WAIMAKARIRI
DISTRICT COUNCIL

Activity Management Plan 2021

Waikuku Beach Wastewater Scheme

3 Waters | July 2021

Prepared by

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Revision History:

Revision Nº	Description	TRIM	Date
A	Draft for Presentation to U and R Committee	200120006524	18/12/2020
B	Draft for presentation to Council	200120006524	23/02/2021
C	Final for presentation to Council	200120006524	

Document Acceptance

Action	Name		Signed	Date
Prepared by	Gavin Hutchinson	Wastewater Asset Manager		17/02/2021
	Simon Collin	Infrastructure Strategy Manager		17/02/2021
	Chris Bacon	Network Planning Team Leader		17/02/2021
Reviewed by	Kalley Simpson	3 Waters Manager		17/02/2021
Approved by	Gerard Cleary	Manager Utilities and Roading		17/02/2021
Adopted by	Council			

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1 Executive Summary

The following table provides a summary of the key asset management issues of the Waikuku Beach Wastewater Scheme identified through consideration of the levels of service, consents, asset condition, risk analysis, disaster resilience, growth projections, and capacity assessment:

Table 1: Key Asset Management Components

Resource Consents	The Waikuku Scheme is operating well and is compliant with the resource consent conditions.
Levels of Service	The scheme is currently meeting all its level of service targets.
Capacity & Performance	The scheme has been assessed as having sufficient capacity to meet current demand.
Condition Assessment	The majority of the scheme is in moderate to good condition, with only minor replacements required over the next 20 years.
Risk Assessment	The Risk Assessment did not identify any high or extreme risks for this scheme.
Disaster Resilience	There are 1.9km of critical mains rated as extreme or high risk in an earthquake identified through the Disaster Resilience Assessment. Mitigation actions for these mains needs to be further assessed and prioritised as part of the planned update and integration of the two different risk assessments.
	The treatment plant and a number of the pump stations are at high risk in an earthquake. Headworks assessments and subsequent actions are required to improve resilience.
Growth Projections	The scheme is predicted to increase by approximately 24% over the next 50 years. No upgrades of the treatment plant will be required to accommodate this level of growth, but the Kings Ave rising main will be increased in size when replaced to accommodate the expected growth

2 Introduction

The purpose of this Activity Management Plan (AMP) is to outline the significant issues associated with the Council's assets and to show how the Council proposes to manage the schemes in the future.

The data that has been relied upon to produce this document was taken at the end of the 19/20 financial year. i.e. 30 June 2020 . More up to date scheme statistics are available on document TRIM 121108078891 which is to be updated quarterly.

Further details of the asset management practices used by Council to manage this scheme are summarised in the District Wastewater AMP Overview document.

Projects identified to improve asset management processes for this scheme will also benefit the performance of other 3 waters schemes and are managed at a District level for efficiency.

Projects are also identified within this AMP that will maintain or improve levels of service.

Repair of wastewater supply asset damage from the Canterbury earthquake sequence has now been completed. No significant legacy effects are expected.

All figures within this AMP exclude inflation.

3 Related Documents

The following related documents have been used as reference documents or for guidance in the development of some of the sections in this Activity Management Plan

- Waimakariri District Plan
- Population in the Waimakariri District (TRIM 170328030077)
- New Projections for LTP 2021-2031 (TRIM 200908117997
- WDC Asset Management Policy (TRIM 180605062091)
- 2019 Customer satisfaction Survey (TRIM 200313034937)
- Development Contributions Policy 2021/22 (TRIM 200729095963)

4 Scheme Description (What Do We Have?)

The Waikuku Beach Wastewater Scheme is part of the Eastern Districts Wastewater Scheme. It is generally an urban gravity reticulation scheme, except for two small pump stations (Kings Ave PS and North Oval PS) that discharge into the reticulation. The sewage is conveyed via a network of gravity pipes to the Reserve Road Pump Station where it is transferred to the Waikuku Beach Treatment Plant via a rising main.

The treatment plant consists of an automatic step screen to remove large solid particles and two oxidation ponds with a mechanical aerator that discharges via a pump station to the Woodend Wastewater Treatment Plant for further treatment and disposal via the ocean outfall.

Some key statistics (2019/20) of the scheme are shown in Tables 2 to 7. The extent of the currently serviced area and comprehensive flow data records are presented in Figure 13 and Figure 14 respectively.

A schematic view of the treatment system is presented in Figure 1.

Table 2: Scheme Statistics for 2019/2020

Scheme Parameter	Statistics	Source
Type of Supply	Urban Gravity / Individual pressure connections	
Treatment	Oxidation ponds	
Length of Reticulation	10.3 km	Wastewater Asset Valuation Tables 8-5 and 8-6, pages 59 to 62
Total Replacement Value	$10,099,664	
Depreciated Replacement Value	$6,053,872	
Number of Connections	456	2019/20 Rating Query
Number of Rating Charges	504	
Average Daily Flow (5 year average)	306 m^3/day	Flow Data Analysis – Sewer
Average Daily Flow/connection (5 year average)	685 l/day/con	
Peak Daily Flow (5 year average)	670 m^3/day	
Peak Daily Flow/connection (5 year average)	1,494 l/day/con	

Table 3: Wastewater Gravity Pipe Data Summary

Wastewater Gravity pipe length (m) by diameter and pipe material						
Pipe material	**Pipe Diameter (mm)**					
	50	**100**	**150**	**200**	**225**	**Total**
Asbestos cement	0m	0m	3,401m	233m	0m	3,634m
Polyethylene	0m	82m	0m	0m	0m	82m
Polyvinylchloride	0m	18m	941m	88m	50m	1,097m
Other	2m	0m	1,199m	0m	0m	1,201m
Total	**2m**	**100m**	**5,541m**	**321m**	**50m**	**6,014m**

Table 4: Wastewater Pressure Pipe Data Summary

Wastewater Pressure pipe length (m) by diameter and pipe material							
Pipe material	**Pipe Diameter (mm)**						
	50	**100**	**150**	**200**	**250**	**300**	**Total**
Asbestos cement	0m	1,095m	0m	432m	0m	0m	1,526m
Polyethylene	1,322m	1,296m	0m	0m	0m	0m	2,618m
Polyvinylchloride	0m	36m	0m	69m	22m	0m	126m
Other	0m	22m	1m	0m	0m	4m	27m
Total	**1,322m**	**2,449m**	**1m**	**501m**	**22m**	**4m**	**4,298m**

Table 5: Wastewater Valve Data Summary

Wastewater Valves	
Diameter (mm)	**Count**
50	39
100	7
250	2
Total	**48**

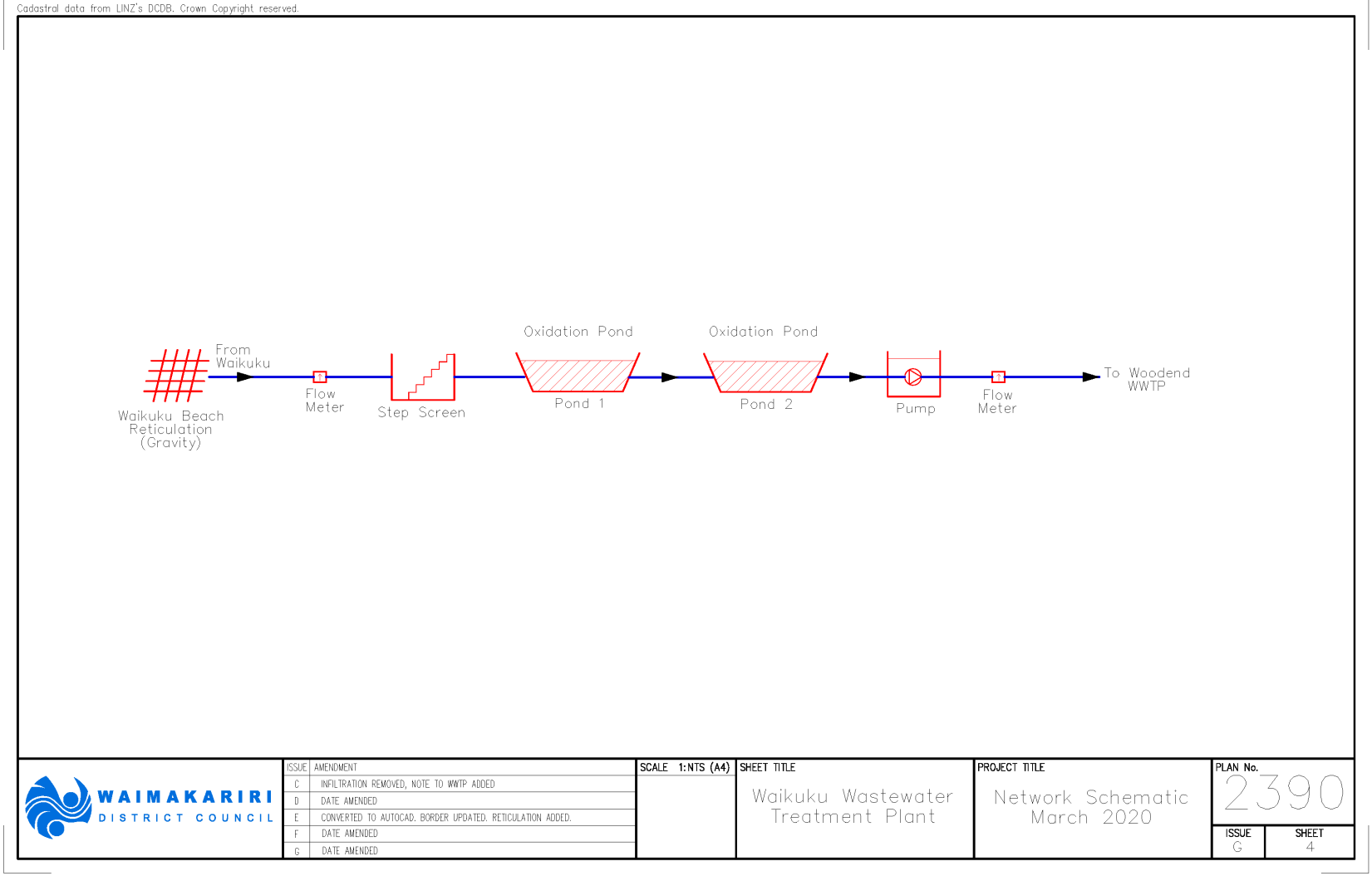
Table 6: Wastewater Manhole Data Summary

