WAIMAKARIRI
DISTRICT COUNCIL

Activity Management Plan 2021

Woodend Wastewater Scheme

3 Waters | July 2021

Prepared by

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Revision Nº	Description	TRIM	Date
A	Draft for Presentation to U and R Committee	200120006520	18/12/2020
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Document Acceptance

Action	Name		Signed	Date
Prepared by	Gavin Hutchinson	Wastewater Asset Manager		17/02/2021
	Simon Collin	Infrastructure Strategy Manager		15/01/2021
	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 Woodend 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 Woodend Scheme is operating well and is fully compliant with the resource consent conditions.
Levels of Service	The scheme is meeting its level of service targets.
Capacity & Performance	The existing reticulation system has the capacity for the peak wet weather flow resulting from a 2 year rainfall event.
Asset Condition	The majority of the scheme is in moderate to good condition; however, some replacements are required over the next 10 years.
Risk Assessment	The Risk Assessment did not find any high or extreme risks for this scheme.
Disaster Resilience	The Woodend Wastewater Treatment Plant, the plant outfall pump station, and Gladstone Road pump station are an extreme or high earthquake hazard. The Treatment Plant is also a high hazard in a wildfire. Resilience assessments are required to identify options to mitigate these hazards.
	Several kilometres of mains also appear at extreme or high risk in an earthquake, requiring further investigation.
Growth Projections	The scheme is predicted to grow in size by approximately five fold over the next 50 years. Upgrades of the system will be required to accommodate this growth.
	A new oxidation ponds at the Woodend WWTP is scheduled for construction in 2031/32.

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.

This plan summarises the various components of the Woodend wastewater scheme, its condition and performance, and identifies future funding requirements including upgrades where necessary.

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 Woodend Wastewater Scheme is part of the Eastern Districts Sewer Scheme. It is generally an urban gravity reticulation scheme, except for four small pump stations that discharge into the reticulation. There are 3 terminal pump stations that convey wastewater to the Woodend WWTP. The Tuahiwi wastewater scheme discharges directly into a manhole at the northern end of the Woodend wastewater reticulation and the Pegasus wastewater scheme pumps directly to the Woodend wastewater treatment plant. The Waikuku WWTP discharges directly into the Woodend WWTP inlet structure.

The Treatment Plant consists of an automatic step screen to remove large solid particles and three aeration basins followed by two facultative ponds and 2.5 ha planted wetland. UV treatment is used to ensure the final effluent meets the consent conditions.

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

A schematic view of the treatment system is presented in Figure 1. Refer to the Overview AMP for a plan of how the Rangiora system fits within the overall scheme.

Table 2: Scheme Statistics for 2019/2020

Scheme Parameter	Statistics	Source
Type of Supply	Urban Gravity	
Treatment	Aeration basin and oxidation ponds with Wetlands and UV disinfection	
Length of Reticulation	29.7 km	Wastewater Asset Valuation Tables 8-5 and 8-6, pages 59 to 62
Total Replacement Value	$31,403,491	
Depreciated Replacement Value	$24,169,742	
Number of Connections	1,236	2019/20 Rating Query
Number of Rating Charges	1,430	
Average Daily Flow (5 year average)	652 m^3/day	Flow Data Analysis - Sewer Turiwhaia Road data is being subtracted from Gladstone data in flow analysis spreadsheets (via manual logging sheets)
Average Daily Flow/connection	626 l/day/con	
Peak Daily Flow (5 year average)	1,427 m^3/day	
Peak Daily Flow/connection (5 year average)	1,382 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**	**250**	**300**	**Total**
Asbestos cement	0m	0m	4,902m	948m	0m	419m	0m	6,269m
Concrete	0m	34m	0m	0m	0m	0m	0m	34m
Earthenware	0m	107m	0m	0m	0m	0m	0m	107m
Polyvinylchloride	0m	13m	9,785m	74m	2,085m	0m	15m	11,972m
Other	0m	0m	321m	85m	0m	265m	0m	670m
Total	**0m**	**155m**	**15,008m**	**1,107m**	**2,085m**	**684m**	**15m**	**19,053m**

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	31m	328m	0m	0m	1,112m	1,471m
Polyethylene	1,739m	1,071m	0m	0m	0m	1,305m	4,115m
Polyvinylchloride	0m	120m	71m	0m	0m	178m	368m
Other	0m	2m	0m	0m	0m	0m	2m
Total	**1,739m**	**1,224m**	**398m**	**0m**	**0m**	**2,595m**	**5,956m**

Table 5: Wastewater Valve Data Summary

Wastewater Valves	
Diameter (mm)	**Count**
50	6
100	10
150	5
200	0
250	6
300	1
Total	**28**

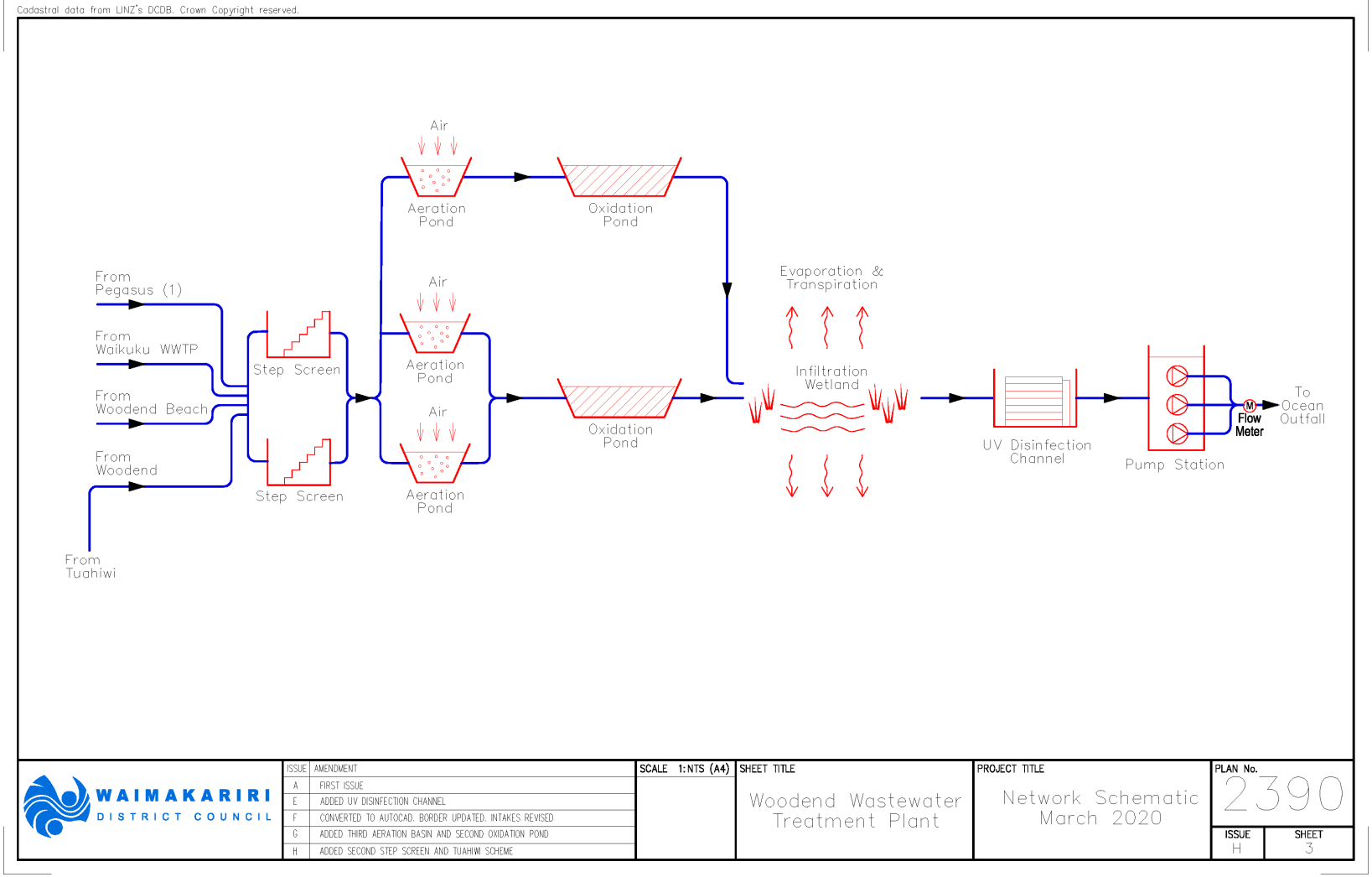
Table 6: Wastewater Manhole Data Summary

