WAIMAKARIRI
DISTRICT COUNCIL

Activity Management Plan 2021

Pegasus Wastewater Scheme

3 Waters | July 2021

Prepared by

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Document Acceptance

Action	Name		Signed	Date
Prepared by	Gavin Hutchinson	Wastewater Asset Manager		17/02/2021
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Reviewed by	Kalley Simpson	3 Waters Manager		17/02/2021
Approved by	Gerard Cleary	Manager Utilities and Roading		17/02/2021
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1 Executive Summary

The following table provides a summary of the key asset management issues of the Pegasus 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	There are no consents that relate specifically to the Pegasus scheme. The overall Eastern Districts Sewer Scheme is operating well and is generally compliant with the resource consent conditions.
Levels of Service	The scheme is currently meeting all of its levels of service.
Capacity & Performance	The scheme provides adequate capacity for the current and future flows from the town.
Asset Condition	The Pegasus scheme is new and is assumed to be in very good condition. However, as additional CCTV data becomes available and actual condition of the system is known, some short-term renewals may be needed to address poor workmanship that has resulted in pipe sags. There was some localised earthquake damage to some of the pump stations. This has now been repaired.
Risk Assessment	There are no high or extreme risks that have been identified from the Risk Assessment for this scheme.
Disaster Resilience	The most significant hazard affecting the scheme as identified through the Disaster Resilience Assessment is the risk of earthquake affecting the pump stations. The risk of lighting and pandemic also poses a moderate hazard to the pump stations. Further headwork's assessments are required to determine and address resilience.
Growth Projections	Significant growth is expected on the scheme with around 114% over the next ten years, which can be accommodated within the existing infrastructure designed for the town

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 Pegasus 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 Pegasus Wastewater Scheme is part of the Eastern Districts Sewer Scheme.

Pegasus wastewater is a combination of an urban gravity reticulation scheme that consists of a series of inter-linked pumped catchments, a pressure system in stages 12 and 13 and a STEP system in the Mapleham area. In the first 10 stages of Pegasus, the sewage is conveyed via a network of gravity pipes to a number of smaller pump stations, before being pumped to two larger pump stations. From there, it is pumped to the Woodend Wastewater Treatment Plant at Gladstone Road. The pressure system consists of individual pump stations on each property that macerate the wastewater and pump directly into pressure mains that all discharge to the Te Kohanga Drive pump station. The individual pump stations on each property are owned and maintained by the property owners. The STEP system in Mapleham consists of privately owned septic tanks on each property pumped on a

pressure system to a tank at the water treatment plant where it feeds into the Pegasus gravity network.

The sewage is treated at the Woodend Treatment Plant, and this is covered in the Woodend Wastewater Scheme AMP.

Some key statistics (2019/20) of the scheme are shown in Table 2 to 6. The extent of the currently serviced area and comprehensive flow data records are presented in Figure 13 & Figure 14

A schematic view of the treatment system is presented in Figure 1. Refer to the Eastern Districts Sewer Scheme AMP for a plan of how the Pegasus system fits within the overall scheme.

Table *2*: Scheme Statistics for 2019/2020

Scheme Parameter	Statistics	Source
Type of Supply	Urban Gravity and STEP	
Treatment	None (treated at Woodend WWTP)	
Length of Reticulation	33.8 km	Wastewater Asset Valuation Tables 8-5 and 8-6, pages 59 to 62
Total Replacement Value	$36,288,684	
Depreciated Replacement Value	$31,926,364	
Number of Connections	1205	2019/20 Rating Query
Number of Rating Charges	1287	
Average Daily Flow (5 year average)	503 m^3/day	Flow Data Analysis – Sewer
Average Daily Flow/connection (5 year average)	501 l/day/con	
Peak Daily Flow (5 year average)	707 m^3/day	
Peak Daily Flow/connection (5 year average)	703 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**
Polyethylene	3m	0m	0m	0m	0m	0m	0m	3m
Polvinylchloride	0m	73m	17,651m	0m	2,332m	0m	568m	20,624m
Total	**3m**	**73m**	**17,346m**	**0m**	**2,030m**	**0m**	**568m**	**20,627m**

Table 4: Wastewater Pressure Data Summary

Wastewater Pressure pipe length (m) by diameter and pipe material							
Pipe Material	**Pipe Diameter (mm)**						
	50	**100**	**150**	**200**	**250**	**300**	**Total**
Polyethylene	3,701m	3,869m	1,424m	1,362m	1,367m	1,310m	13,033m
Polvinylchloride	0m	0m	0m	0m	106m	0m	106m
Total	**3,701m**	**3,869m**	**1,424m**	**1,362m**	**1,474m**	**1,310m**	**13,139m**