Wastewater Manholes	
Diameter (mm)	**Count**
900	61
1050	12
1200	1
1500	0
Total	**74**

Table 7: Data References

Data Reference	Trim Reference
Sewer flow data analysis	121108078891
2020 3 Waters Asset Valuation	200824109857
2020 50 Year Water and Sewer Growth Forecast	200224024348
2019 Customer Satisfaction Survey	200313034937

Figure 1: Network Schematic



5 Scheme Management Issues (What Do We Need to Consider?)

There are a number of key aspects to consider when managing a wastewater scheme, these include

- Target & actual levels of service
- Asset condition & criticality
- Capacity & performance of the supply
- Risks associated with the supply
- Growth predictions for the scheme

These issues have been assessed in detail and are explained in the following sections.

5.1 Levels of Service

Table 8 sets out the performance measures and targets for the scheme, and performance achievement against targets since 2008.

Mandatory performance measures are measured at the district wide level and are not included in the individual wastewater scheme AMPs. They are located in the District Overview Wastewater Activity Management Plan. However there is considerable overlap between the measures at Scheme and District levels. Mandatory measures cover overflows, consent compliance, time to respond to faults, and complaints. The Scheme LOS measures include more detail, and cover complaints, consent compliance, overflows and outages, but not response times, which are only measured at scheme level.

None of the WDC targets are expected to change with time so only the one target value has been shown in this document

Performance in Table 8 is measured against the performance measures set in 2018, as part of the 2018-28 Long Term Plan process. Going forward from 2021 onwards, performance will be against the modified set of performance measures that were presented to the Council's Utilities and Roading Committee in 2020 (refer report 200406043184[v2]), and subsequently approved by Council. These revised levels and targets are detailed in the District Overview Water Supply Activity Management Plan.

Table 8: Elective (non-mandatory) Levels of Service Targets and Performance Measures as Assessed in 2020

** Note A "Y" indicates that the LOS has been met, and an "N" indicates it has not been met*

 # Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment.

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results#			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	Nil	There were no complaints regarding midges or insects.	Achieved	N/A	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	There were no complaints regarding odour.	Achieved	N/A	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	Nil	There were no complaints regarding odour.	Achieved	N/A	Y	Y	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	Nil	No notices of consent breach were received.	Achieved	N/A	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	There were no losses of service greater than 8 hours.	Achieved	N/A	Y	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components	1 in 2 year	Nil	This level of service is met.	Achieved	N/A	Y	Y	Y	Y

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results#			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
		designed prior to May 1999 without overflows occurring									
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met.	Achieved	N/A				
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met.	Achieved	N/A				

5.2 Asset Condition

The current assessment of asset condition is based on theoretical remaining useful life derived from component age and adopted useful life. Adjustments to the remaining life are made to individual components where information is available to suggest the theoretical remaining life is inappropriate.

A rolling wastewater CCTV programme was started in 2008 to survey the reticulation network and assign evidence based condition ratings. District wide these surveys have identified a number of mains faults that have led to remedial actions including immediate or scheduled repair, decreased remaining useful life and increased renewal priority. However analysis of this survey information has not been well managed due to the lack of appropriate software. The expected purchase of the widely used InfoAsset Manager software for this purpose will significantly improve this situation, and enable better determination of asset condition and remaining useful life.

The CCTV condition information is complemented with maintenance activity records from the field recording wastewater mains blockage and overflow records.

Figure 2 below, shows the assessed pipe condition for all pipes within the scheme. Figure 3 summarises the theoretical asset condition for both the network and headworks in a graph, while Table 9 provides more detail about the value of the assets within different asset condition categories.

Figure 2: Pipe Condition Assessment Plan

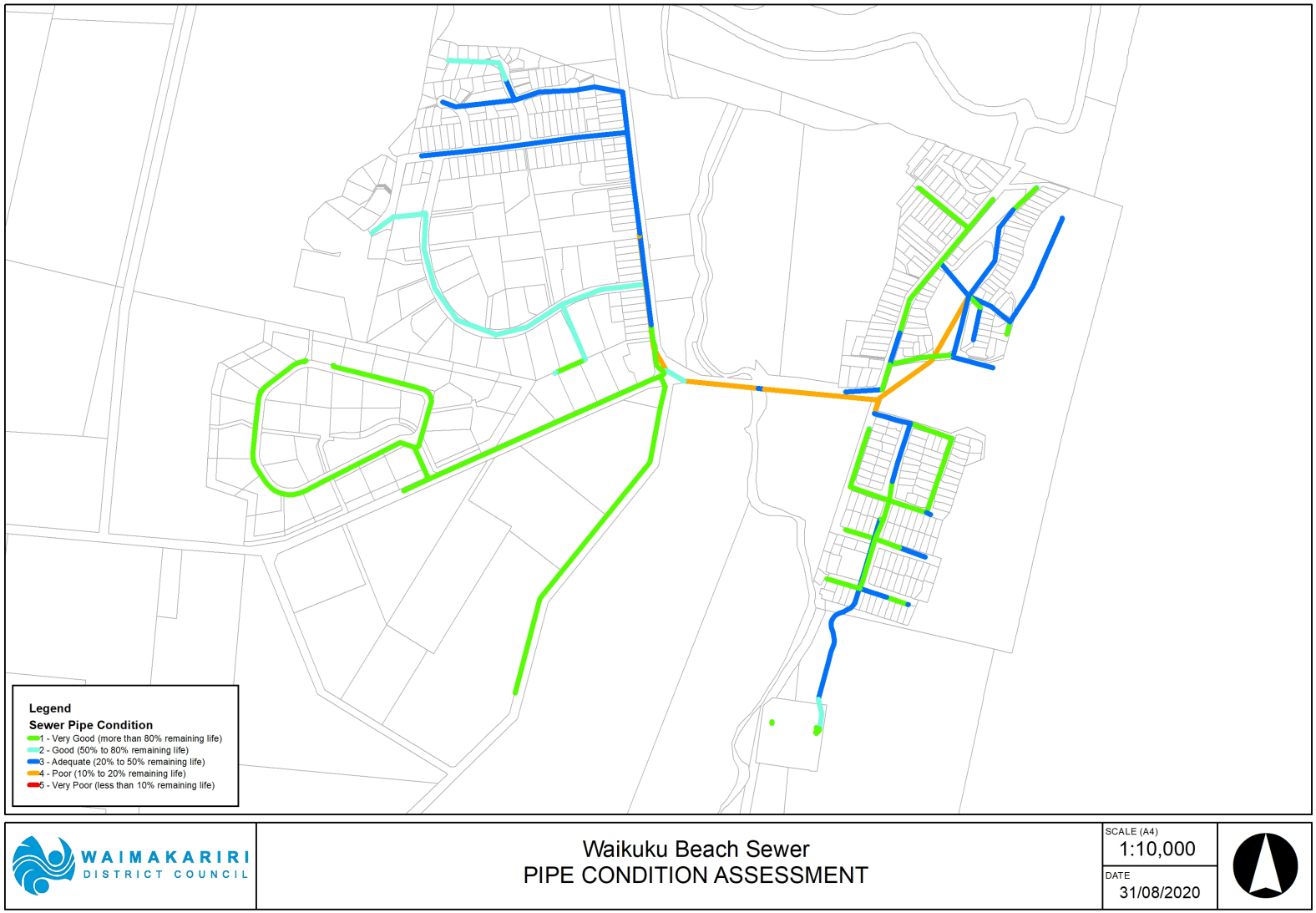
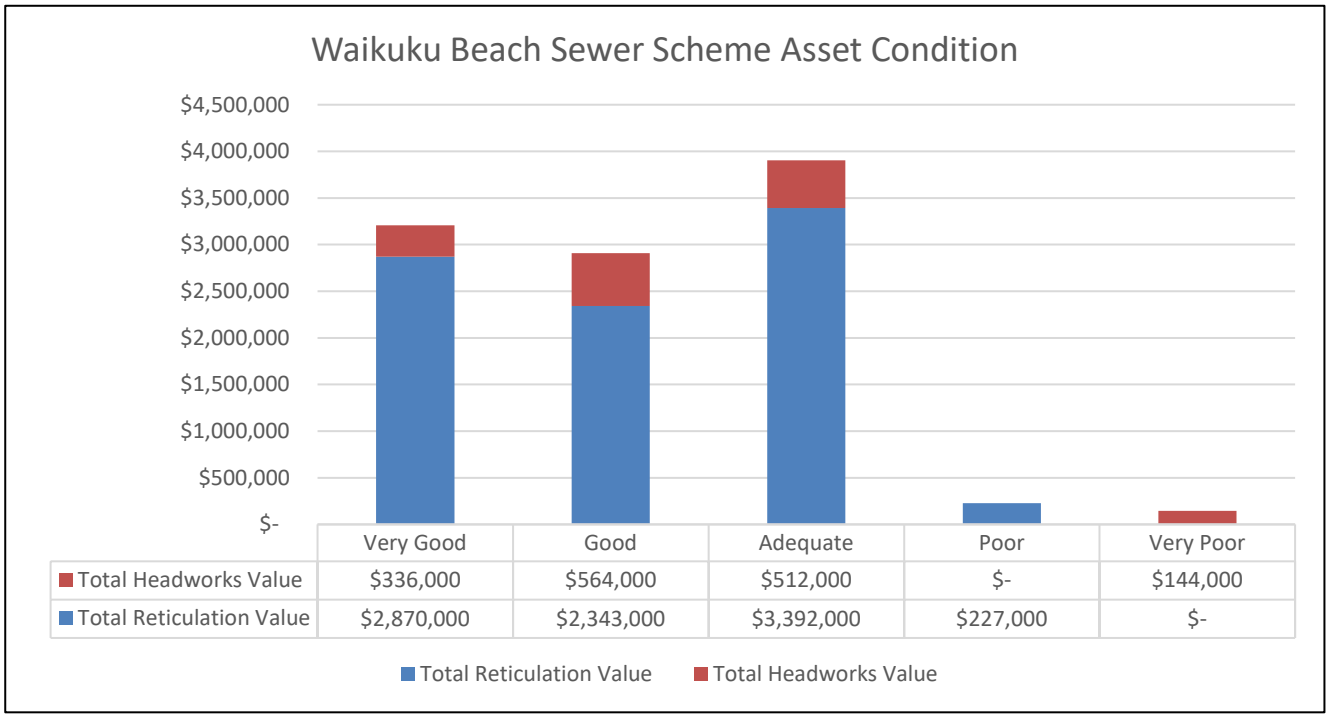