Wastewater Manholes	
Diameter (mm)	**Count**
900	172
1050	175
1200	1
1500	3
Total	**351**

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

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 over the 10 year LTP period, 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	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
		network components 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	Y	Y	Y	Y
	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	1	There was a single overflow on a private property due to a blocked main caused by a contractor fault.	Not Achieved	Improved monitoring of contractors	Y	Insf. Data	Y	N

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 a 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

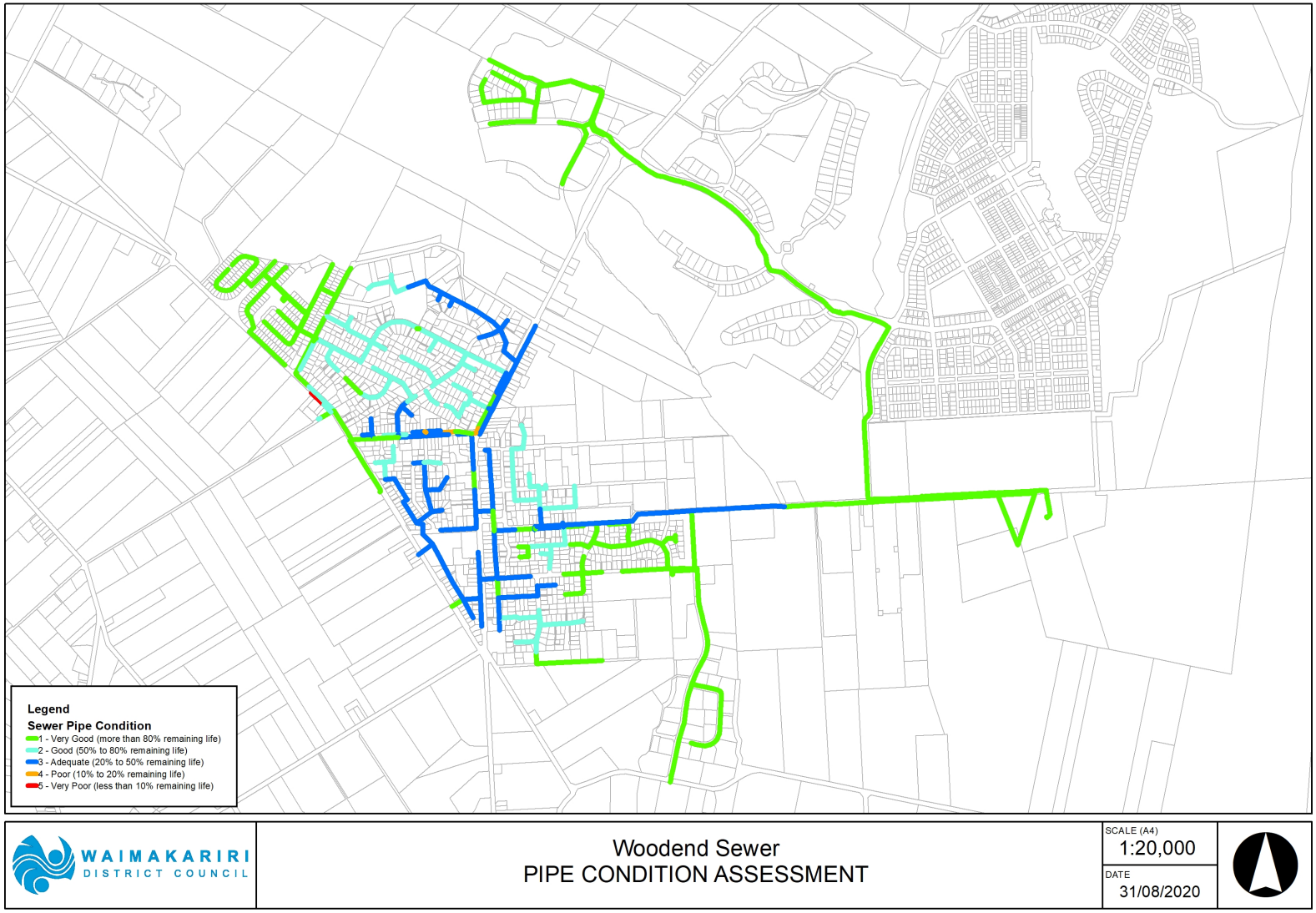
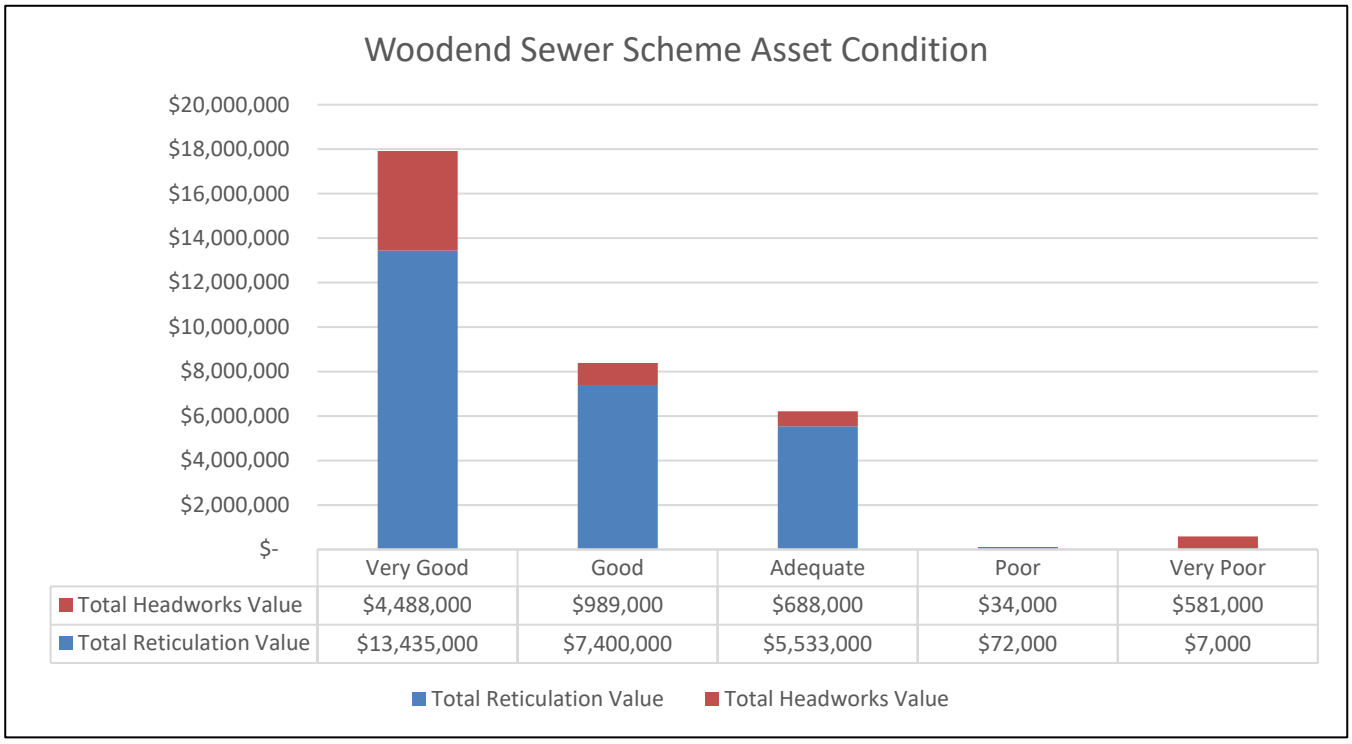