Table 5: Wastewater Valve Data Summary

Wastewater Valves	
Diameter (mm)	**Count**
50	90
100	15
150	1
Total	**106**

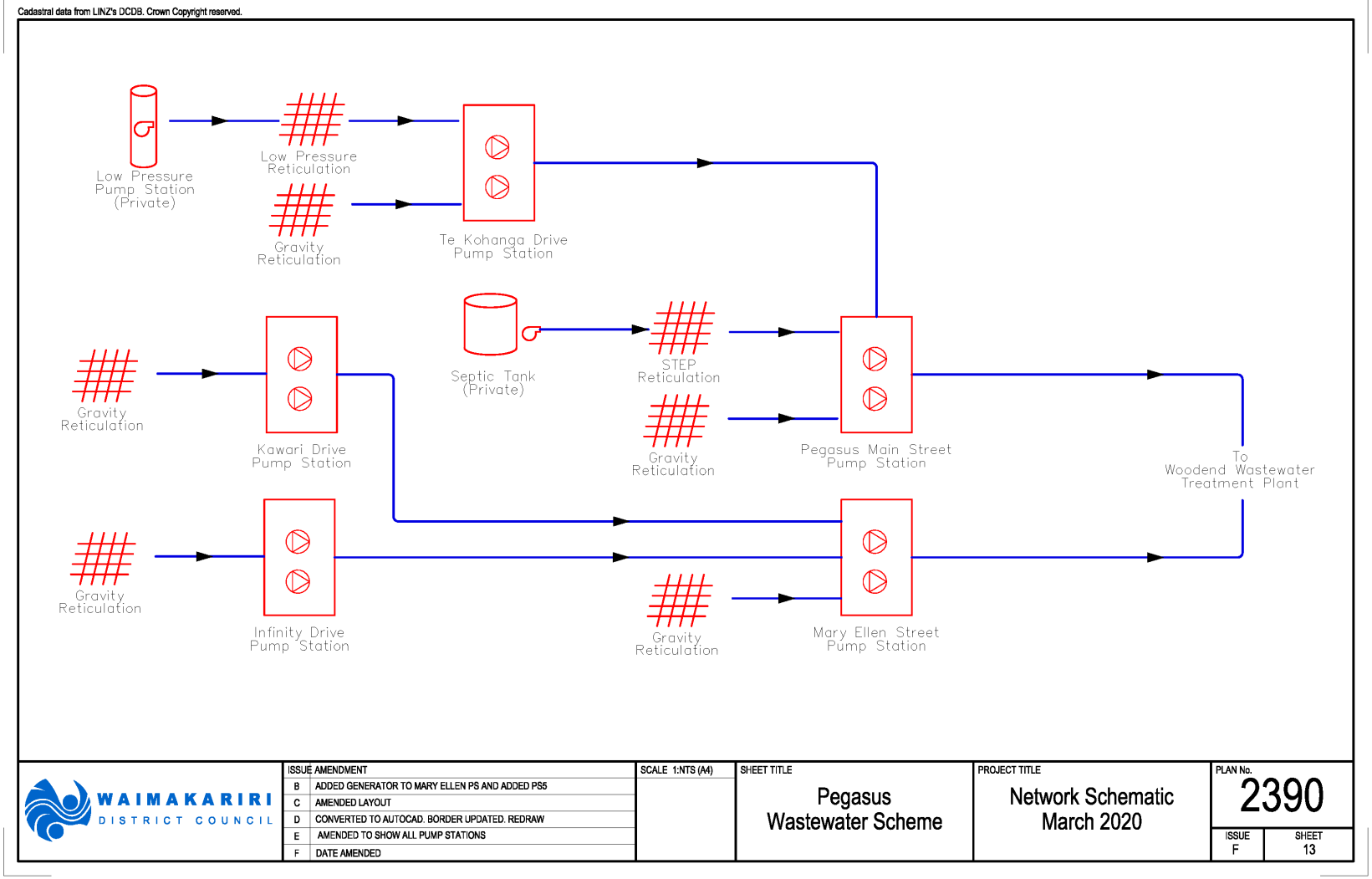
Table 6: Wastewater Manhole Data Summary

Wastewater Manholes	
Diameter (mm)	**Count**
900	0
1050	365
Total	**365**

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 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 - 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
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	This level of service is met.	Achieved	N/A	N	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met.	Achieved	N/A	Y	Y	Y	Y
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

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results#			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
Overflows	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	Y	Insf. Data	Y	Y

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 planned 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