Figure 3: Asset Condition Summary



"Headworks" is inclusive of all above ground assets associated with the wastewater supply scheme e.g. buildings, pump sets.

Table 9: Pipe Condition Summary

Condition Grade	Definition	Pipeline Quantity	Total Reticulation Value	Total Headworks Value	Total Value
1	Very Good *More than 80% of life remaining*	4.6 km *45%*	$ 2,870,000 *32%*	$ 336,000 *22%*	$ 3,206,000 *31%*
2	Good *Between 50% and 80% of life remaining*	1.2 km *12%*	$ 2,343,000 *27%*	$ 564,000 *36%*	$ 2,907,000 *28%*
3	Adequate *Between 20% and 50% of life remaining*	3.3 km *33%*	$ 3,392,000 *38%*	$ 512,000 *33%*	$ 3,904,000 *38%*
4	Poor *Between 10% and 20% of life remaining*	1.0 km *10%*	$ 227,000 *3%*	$ - *0%*	$ 227,000 *2%*
5	Very Poor *Less than 10% of life remaining*	0.0 km *0%*	$ - *0%*	$ 144,000 *9%*	$ 144,000 *1%*
Total		**10.3 km**	**$8,832,000**	**$1,556,000**	**$10,388,000**

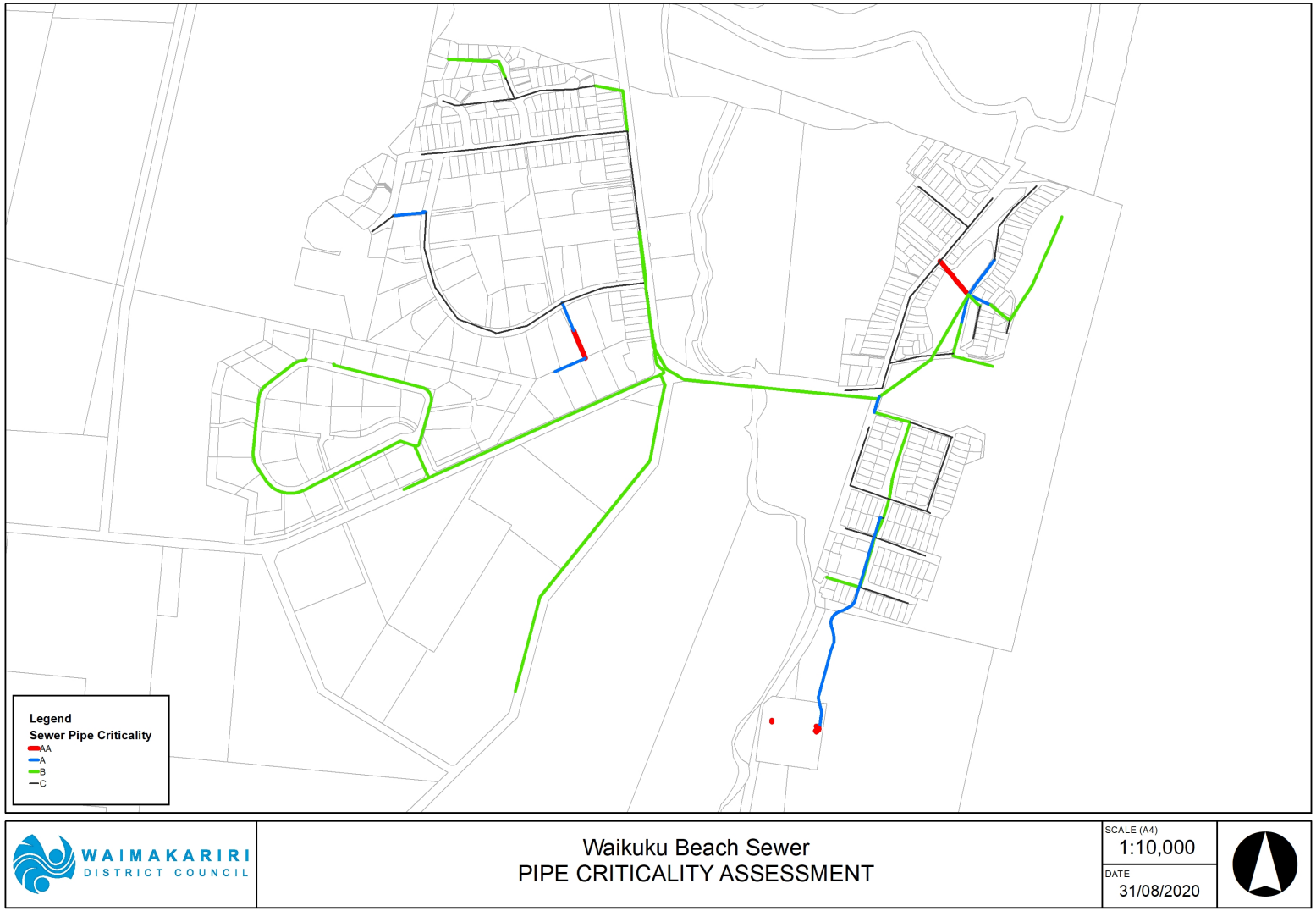
5.3 Asset Criticality

Asset criticality provides an indication of the importance of an individual asset and the corresponding impact on the service delivery should the asset fail for any reason. Criticality is used in risk based investment decisions to help decide when an asset should be replaced to avoid the consequences of failure. The Council has developed an assessment process which scores assets from most critical 'AA' to least critical 'C'.

The pipe criticality scoring process has been significantly improved through automation and dynamic links to GIS data layers for this AMP.

Figure 4 provides a spatial view of asset criticality for the scheme.