Figure 3: Asset Condition Summary



"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*	16.5 km *55%*	$ 13,435,000 *51%*	$ 4,488,000 *66%*	$ 17,923,000 *54%*
2	Good *Between 50% and 80% of life remaining*	6.3 km *21%*	$ 7,400,000 *28%*	$ 989,000 *15%*	$ 8,389,000 *25%*
3	Adequate *Between 20% and 50% of life remaining*	6.8 km *23%*	$ 5,533,000 *21%*	$ 688,000 *10%*	$ 6,221,000 *19%*
4	Poor *Between 10% and 20% of life remaining*	0.2 km *1%*	$ 72,000 *0%*	$ 34,000 *1%*	$ 106,000 *0%*
5	Very Poor *Less than 10% of life remaining*	0.1 km *0%*	$ 7,000 *0%*	$ 581,000 *9%*	$ 588,000 *2%*
Total		**29.8 km**	**$26,447,000**	**$6,780,000**	**$33,227,000**

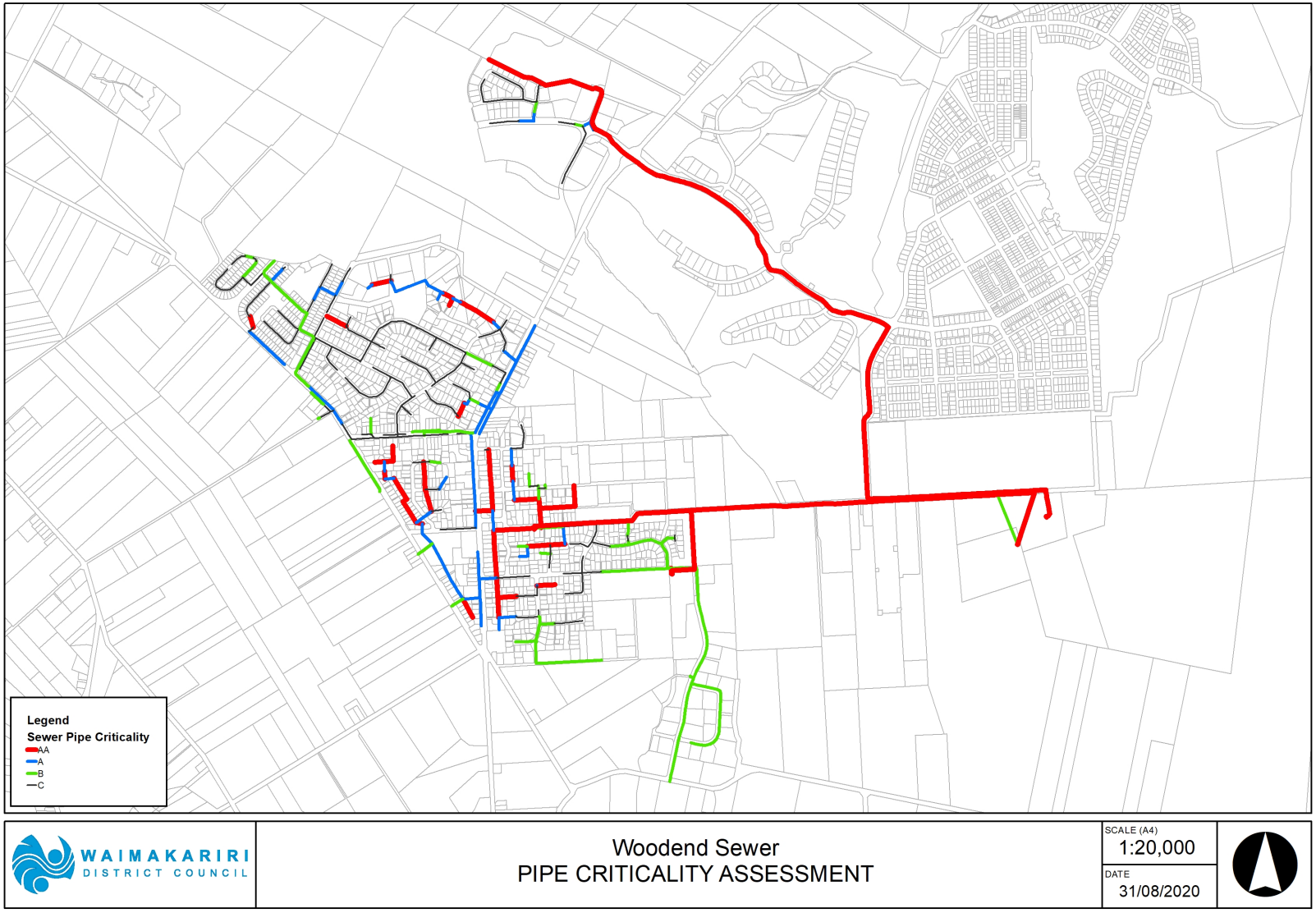
5.3 Asset Criticality

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 Woodend Wastewater Scheme in 2004, and it has been regularly updated since that time. It was last updated for the 2015 AMP review.

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 Woodend 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	2	0	0	0
Moderate risks	30	32	20	22
Low risks	11	14	27	25
Not applicable	1	1	0	0
Total	0	0	0	0

The table shows there are currently no high or extreme risks on 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, and accelerates renewals of these pipe types by reducing their book life.

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 (included in) 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	Gladstone Rd PS	Main North Rd PS	Panckhurst Drive PS	Petries Rd PS	Woodend Road PS	Woodend WWTP	Woodend WWTP Outfall PS
100 yr Local Flooding	M	L	L	L	L	N	N
475 yr Earthquake Induced Slope Hazard	L	L	L	L	L	L	L
Earthquake (50 yr)	H	M	M	L	M	E	E
150 Yr Earthquake	M	L	L	L	L	H	H
475 Yr Earthquake	L	L	L	L	L	M	M
Wildfire	L	L	L	L	L	H	M
Snow 150 Yr	L	L	L	L	L	L	L
Wind 100 Yr	L	L	L	L	L	L	L
Lightning	M	M	M	M	M	M	M
Pandemic	M	M	M	M	M	M	M
Terrorism / Sabotage	L	L	L	L	L	M	L
E = Extreme, H = High, M = Moderate, L = Low							

The scheme is located in the zone of liquefaction susceptibility. The pump stations are considered to be of moderate resilience while the treatment plant and outfall pump station are considered to be of low resilience to earthquake activity.

Gladstone Road PS is at moderate risk from 0.25 metres of flooding from local sources.

The wildfire threat as modelled by Rural Fire as high at the treatment plant.