Of note on the Pegasus scheme is the relatively young age of the infrastructure on the scheme, particularly the reticulation mains relative to their design life. Most of the mains on the scheme are less than 15 years old compared to a design life of 100 years in most cases. Due to poor workmanship during construction, which has resulted in sag in a few lines some mains are being suggested for replacement by the renewals model at a much earlier date than expected, although this may be able to be managed with flushing. As more of the scheme is inspected by CCTV and this data entered into the renewals model, more of the Pegasus scheme may require replacement at an earlier age than expected. The newly introduced asset management information system which enables direct tracking of maintenance against assets will make monitoring of this issue easier.

Figure 2: Pipe Condition Assessment Plan

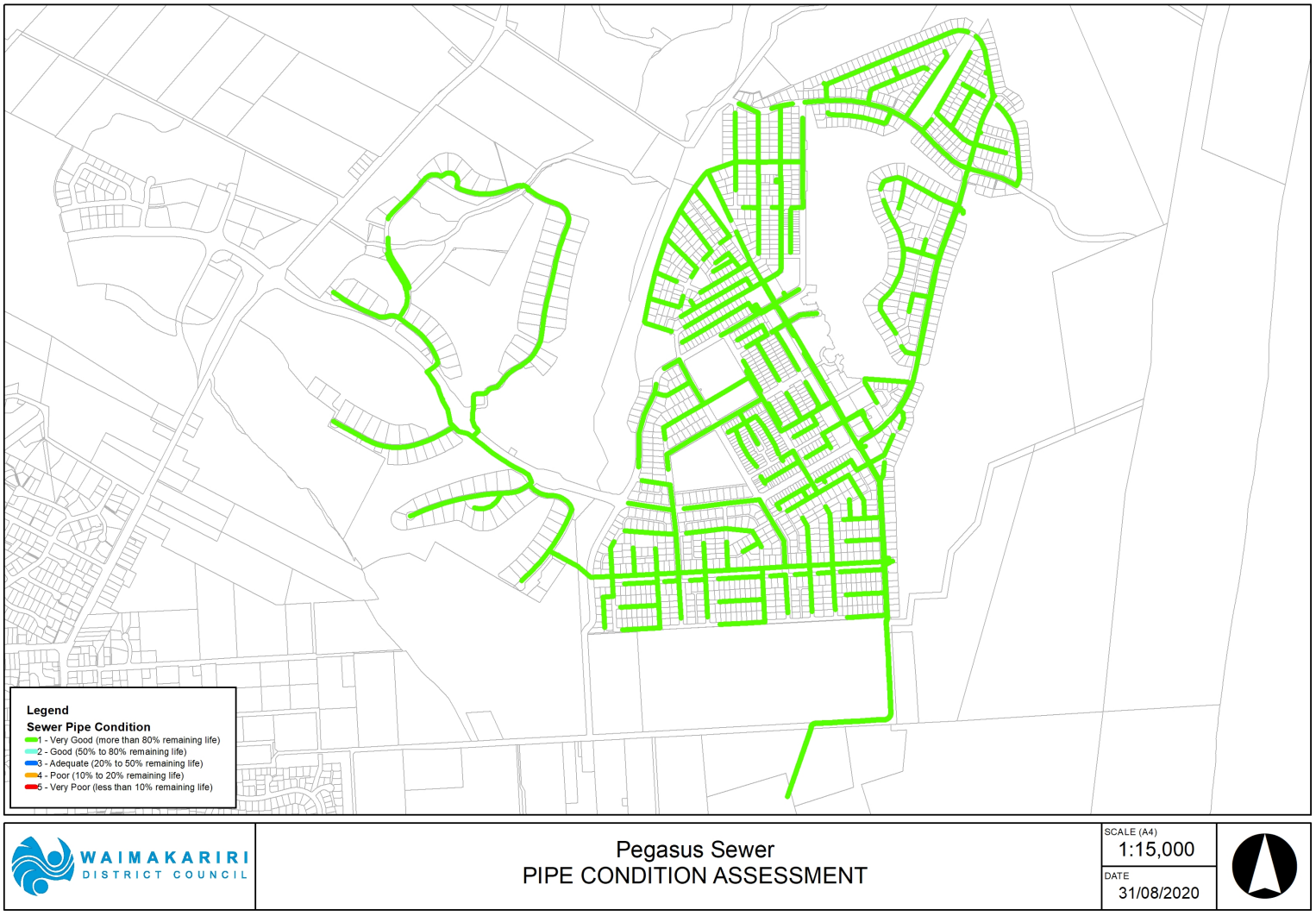
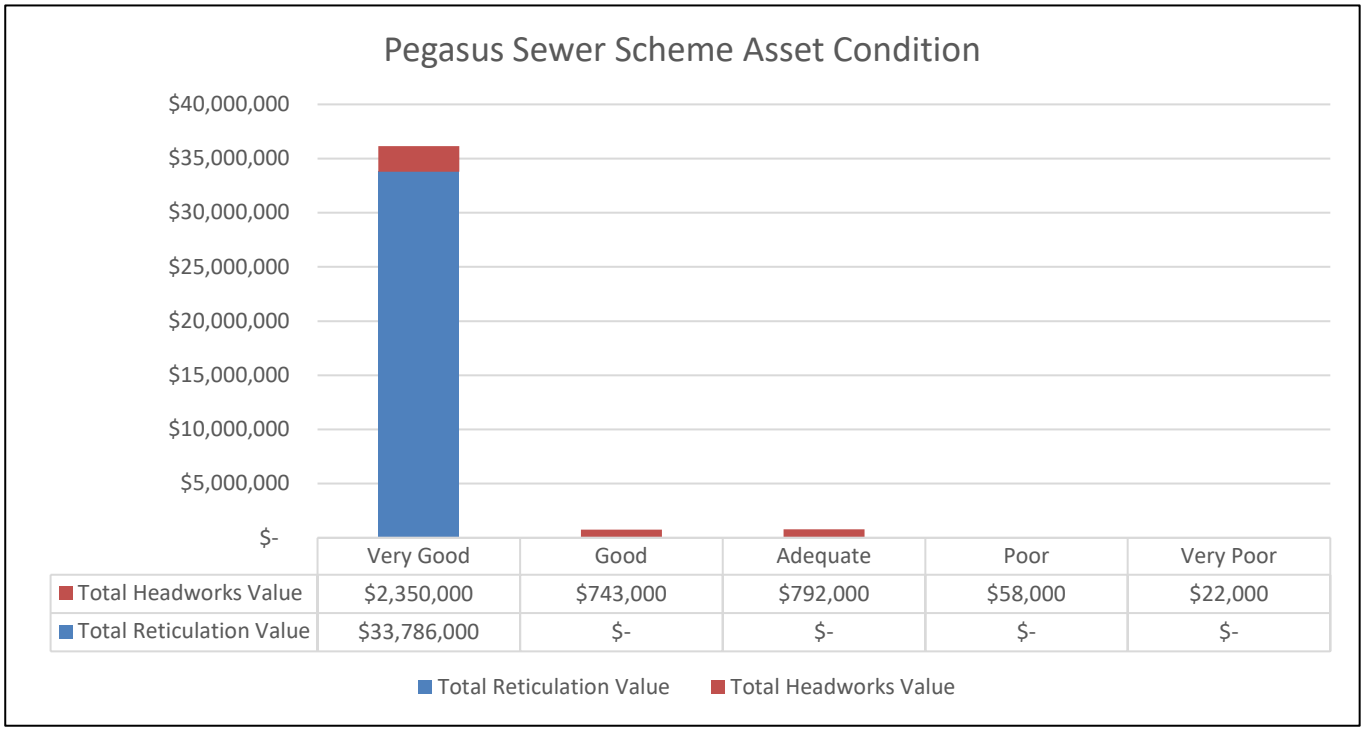