Figure 4: Pipe and Facilities Criticality



5.4 Risk Assessment

An Operational Risk Assessment was first undertaken for the Waikuku Wastewater Scheme in 2004, and it has been regularly updated since that time. It was last updated for the 2015 AMP review. At the last review there are no high risks remaining for the Waikuku Beach wastewater scheme.

The District Wide Overview details the risk events considered and includes a summary of the risk assessment results for all the wastewater supply schemes and is useful in indicating overall wastewater network priorities.

Table 10 summarises the number of events at each level of risk for the Waikuku Beach Wastewater Scheme.

Table 10: Number of Events per Level of Risk

Risk Level	2004	2008	2011	2014
Extreme risks	0	0	0	0
High risks	5	0	0	0
Moderate risks	29	33	22	20
Low risks	6	10	22	24
Not applicable	0	1	0	0
Total	**40**	**44**	**44**	**44**

The table shows there are no high or extreme risks identified for this scheme.

District wide, moderate risks are being deferred until extreme and high risks have been addressed.

5.5 Disaster Resilience Assessment

The 2009 Disaster Resilience Assessment (DRA) is a desk top study that primarily considered the risks to above ground structures presented by natural hazard events across all Council operated 3 Waters schemes. The original assessment was updated in 2012 using revised hazard and asset behaviour information captured during the 2010-11 Canterbury earthquake sequence.

Risk from earthquake events that could induce liquefaction, on brittle pipes (AC and earthenware) is managed using a reticulation vulnerability score. This is used as an input to the risk based renewals assessment.

Above Ground Facilities

The above ground facilities were assessed for risk of failure against 13 natural and 2 manmade hazard scenarios. The following risk profile reflects the likelihood of the event occurring and the consequence on the community of the facility failing. Hazards classified as having 'No Known Risk' have been omitted from the table.

Table 11: Risks to Above Ground Facilities

Threat	Kings Ave PS	North Oval PS	Reserve Rd PS	Waikuku Beach WWTP	Waikuku Beach Outfall PS
100 yr Local Flooding	L	L	L	N	N
475 yr Earthquake Induced Slope Hazard	L	L	L	L	L
500 Yr Ashley Flood	L	L	L	L	L
Earthquake (50 yr)	H	M	H	H	H
150 Yr Earthquake	M	M	M	M	M
475 Yr Earthquake	M	L	L	M	L
200 Yr Tsunami	M	L	M	M	M
Wildfire	L	L	L	M	M
Snow 150 Yr	L	L	L	L	L
Wind 100 Yr	L	L	L	L	L
Lightning	M	M	M	M	M
Pandemic	M	M	M	M	M
Terrorism / Sabotage	L	L	L	L	L
E = Extreme, H = High, M = Moderate, L = Low					

The scheme is located in the high liquefaction susceptibility zone and the facilities are considered to have low resilience to earthquake activity.

Up to 0.6m of flooding has been modelled from the Ashley River at Kings Ave, Reserve Road and North Oval pump stations. All facilities are at risk from 0.6-1 metres of inundation from a worst case distant source tsunami.

The threat from wildfire is high at all sites on the Waikuku Beach wastewater scheme, however due to the low consequence ratings, this risk is low or moderate.

All wastewater sites in the District have been identified as at moderate risk from lightning and pandemic.

The Councils response to these risks is being managed at a district level via the DRA Action Plan and related projects. Refer to the District level AMPs for details.

5.6 Growth Projections

Situation

The growth in Waikuku Beach is constrained by the physical characteristics of the area with only one small area remaining for development. The majority of the growth on the Waikuku Beach Scheme is as infill in the Allin Drive area.

The increase in population may be greater than the modest increase in connections predicted due to the expected continuing trend for holiday homes becoming permanent residences in this community.

The overall district population growth scenario used for the 2021 AMP update was supplied by Council's Development Planning Unit, broken into towns and rural areas. Wastewater growth projections were calculated using the New Projections for LTP 2021-2031 (TRIM 200908117997), which was the basis for infrastructure planning.

Due to issues that have occurred with the Census 2018, the population projections that would normally be used as a basis for updating the work previously developed by the Council's Development Planning Unit have not been released by Stats NZ in time for the development of this assessment.

However, based on the historical growth patterns of new dwelling Building Consents over the last three years (636 in 2017/18, 661 in 2018/19 and 615 in 2019/20), the projections used for the previous LTP/infrastructure strategy remain valid to be used for infrastructure planning. As the timeframe for this infrastructure planning is for the thirty years between 2021 to 2051, the previous population projections have been extended out a further three years, as documented in New Projections for LTP 2021-2031 (TRIM200908117997)

It is important to provide a brief comment on COVID19 and the impact it could have on population projections. At the time of writing this paragraph (August 2020), New Zealand is currently in Level 3 restrictions in Auckland and Level 2 restrictions in the remainder of the country. While international migration is currently low arising from the COVID19 travel restrictions, a significant number of New Zealanders are returning home due to the impact of COVID19 on overseas countries. This has contributed to a high level of population growth nationally over the last six months, which has had a flow on effect to growth in the Greater Christchurch and Waimakariri Districts. How long this might continue for and when international migration (from other countries) might return to pre COVID levels is still to be determined. However the existing population projections remained the most appropriate to use for infrastructure planning at this time.

Demand

Demand on the Waikuku Beach wastewater scheme is expected to increase by 6%, by the end of the 2021-31 Long Term Plan (LTP) period. This projection is based on 29 new connections being established from 2019/20 to 2030/31, as identified in the 2020 50 Year Water and Sewer Growth Forecast Report (TRIM reference number 200224024348).

The number of new residential connections are predicted to increase by 3 per year, during the 2021-31 Long Term Plan (LTP) period to accommodate this demand. Demand beyond the 2021-31 LTP period (2030/31 to 2070/71) is forecast to transition to a slightly lower growth profile resulting in an average of 2 new connections per year (Table 12).

Table 12: Growth Projections

Waikuku Beach	Rates Strike July 2019	Years 1 - 3	Years 4 - 10	Years 11 - 20	Years 21 - 30	Years 31 - 50
	2019/20	2021/22 to 2023/24	2024/25 to 2030/31	2031/32 to 2040/41	2041-42 to 2050/51	2051/52 to 2070/71
Projected Connections	449	461	478	502	524	556
Projected Rating Units	500	512	529	553	575	607
Projected increase in Connections		3%	6%	12%	17%	24%
Projected Average Dry Weather Flow (m3/day)	341	349	361	377	392	414
Projected Peak Wet Weather Flow (m3/day)	2,029	2,069	2,126	2,207	2,283	2,391

Note that the time frames have been chosen to reflect the periods 3, 10, 20 and 30 years from the AMP release date, however due to the time it takes to complete the analysis the base rates strike data used was from 2019/20.

Longer term, connections are projected to increase by 24%. This long term projection is lower than the 2017 growth projection, of 78% (used for the 2017 AMP). Both projections utilised the best data and information available to project the connections for the wastewater schemes at the time. The base population projections given to PDU for 2019 infrastructure planning were more area specific than the 2017 projections, and has given a better projection for the Waikuku Beach area.

Average Dry Weather Flow (ADWF) and Peak Wet Weather Flow (PWWF) projections have been based on the assumptions that for future development areas the Engineering Code of Practice (ECOP) ADWF or PWWF per person is added to the existing flow. The assumptions made to calculate the future ADWF were based on the ECOP, with the residential 0.675m3/prop/day and non-residential 0.2m3/Ha/day; and the future PWWF was based on the ECOP, at residential 3.375m3/prop/day and non-residential 1m3/Ha/day.

Waikuku Beach's existing Inflow/Infiltration level is considered Low, resulting in below-average Peak Wet Weather Flow.

Projections

Figure 5 and Figure 6 present the projected growth and corresponding demand trends for the Waikuku Beach wastewater scheme.

