Carterton District Council

Infrastructure Strategy

2015–2045

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1 Purpose of this Infrastructure Strategy

Infrastructure accounts for over half of the Carterton District Council's (CDC) annual operating expenditure and approximately 80% of Council's capital expenditure. This infrastructure provides the foundations on which the Carterton district community is built. It is essential to the health, safety, and land transport needs of the district and has a significant impact on the physical environment.

Good quality local infrastructure facilitates social and economic wellbeing. It enables businesses and communities to flourish. Conversely, poor infrastructure will inhibit the economic performance of Carterton district. Getting infrastructure spending right is a pre-requisite to enhancing the quality of life and attracting people to live in the district.

This infrastructure strategy outlines:

- the key sewerage, water supply, stormwater and land transport infrastructural issues the Carterton district community must address over the next 30 years
- the main options for dealing with those issues
- the cost and service delivery implications for residents and businesses of those options
- the Council's current preferred scenario for infrastructure provision.

This strategy will help the Council to make informed decisions to deal with the major decisions and investment opportunities that will occur over the next 30 years.

2 Background

2.1 Legislative context

Section 101B of the Local Government Act 2002, introduced as a result of the Local Government Act 2002 Amendment Act 2014, requires all local authorities to prepare and adopt an infrastructure strategy covering a period of at least 30 years, as part of its long-term plan. The statutory purpose of an infrastructure strategy is to identify significant infrastructure issues for the Council over the 30-year period covered by the strategy, and to identify the principal options for managing those issues.

This strategy addresses the above purpose by outlining how CDC intends to manage its water supply, sewerage and the treatment and disposal of sewage, stormwater, and roads and footpath infrastructure assets. In many respects, the strategy represents a culmination of the strategies underpinning CDC's corresponding activity management plans (AMPs).

Inclusion of the above infrastructure assets in the strategy is mandatory. Other asset types (eg parks, buildings, etc) may be included, at the discretion of CDC, but do not form part of this Infrastructure Strategy.

The Infrastructure Strategy will be reviewed on a three-yearly basis in line with, and as an important component of, the Council's Long Term Plan. The Infrastructure Strategy, the

Financial Strategy, and the supporting documents for consultation on the Council's Long Term Plan 2015–2025 were developed together and are consistent with each other. Before the next long term plan, the Council may consider preparing a single financial and infrastructure strategy document.

2.2 Historical context—formation of Carterton District Council

Carterton District Council was formed in April 1989 from a voluntary amalgamation of the former Carterton Borough and South Wairarapa County Councils. The Borough Council had been in existence since 1887 while the County Council's origins go back to earlier roads boards in the 1850s.

2.3 Geographical context

Carterton district encompasses predominantly rural land on the eastern side of the lower North Island. The western boundary is the Tararua Ranges with the eastern boundary being the Pacific Ocean. The District is adjacent to Masterton District to the north, and South Wairarapa District to the south. Kāpiti Coast District adjoins its western boundary.

The usually resident population of Carterton district was 8,235 at the 2013 Census. The administrative and main trading centre is Carterton, with over half (57% or 4,686 in 2013 Census) of the District's usually resident population residing in this town.

There are other, smaller, rural settlements located within the district including Gladstone, Flat Point and Clareville.

The predominant land use in the district is pastoral agriculture, principally beef and sheep and dairy farming, with a significant amount of forestry in the eastern hill country. The main employment sectors are agriculture, forestry, and fishing, with all of these sectors highly dependent on CDC's roading infrastructure for transport connections. Small pockets of viticulture and winemaking exist in the Gladstone area.

A moderate scale industrial precinct is located at the northern end of the district (Waingawa) with water and sewerage reticulation provided by Carterton District Council. However, because of the location, the Masterton District Council provides, by agreement, the potable water and treats and disposes of the sewage and trade waste. A large and expanding bacon and ham smallgoods factory is located within Carterton with water supply mostly sourced from its own bore, but is reliant on CDC infrastructure for sewage treatment and disposal.

The Local Government Act provides processes for applying for and determining the reorganisation of councils, including amalgamations. At the time of writing this strategy, the Local Government Commission has rejected its proposal for reorganising local government structure in the Wairarapa and Wellington regions, after strong negative response during

consultation. The Commission has said it will continue to look for positive change and the Council is uncertain what the final proposal will be, if any.

The status quo is still an option, and any final proposal will have to be confirmed by a poll of all ratepayers in the two regions. The assumption in this strategy is therefore that the status quo will endure.

Figure 1: Carterton District Boundaries

3 Approach to managing infrastructure assets

CDC's approach to managing its infrastructure assets involves optimisation of the whole of life costs of its infrastructure. There are three key components of that: operating and maintenance costs, renewal costs, and development activities. The three are interrelated, with the timing of renewals or new capital development impacting on annual maintenance costs.

The strategy outlines how CDC intends to manage its three-waters and roading infrastructure assets, taking into account the need to:

- maintain, renew or replace existing assets
- respond to growth or decline in the demand for services reliant on those assets
- allow for any planned changes to levels of service provided through those assets
- maintain or improve public health and environmental outcomes or mitigate adverse effects on them

- 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.

3.1 Operating and maintenance

Operational activity is work or expenditure which has no effect on asset condition but which is necessary to keep the asset functioning, such as the provision of staff, consumable materials, resource consent applications and compliance, monitoring, and investigations.

Maintenance can be defined as that group of activities that preserve an asset in a condition which allows it to perform its required function. Maintenance is the regular work and immediate repairs necessary to keep the asset operational. The ongoing efficiency of routine maintenance is critical to achieve optimum asset life cycle costs that best suit the desired levels of service. Maintenance falls into two categories, planned and unplanned, each having quite different triggering mechanisms and objectives.

The strategy is to maintain levels of service through timely and effective maintenance interventions until the age or condition of the asset makes it uneconomic to continue to maintain.

3.2 Renewal or replacement

Asset renewal or replacement does not increase the assets' original design capacity but restores, rehabilitates, replaces or renews an existing asset to extend its economic life and/or restore the asset to its original service potential. It is a key driver of CDC's infrastructure strategy because of the age profile and condition of some of the assets, and the need to develop a replacement strategy which is both affordable and sustainable.

CDC's renewal strategy is, in general, to rehabilitate or replace assets when justified by:

Asset performance: renewal of an asset where it fails to meet the required level of service due to deterioration of asset condition. Non-performing assets are identified by the monitoring of asset condition, reliability, capacity, and efficiency during planned maintenance inspections and operational activity. Indicators of non-performing assets include:

- structural failure
- repeated asset failure (blockages, mains failure, pavement failure, etc)
- ineffective water or sewage treatment.

Economics: Renewals are programmed with the objective of achieving:

- the lowest life-cycle cost for the asset (the point at which it is uneconomic to continue repairing the asset)

- a sustainable long term cash flow by smoothing spikes and troughs in renewals programmes based on the estimated economic lives of asset groups
- savings by co-ordinating renewal works with capacity upgrade work or other planned works in the area.

Risk: The risk of failure and associated financial and social impact justifies action (eg probable extent of property damage, safety risk).

Renewal works are assessed and prioritised in accordance with the following priority ranking table, the cost/benefit ratio of each project, Council's objectives and strategies, and available funds.

Priority	Renewal criteria
1 (High)	• Asset failure has occurred and renewal is the most cost effective option. • Asset failure is imminent and failure is likely to have major impact on the environment, public safety or property • Condition and performance ratings of asset is 4–5 (poor or very poor) • Asset performance is non-compliant with resource consent requirements • The asset has a high criticality rating
2	• Asset failure is imminent, but failure is likely to have only a moderate impact on the environment, public safety or property. • Asset failure is imminent and proactive renovation is justified economically • Condition and performance ratings of asset is 4–5 (poor or very poor) • System upgrading scheduled within five financial years as asset is nearing end of economic life. • Asset renewal is justified on the basis of benefit cost ratio and deferment would result in significant additional costs • The asset has a medium criticality rating of 2
3	• Asset failure is imminent, but failure is likely to have a minor impact on the environment, public safety or property • Condition and performance ratings of asset is 3 (moderate/average • Asset renewal is justified on the basis of life cycle costs, but deferment would result in minimal additional cost • The asset has a low criticality rating o
4	• Existing assets have a low level of flexibility and efficiency compared with replacement alternative • Condition and performance ratings of asset is 1–2 (good to excellent)
5 (Low)	• Existing asset materials or types are such that known problems will develop in time. • Condition and performance ratings of asset is 1 (excellent)

3.3 Capital improvements—planning for the future

Growth and demand are the main drivers of new capital development, and includes:

- changes to and the incidence of new land use activities
- population increase and demographics
- community expectations and demand for additional services.

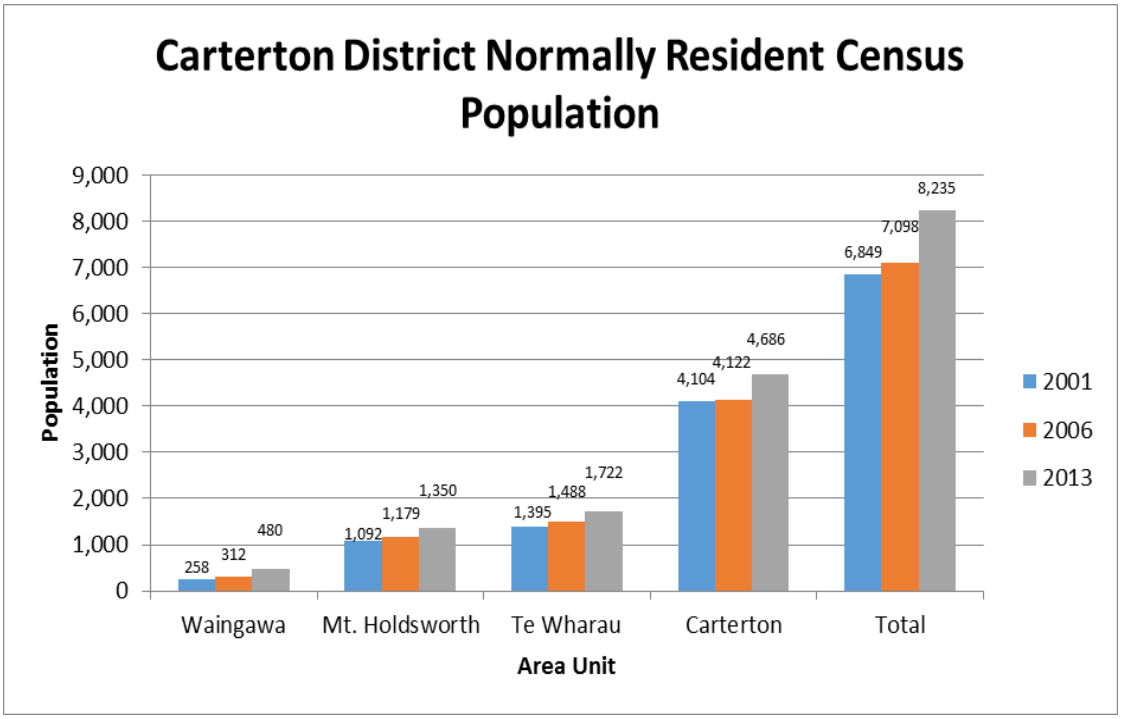
Mitigating the effects of demand can be achieved through demand management strategies, particularly in respect of the 3-waters. CDC's capital development strategy entails maximising the use of existing asset capacity as the first priority over investment in new infrastructure capacity.