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 mainly residential growth anticipated is expected to occur within the existing town boundary, mainly in the Ravenswood development area. Then it is anticipated that growth would be beyond the existing town boundary to the North of Woodend.

Due to capacity constraints Ravenswood has constructed a dedicated rising main to the Wastewater Treatment Plant through Pegasus. It is likely that any further developments to the north of Woodend would do the same.

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 Woodend wastewater scheme is expected to increase by 72%, by the end of the 2021-31 Long Term Plan (LTP) period. This projection is based on 72 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 67 per year and commercial connections are predicted to increase by 4 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 53 new connections per year (Table 12). Note that this growth excludes the growth in Tuahiwi.

Table 12: Growth Projections

Woodend	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	1,097	1,482	1,889	2,485	2,990	4,026

Projected Rating Units	1,278	1,751	2,158	2,839	3,344	4,380
Projected increase in Connections		35%	72%	127%	173%	267%
Projected Average Dry Weather Flow (m3/day)	836	1,064	1,339	1,711	2,052	2,751
Projected Peak Wet Weather Flow (m3/day)	4,973	6,116	7,487	9,348	11,052	14,548

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 267%. This long term projection is lower than the 2017 growth projection, of 563% (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 2017 population projections had much higher long term growth for the Woodend/Ravenswood area, resulting in a lot of long term growth north of Ravenswood.

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.

Woodend's existing inflow and infiltration level is considered moderate, resulting in average PWWF.

Projections

Figure 5 & Figure 6 present the projected growth and corresponding demand trends for the Woodend wastewater scheme.

Figure 5: Population Projections

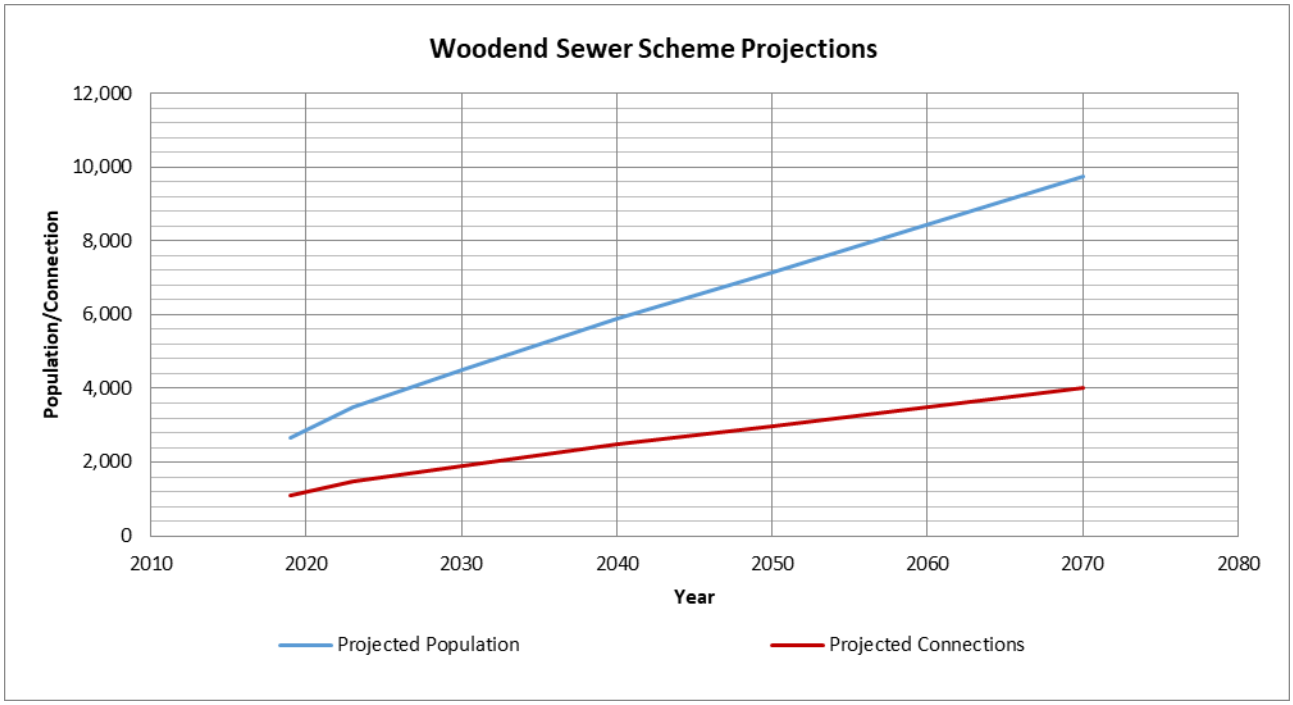
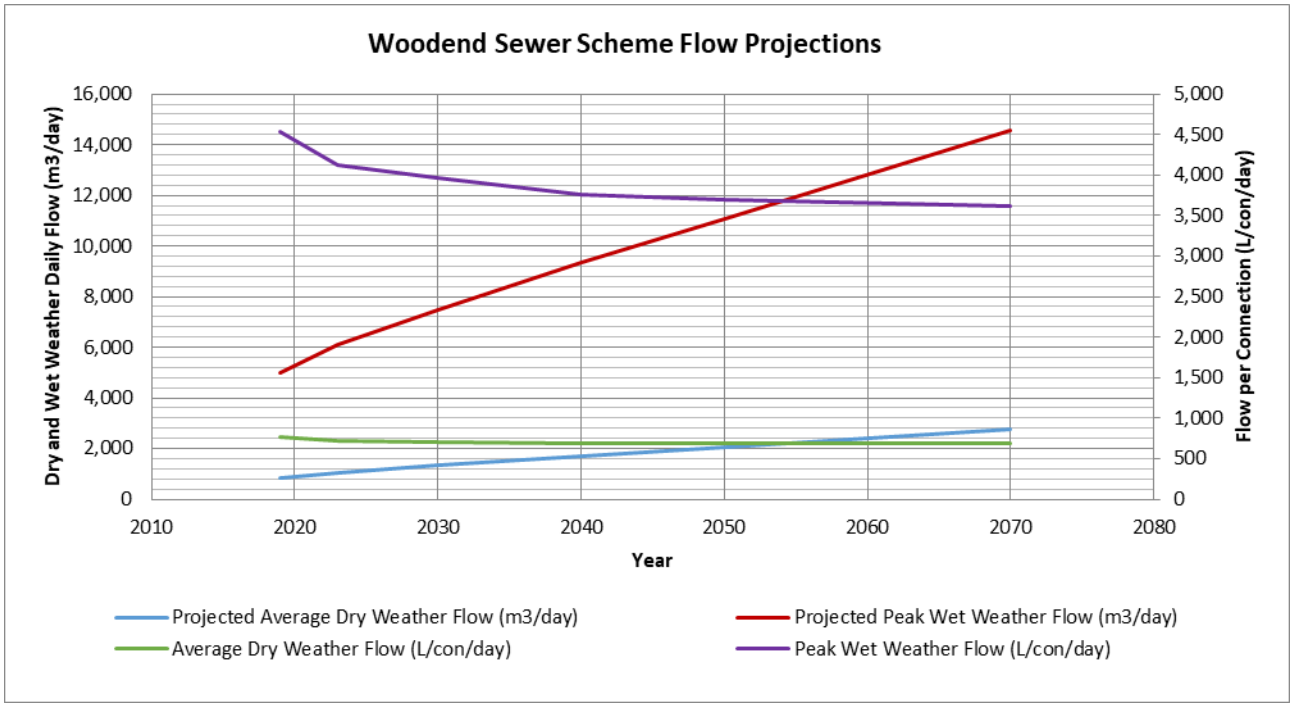


Figure 6: Flow Projections



5.7 Capacity & Performance

This section of the AMP considers the capacity and performance of the Woodend 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 treatment plant consists of an automatic step screen to remove large solid particles, three aerated ponds followed by two oxidation ponds and a 2.5Ha planted wetland. The final effluent is UV treated prior to being pumped to the ocean outfall.