Figure 3: Asset Condition Summary



"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*	33.8 km *100%*	$ 33,786,000 *100%*	$ 2,350,000 *59%*	$ 36,136,000 *96%*
2	Good *Between 50% and 80% of life remaining*	0.0 km *0%*	$ - *0%*	$ 743,000 *19%*	$ 743,000 *2%*
3	Adequate *Between 20% and 50% of life remaining*	0.0 km *0%*	$ - *0%*	$ 792,000 *20%*	$ 792,000 *2%*
4	Poor *Between 10% and 20% of life remaining*	0.0 km *0%*	$ - *0%*	$ 58,000 *1%*	$ 58,000 *0%*
5	Very Poor *Less than 10% of life remaining*	0.0 km *0%*	$ - *0%*	$ 22,000 *1%*	$ 22,000 *0%*
Total		**33.8 km**	**$33,786,000**	**$3,965,000**	**$37,751,000**

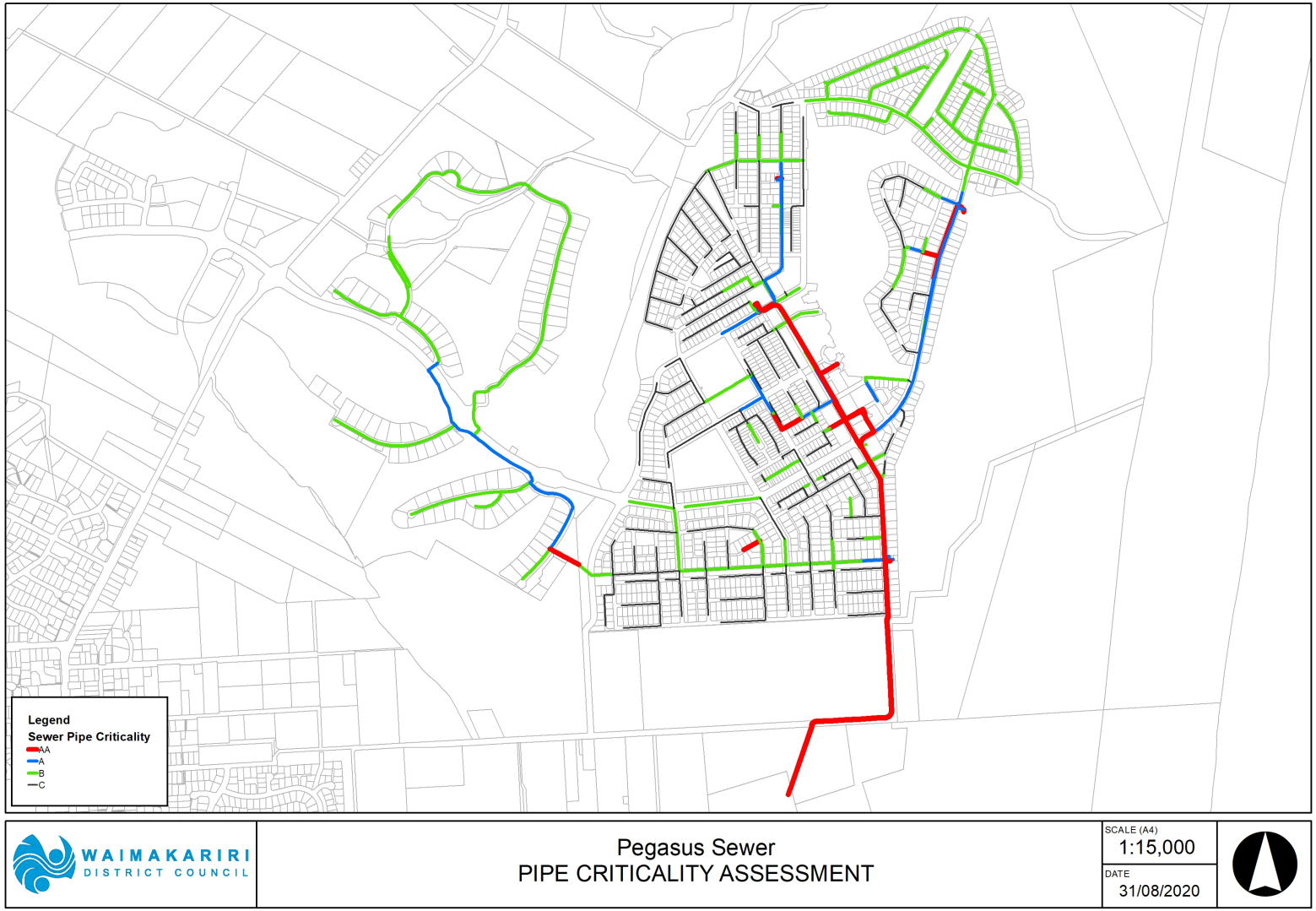
5.3 Asset Criticality

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 Pegasus 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 Pegasus Wastewater Scheme:

Table 10: Number of Events per Level of Risk

Risk Level	2004	2008	2011	2014
Extreme risks	N/A	0	0	0
High risks	N/A	0	0	0
Moderate risks	N/A	16	6	7
Low risks	N/A	15	25	25
Not applicable	N/A	16	16	20
Total	**-**	**47**	**47**	**52**

There have been no extreme or high risk events determined in the Pegasus Wastewater 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 (Table 11) 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	Infinity Dr PS	Kawari Dr PS	Mary Ellen PS	Pegasus Main St PS	Te Kohanga Dr PS
100 yr Local Flooding	-	L	L	-	-
475 yr Earthquake Induced Slope Hazard	L	L	L	L	L
Earthquake (50 yr)	H	H	H	H	H
150 Yr Earthquake	M	M	M	M	M
475 Yr Earthquake	M	M	M	M	L
200 Yr Tsunami	-	-	-	-	L
Wildfire	L	L	L	L	L
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 most significant hazard impacting on the Pegasus scheme is the risk of an earthquake. The scheme is located in the high risk liquefaction zone and the assets are newly installed.

Based on modelling of a worst case distant source tsunami, 1.5 metres of inundation is possible at Te Kohanga Drive PS.

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 Pegasus Sewer Network is now fully developed. However the sewerage loadings are still relatively low as a large portion of Pegasus has not been built on yet.

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 Pegasus wastewater scheme is expected to increase by 78%, by the end of the 2021-31 Long Term Plan (LTP) period. This projection is based on 78 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 76 per year and commercial connections are predicted to increase by 2 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 flat profile, with no additional growth due to geographical constraints. The connection growth rate for Pegasus water and Pegasus wastewater schemes were quite different. This is due to water and sewer connections being established and rated for at different times. A water connection is usually established and rated for once a property record is created and a connection is installed. A sewer connection is normally only established and rated for once the property has a dwelling built and is physically connected to the sewer system. While the equivalent number of available sewer connections will exist they have not yet been captured on the rating data base (Table 12).

Table 12: Growth Projections

Pegasus	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	1,090	1,357	1,943	1,943	1,943	1,943
Projected Rating Units	1,170	1,466	2,048	2,048	2,048	2,048
Projected increase in Connections		24%	78%	78%	78%	78%
Projected Average Dry Weather Flow (m3/day)	554	723	1,116	1,116	1,116	1,116
Projected Peak Wet Weather Flow (m3/day)	1,545	2,390	4,356	4,356	4,356	4,356

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 78%. The connection capacity of Pegasus has remained the same between 2017 and 2019. The area is geographically constrained and when current planned stages are complete there is little suitable land for growth on the sewer scheme. All future growth is already planned and documented for the area, the wastewater network has been designed for the full development.

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.

It is noted that the network was recently constructed using best practice methods; therefore it is hoped that the PWWF will be lower than the Engineering Code of Practice ECOP based estimates. This will not be verified until the development is more nearly complete.