3.4 Demographic factors

Carterton District has experienced relatively high population growth since 2006. The Carterton district, usually resident, population increased from 6,849 in 2001 to 8,235 in 2013, an overall increase of 20%, and an average annual increase of 1.7% per annum. For statistical purposes, the Carterton district population is distributed across four area units. The largest area unit population is the urban area of Carterton, and the smallest is Waingawa.

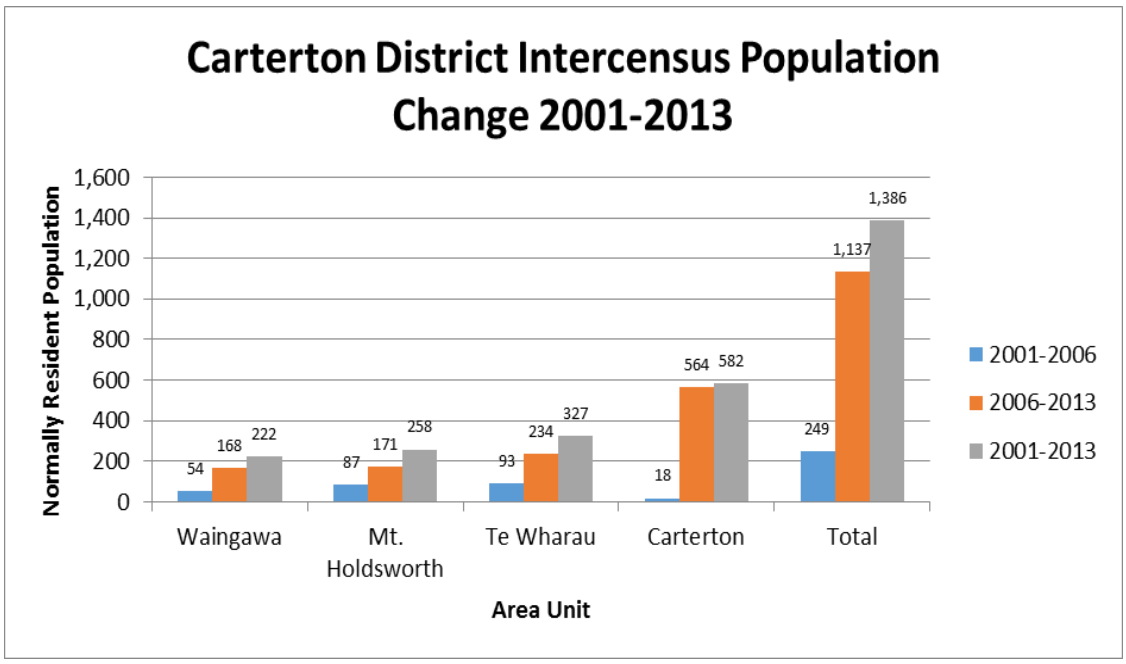
Area Unit	2001	2006	2013
Waingawa	258	312	480
Mt. Holdsworth	1,092	1,179	1,350
Te Wharau	1,395	1,488	1,722
Carterton	4,104	4,122	4,686
Total	6,849	7,098	**8,235**

(Note: The above numbers do not total exactly due to rounding of data)

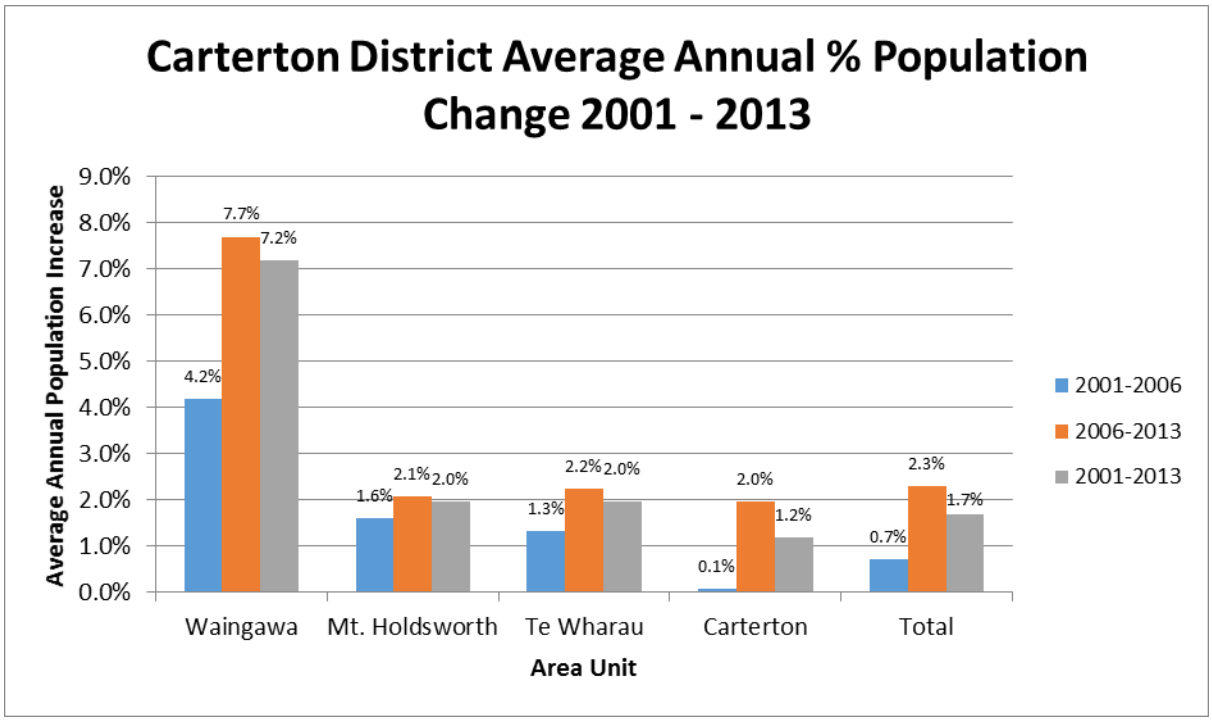


A comparison between the 2001, 2006 and 2013 census figures (the 2011 census was cancelled and replaced with the 2013 census due to the 2011 Christchurch earthquake) shows that the major increase (16%) occurred in the 2006 to 2013 inter-census period, with

nearly 50% of that occurring in the Carterton area unit. Positive growth was also measured across the remaining area units.

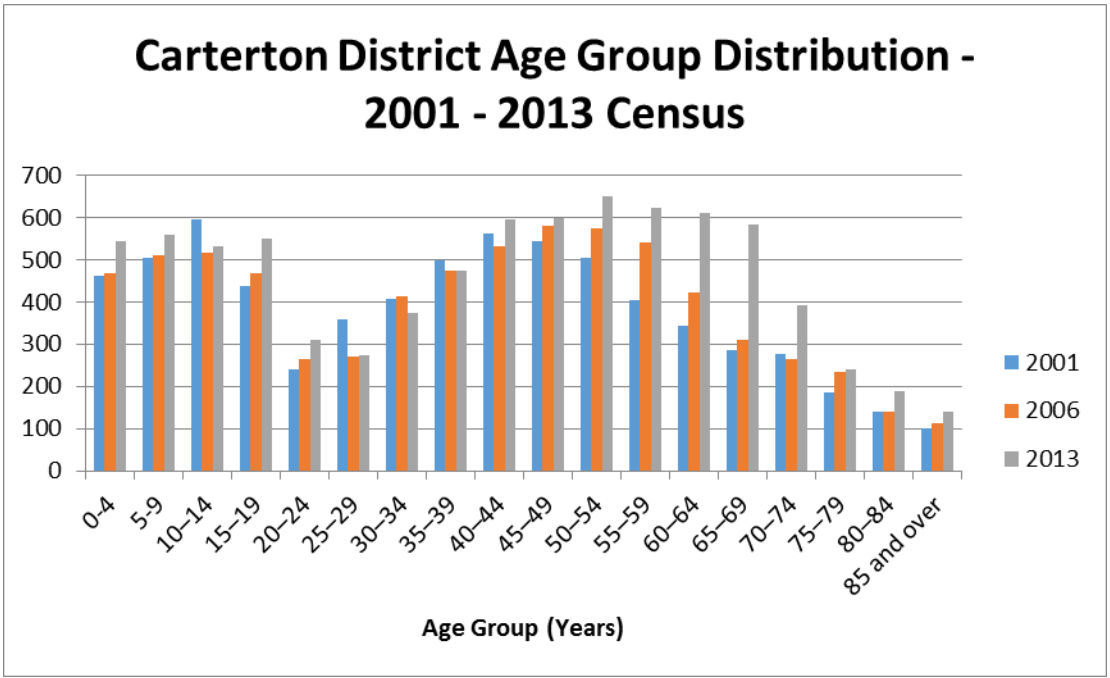


The above population change equates to an overall average population increase of 1.7% per annum, distributed across the four area units making up the district as follows:



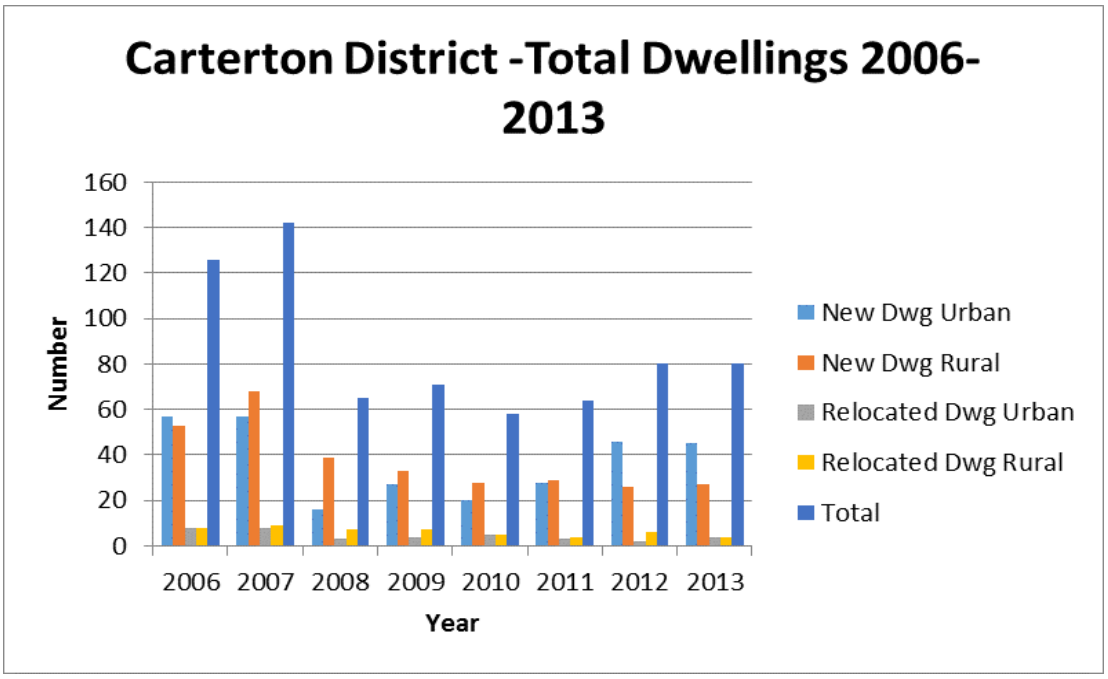
While most of the population increase, in absolute terms, occurred in Carterton, the highest annual percentage increase occurred in the Waingawa area unit because of its low population base (258 people in 2001).

Compared with the 2001 and 2006 censuses, the 2013 population decline in the 25–39 years age bracket is off-set by an increase in population from 40 years and above. Significant increases in population distribution are represented in the 50–74 years age brackets.

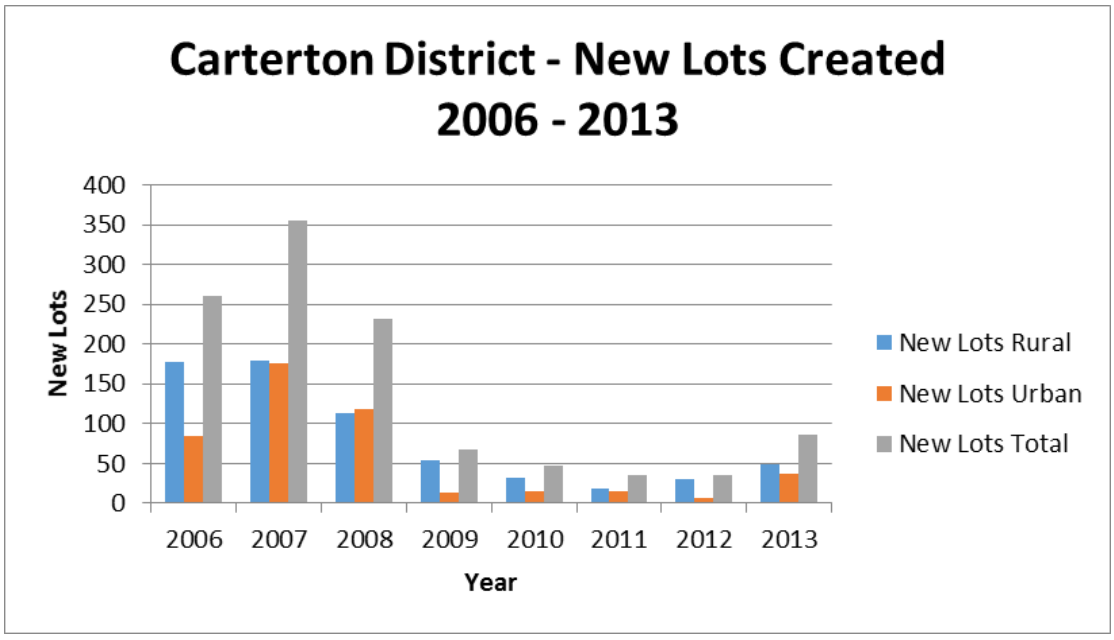


A further indicator of the above population growth trends is in the form of new dwellings. The following table and graphs show that there is early indication of increasing demand for new urban and rural dwellings after slowing down in 2008–2010:

ALL DWELLINGS	2006	2007	2008	2009	2010	2011	2012	2013	Total
New Dwg Urban	57	57	16	27	20	28	46	45	296
New Dwg Rural	53	68	39	33	28	29	26	27	303
Relocated Dwg Urban	8	8	3	4	5	3	2	4	37
Relocated Dwg Rural	8	9	7	7	5	4	6	4	50
Total	126	142	65	71	58	64	80	80	686



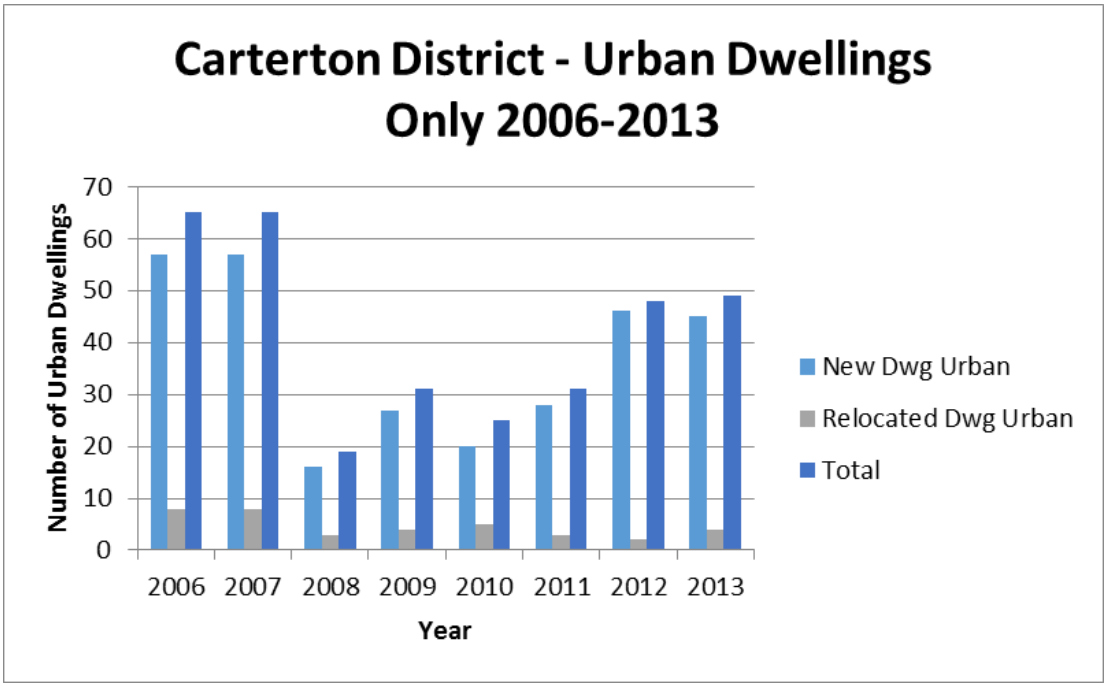
Similarly, the number of new lots created follows a matching trend as demand for settlement in the district has continued to grow in recent years



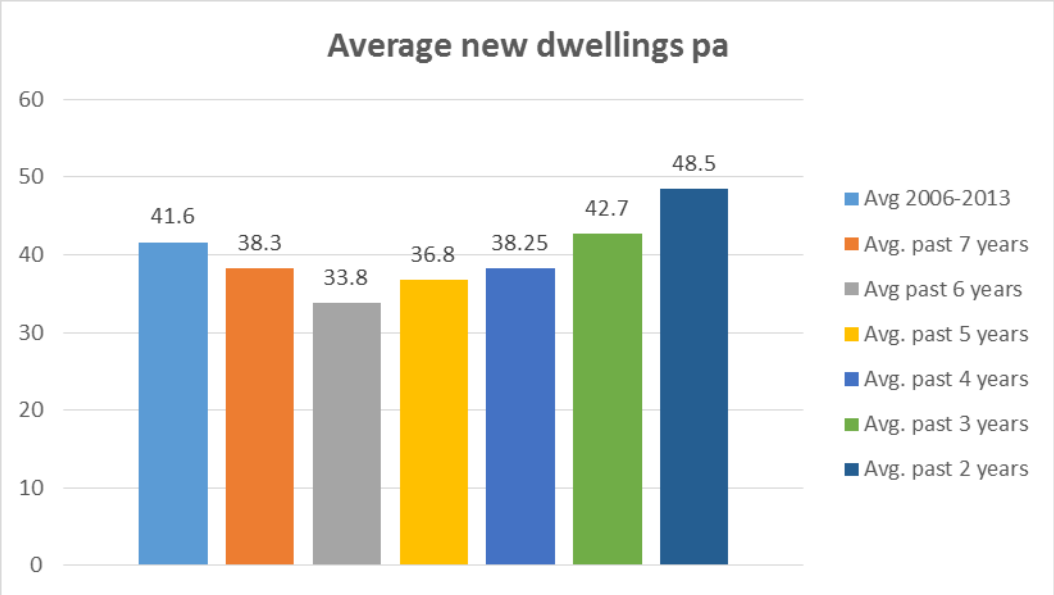
Of particular relavance to CDC's water, sewerage and stormwater infrastructure is the number of new urban dwellings constructed since 2006.

The following table shows the long-run average number of new and relocated residential dwellings per year in Carterton, including relocated dwellings, is approximately 40 per year:

Urban Dwellings	2006	2007	2008	2009	2010	2011	2012	2013	Total	Ave pa
New	57	57	16	27	20	28	46	45	296	37.0
Relocated	8	8	3	4	5	3	2	4	37	4.6
Total	65	65	19	31	25	31	48	49	333	41.6



Over the three years, 2011–2013, when the annual housing growth rate shifted from decline to increase, the average number of new houses increased to 42.7 per year, with 49 new dwellings in 2013.



In 2007, Boffa Miskell prepared an assessment of the remaining capacity for future residential parcels within the Carterton residential zones of the then Proposed Wairarapa

Combined District Plan. It was estimated that there were approximately 1012 allotments available for future residential growth based on typical lot sizes for urban residential units.