Figure 5: Population Projections

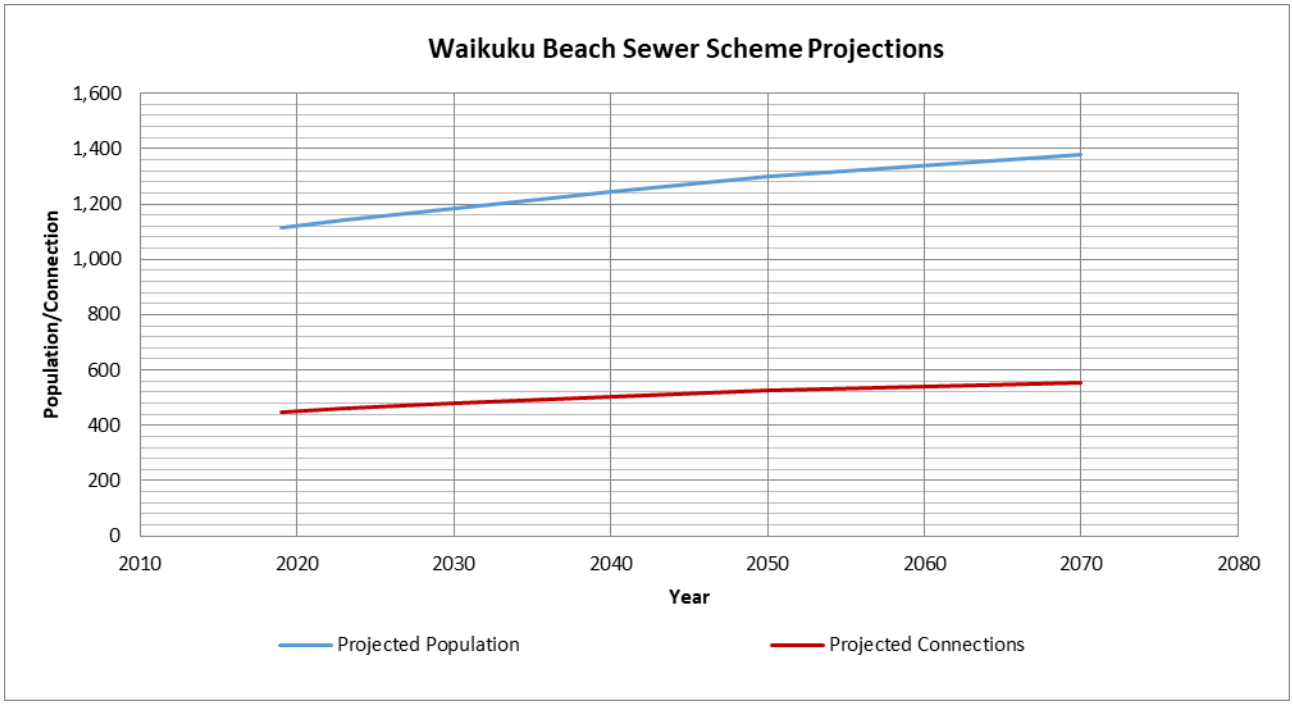
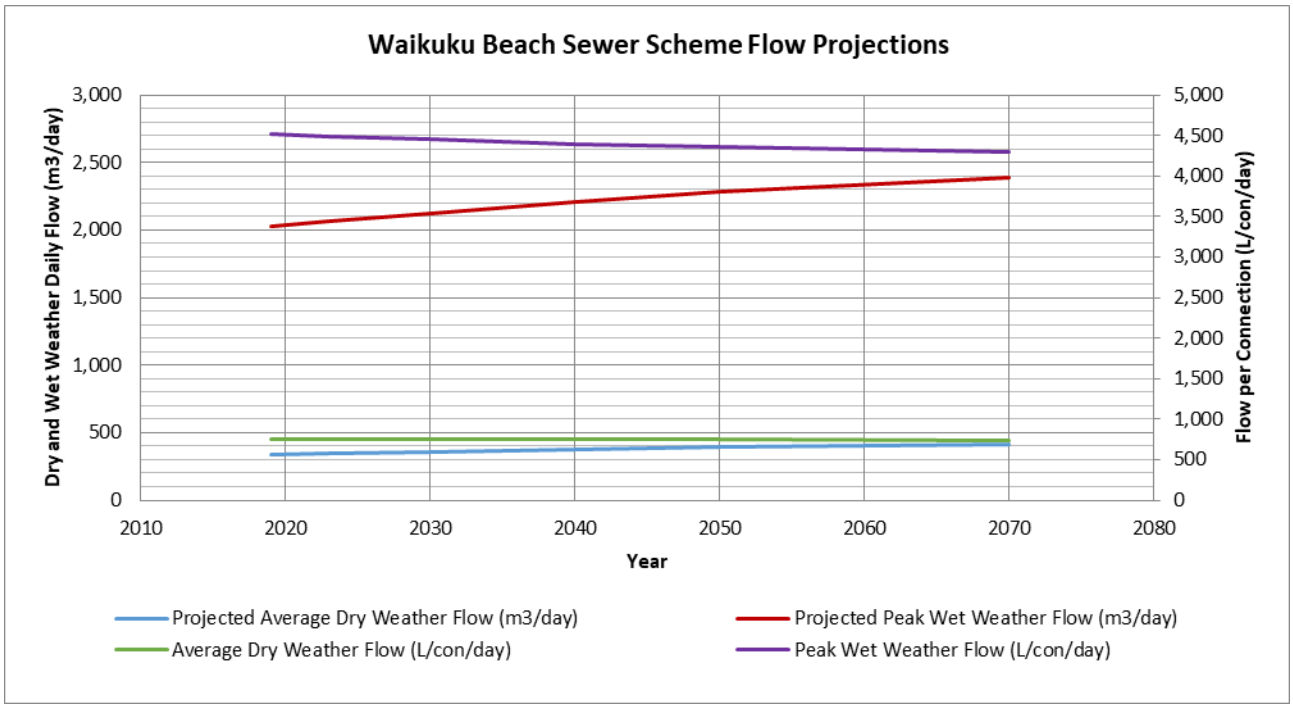


Figure 6: Flow Projections



5.7 Capacity & Performance

This section of the AMP considers the capacity and performance of the Waikuku Beach Wastewater Scheme. The specific aspects of the scheme that have been considered are the treatment plant and the reticulation system. These are discussed in more detail in the following sections.

Treatment Plant

The existing Waikuku Beach Wastewater Treatment Plant consists of an automatic step screen to remove large solid particles and two oxidation ponds with a mechanical aerator that discharges via a pump station to the Woodend Wastewater treatment Plant for further treatment and disposal via the ocean outfall.

No provision has been made for future expansion. The oxidation ponds have sufficient capacity to treat the flow from all likely growth in the Waikuku Beach area.

Reticulation System

The capacity of the wastewater reticulation was assessed using a calibrated hydraulic model in 2007/08, which was updated in 2013 (TRIM141106121398 Waikuku Beach Sewer PS System Assessment). The model was used to assess the upgrades necessary to accommodate growth and to provide sufficient capacity to achieve the LoS relating to overflows. The model indicates the scheme is meeting its levels of service for both existing and new development areas (2 and 5 year level of service).

Although the wastewater reticulation is deep and below the groundwater table, inflow and Infiltration does not appear to be a problem in this area. The majority of the houses are constructed on sand where stormwater drainage is generally not a problem.

Root intrusion seems to be an issue in some areas due to the lack of natural water for the trees. This has the potential to reduce the reticulation capacity and ultimately cause blockages. This will require increased maintenance and informing the property owners of their responsibility to maintain their trees in a manner that does not cause damage to the Councils infrastructure. The CCTV programme will inform this increased maintenance.

There was some damage to the wastewater reticulation on the Waikuku Beach Scheme as a result of the earthquakes. Some sections of the reticulation have been replaced to maintain levels of service.

Rising main replacements at Kings Ave, North Oval and Reserve Road pump stations have been deferred to post 2031. This is following the condition assessment of a section of AC pipe from the Kings Ave pressure main recommended programing the renewal in 2037 (TRIM 210111001675). The rising main capacity will be increased when it is replaced to accommodate the expected growth.

6 Future Works & Financial Projections (What Do We Need To Do?)

This section covers the future works required to meet the target levels of service, maintain the asset in an acceptable condition, reduce the risks to an acceptable level and accommodate growth. Note financial forecasts do not include inflation.

6.1 Operation & Maintenance

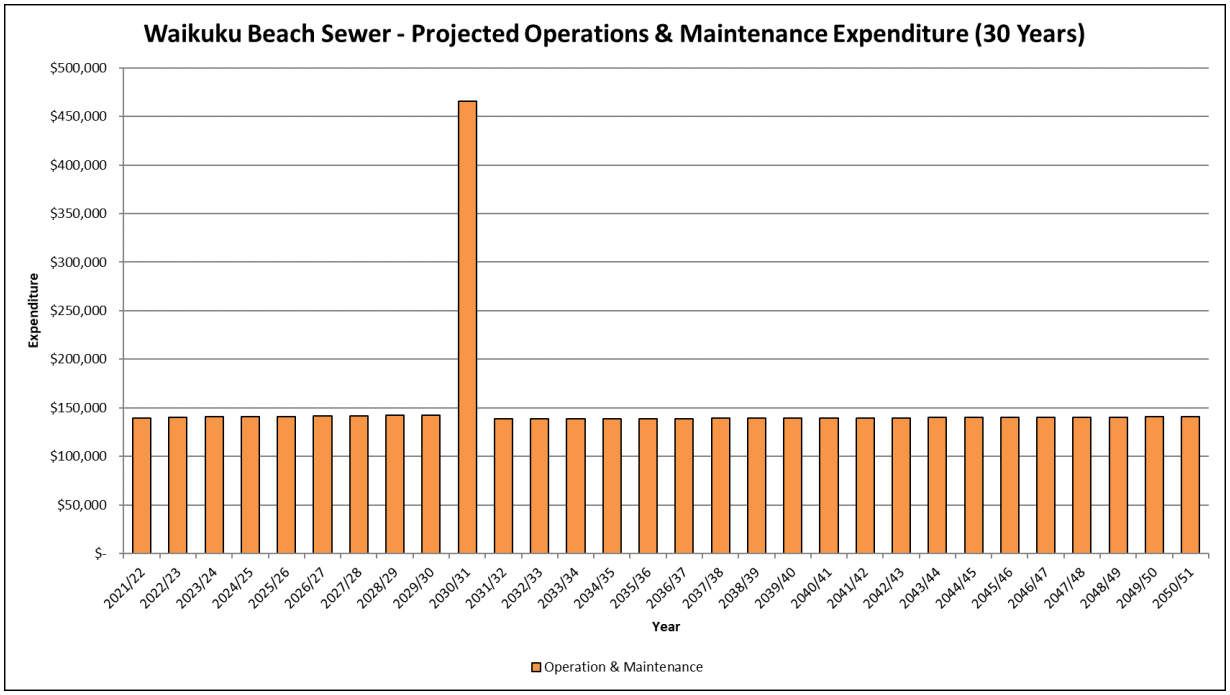
Operation and maintenance (O&M) expenditure incorporates the day to day running of the water supply network and allows the system to carry on functioning to deliver the agreed levels of service.