Projections

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

Figure 5: Population Projections

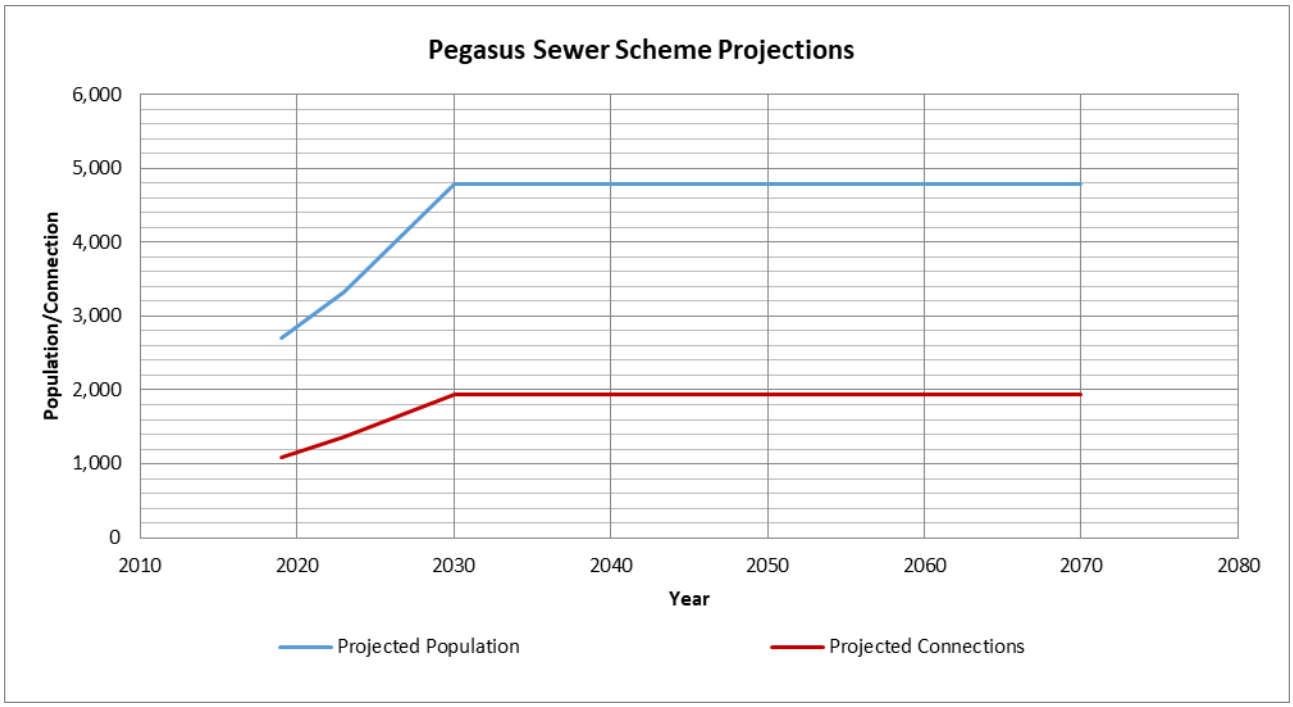
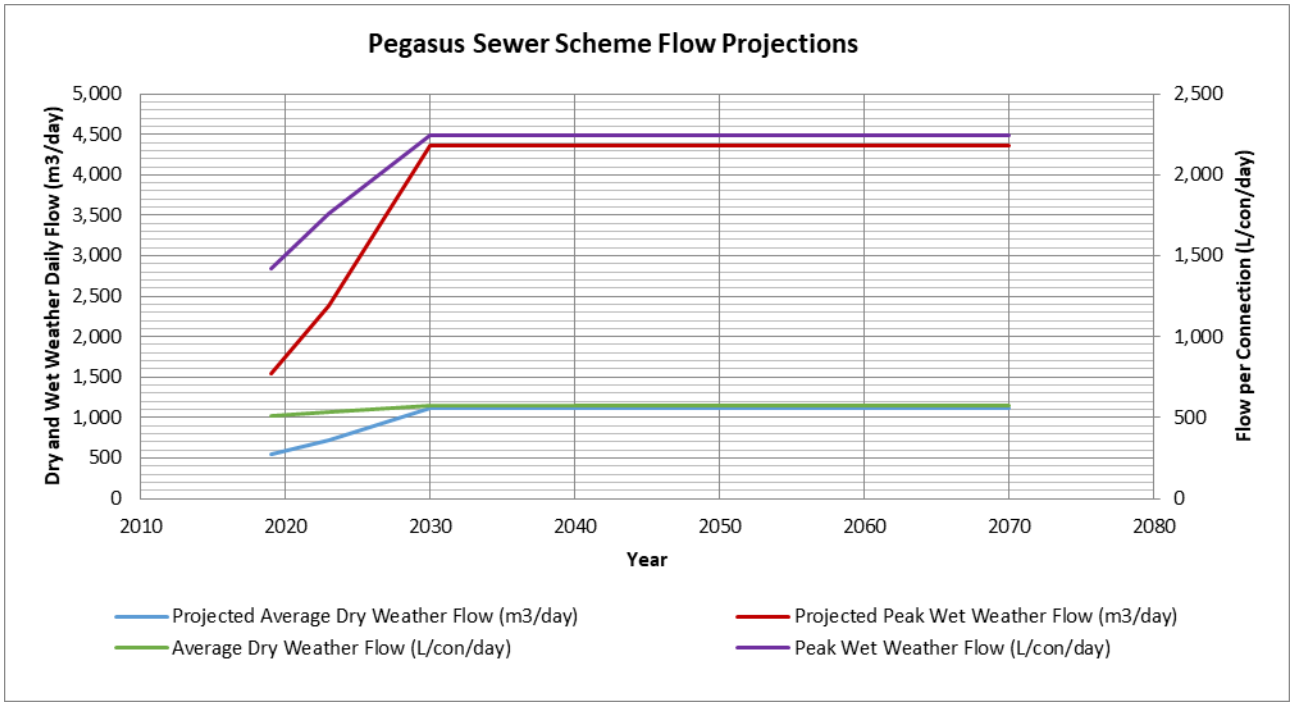


Figure 6: Flow Projections



5.7 Capacity & Performance

This section of the AMP considers the capacity and performance of the Pegasus 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 Pegasus scheme does not have a dedicated treatment plant. Rather it pumps raw sewage to the Woodend Treatment Plant. That infrastructure is discussed in the Woodend AMP.

Reticulation System

The reticulation system is new and has been designed to accommodate the peak dry and wet weather flows. The system has been designed in accordance with the WDC Engineering Code of Practice and therefore is expected to have adequate capacity for the long term demands of the area.

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

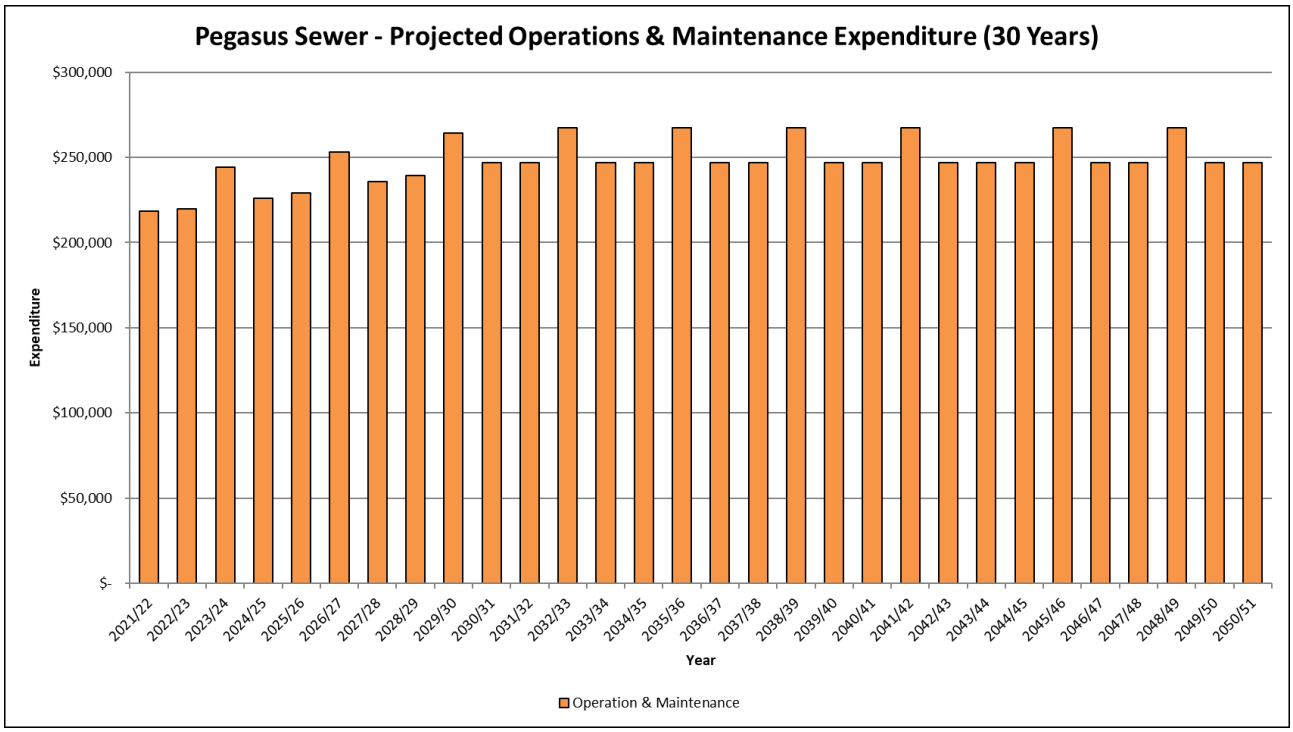
Operation and maintenance (O&M) expenditure incorporates the day to day running of the water supply network and allows the system to carry on functioning to deliver the agreed levels of service.