Since then, CDC records show that there have 268 new or relocated houses constructed in the residential zone over the period 2007–2013. That leaves an estimated 744 new lots available for residential dwellings within the current residential zone.

Based on an average of 40 new dwellings per year, the remaining residential capacity in Carterton will be fully developed within the next 19 years. Beyond that, CDC will need to plan for future residential development outside the current zoning, together with the provision of infrastructure to support that development.

The estimated future population of the Carterton area unit at the end of the 2015–2045 planning period is estimated to be approximately 7,560, based on the long-run average population growth rate, the annual number of new houses and current occupancy rate. A key assumption is that there is sufficient additional residential zoned land available to accommodate the demand once the existing residential land is fully developed, in approximately 19 years' time.

The population of the district is similarly estimated to be approximately 12,140 by 2045 (or 11,355 to 2043) subject in part to the same assumption regarding the availability of residential zoned land.
Continuation of the higher growth rates evident over the past three years would increase both population estimates.

The Statistics NZ population projection for Carterton district over the period 2013-2043 is in the range 8,560 (low growth scenario) to 11,850 (High growth scenario). The latter is very consistent with the population forecast in sub-clause 3.3.15 above, noting the higher 2013 estimated base population used in the Statistics NZ forecast, as at 30 June 2013, of 8,490.

	PROPOSED DISTRICT PLAN (AS RECOMMENDED 2007)				CALCULATION OF REMAINING ALLOTMENTS		
	Recommended (northern end) Urban Residential (400 m^2 minimum)	Recommended (southern end) Low Density (1,000 m^2 minimum)	Retain (southern end) Low Density (2,000 m^2 minimum)	Average Southern end	Total lots available in 2007 - northern plus avg.southern end.	New dwellings 2007-2013	Net lots remaining 2013
Number of Vacant Properties (parcels > 3,000 m^2)	19	31	31	31	50		
Total Vacant Land Area (parcels > 3,000 m^2)	55.6ha	73.9ha	73.9ha	73.9ha	129.5		
Theoretical Lot Yield (based on all lots developed at minimum lot size plus 1/3 for roading and reserve)	1044	555	277	416	1,460		
Theoretical Lot Yield (based on 'typical' lot size for Urban Residential, i.e. 700 m^2, plus 1/3 for roading and reserve)	596	555	277	416	1,012	268	**744**

In summary, the above demographic trends indicate that there will be a medium increase in residential demand for urban water, sewerage, and stormwater infrastructure at Carterton. For the past few years, Council has been working on improving the condition of its core infrastructure assets, particularly the water supply and sewerage activity areas, in order to support public health outcomes and to meet its resource consent requirements. The demographic growth trend supports an approach involving maintenance, renewal and capital improvements to the existing infrastructure to maintain current levels of service, alongside moderate increase in new capacity for water and sewage treatment and storage.

The water and sewerage infrastructure in particular is principally designed for residential use, with industrial access to these services secondary and dependent on availability of supply within current consent limitations, and appropriate on-site pre-treatment. Similarly, any additional reticulation capacity required within the respective pipe networks would need to be funded by developers.

3.5 Levels of service

Current levels of service provided by CDC's 3-waters infrastructure (water supply, sewerage, and stormwater) are likely to continue to be dominated by minimum regulatory requirements such as drinking water standards, regional policy statement and resource consents.

Wellington Regional Council's Natural Resources Plan is currently under review and scheduled for notification as a proposed plan later in 2015. It is expected it will impact on minimum levels of service across each of the 3-waters. Retaining current levels of service will likely require greater attention to efficient water management and environmental impacts, for all systems - see asset specific discussion of this under Section 4.

For the roading infrastructure, a move to standardised, national, customer levels of service for each of the new road classifications will tend to result in reduced customer levels of service for low volume rural roads. Many of CDC's roads are in this category.

The processes required to finalise these core, levels of service, planning processes are still some way off. In the case of the draft Natural Resources Plan, a proposed plan is still to be prepared and notified for public submissions. Some aspects may be contested by referral to the Environment Court. For the roading infrastructure, the proposed new levels of service associated with One Network Roading Classification project will not take effect before 1 July 2018, and in any event, are not likely to have significant impact on the current levels of service for CDC's road and footpath networks.

Either way, financial provision for mandatory changes to levels of service as a result of regulatory planning processes or external funding criteria, will be phased in to CDC's budgetary provisions through future annual and long term planning processes, once they are finalised.

In all cases, the capital costs relate to maintaining levels of service. There is no growth-related expenditure relating to additional asset capacity over the term of the plan. It has been assumed that any new infrastructure required as a result of the projected population growth will be funded by developers and downstream asset capacity will be sufficient to accommodate the projected growth.

3.6 Climate change

Climate change is likely to result in more extreme storm and drought events. This will require Council to consider the capacity of the Carterton's water supply, stormwater drainage, and sewerage systems.

More frequent droughts may affect the security of the Carterton water supply. Currently the council relies on adequate water flows from the Kaipaitangata River and Lincoln Road well-field and has limited stored capacity for a sustained drought.

Conversely, more frequent, high intensity rainfall will challenge the existing capacity of the urban stormwater drainage network and downstream drainage channels. Similarly, increased inflow and infiltration to the sewerage network is likely to be a consequence of higher rainfall events.

3.7 Risks and resilience of infrastructure

The main risks to CDC's infrastructure from natural hazards are major earthquakes and flooding. Climate change variability in rainfall patterns and hence groundwater and surface flows, is a potential risk for all water utilities and changes to environmental effects.

Parts of Carterton District are built on old flood plains that could be subject to liquefaction in a major earthquake. Part of the Council's reticulation renewals programme will involve using different construction methods and materials to provide greater earthquake resilience in pipelines. Council does not consider this risk is so great that it should bring forward its renewals programme. Instead it will address resilience at the time pipes are replaced.

Previous risk mitigation measures include the installation of baffles in the town water reservoirs to reduce water "surge" during a major seismic event, bore-field development to provide an auxiliary supply in the event of drought or trunk main failure from the Kaipaitangata supply, and incorporation of seismic design in the construction of all bridge structures.

Current risk mitigation measures are incorporated in CDC's renewals strategy as a means of prioritising replacement work, and include the replacement of brittle pipe materials with modern, flexible materials and jointing systems. The funding of these measures is built into forecast asset renewal and capital works programmes.

Additional assessment of the likelihood and consequence of the above risks, followed by intervention and mitigation strategies to improve resilience of CDC's critical assets, is an ongoing process. This work will be developed and costed over the next three years. Financial provision for any necessary risk mitigation measure identified will be included in the 2018 review of the Infrastructure Strategy.

In the meantime, current risk mitigation measures will be maintained, funded from forecast programmes, to ensure CDC's critical assets including bridges, treatment plants, reservoirs and trunk mains are routinely inspected, assessed, and strengthened to improve resilience to natural hazards. Critical assets are defined as those that would have the greatest consequence in the event of failure.

Flood protection of the district is the responsibility of GWRC and is therefore not addressed in this strategy.

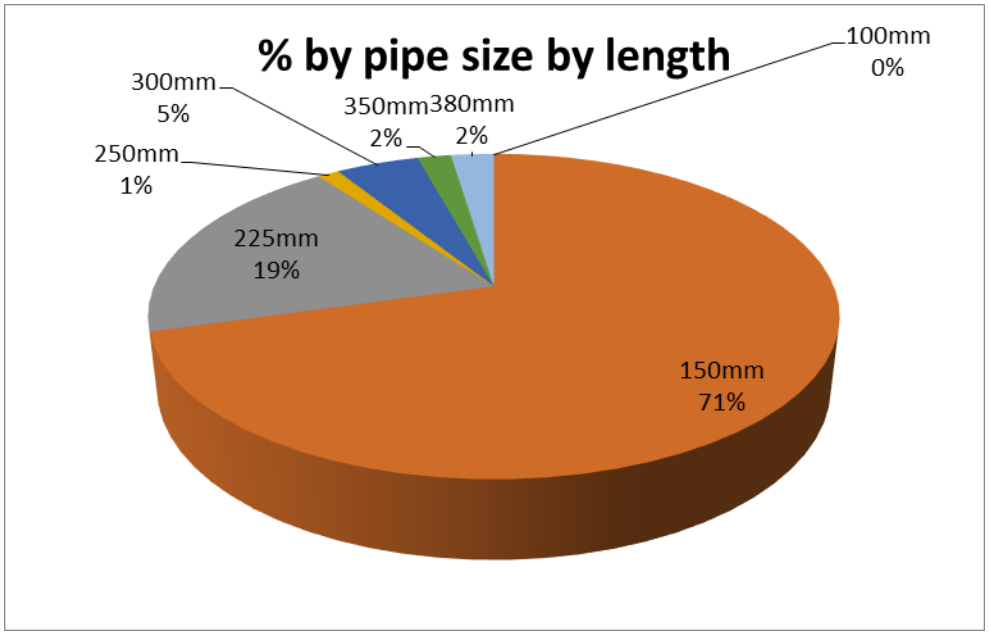
4 Significant infrastructure issues for Carterton District

4.1 General

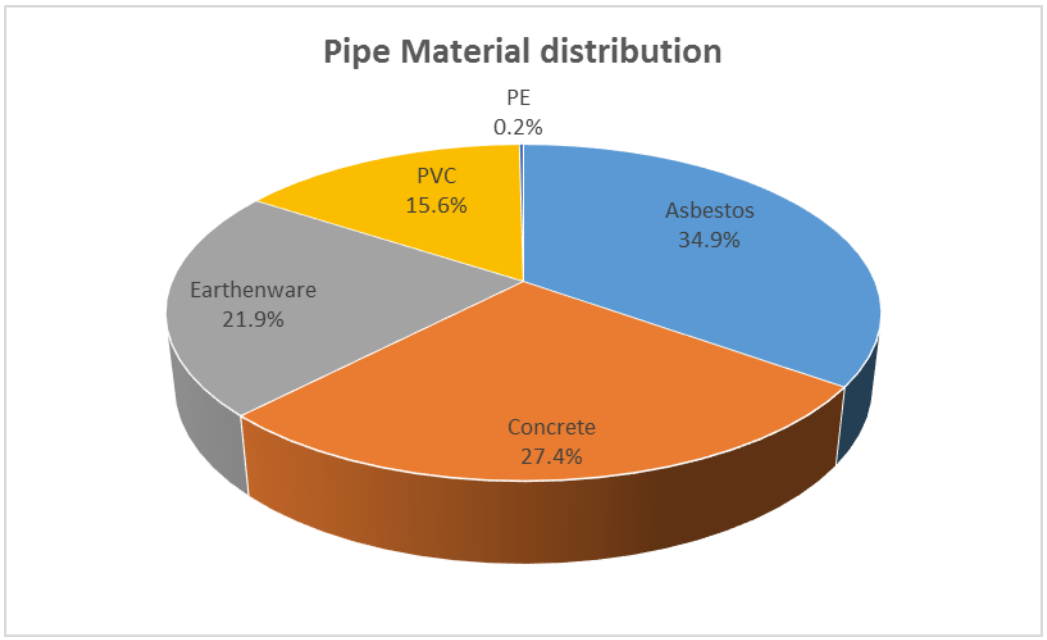
This strategy relates to Carterton District Council's (CDC's) sewerage, water supply (including water races), stormwater drainage, and road and footpath infrastructure. The tables on the following pages summarise the significant infrastructure issues facing CDC, the proposed response to those issues, and the implications of taking or not taking the action proposed by the response. In many instances, the same principal response option is capable of addressing several infrastructure issues.