The O&M programme includes a combination of reactive and planned tasks. Examples of the differing nature of these tasks is summarised within the Overview document.

While there are no known deferred maintenance items, it is expected that the recent implementation of an Asset Management Information System (AMIS) will enable improved planned maintenance regimes. For example the new system will allow analysis of blockages that will identify where a pre-emptive regular cleaning programme should prevent blockages from occurring.

O&M budgets are set based on a combination of past expenditure (for reactive tasks), cost estimates for planned works, and adjustments going forward to account for growth, inflation, depreciation and any significant new works planned. Further detail of this process is provided in the Overview document. The end result of this is shown in Figure 7.

Figure 7: Annual Operation & Maintenance 30-Year Budget



The increase in 2030/31 is for the desludging of a oxidation pond at the Waikuku WWTP .

6.2 Renewals Programme

The renewals programme is determined in two stages. The renewals model, details of which are provided in the overview document, provides a long term view of the funding required to ensure that a renewals fund is sufficient to enable future asset renewals, without needing to borrow. For sewer the model is operated at the Eastern Districts Sewer Scheme level, but it provides Asset Managers, at a scheme level, prioritised candidates based on criticality, risk, and expected asset life on for consideration for inclusion in the LTP. Asset Managers consider other factors such as roading renewal programmes in determining final projects for the LTP.

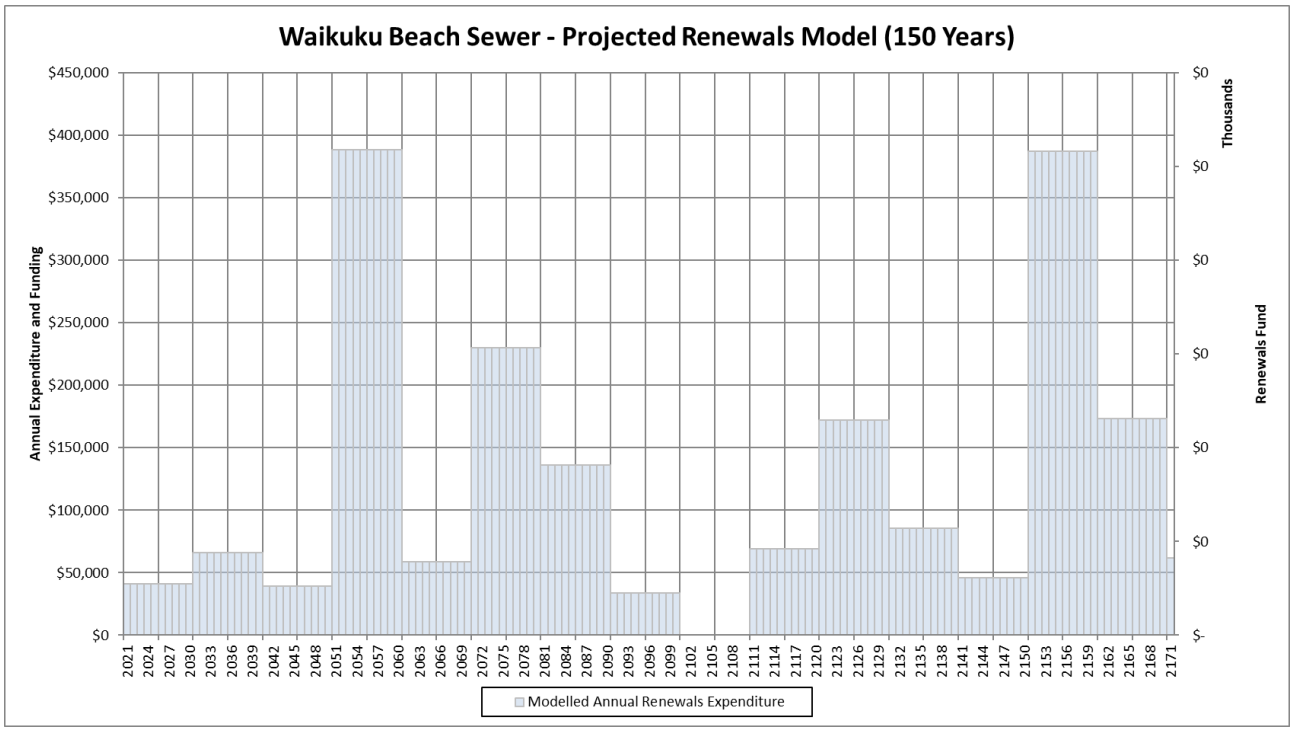
Figure 8 below shows the output from the model only and provides a broad brush spatial view of the likely timeframe for renewals.

Figure 8: Pipe Renewal Time Frames

Figure 9 below shows the financial output from the model alone. Budgeted depreciation funding, modelled annual funding required, and the modelled renewals fund are not shown on this graph, but are shown on the equivalent graph in the Overview AMP. This is because all properties that are connected to the Eastern District Wastewater Scheme (EDWS) are charged using the same set of (differential) rates.

The figure only shows the output from the model, so expenditure shown in the graph for the first ten years may be different from the expenditure shown in the final budget, as adjustments may have been made by the Asset Manager from the direct renewals model outputs. The final renewals budget put forward into the draft LTP, is included in the capital works graph, Figure 10 . There are no deferred renewals.

Figure 9: Annual Renewals Expenditure, 150 Year Budget



6.3 Capital Works

The following graph shows the 50 year budget for all capital works, including projects driven by growth and levels of service (Figure 10). Renewals expenditure showing in the first ten years of the graph, includes the actual planned programme, not the model output.

Figure 10: Projected Capital works

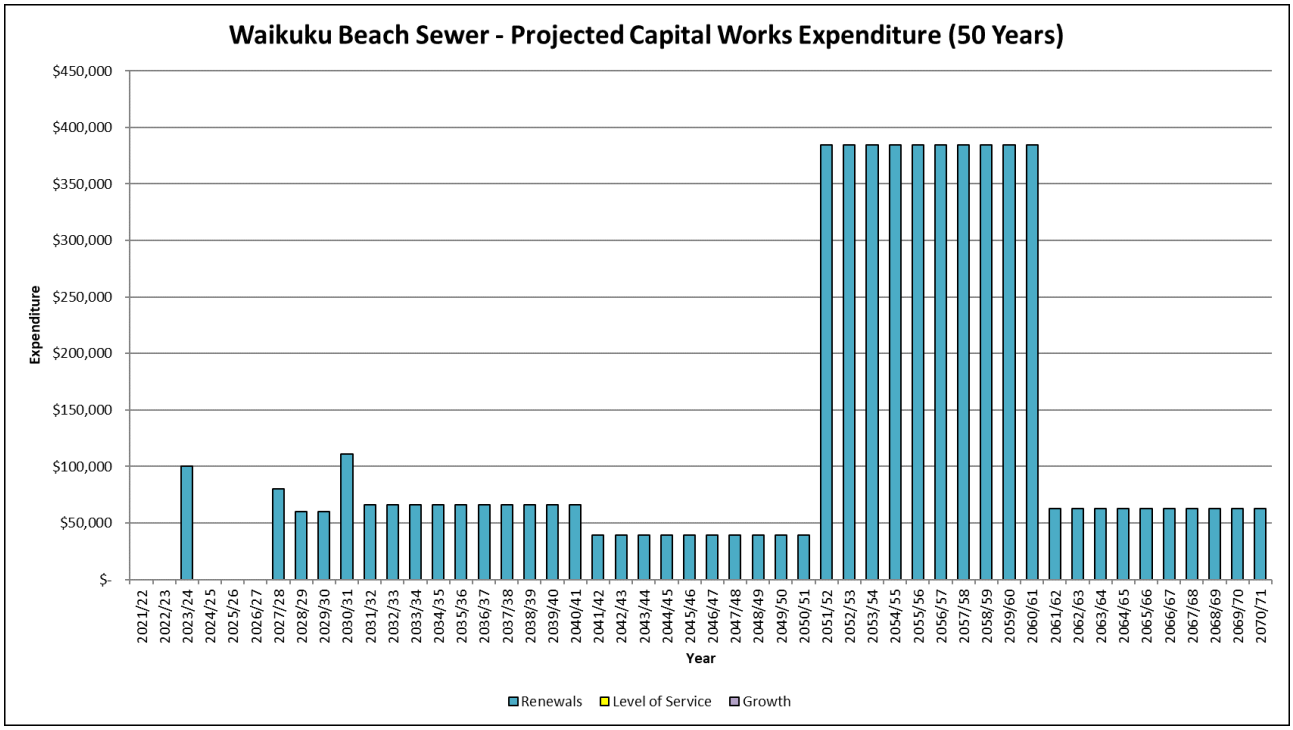


Table 13 on the following page summarises the projected capital works for the next 50 years, including renewals.