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.

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 primary reason for the increase in the operation and maintenance budget through to 2030 is the expected completion of all the housing in the development, on sections that are available to be built on. The small three yearly peak is to replace carbon filters.

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

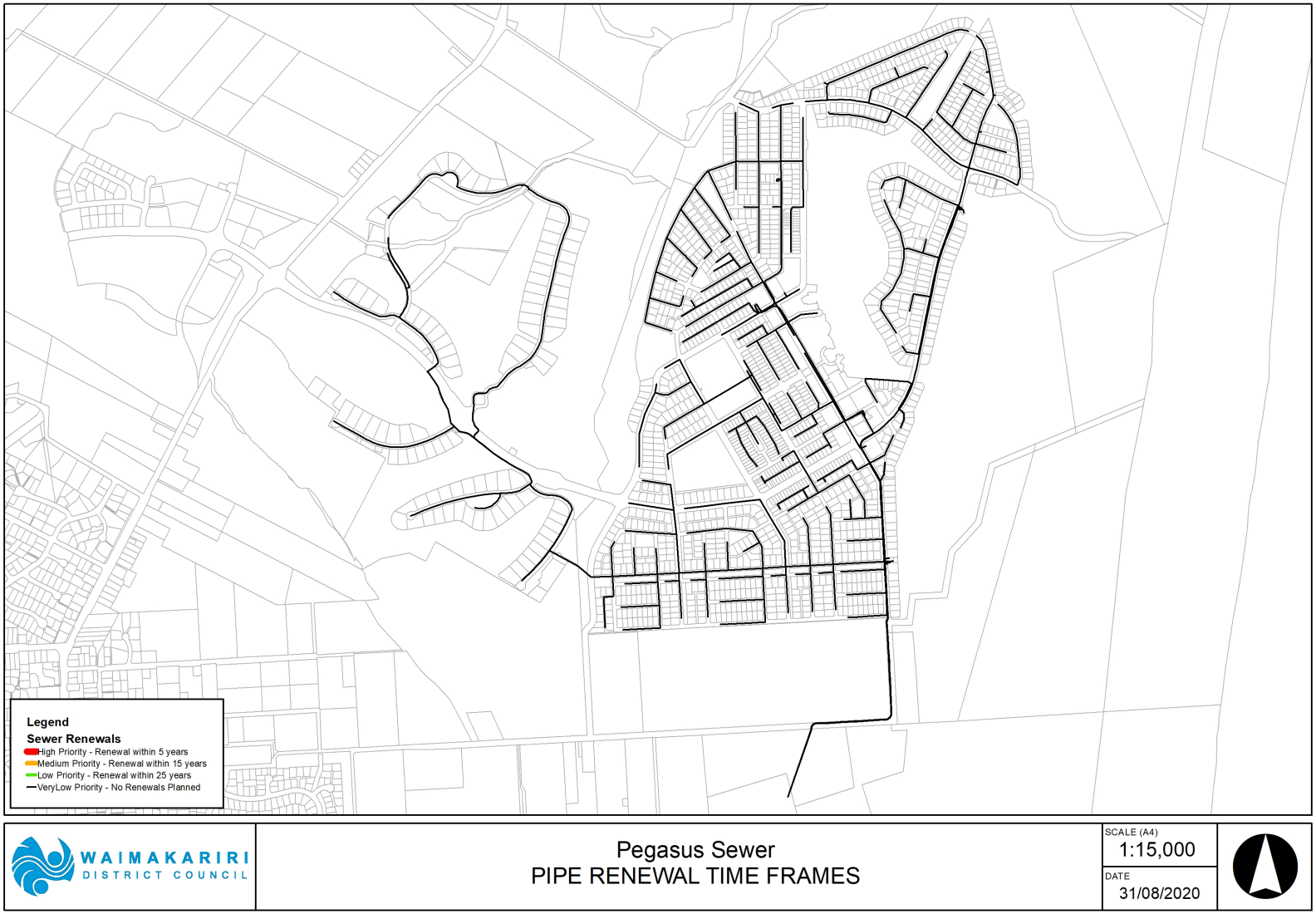
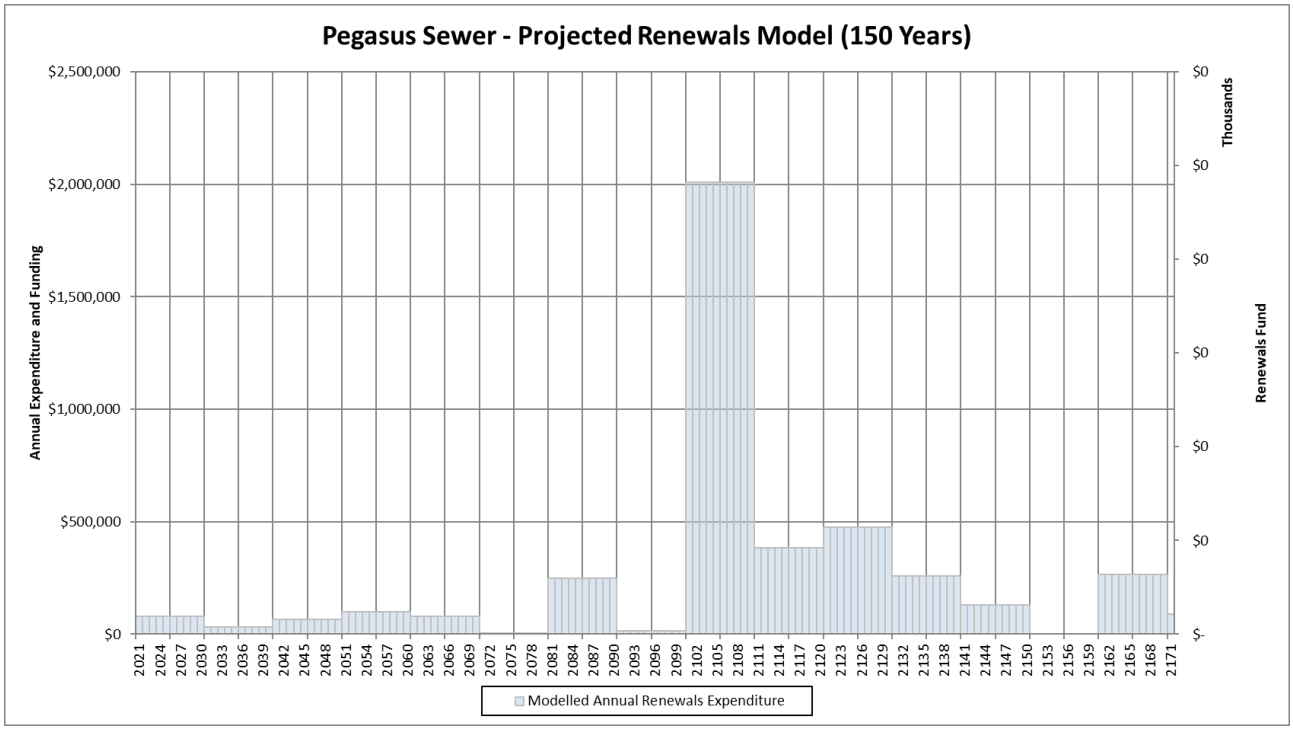