The capacity of the Woodend Wastewater Treatment Plant is designed to accommodate the new Pegasus Town and future upgrades to Woodend. A third oxidation pond is scheduled for construction in 2031 to cater for predicted growth.

Reticulation System

The capacity of the wastewater reticulation was assessed using a calibrated hydraulic model in 2002/03. This was re-modelled in 2014. The model was used to assess the upgrades necessary to accommodate growth and to provide sufficient capacity to achieve the following LoS relating to overflows:

- A LoS of a 5 year period between wet weather overflows in new development areas as per the Council Engineering Code of Practice. The calibrated hydraulic model shows the network is currently achieving the 5 year LoS in new development areas.
- A LoS of a 2 year average recurrence interval between wet weather flows for the existing network. The model shows this LoS is also being met

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.

Financial forecasts do not include inflation

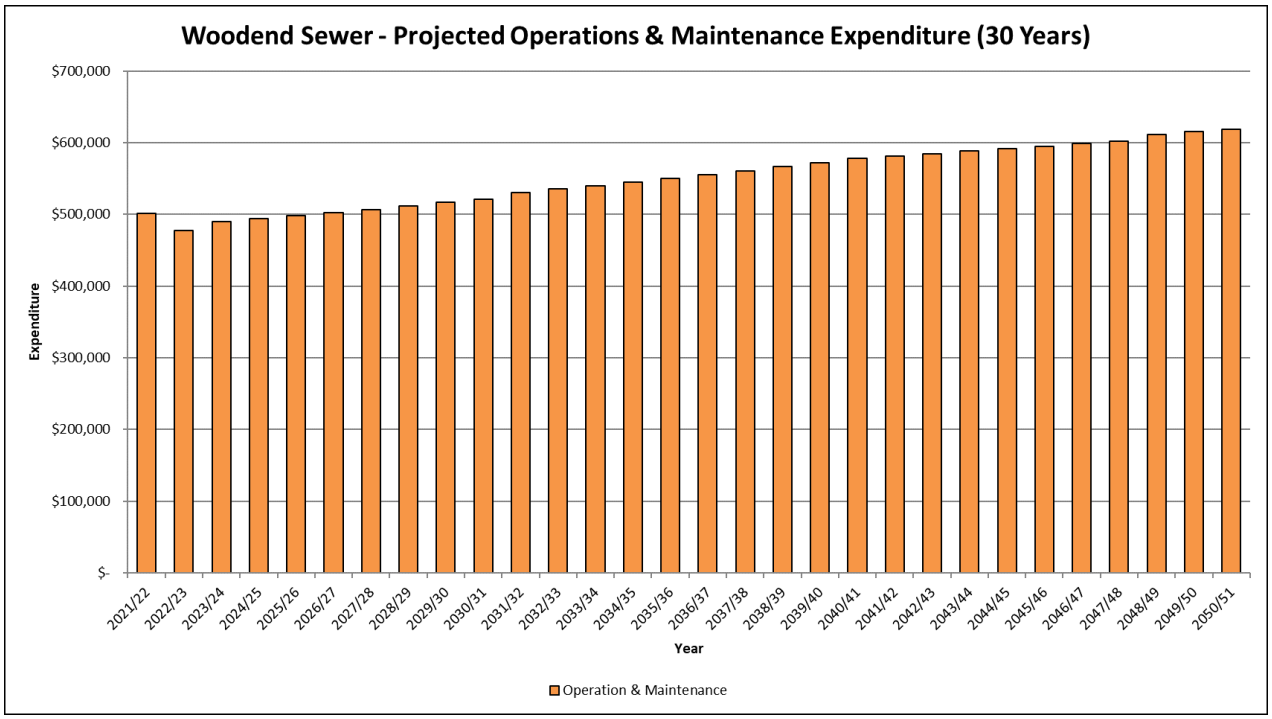
6.1 Operation & Maintenance

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.

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



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 wastewater, for those schemes connected to it the model is operated at the Eastern Districts Sewer Scheme level. 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 other works that may be planned in the area, as well as local asset history, 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