Figure 11 shows the corresponding location of the projected capital upgrade works.

The level of confidence in the budget for the works (High / Medium / Low) is presented in the table. For a more complete discussion on the level of optimisation, refer to the introductory chapter of the AMP. The figures in the table are not adjusted for inflation.

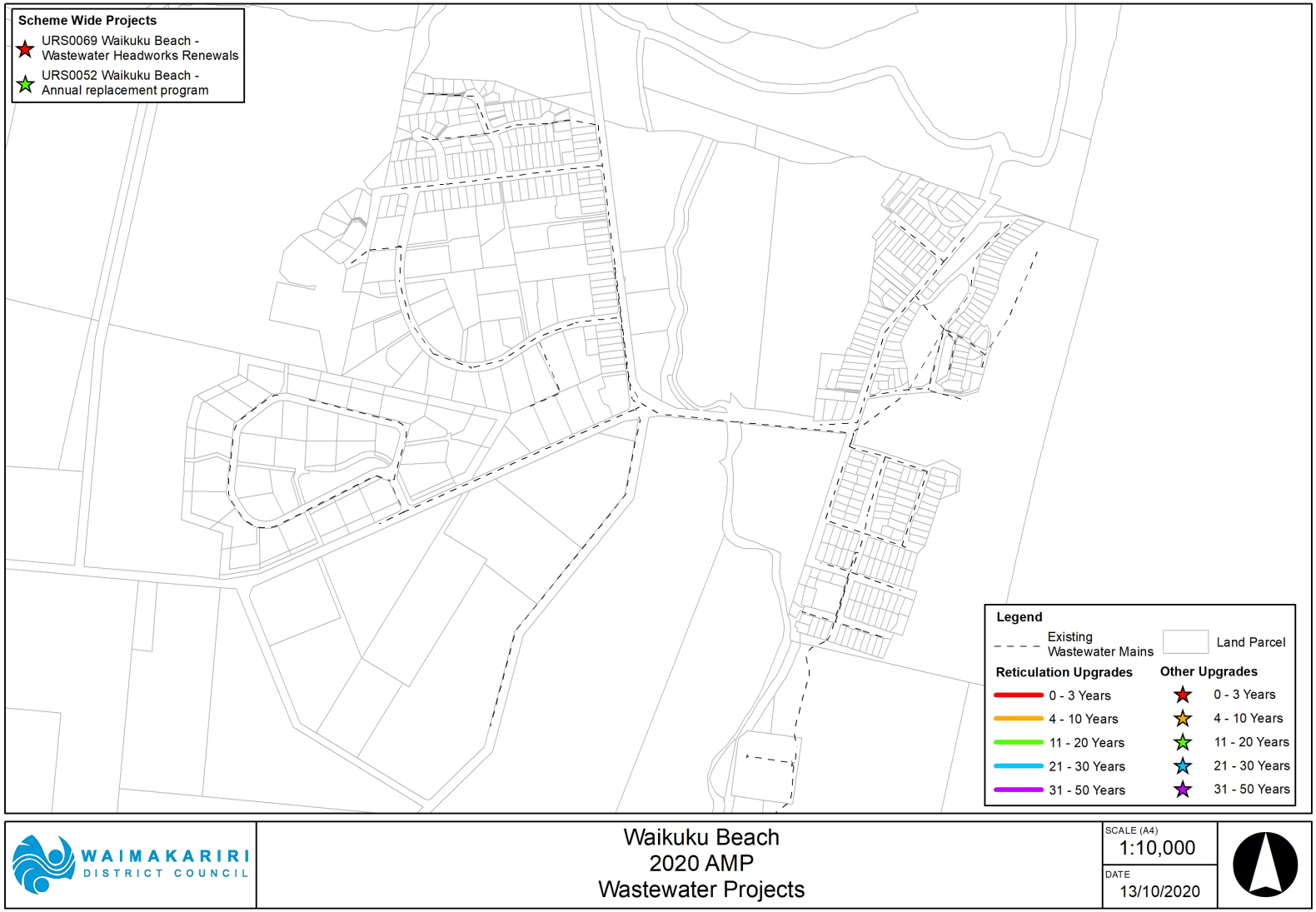
Any programme or project that occurs over a number of years, such as the renewals programme, is only shown within the table for the first year in which it occurs. The Project Value indicates the projected full total cost of the project over the number of years it occurs.

Table 13: Summary of Capital Works (Includes Renewals)

Year	Project ID	Project Name	Level of Confidence	Project Value	LOS Component	Renewals Component	Growth Component
Year 1 - 10							
2024	URS0069	Waikuku Beach - Wastewater Headworks Renewals	2 - Very Low	$ 2,237,621	$ -	$ 2,237,621	$ -
Year 11 - 20							
2032	URS0052	Waikuku Beach - Annual replacement program	3 - Low	$ 3,698,338	$ -	$ 3,698,338	$ -
Grand Total				$ 5,935,959	$ -	$ 5,935,959	$ -

Note: Waikuku Beach Wastewater Scheme renewals/replacements item indicates the total renewals programme value for the 50 years beginning in the financial year shown.

Figure 11: Projected Capital Upgrade Works (not to scale)



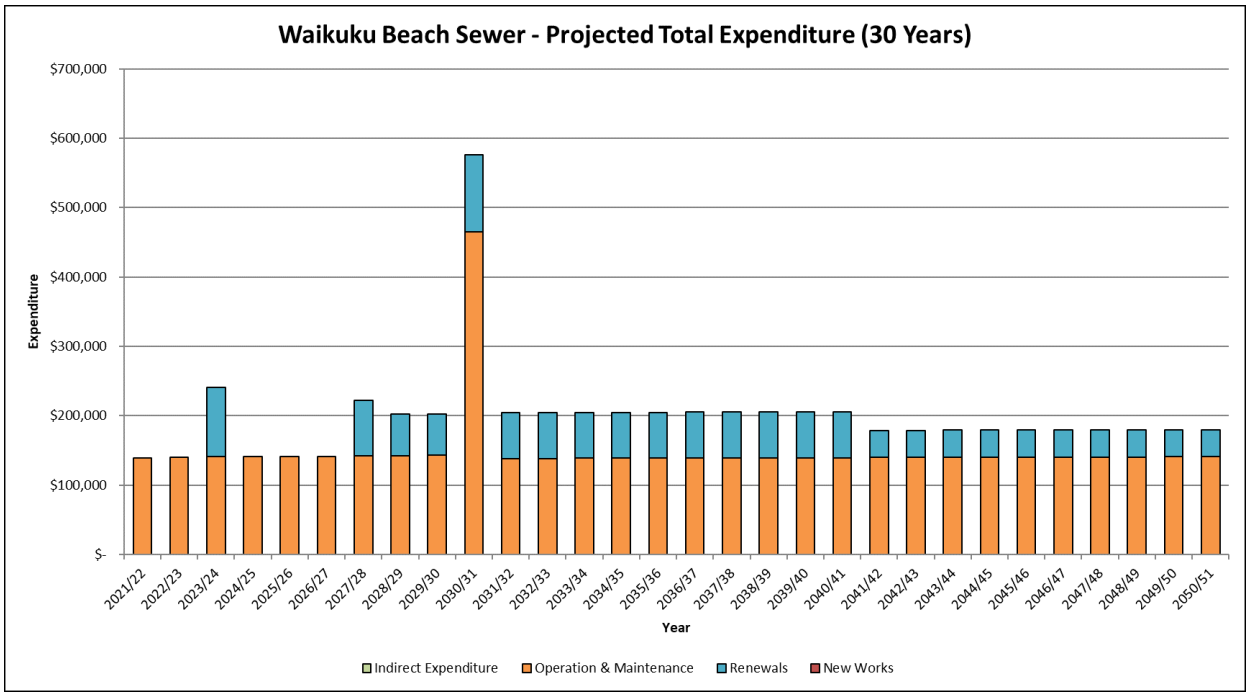
6.4 Financial Projections

The following graph summarises the breakdown of projected total expenditure over a 30 year time horizon. It includes both operational and capital expenditure. Operational costs include operations and maintenance, but not indirect expenditure.