4.2 CDC Sewerage Scheme

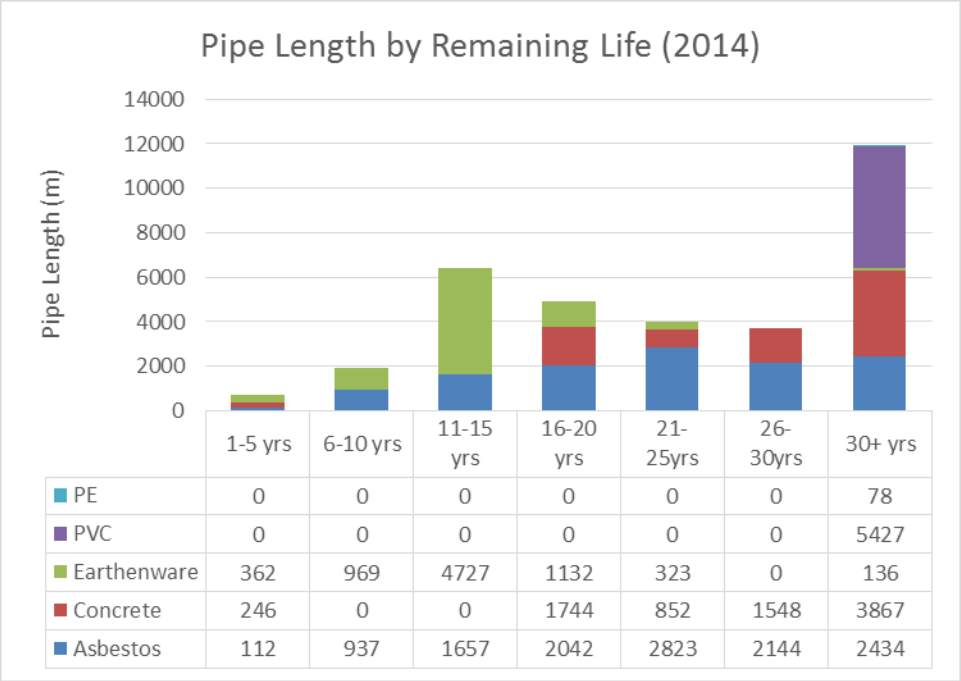
CDC owns and manages a single community sewerage scheme in the district, at Carterton. The scheme comprises approximately 38 km of sewer pipe ranging in size from 80mm to 380mm diameter.



Fifty-six percent of the pipe material is asbestos cement and earthenware.



Earthenware and asbestos cement pipe types tend to be brittle and a large proportion is approaching the end of their useful lives—a factor in the sewerage renewals profile.



	1-5 yrs	6-10 yrs	11-15 yrs	16-20 yrs	21-25yrs	26-30yrs	30+ yrs
PE	0	0	0	0	0	0	78
PVC	0	0	0	0	0	0	5427
Earthenware	362	969	4727	1132	323	0	136
Concrete	246	0	0	1744	852	1548	3867
Asbestos	112	937	1657	2042	2823	2144	2434

CDC has established an annual replacement programme to address deterioration of its older sewerage infrastructure. Approximately 2.9km of sewer pipelines have been replaced since 2008 through implementation of this programme.

In addition to the pipe reticulation, the Carterton sewerage infrastructure assets include 15 pump stations and a three stage sewage treatment plant with tertiary effluent irrigated to a 65.6ha CDC owned property.

The Carterton sewage treatment plant discharges (air, land, water and groundwater) were re-consented in 2013 for a four year term expiring 14 October 2017. The sewage treatment plant and the adjoining landfill are designated activities in the Wairarapa Combined District Plan.

A separate consent for the irrigation of treated effluent on the adjoining CDC land, known as Daleton Farm, was issued for a three year term, also expiring on 14 October 2017. Separate land use consents pertaining to this property are held for dripline irrigation within 5m of property boundaries on the eastern side and for the excavation of fill material from the south-east corner. A designation for the site will be sought at the time of the next Wairarapa Combined District Plan review, due in 2016.

The Council has adopted a draft wastewater strategy to give effect to a long-term vision of ultimately removing the discharge of effluent to the Mangatārere Stream all year round, except in exceptional circumstances. The key components of the strategy are:

<u>Stage 1:</u>

- I & I investigation, condition assessment, rehabilitation/replacement, and control

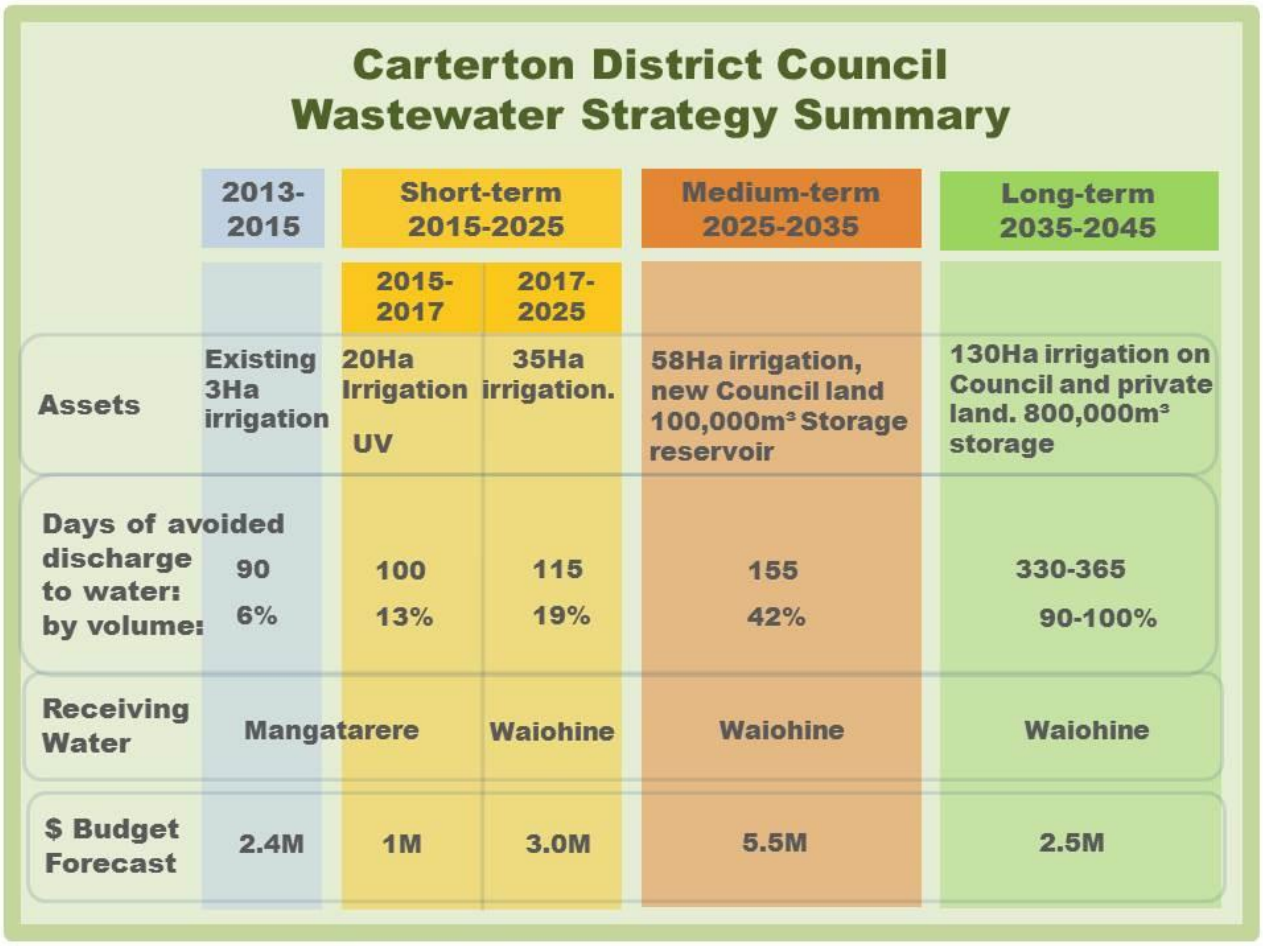
- manage trade wastes
- implement consent for irrigation on Daleton Farm
- operate, monitor and record effects of Centre Pivot irrigation
- use trial results to inform 2017 consent renewal.

Stage 2:

- provide on-site storage on Daleton Farm
- extend irrigation on Daleton Farm
- relocate riverine discharge to Waiohine River.

Stage 3:

- provide supplementary, off-site, bulk storage
- extend irrigation off Daleton Farm.