Figure 9 below shows the renewals expenditure from the model only. Budgeted depreciation funding, modelled annual funding required, and the modelled renewals fund are not shown on this graph, but are shown on the equivalent graph in the Overview AMP. This is because all properties that are connected 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). The renewals for years 1 to 3 are for pump station electrical upgrades. Renewals for years 5 to 10 are for assets identified in the renewals model. The condition of these assets will be assessed in years 1 to 3 to confirm the date for renewal. Renewals expenditure showing in the first ten years of the graph, includes the actual planned programme, not the model output.

The $550,000 item is a consequence of the small annual renewals budget produced by the model for the first ten years having been pushed out and aggregated in year ten, as there are no known actual replacement candidates at this stage.

Figure 10: Projected Capital Works Expenditure

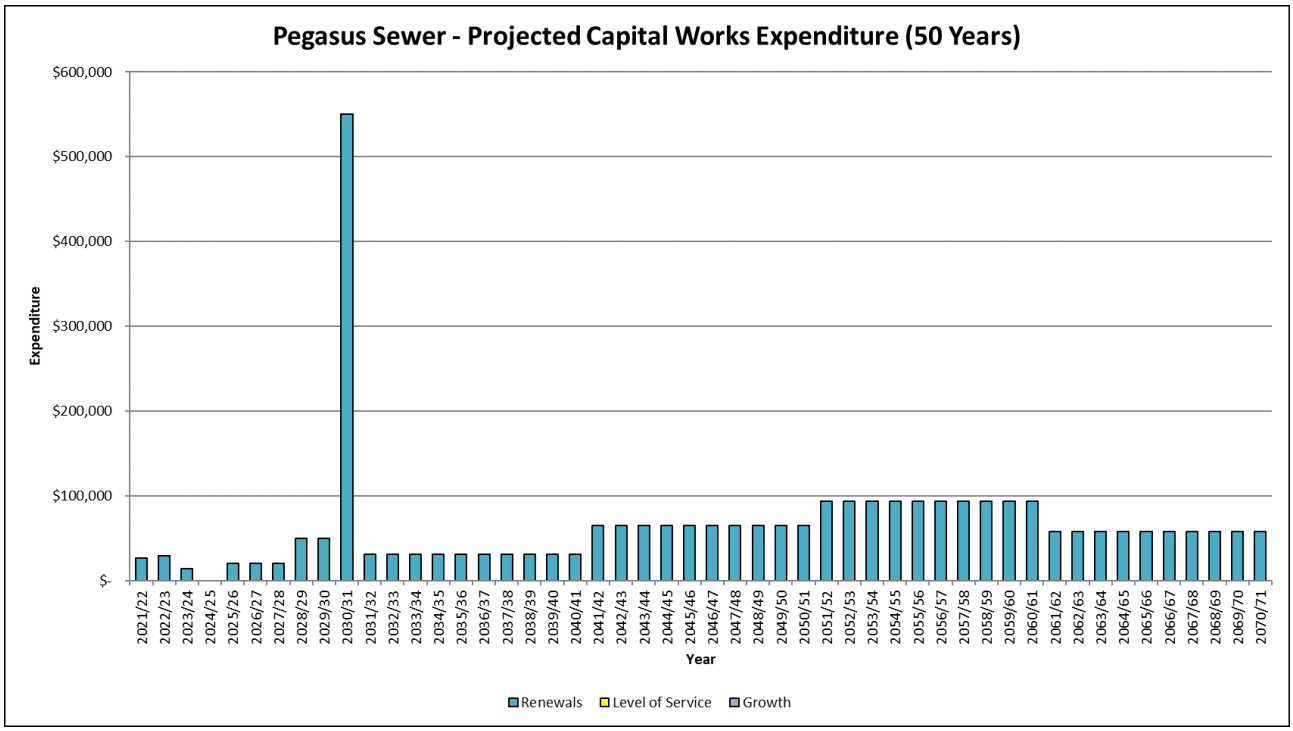


Table 13 on the following page summarises the projected capital works for the next 50 years, including renewals. Figure 11 shows the corresponding location of the projected capital upgrade works.