Indirect expenditure includes interest, rating collection costs, costs associated with maintaining the Asset Register, and other internal overhead costs. For systems connected to the Eastern District Wastewater Scheme, these costs are aggregated within the Eastern District Scheme budget.

Capital includes expenditure for growth, levels of service and renewals.

Figure 12: Projected Total Expenditure



6.5 Valuation

A full peer reviewed valuation of assets is carried out on a three yearly cycle, using the asset data in our asset management information system. Table 14 below provides a summary of the replacement cost, depreciated replacement cost and annual depreciation for this scheme

Table 14: Asset Valuation

Asset Type	Unit	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Manhole	No.	94	$1,034,783	$688,034	$8,556
Valve	No.	53	$38,459	$33,801	$442
Main	m	10,312	$5,794,103	$3,350,954	$79,750
Service Line	properties	417	$1,676,113	$1,074,514	$22,609
Facilities			**$1,556,205**	**$906,568**	**$44,348**
Total			**$10,099,664**	**$6,053,872**	**$155,705**

6.6 Revenue Sources

Revenue is provided from two key sources; targeted rates and Development Contributions. Development contributions are calculated in accordance with Council's Development Contributions Policy (TRIM 191129168016), while targeted rates are charged in accordance with Council's Revenue and Financing Policy (TRIM 180522056008).

7 Improvement Plan

7.1 2021 Improvement Plan

Table 15 details the scheme specific improvements and relevant district wide improvements recommended to address the management issues identified in Section 3. Each improvement item has been tagged to either a capital project or, a process improvement project to help manage and track Councils response. Short term indicates within the first three years of the LTP, long term, out beyond 2021.

If the table is empty, this indicates that all improvements required are either district wide improvements (covered by the Overview AMP), or covered by a capital project or projects, covered in the Capital Works section

Table 15: 2021 AMP Improvement Plan

Project Ref	AMP Section	Project Description	Priority	Status	Estimated Cost
NA	NA	NA	NA	NA	NA

APPENDIX 'A'. PLANS

Figure 13: A1 - Plan of Serviced Area

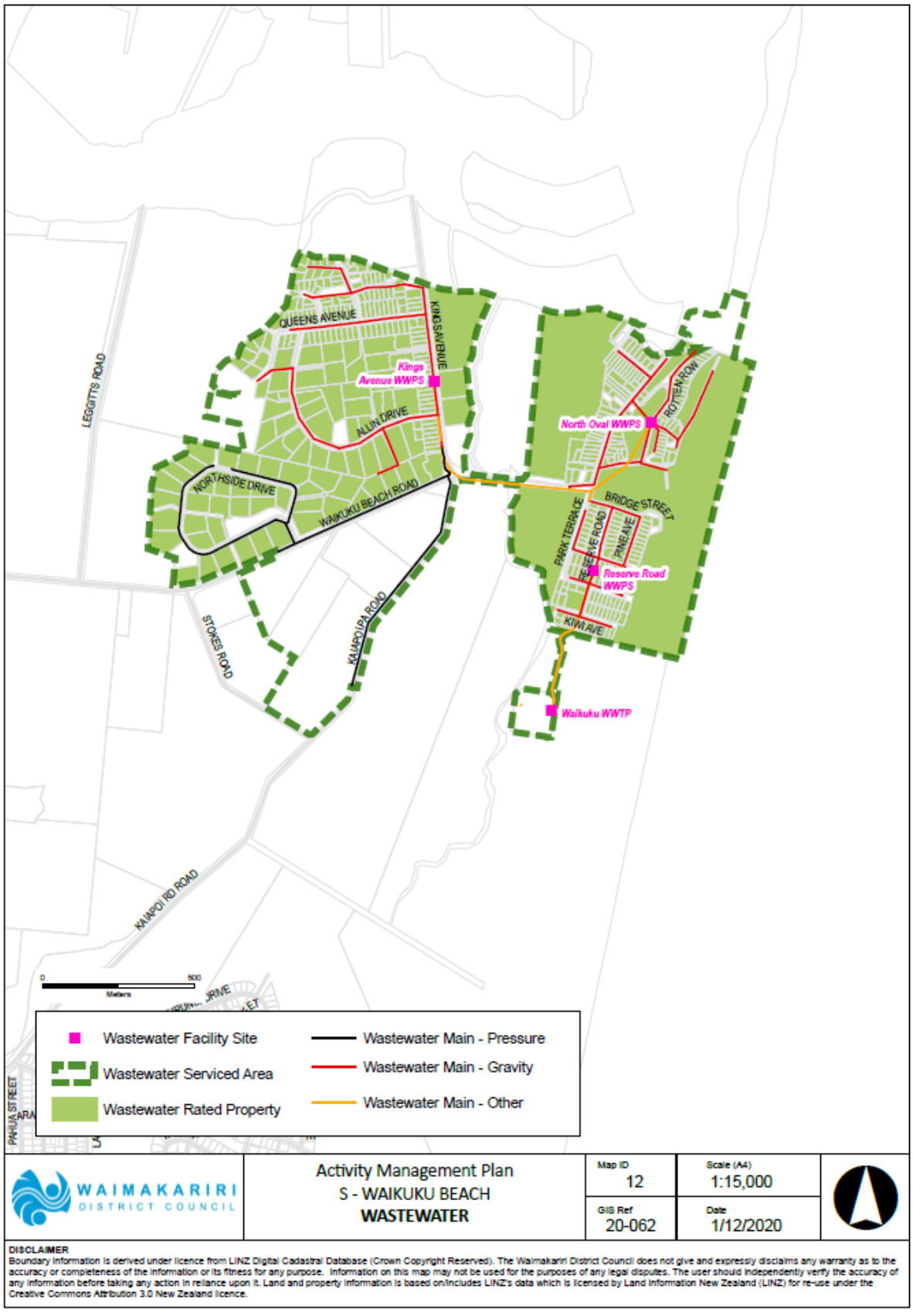


Figure 14: Waikuku Beach Wastewater Supply Statistics

Waikuku Beach Wastewater Statistics

Waikuku Beach | 19/20 | Updated: Jun-20

Note that shading indicates the relative quantity measured for the ten year period (i.e. the lowest value has no shading, the highest has complete shading.)

		July '09 - June '10	July '10 - June '11	July '11 - June '12	July '12 - June '13	July '13 - June '14	July '14 - June '15	July '15 - June '16	July '16 - June '17	July '17 - June '18	July '18 - June '19	July '19 - June '20	5 yr Average	10 yr Average
Average Daily Flow	m^3/day	279	460	363	338	349	341	321	305	335	283	288	306	338
Average Dry Weather Flow	m^3/day	261	462	359	309	314	336	310	286	292	276	274	288	322
Peak Daily Flow	m^3/day	590	1,081	487	1,181	1,045	426	415	883	1,014	423	612	670	757
Peak Weekly Flow	m^3/day	498	862	464	768	599	398	365	483	563	360	406	435	527
Peak Monthly Flow	m^3/day	366	635	415	505	463	371	355	397	392	326	323	359	418
Peak Instantaneous Flow	L/s	-	-	-	-	-	-	-	-	-	-	-	-	-
Peak Month		Jun	Sep	Jul	Jun	Jun	Nov	Jul	Apr	Jul	Dec	Jul		
Peak Week		Week 23	Week 38	Week 22	Week 26	Week 25	Week 43	Week 34	Week 16	Week 9	Week 52	Week 30		
Peak Day		27/05/2010	14/09/2010	24/10/2011	17/06/2013	18/04/2014	19/10/2014	19/07/2015	14/04/2017	21/02/2018	4/06/2019	21/07/2019		
Peak Day Rainfall	mm	30.3	0	0	74.5	74.7	1.5	8.9	38	9.8	0	12.2		
Peak Day Weather		Storm	Storm	Wet	Storm	Storm	Wet	Wet	Storm	Storm	Wet	Storm		
Total Annual Volume	m^3	102,214	168,985	133,360	124,163	127,979	125,211	117,806	112,036	122,794	103,822	105,550	112,401	124,171

Rating Connections		410	410	411	407	422	431	440	446	448	449	456		
Rating Charges		458	453	462	-	471	478	486	492	498	500	504		
Average Daily Flow per Connection	L/con/day	679	1,123	884	831	826	792	730	684	747	630	632	685	788
Peak Daily Flow per Connection	L/con/day	1,439	2,637	1,185	2,902	2,477	988	944	1,980	2,264	942	1,342	1,494	1,766

Data Quality		very high	very high	very high	very high	very high	high	high	high	high	high	medium		