Carterton District Council
Wastewater Strategy Summary

	2013-2015	Short-term 2015-2025		Medium-term 2025-2035	Long-term 2035-2045
		2015-2017	2017-2025		
Assets	Existing 3Ha irrigation	20Ha Irrigation UV	35Ha irrigation.	58Ha irrigation, new Council land 100,000m³ Storage reservoir	130Ha irrigation on Council and private land. 800,000m³ storage
Days of avoided discharge to water:	90	100	115	155	330-365
by volume:	6%	13%	19%	42%	90-100%
Receiving Water	Mangatarere		Waiohine	Waiohine	Waiohine
$ Budget Forecast	2.4M	1M	3.0M	5.5M	2.5M

Summary of issues - Carterton Sewerage Scheme

Issue	Description	Principal options for response	Implications
Asset Renewal or Replacements	High infiltration rates entering pipe network indicate poor asset condition.	Programme of condition assessment of pipe network followed by continuation of a prioritised repair and renewal programme	The financial impacts of deferred maintenance and renewals have been balanced against levels of service, consent compliance and ratepayer affordability.
Response to Demand	Future demand includes increased residential growth projection beyond capacity of current zoning.	Treatment plant capacity will be upgraded in line with current and projected demand. Application of trade waste bylaw to provide mechanism for controlling trade waste discharges and recovering costs from industrial users proportional to volume and concentration of discharge.	Forecast cost of treatment plant upgrade is approximately $14.5 million over the 30-year planning period. Loan servicing and associated operating costs have been provided for in the Long Term Plan.
Levels of Service (LoS)	LoS focus is on reliability of service, capacity, public health and environmental protection. New mandatory performance standards will take effect from 1 July 2015. These cover: • system adequacy • management of environmental impacts • responsiveness • customer satisfaction.	Environmental protection will continue to be enhanced through extension of the recently commissioned land treatment system, involving storage, land acquisition and irrigation. Reliability of the service and protection of public health, as monitored through the incidence of sewage overflows, is dependent on timely maintenance and condition assessment of the pipe network followed by prioritised repair and renewal programmes	Current levels of service, as improved through replacement and upgrades of main components of scheme, will be maintained through the period.
Public Health and Environment	An innovative development of the adjoining CDC owned property (Daleton Farm) for use as land treatment of the final effluent, involving deficit irrigation via a centre pivot irrigator, took place in 2014. Upstream works	Ongoing monitoring of the treatment plant to ensure compliance with the new discharge consent parameters is met. Condition assessment followed by prioritised	The financial impacts of the recent treatment plant upgrade have been included in the 2015–2025 Long Term Plan.

Issue	Description	Principal options for response	Implications
	included installation of a new, high capacity, UV disinfection unit and covering of the anaerobic digester to capture and filter odours. The enhanced effluent disposal system is expected to show enhanced environmental impacts on the Mangatārere Stream.	repair and renewal of damaged pipes to reduce infiltration and potential contamination of surrounding groundwater	
Risk and Resilience	Sewerage service continuity and environmental and public health is threatened by sections of the sewerage network. Older pipes are brittle and prone to breakages and leaks due to gradual ground movement or more sudden and significant ground movement caused by a seismic event.	The vulnerability of components of the sewerage system has been assessed by the Wairarapa Engineering Lifelines Association (Wairarapa Engineering Lifelines Association, 2003). It assesses the significance, vulnerability, and overall risk to assets. The response strategy instigates the incorporation of asset vulnerability into renewal and upgrade planning with the aim to enhancing resilience. Rolling replacement of sewerage pipes in poor condition and at the end of their effective lives with new flexible pipe materials is a component of this.	Current risk mitigation measures will be maintained through the strategy period. Condition assessment and subsequent rehabilitation/replacement programming, commencing with critical assets, is a high priority. Failure to complete this work in a timely manner will increase the risk of overloading the treatment plant during flood events, and pipe failure due to end of lifecycle or following an earthquake event. Such failures have the potential to breach the discharge consent and contaminate surrounding groundwater with untreated waste. The probability of this risk occurring is considered to be low to moderate within the term of this strategy but the consequences are high.

4.3 CDC water supply schemes

CDC owns and manages a municipal water supply scheme at Carterton, and two rural water race schemes—Carrington and Taratahi.

The Carterton supply comprises a dam and two storage reservoirs totalling 1500m^3 at the Kaipaitangata intake, supplemented by a four-bore well-field and 500m^3 storage in Lincoln Road. Water treatment involves pH adjustment and disinfection at both sources, with filtration provided at the Kaipaitangata source.

The water supply reticulation consists of approximately 50km of watermains, including 9km of trunk main. Higher levels of service driven by the Public Health (Drinking Water) Amendment Act and security of supply are the key issues impacting on the Carterton urban water supply.

The Taratahi and Carrington water races supply non-potable water to rural properties. The assets comprise surface intakes and 242km and 36km of open channel races respectively. Consents to take water are critical to maintaining adequate, all year supply quantities for domestic and commercial/industrial use. The following table summarises current consent expiry dates:

Scheme	Consent Expiry Date
Carterton – Kaipaitangata intake[1]	Consent renewal in progress
Carterton – Lincoln Road bores	30 September 2034
Carrington Water Race	28 June 2023
Taratahi Water Race	28 June 2023

The Wairarapa Water Use Project is currently under investigation, led by Wellington Regional Council. While principally targeted at rural water use, the potential exists for the project to be extended to include urban water supply needs, either supplementary to or in substitution of current supply arrangements for Carterton. Given the preliminary stages of investigation, development of the scheme will be monitored over the course of this strategy period.

[1] Application awaits GWRC processing

Summary of Issues—Carterton Water Supply Scheme

Issue	Description	Principal options for response	Implications
Asset renewal or Replacements	Large parts of the reticulation are near the end of its theoretical useful life, increasing the risk of mains failure, leaks, etc. Asbestos cement pipe makes up 55% of the reticulation, with its remaining, nominal, useful life expiring over the next 30 years	Mains replacement programme based on actual pipe condition.	Replacement programme of $120,000 per year over the next 10 years.
		A reduced replacement programme extending over a longer period could result in reduced levels of service and increase in maintenance cost due to increased mains failure, loss of water and supply interruptions	Not replacing the pipes leaves them vulnerable to breakage or complete severance in the event of earthquakes or other ground movement. The probability of this risk occurring is considered to be low to moderate within the term of this strategy but the severity of the consequences are expected to be high
Response to Demand	The Carterton water supply is designed for residential and commercial/industrial demand. Current demand exceeds recommended storage capacity during peak summer periods. Additional demand beyond current supply capacity is anticipated due to population growth projection and effects of climate change, subject to available capacity of residential zone. It is expected that future consents will restrict water take from the Kaipaitangata River during low flow/high demand periods, placing increased demand on bore water source and storage.	Stage 1—Continue 5-yearly programme of water main leak detection, supported by data from universal metering. Stage 2—Implement more extensive use of demand management techniques including water conservation (in conjunction with stormwater and sewerage demand management), low volume water fittings, premium water use pricing for water use above average daily demand. Stage 3—Test yield of Lincoln Road bore supply under sustained pumping regime Stage 4—Monitor and plan for a larger residential zone beyond 2030. Stage 5—Investigate options for augmentation of groundwater supply with a supplementary bore, or transfer of	Growth related implications for the Carterton water supply scheme are dependent on sufficient residential zone capacity to meet projected demand beyond 2030. Enhanced demand management techniques utilising existing universal metering, followed by supplementary bore water supply and storage capacity to improve security of supply during peak demand periods, needs to be investigated over the next three years.

Issue	Description	Principal options for response	Implications
		consented takes between bore and Kaipaitangata surface take, plus additional storage to be considered.	
Levels of Service	Levels of service for colour, taste and odour are met. Increased reliability and security of supply against risk of bacteriological contamination to be addressed	Investigate options for the Kaipaitangata and bore treatment plants to include additional barriers against potential bacteriological and protozoan contamination.	The costs of additional treatment to mitigate the risk of pathogens contaminating the supply will be investigated and evaluated as the next step in the strategy over the next three years.
Public Health and Environment	The most recent gradings of the Carterton water supply was 'E-c'. A treatment plant grading of E is defined as 'unsatisfactory'. A distribution zone grading of 'c' is defined as 'marginally satisfactory'. The Kaipaitangata treatment plant is graded E. The Frederick Street bore treatment plant is graded D.	Develop evidence of the level of compliance with NZ Drinking Water Standards for a secure supply, including a catchment assessment, and from that investigate options for upgrading the treatment plants, as necessary.	Enhanced treatment and storage will improve public health and environmental protection but at greater cost. Investigations and study of options to be completed over next three years.
Risk and Resilience Issues	Continuity of supply is identified as a risk during sustained drought periods due to the effects of climate change. Low flows in the Kaipaitangata River during peak summer demand periods will limit the ability to extract water from this source. The water storage reservoirs are critical assets. The smaller, 500m^3, reservoir at the Kaipaitangata take is the oldest - approximately 40-years old. The 1,000m^3	Investigate options for increased demand management followed by supplementary raw water storage. Assess susceptibility of soil structures to liquefaction during a major seismic event and implement further resilience measures for critical assets as required over the next 10 years. Include the use of flexible pipe materials and	Current risk mitigation measures will be maintained through the strategy period. Not completing the work risks the water supply being severely restricted during extended drought conditions. The probability of the risk occurring is considered to be moderate, with the severity of consequences being high to critical Seismic protection of the reticulation trunk mains is critical to the resilience of the water

Issue	Description	Principal options for response	Implications
	Kaipaitangata reservoir was constructed in 2008, with the two bore reservoirs constructed in 2003. Resilience of these reservoirs to a major seismic event is key to the integrity of the supply. Internal baffles were installed inside the Kaipaitangata storage reservoirs during 2014/15 and the bore reservoirs in 2012 to reduce the impacts of water 'surge' during a large seismic event. The brittle nature of pipe materials (asbestos cement and earthenware) and jointing systems of older pipes, particularly the trunk mains, makes these assets more vulnerable to failure during seismic events.	jointing systems in future annual pipe replacement programmes.	supply.

Summary of issues—Carrington and Taratahi water races

Issue	Description	Principal options for response	Implications
Asset renewal or Replacements	Routine maintenance includes race inspection and cleaning. Future issue of tree root encroachment along race banks. Intake weirs will require replacement in 10 plus years' time, complete with a new screen for the Carrington intake.	Current maintenance and replacement programmes to be maintained. Any supplementary maintenance will be separately identified, costed and programmed as reactive maintenance. Monitor need for and timing of replacement screen for Carrington water race and erosion protection for both intakes.	

Issue	Description	Principal options for response	Implications
	Need for Tyco rock protection of intakes to be monitored and programmed. Progressive replacement programme for culverts, from 300mm diameter to 500mm diameter, to improve maintenance access.		
Response to Demand	Current capacity is adequate for primary use of water races – stock water supply. Supplementary demand factors include: • greywater for rural dwelling toilets • Firefighting supply for rural dwellings • Protection of stream ecosystem and fishery Habitat • Cultural food source – watercress and eels	Continue water quantity monitoring programme including water budget audit to investigate use, efficiency and measures to reduce water loss. Continue installation of measuring flumes at tail races. Continue with installation of weirs where water races join streams. Review and develop a new bylaw to control water race use.	
Levels of Service	Primary LOS is stock water supply. Water races provide secondary roles of land drainage, rural fire-fighting and in-stream, fish habitat protection during drought periods.	Focus will be on primary role of water races as prescribed in Local Government Act 2002 – stock water supply.	
Public Health and Environment	Both water races are non-potable supplies suitable for stock watering purposes. Persons using the water for drinking purposes do so at their own risk contrary to the legislation and CDC regulations relating to the use of the supply.	Ensure users are informed of unsuitability of water race as a potable supply.	