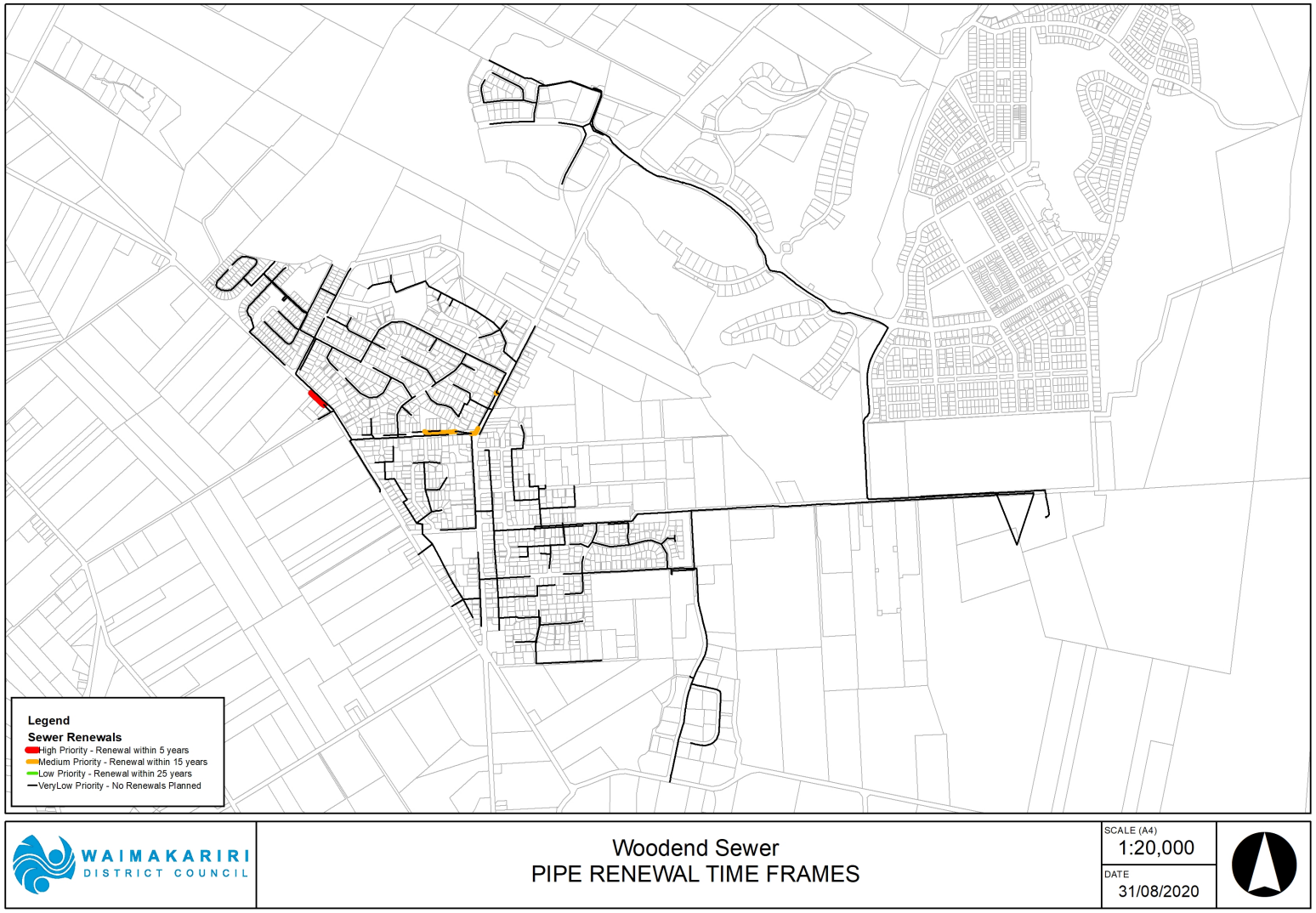
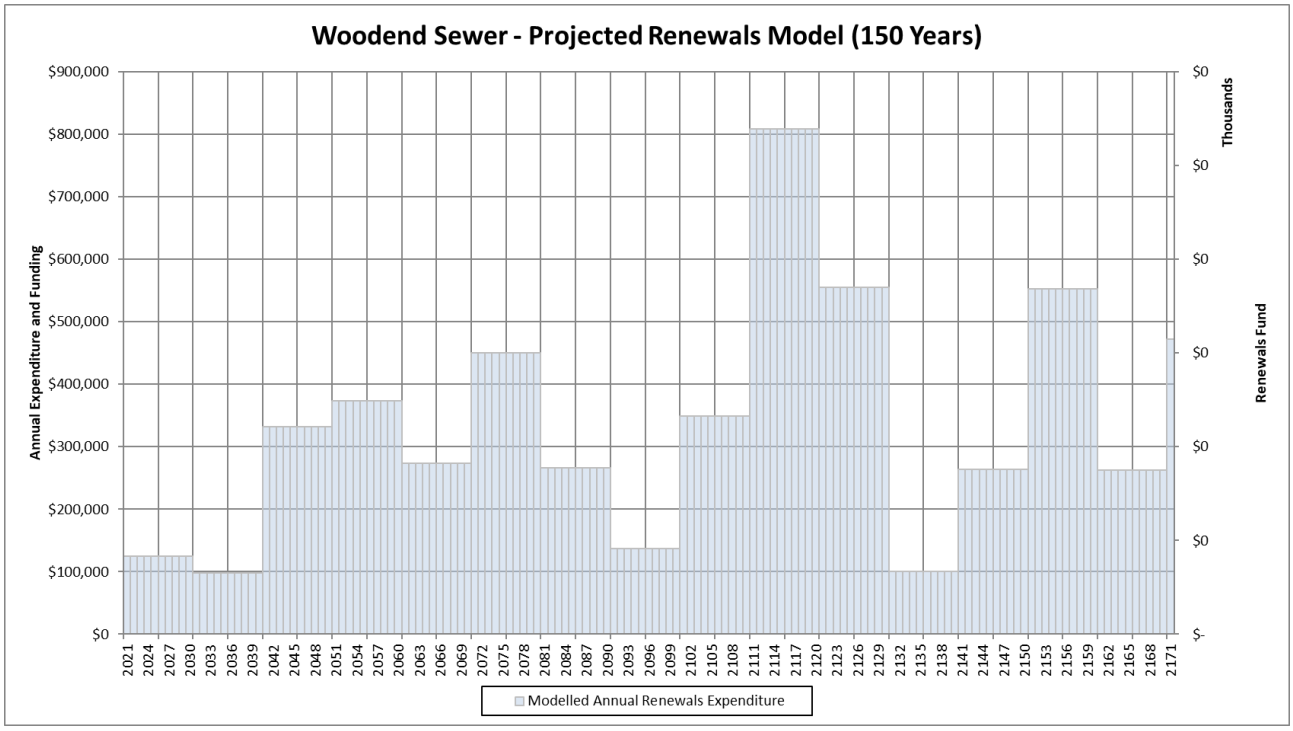


Figure 9 below shows the renewals expenditure from the model only. Budgeted depreciation funding, modelled annual funding required, and the modelled renewals fund are not shown on this graph, but are shown on the equivalent graph in the Overview AMP. This is because all properties that are connected 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. 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. The budget spike in 2030/31 is for an additional oxidation pond at the Woodend WWTP to cater for growth, and the 2035/36 spike is to replace the Gladstone pressure main, which will have reached the end of its theoretical life.

Figure 10: Projected Capital Expenditure

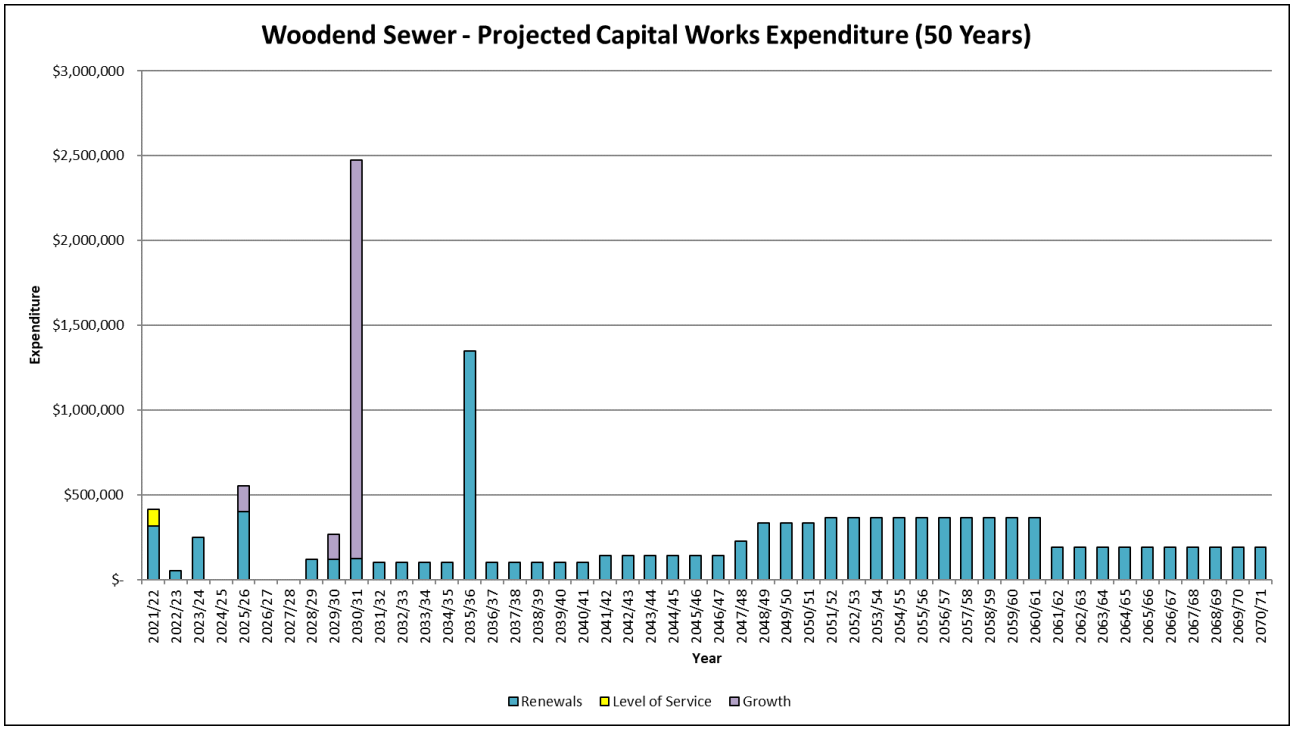


Table 13 on the following page summarises the projected capital works for the next 50 years, including renewals. Figure 11 shows the corresponding location of the projected capital upgrade works.

