewater collection and treatment systems that are reliable and do not generate nuisance.	The number of complaints we receive about problems with the wastewater system remains low. This suggests that the system is functioning well, without faults or blockages, and without nuisance of odours.	The total number of complaints received by the local authority about any of the following, expressed per 1000 connections to the local authority's sewerage system: (a) sewage odour (3) (b) sewerage system faults (10) (c) sewerage system blockages (5), and (d) the local authority's response to any of these issues (2)	Target (total): < 20

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Pump station and wastewater treatment plant performance is effectively managed, with effluent samples taken not less than three-monthly, to ensure effective wastewater treatment conditions are maintained	Our wastewater systems do not adversely affect the receiving environment. The Council has resource consents granted from Environment Canterbury that control the discharge of sewage to land, and these consents are monitored regularly to ensure we are fulfilling the required obligations.	The number of: (a) abatement notices (b) infringement notices (c) enforcement orders, and (d) convictions, received by the Council in relation to those resource consents	The target for each of these measures is zero.
Ensure that wastewater reticulation (including pump stations) is effectively maintained to reduce the potential for blockages or other interruption to flow	Blockages or other interruptions to flow do not result in uncontrolled discharges of wastewater	The number of sewage overflows, expressed per 1000 wastewater connections	The target for this measure is zero.
We endeavour to respond to wastewater issues within defined timeframes depending on the urgency of the issue.	Information from our water services contractor indicates initial responses to wastewater issues (typically an initial attendance at the site) are being consistently provided within defined timeframes.	The median attendance time to attend sewage overflows: from the time that the local authority receives notification to the time that service personnel reach the site.	<1 hour
		The median resolution time: from the time that the local authority receives notification to the time that service personnel confirm blockage or other fault has been resolved.	<24 hours
Provide stormwater systems in urban areas with adequate capacity to minimise significant flooding of land and habitable properties in severe rainfall events with expected annual return period of 5 years and 50 years respectively.	The number of instances of damaging flooding of urban properties or dwellings is low	The number of flooding events where water enters habitable property per year.	Zero
		For each flooding event, the number of habitable floors affected, expressed per 1000 connections to the local authority's stormwater system.	<3
Provide controls on materials entering the stormwater system through physical interception, application of drainage bylaw provisions, and monitoring the standard of stormwater discharges.	There is no evidence that our stormwater system adversely affects the receiving environment and obligations of relevant Environment Canterbury resource consents for stormwater discharge are being fulfilled.	Compliance with the Council's resource consents for discharge from its stormwater system measured by the number of: (a) abatement notices (b) infringement notices (c) enforcement orders, and (d) convictions, received by the Council in relation those resource consents.	The target for each of these measures is zero.

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We endeavour to respond to stormwater issues within defined timeframes depending on the urgency of the issue.	Information from Customer Service Request (CSR) systems indicates initial responses to stormwater issues (typically an initial attendance at the site) are being consistently provided within defined timeframes.	The median response time to attend a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site.	<1 hour
The stormwater system varies widely in its construction, from open channels, swales and wetlands, to concrete piped drains and outlet structures.	There is no significant damage to property or disruption to traffic flow due to moderately severe rainfall events. The number of complaints we receive about stormwater issues remains low. This suggests that the system is functioning well, without frequent overflows or flooding.	The number of complaints received about performance of the stormwater system, expressed per 1000 connections.	< 3

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Appendix 4

3 Waters Resource Consents

The following table lists the water resource consents that are presently held for the taking of water.

Supply	Consent No	Expiry date	Allowable take	Comments
Kaikōura Urban	CRC-054849	14 Sep 2041	100 l/s or 8,640 m3/day Mackles Bore	To take and use ground water
	CRC-981641.1	12 Aug 2033	30 l/s or 77,760m3 annually Alternate Bore	To take and use ground water
	CRC-011818	20 Feb 2038	86 l/s or 7,430 m3 day	To take and use surface water
	CRC-163587	20 Feb 2038	55 l/s - Combined take in conjunction with CRC-011818 cannot exceed 86 l/s	To take and use surface water
Oaro	CRC-951060.2	8 Mar 2030	4.5 l/s or 200 m3/day	To take and use ground water
Peketa	CRC-991951	21 May 2034	4.5 l/s or 97.2 m3/day	To take and use ground water
Ocean Ridge	CRC-194257	02 Oct 2037	20 l/s or 15,840 over 10 days	To take and use ground water
Fernleigh	CRC-042702.1	29 Nov 2039	18.5 l/s or 400 m3/day	To take and use ground water
Kincaid	CRC-011818	20 Feb 2038	86 l/s or 7,430 m3/day	To take and use surface water
East Coast	CRC-970568.1	20 Oct 2031	4.5 l/s or 389 m3/day	To take and use ground water

Only the consents for Oaro and East Coast will expire in the next 10 years, and it would not be expected that the renewal of either would be problematic.

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The current set of consents help for wastewater are shown in the table below.

System	Consent No	Expiry date	Comments
Kaikōura	CRC-050316	03 October 2031	Operation and maintenance of the anaerobic lagoon
	CRC-050395	05 May 2040	Construction and maintenance of the anaerobic lagoon in a coastal hazard zone
	CRC-050485	Open	To excavate and operate effluent soakage beds
	CRC-191229	15 September 2045	To construct an aerated lagoon
	CRC-191230	15 September 2045	To discharge odour from the aerated lagoon
	CRC-191231	15 September 2045	To store human effluent at the Kaikoura WWTP
	CRC 941111	03 October 2031	Discharge of oxidation pond effluent

At the time of preparing this Infrastructure Strategy there are significant risks related to resource consents for the WWTP. Some activities (solids storage and dewatering) do not have current consents, and not all clauses of the current consents that do exist were being complied with.

This non-compliance had been present for many years, but a more inflexible compliance approach was taken by ECan occurred after the Water Services Act 2021 came into force and responsibilities for wastewater were delegated to ECan.

Abatement notices were issued to KDC and an agreed process is being worked through with ECan. This includes carrying out detailed investigations and expert assessments and applying for replacement consents in 2024.

The main risks associated with resource consents relate to solids storage and disposal, odour management and electrical power requirements. If consents are not granted for the existing activities in their current form as there could be significant unbudgeted capital costs for additional aeration, sludge dewatering and remote disposal and for monitoring equipment.

It is however the current belief of Council that the extent of environmental effects associated with existing activities, such as the disposal of collected sludges on the site, are not sufficient to rationally justify the abandonment of those activities and replacement with much more expensive processes, and for that reason (and the extent of uncertainty as to what the expense of such processes might be) no substantial associated additional future opex or capex budgets are proposed at this time.

The following table lists the stormwater discharge resource consents that are presently held.

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System	Consent No	Expiry date	Comments
Kaikōura	CRC022031.1	31 July 2037	To disturb the bed of and to place structures under Phairs Drain (South Bay) and to place a structure within eight metres of Phairs Drain
	CRC144682	28 July 2051	Global consent - to discharge stormwater from the area identified as the "Kaikōura Township Stormwater Management Area"
	CRC063634.1	24 August 2041	To discharge stormwater to land and water at Goose Bay
	CRC081215	5 April 2040	To discharge stormwater for both roading and residential hardstand

No stormwater resource consents are due to expire during the next ten years.

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