Issue	Description	Principal options for response	Implications
Risk and Resilience Issues	Low flows in the stream during droughts limit the ability to extract water from the stream. Conversely, flood conditions impose risk of damage to the intake structures. Cross-overs across streams are vulnerable to earthquake damage	Investigate options and risks for seismic protection of cross-overs. Progressively install boundary gates to improve water race accessibility and responsiveness.	Current risk mitigation measures will be maintained through the strategy period.

4.4 Stormwater drainage

CDC's stormwater infrastructure comprises two components. The primary component consists of 12.4km of piped stormwater drainage, 79% of which is reinforced concrete and 21% is uPVC. Pipe sizes range in diameter from 150mm to 1,200mm. In addition, the stormwater assets include 267 street sumps and 126 manholes, plus 6.5km of open drains in the urban area and approximately 20km of open drain in the rural area (in part with rural water race network), complete with discharge structures. The secondary component consists of overland flow paths, including the roading network. The multiple Carterton stormwater discharges are consented through a district wide comprehensive consent. The consent expires on 30 May 2016.

A current project involving construction of a bypass channel on the western side of Carterton is aimed at restoring stormwater drainage capacity of the Waikākāriki Stream during storm events. Land use development along the Waikākāriki Stream has impacted on levels of service. The bypass channel will divert peak stream flows to avoid surface flooding of the adjoining urban area. Consent application and project implementation is scheduled to be completed in 2015/16.

Summary of issues—stormwater drainage

Issue	Description	Principal options	Implications
Asset renewal or Replacements	Ageing pipe assets. Information on pipe condition is mostly anecdotal. Current records indicate the pipe assets are relatively young, with oldest pipes shown as 40-years old	Implement stormwater pipe condition assessment programme. Undertake renewals on a prioritised basis. Maintenance and renewal of damaged pipes will be programmed based on actual condition. Additional capacity could be incorporated in pipe replacements, as required, based on actual and forecast growth.	Develop stormwater renewal programme over next three years based on condition assessment of network.
Response to Demand	Piped stormwater drainage systems are not comprehensive in urban areas. Additional demand from subdivisional land development and intensification will be moderate and funded by developers.	There is no plan to increase network capacity beyond current design. Progressive maintenance and renewal of stormwater pipes is expected to restore pipes to full capacity	There are no new demand based implications for the stormwater infrastructure due to changes in demand.
Levels of Service	Current reticulation capacity copes with most rainfall events or surface flooding is of short duration. Beyond that, drainage of excess surface water relies on secondary flow paths. More intense rainstorms due to the effects of climate change could erode current levels of service. The Wellington Regional Council's Draft Natural Resources Plan is due to be notified as a proposed plan later in 2015. A key requirement will be preparation of	The planned work on Waikākāriki Stream bypass channel will achieve an improved level of service by reducing the potential for surface flooding. The work is budgeted to occur in 2015/16. Review and/or preparation of a stormwater management plan, consistent with the proposed Natural Resources Plan, to address future stormwater management issues, and associated levels of service is intended.	There are no changes planned to the current level of service for stormwater infrastructure beyond the Waikākāriki Stream bypass channel. Maintenance and progressive pipe replacements of damaged pipes over the term of the strategy will improve performance of the current network. The planned development of a stormwater management plan will provide insight as to the scope and scale of future levels of service planning.

	stormwater management plans to improve planning, control, and mitigation of adverse effects from stormwater discharges		
Public Health and Environment	Increased public safety measures at manhole covers or outlet structures is a new issue. Stormwater from the Carterton network discharges to the Mangatārere Waikākāriki streams. There are no litter traps or treatment systems in place but higher environmental standards are anticipated in GWRC Natural Resources Plan.	Preparation of stormwater management plans ahead of the consent renewal process, due 30 May 2016. Assessment of public risk of stormwater covers and other entry points to be assessed.	Attention to public health and safety issues to be achieved within current budgets.
Risk and Resilience Issues	Current risks include pipe failure, flooding of property due to impaired stormwater capacity and blocked secondary flow paths. A major flood event could overtop the banks of Mangatārere or Kaipaitangata Streams with consequential flooding of property. Flood control is currently the responsibility of Wellington Regional Council.	Identification and protection of secondary flow paths through catchment management plans. Repair and replacement of damaged stormwater pipes.	Current risk mitigation measures will be maintained through the strategy period. Failure to complete this work will increase the risk of flooding and damage to property.

4.5 Roads and footpaths

CDC's road and footpath infrastructure assets comprise the following:

Asset Component	Quantity	Notes
Sealed Roads:		
Urban	28.2km	
Rural	261.2km	
Total sealed roads	289.4km	
Unsealed Roads:		
Urban	0.2km	
Rural	155.9lm	
Total unsealed roads	156.1km	
Total roads:	445.5km	
Bridges	52	15 dual lane. 37 single lane.
Culverts >600mm diam.	253	
Culverts<600mm diam.	1,475	
Catchpits	350	
SW Channel	193.1km	
Guardrail	601m	
Sight rail	240m	
Footpaths	47.5km	
Streetlights	526	
Signs	1,419	

Associated assets include carparking and retaining structures.

The maintenance strategy for CDC's roads and footpaths is to achieve current target levels of service through effective intervention strategies and fit for purpose material selections.

Renewal strategies for unsealed roads is based on an average assumed depth loss of 10mm over the entire pavement, accepting that metal loss varies site by site. A 5-7 year return cycle is programmed, where a minimum 50mm layer will be placed on each return. This achieves an average of 30-35km per annum maintenance treatment. Full rebuilding of unsealed pavements is resulting in improvements to the unsealed network. The positive effect of this improvement is the ability to now reduce the overall annual target length. This will be continually monitored and revised as required.

The target length for resealing the network is 17km per annum. This includes chipseals and thin asphaltic surfacing.

As a result of recent culvert inspections, road drainage culverts identified as being dangerous or having inadequate capacity due to regular flooding, have been identified and prioritised. A programme to extend and/or replace the affected parts of the current drainage system is planned over the next 5 to 10 years starting with the highest priorities.

A study of the aging bridge asset within the network is to be carried out ahead of intervention and replacement if required. The study will encompass actual risk, projected life, traffic impacts etc. An assessment of bridge usage versus bridge condition and anticipated failure timeframes will be included, together with an assessment of the impacts, if any, of using alternatives routes. The purpose of the study is to make best use of the existing infrastructure by understanding the travel demand on roads with bridges and provide possible alternatives to bridge renewal. If bridge renewal is still considered the best option, the study will identify a more accurate timeframe for renewal.

CDC intends to undertake a traffic demand management study of traffic growth on the district roading network due to increased use originating from proposed subdivision development and logging operations. This study will encompass an assessment of current and future subdivision and forestry development and the actual and potential impact it will have on the roading network. This will enable the Council to better plan its road renewal and maintenance requirements.

Minor safety projects will be introduced to target the dominant contributing factors to roads accidents, namely:

- too fast for conditions
- poor handling
- alcohol
- lack of attentiveness
- loss of control on bends on rural roads.

Summary of issues—Roads and Footpaths

Issue	Description	Principal options	Implications
Asset renewal or Replacements	Sealed and unsealed rural roads in the Carterton District are in overall good condition. The presence of heavy trucks on specific haulage routes accelerates deterioration of road strength and quality and requires regular intervention to maintain levels of service. Bridge stock is in generally good condition. There are no bridges identified for renewal during the next 30 years.	Undertake ongoing rehabilitation and reseal programme based on condition and usage criteria. Monitor bridge condition and programme renewal of structural components.	The annual budget for resurfacing and pavement rehabilitation is approximately $1.1 million. Not completing this work may mean that some rural roads will not be fit for purpose with a poor level of safety and resilience/accessibility.
Response to Demand	Changes in demand relate mostly to changes to land use activities impacting on specific routes eg forest harvesting, tourism, overload routes	The need for intervention in response to changes in demand, on specific routes, will be monitored and managed within existing programmes.	Changes in demand will be confined to specific rural routes and have only minor implications in the context of the overall roading network capacity.
Levels of Service	Levels of service include road safety, reliability and accessibility, responsiveness and smoothness of ride. The application of One Network Roading Classification may have a negative effect on current levels of service for rural access roads.	No changes to current levels of service are proposed.	Neutral - current levels of service will be maintained through the strategy period.
Public Health and Environment	Road maintenance and construction operations will be carried out to ensure protection of public health and the environment. The roading network includes 156.1 km of	The current length of unsealed road is not planned to be reduced during the strategy period, except for safety or other compelling reasons because of cost. Current roading operations will be monitored to ensure public safety and environmental	Current public health and environmental protection measures will be adhered to.

Issue	Description	Principal options	Implications
	unsealed roads, out of a total length of 445.5km, with associated dust issues.	impacts are managed appropriately. Resource consents for road construction will be obtained where needed.	
Risk and Resilience	Critical assets include bridges, large culverts and bluff areas where natural hazards could trigger failure and isolation of communities.	Bridge inspections are completed every 12 months and structural assessments completed every five years. Alternative routes are maintained for collector roads	Current risk mitigation measures will be maintained through the strategy period.

5 Infrastructure Investment Programme

5.1 The Most Likely Scenario

The following tables summarise the most likely scenario for managing CDC's infrastructure assets, taking account of the above issues. The 30-year term of the strategy provides a high-level insight as to the significant decisions that might need to be taken beyond the relatively short-term, 10-year planning horizon of the 2015–2025 Long Term Plan. All amounts are inflation adjusted through to 2025. Thereafter, all expenditure forecasts are in 2025 dollar values.

The principal options shown are, in many cases, the only options available other than 'do nothing'. The variable is timing. As noted above, current and proposed levels of service are a minimum, dominated by regulatory and technical considerations. Customer levels of service are more discretionary and need to be considered in the context of projected population changes and ability to pay. Options such as demand management have some practicable relevance for Carterton District, namely in respect of the three-waters infrastructure. Overall, the small ratepayer base of the District is sensitive to relatively modest increases in expenditure. Any increases in the capacity of CDC's core infrastructure needs to be well researched and sustainable.