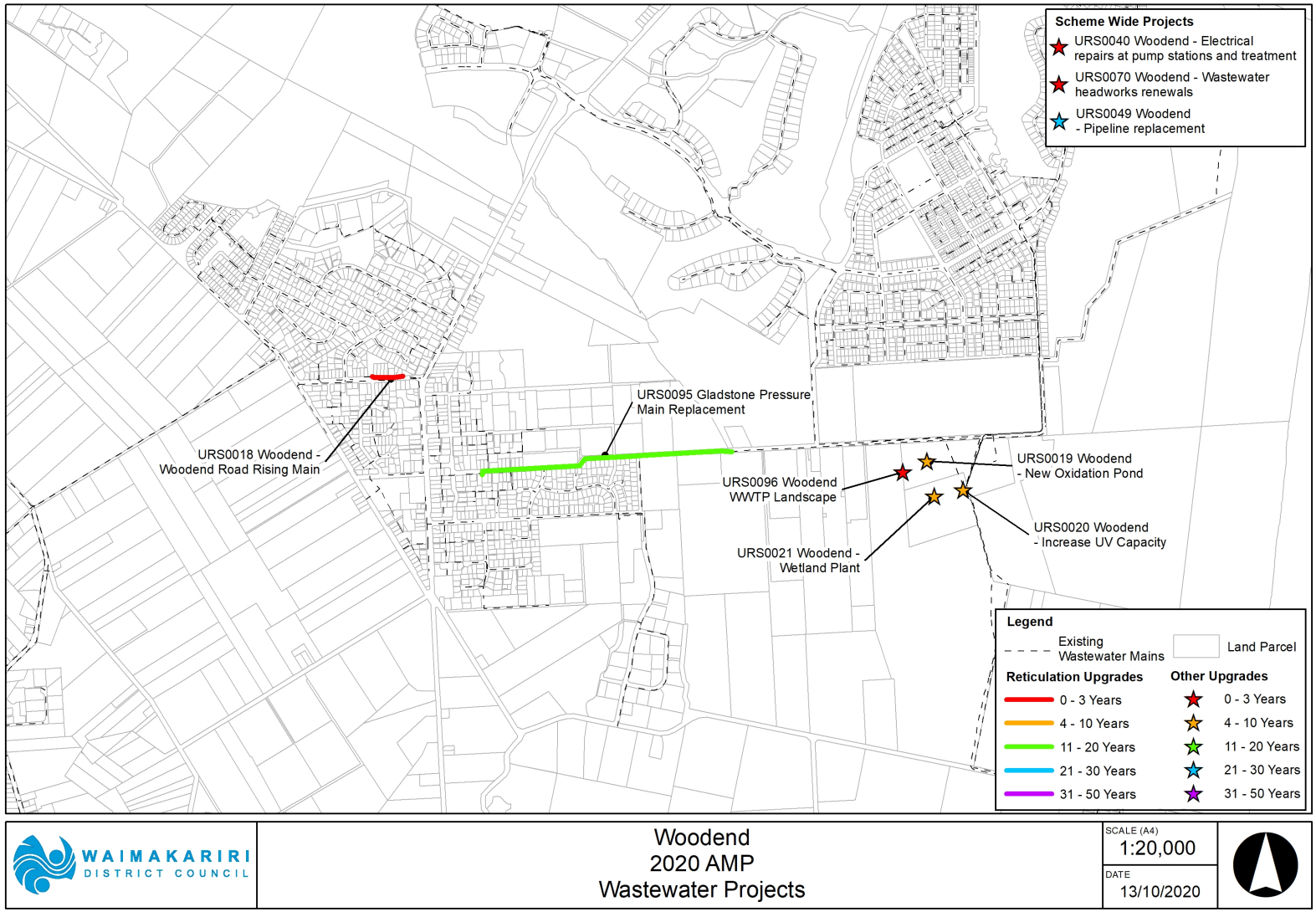
The level of confidence in the budget for the works (High / Medium / Low) is presented in the table. For a more complete discussion on the level of optimisation, refer to the introductory chapter of the AMP. The figures in the table are not adjusted for inflation.

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							
2022	URS0018	Woodend - Woodend Road Rising Main	6 - Above Medium	$ 340,000	$ 50,000	$ 290,000	$ -
2022	URS0040	Woodend - Electrical repairs at pump stations and treatment plant	7 - High	$ 75,000	$ -	$ 75,000	$ -
2022	URS0096	Woodend WWTP Landscape Planting	5 - Medium	$ 50,000	$ 50,000	$ -	$ -
2024	URS0070	Woodend - Wastewater headworks renewals	2 - Very Low	$ 5,296,491	$ -	$ 5,413,416	$ -
2026	URS0020	Woodend - Increase UV Capacity	6 - Above Medium	$ 250,000	$ -	$ 100,000	$ 150,000
2026	URS0021	Woodend - Wetland Plant Investigations	6 - Above Medium	$ 100,000	$ -	$ 100,000	$ -
2030	URS0019	Woodend - New Oxidation Pond	5 - Medium	$ 2,500,000	$ -	$ -	$ 2,500,000
Year 11 - 20							
2036	URS0095	Gladstone Pressure Main Replacement	5 - Medium	$ 1,400,000	$ 150,000	$ 1,250,000	$ -
Year 21 - 30							
2048	URS0049	Woodend - Pipeline replacement program	3 - Low	$ 4,086,821	$ -	$ 4,086,822	$ -
Grand Total				$ 14,098,311	$ 250,000	$ 11,315,238	$ 2,650,000