The tables below show the indicative estimates of operational and capital expenditure up to 2045, by infrastructure asset type, for the most likely scenario. The estimates are shown on an annual basis for the first 10 years, followed by 5-yearly sub-totals covering the remaining 20 years of the strategy:

CDC Infrastructure—Operating and maintenance expenditure forecasts by infrastructure asset type 2015–2045

YEAR	1	2	3	4	5	6	7	8	9	10	11-15	16-20	21-25	26-30
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2026-30	2031-35	2036-40	2041-45
Sewerage O&M														
Carterton (including Waingawa)	1,588,000	1,961,938	1,769,702	1,860,925	1,891,121	1,932,842	1,980,269	1,988,144	2,020,444	2,042,077	10,210,385	10,210,385	10,210,385	10,210,385
Water supply O&M														
Carterton (including Waingawa)	1,456,787	1,431,137	1,478,659	1,515,679	1,490,918	1,495,239	1,507,898	1,496,710	1,683,467	1,608,595	8,042,974	8,042,974	8,042,974	8,042,974
Carrington Water Race	84,098	87,647	91,394	93,060	95,680	98,880	101,069	135,895	108,194	111,267	556,336	556,336	556,336	556,336
Taratahi Water Race	262,064	272,503	283,743	291,027	301,158	311,593	315,834	452,752	339,896	350,330	1,751,649	1,751,649	1,751,649	1,751,649
Total water supply O & M	1,802,949	1,791,287	1,853,796	1,899,766	1,887,756	1,905,713	1,924,801	2,085,356	2,131,557	2,070,192	10,350,959	10,350,959	10,350,959	10,350,959
Stormwater drainage O&M														
Total	223,084	210,228	212,260	211,825	214,402	216,203	215,809	220,084	222,367	222,436	1,112,179	1,112,179	1,112,179	1,112,179
Roading and footpaths O&M														
Total	3,553,393	3,640,697	3,758,215	3,753,872	3,846,475	4,006,111	4,032,046	4,134,069	4,355,028	4,405,450	22,027,252	22,027,252	22,027,252	22,027,252

CDC Infrastructure Capital expenditure forecasts by infrastructure asset type 2015–2045

Year	1	2	3	4	5	6	7	8	9	10	11-15	16-20	21-25	26-30
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2026-30	2031-35	2036-40	2041-45
Sewerage Capital—Renewals														
Carterton Total	542,000	699,050	611,682	304,278	290,296	275,638	248,252	243,410	262,880	244,992	1,224,960	1,224,960	1,224,960	1,224,960
Sewerage Capital—New														
Carterton Total	200,000	51,250	105,100	323,700	277,000	398,650	117,100	120,500	62,000	63,800	2,500,000	3,000,000	1,500,000	1,000,000
Water Supply Capital—Renewals														
Carterton	126,500	131,307	135,102	139,150	143,325	147,752	152,433	157,240	162,300	167,613	838,065	838,065	838,065	838,065
Carrington Water Race	7,500	7,785	8,010	8,250	8,498	8,760	9,038	9,323	9,623	9,938	49,688	49,688	49,688	49,688
Taratahi Water Race	7,500	7,785	8,010	11,550	8,498	8,760	9,038	9,323	9,623	9,938	49,688	49,688	49,688	49,688
Total Water Supply Renewals	141,500	146,877	151,122	158,950	160,321	165,272	170,509	175,886	181,546	187,489	937,441	937,441	937,441	937,441
Water Supply Capital—New														
Carterton	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carrington Water Race	15,500	16,608	0	0	0	0	0	0	0	0	0	0	0	0
Taratahi Water Race	2,500	16,608	6,408	3,300	0	0	0	0	0	0	0	0	0	0
Total Water Supply New Capital	18,000	33,216	6,408	3,300	0	0	0	0	0	0	0	0	0	0
Stormwater Drainage Capital—Renewals														
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stormwater Drainage Capital—New														
Total	215,000	0	0	0	0	0	0	0	0	0	0	0	0	0
Roads and Footpaths Capital—Renewals														
Total	1,729,300	1,733,230	1,770,835	1,811,858	1,832,891	1,878,502	1,925,802	1,976,481	2,028,849	2,084,596	10,519,280	10,683,880	10,422,980	10,668,680
Roads and Footpaths Capital—New														
Total	61,600	91,260	93,240	0	0	0	0	0	0	0	0	0	0	0

5.2 Total expenditure summary—Most Likely Scenario

In addressing the issues identified in the previous sections of this strategy, CDC expects to spend $85.3 million on new or replacement infrastructure between 2015 and 2045. Over the same period, $254.8 million is expected to be spent on operating costs, including direct labour, depreciation, materials and maintenance.

Operating expenditure relates to day-to-day administration, financing, and maintenance of the respective infrastructure assets.

Capital works comprise two categories—renewal/replacements and new.

The above forecast totals are distributed across the four infrastructures asset activity areas as follows (totals for 2015–2045):

Infrastructure activity	Operating expenditure	Capital expenditure (replacements)	Capital expenditure (new)
Sewerage	$59.9 million	$8.6 million	$9.7 million
Water supply	$60.8 million	$5.4 million	$0.1 million
Stormwater drainage	$6.6million	$0.2 million	$0.0 million
Roads and footpaths	$127.6 million	$61.1 million	$0.2 million
TOTAL	**$254.8 million**	**$75.1 million**	**$10.2 million**

The table above shows that expenditure across the four infrastructure activity areas will continue to be dominated by operational requirements (operating costs, labour, depreciation, materials and maintenance) between 2015 and 2045. Total infrastructure expenditure is expected to remain between $10.3 million and $11.5 million per year for most of the period covered by this strategy.

5.3 Significant capital works programme summary

Significant decisions to be made regarding new infrastructure projects (defined, for the purpose of this strategy, as being $0.5 million or more of capital expenditure) that are expected to be required during the 2015–2045 period are shown in the tables below. The estimated capital costs and timing are based on forecast amounts included in the above tables.

Sewerage

Significant decision and principal option	Estimated Cost	Estimated Timing
Sewer pipe replacements	$6.4 million	2015–2045

Water Supply

Significant decision and principal option	Cost	Timing
Water supply renewals	$4.5million	2015–2045

Stormwater Drainage

There are no new major stormwater infrastructure projects (being $0.5 million or more of capital expenditure) that are expected to be undertaken in the 2015–2045.

Roading and Footpaths

Significant decision and principal option	Cost	Timing
Bridge and road renewals (reseals, pavement rehabilitation, bridge component renewals)	$60.5 million (average $2.0 million per year before NZTA subsidy)	2015–2045
New miscellaneous works	$13.2 million (average $430,000 per year)	2015–2045

6 Assumptions

The above strategy for managing CDC's infrastructure assets is based on the following assumptions:

Assumption	Level of Uncertainty	Potential Effects of Uncertainty
Construction Costs No major changes relative to current cost structure.	Low	It is possible that the price of some components will change relative to others. Budgets are reassessed each year for the AP process to mitigate this risk. BERL inflation factors applied to the LTP also incorporate an element of price changes in different activity sectors.
Maintenance and operational costs These are largely based on historical rates and assume similar contract rates throughout the planning period.	Low	No inflation factors have been applied. BERL inflation factors will be applied to the programmes and budgets in the LTP. Budgets for successive years of the Annual Plan are based on the corresponding year of the LTP.
NZ Transport Agency Subsidies Subsidies will remain at NZTA forecast levels	Medium	Reduced subsidy would impact on local affordability of CDC's contribution to road asset maintenance and renewals required to maintain current levels of service.
Depreciation Average asset lives at a project level for new works have been used to calculate depreciation.	Medium	Actual rate of asset depreciation is condition based and more accurately described as decline in service potential. Depreciation funding may be over or understated.
Vested assets On average the same level of assets are gifted to the council as a result of subdivision as has occurred over the last 5 years	Low	Rate of subdivisional activity is steady and modest. Financial provision for increased lifecycle costs has been allowed for.
Service potential Service potential of the asset is maintained by the renewal programme.	Pipe networks—Medium Roading and Footpaths—Low	There is medium risk that the service potential of the pipe network assets will not be maintained by implementation of the renewal programme since the latter is not based on reliable asset condition information or planning.

Assumption	Level of Uncertainty	Potential Effects of Uncertainty
Asset lives Asset lives are accurately stated.	Pipe networks—Medium to high Roads and Footpaths—Low	The risk that pipe network asset lives are inaccurate is medium. Lives are based on generally accepted industry values, modified by local knowledge and condition assessment. The condition of large sections of pipe networks has yet to be confirmed. The potential effect is that, for the unconfirmed pipe sections, the effective lives of pipe assets might be overstated, with a consequential impact on depreciation funding and the respective renewals programme.
Natural disasters That there are no major natural disasters requiring additional funding for reinstatement of assets.	Medium	There is medium risk of a natural disaster occurring during the 30-year period requiring additional funds to repair or reinstate assets. Some further provision for increasing the resilience of the assets has been built into this plan but there is still further work to be undertaken to determine the desired level of resilience and the further asset improvements to achieve this.
Council policy No significant change to Council policy that impacts on assets and services.	Low	Any significant change will require a full review of asset management plans and implications identified at the time.
Growth or decline in demand Low to medium change in demand.	Low to medium	Potential changes in demand for the three-water services are expected to be moderate over the period due to the medium population growth projection.
Growth-related expenditure Additional asset capacity required as a result of growth is nil.	Low	Impact of growth on asset capacity is expected to be nil, with developers meeting the costs of any new infrastructure required. Any significant change from that would be addressed through 3-yearly reviews of the Infrastructure Strategy and LTP.
Changes to levels of service Except where specifically identified, changes to levels of service are minor.	Sewerage, water, and stormwater assets—Low	Levels of service due to increased regulatory requirements for drinking water and waste water discharges have been accommodated in the strategy. Uncertainty regarding new levels of service in future resource consents is low for CDC's sewerage scheme because of the recent progress on implementation of a new wastewater strategy. Changes to technical levels of service for the Carterton water supply take are expected due to the current consent renewal process and changes mooted in the draft Wellington Regional Council Natural Resources Plan.

Assumption	Level of Uncertainty	Potential Effects of Uncertainty
	Roading assets—Low to medium	NZTA's current nation-wide move towards a common roading classification, and review of roading subsidy rates, could result in reduced NZTA funding towards CDC's road maintenance and renewal programmes. The consequence would be either an increased local contribution or a reduction in levels of service.