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



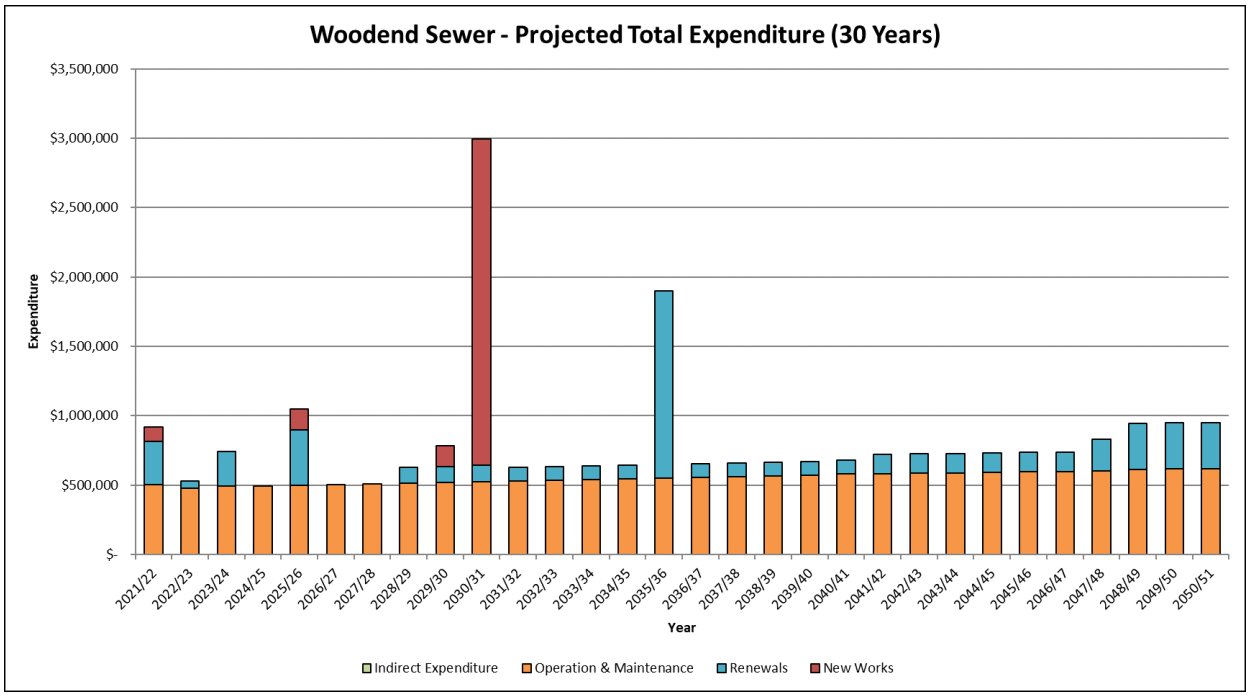
6.4 Financial Projections

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 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.	371	$4,362,870	$3,589,886	$35,173
Valve	No.	35	$167,597	$152,047	$1,873
Main	m	29,746	$15,551,347	$11,917,104	$174,258
Service Line	properties	1,130	$4,541,985	$3,386,641	$49,829
Facilities			**$6,779,691**	**$5,124,064**	**$191,683**
Total			**$31,403,491**	**$24,169,742**	**$452,816**

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.

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

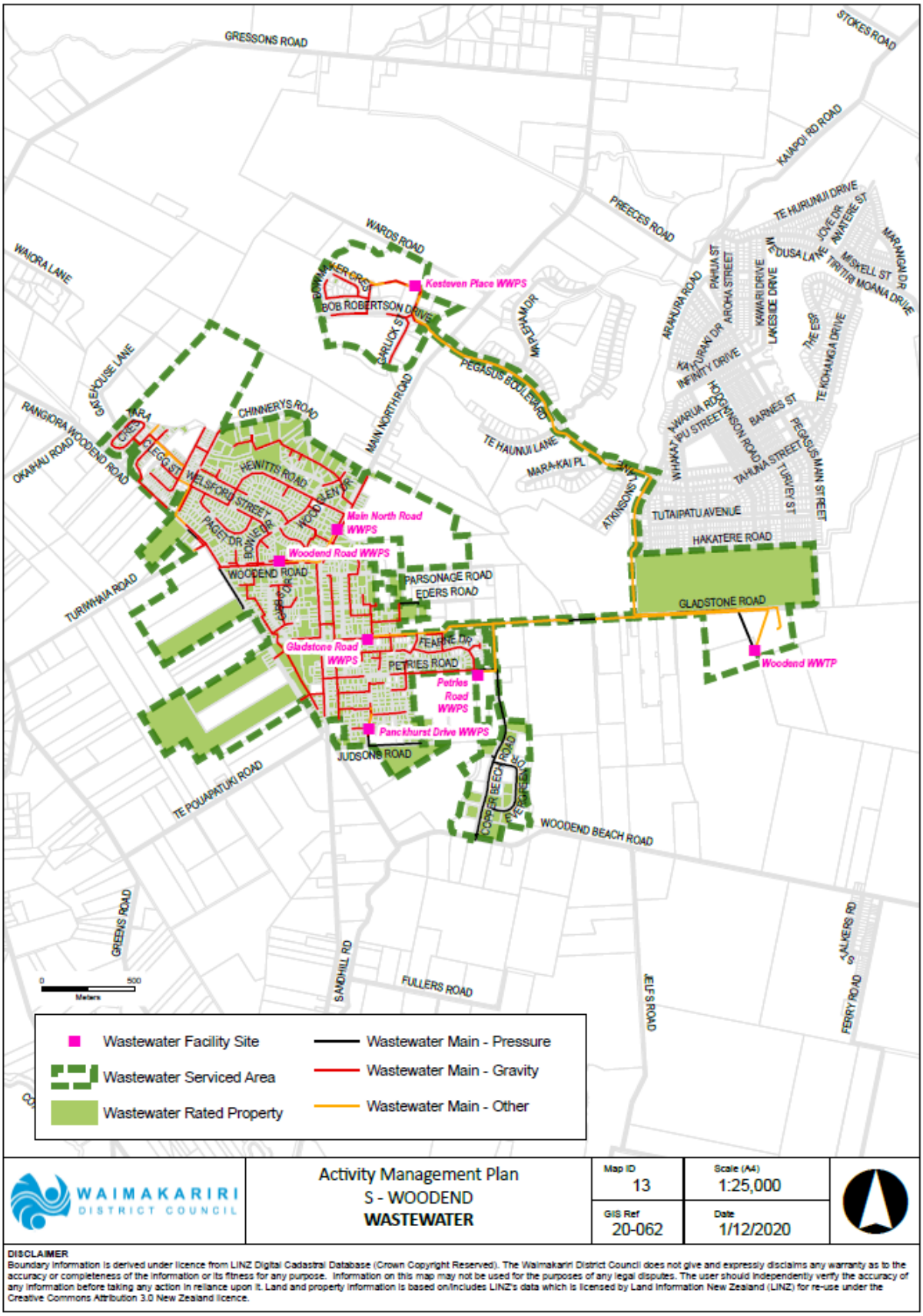


Figure 14: Woodend Wastewater Supply Statistics

Woodend Wastewater Statistics

Woodend | 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	740	781	654	733	825	609	565	579	836	617	662	652	686
Average Dry Weather Flow	m^3/day	695	749	640	647	703	600	554	546	710	613	620	609	638
Peak Daily Flow	m^3/day	1,310	1,785	854	3,954	5,402	1,052	739	1,586	2,486	969	1,357	1,427	2,018
Peak Weekly Flow	m^3/day	1,167	1,400	740	2,140	2,195	858	626	904	1,548	858	992	986	1,226
Peak Monthly Flow	m^3/day	1,008	1,080	698	1,274	1,428	823	595	752	1,097	786	861	818	940
Peak Instantaneous Flow	L/s	-	-	-	-	-	-	-	-	-	-	-	-	-
Peak Month		Jun	Sep	Oct	Jun	Jun	Jul	Sep	Apr	Jun	Jun	Aug		
Peak Week		Week 23	Week 31	Week 34	Week 26	Week 25	Week 28	Week 5	Week 16	Week 25	Week 25	Week 30		
Peak Day		28/05/2010	25/07/2010	20/08/2011	17/06/2013	10/06/2014	2/07/2014	28/01/2016	14/04/2017	13/06/2018	5/06/2019	21/07/2019		
Peak Day Rainfall	mm	4.9	1	0	74.5	95.1	7.9	27	38	41.2	0	12.2		
Peak Day Weather		Storm	Wet	Wet	Storm	Storm	Wet	Storm	Storm	Storm	Wet	Storm		
Total Annual Volume	m^3	271,476	286,800	240,021	269,012	302,742	223,359	207,272	212,390	306,744	226,256	243,064	239,145	251,766
Rating Connections		929	928	931	955	958	964	967	972	982	1,095	1,236		
Rating Charges		1,061	1,056	1,066	-	1,128	1,133	1,140	1,134	1,150	1,274	1,430		
Average Daily Flow per Connection	L/con/day	796	842	702	768	861	631	584	595	851	563	536	626	693
Peak Daily Flow per Connection	L/con/day	1,410	1,924	917	4,140	5,639	1,092	764	1,632	2,532	884	1,098	1,382	2,062
Data Quality		very high	very high	very high	very high	very high	very high	high	high	high	high	high		