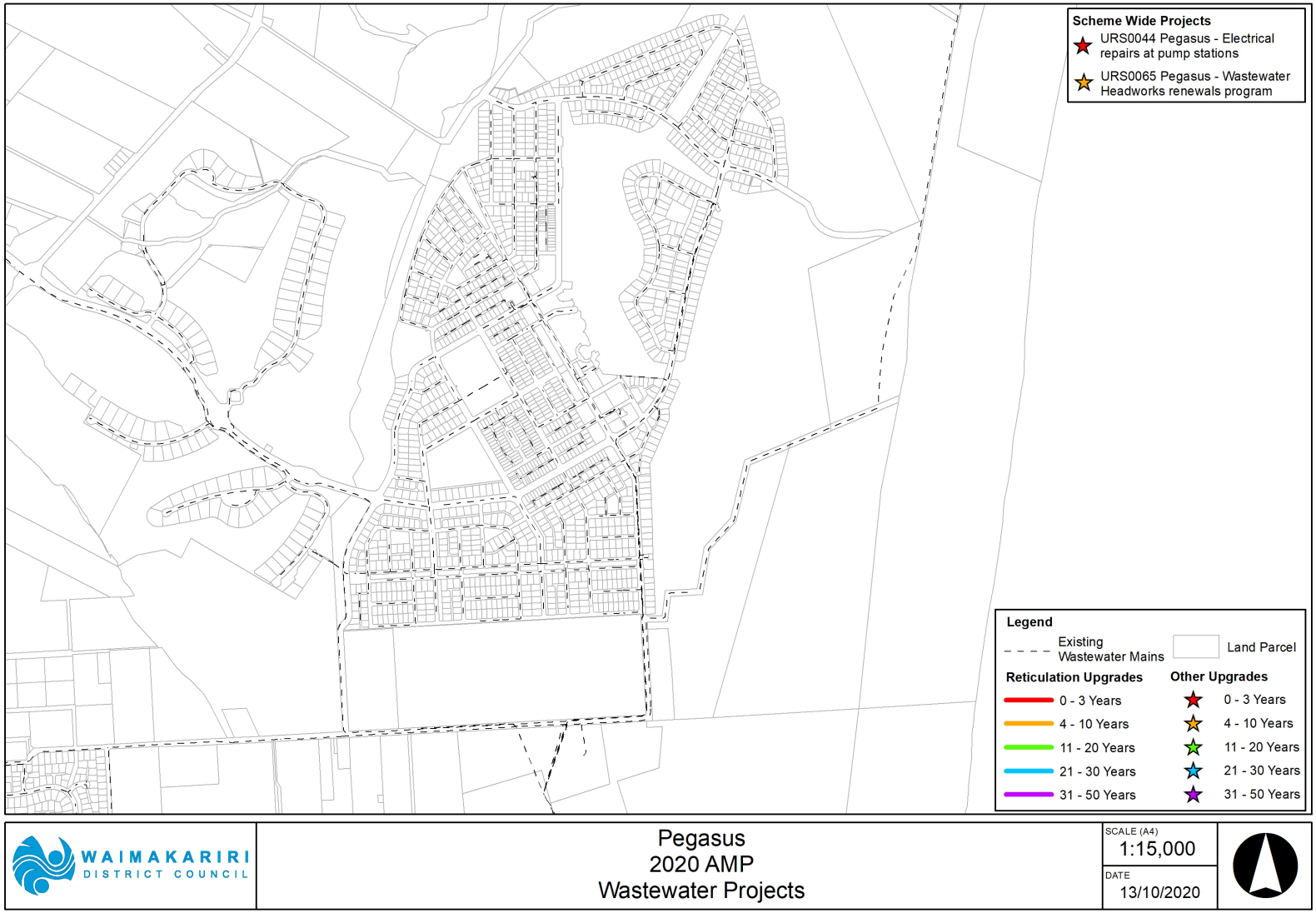
The level of confidence in the budget for the works (High / Medium / Low) is presented in the table. For a more complete discussion on the level of optimisation, refer to the introductory chapter of the AMP. The figures in the table are not adjusted for inflation.

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	URS0044	Pegasus - Electrical repairs at pump stations	7 - High	$ 69,000	$ -	$ 69,000	$ -
2026	URS0065	Pegasus - Wastewater Headworks renewals program	2 - Very Low	$ 3,171,289	$ -	$ 3,171,290	$ -
Grand Total				$ 3,240,289	$ -	$ 3,240,290	$ -

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



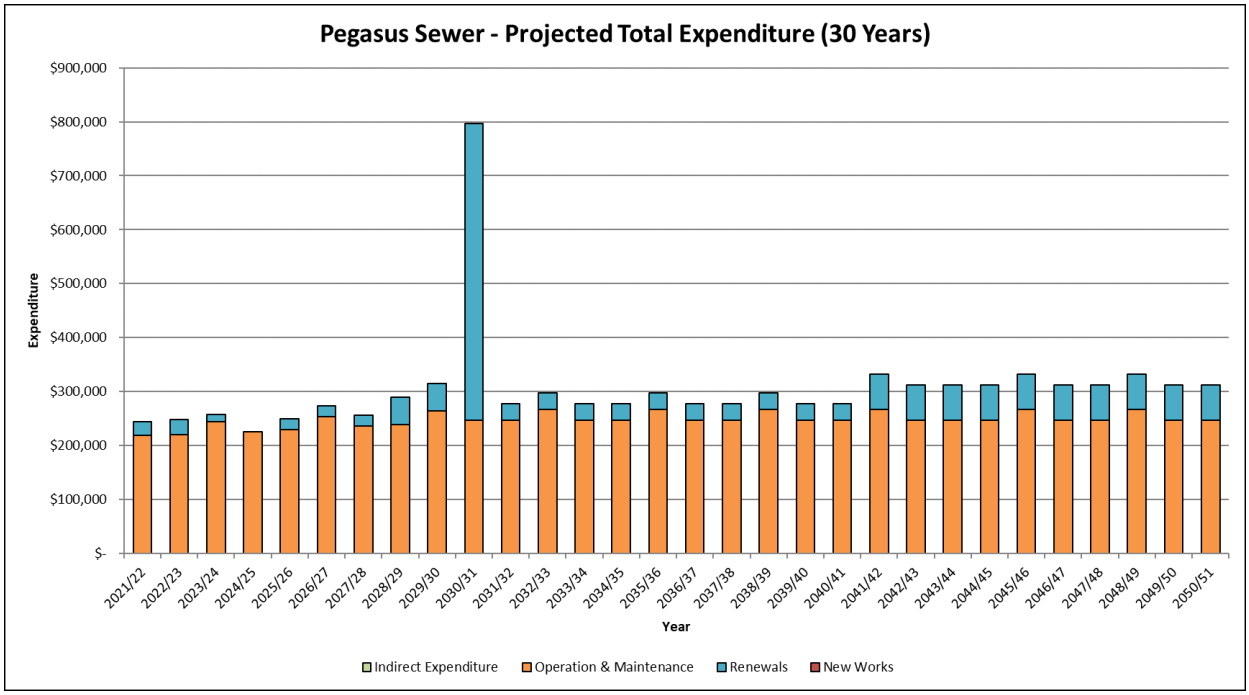
6.4 Financial Projections

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.	365	$4,435,387	$4,053,670	$35,483
Valve	No.	114	$171,646	$153,001	$1,982
Main	m	33,766	$21,550,908	$19,232,053	$215,509
Service Line	properties	1,534	$6,165,846	$5,565,023	$61,658
Facilities			**$3,964,897**	**$2,922,617**	**$89,666**
Total			**$36,288,684**	**$31,926,364**	**$404,299**

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

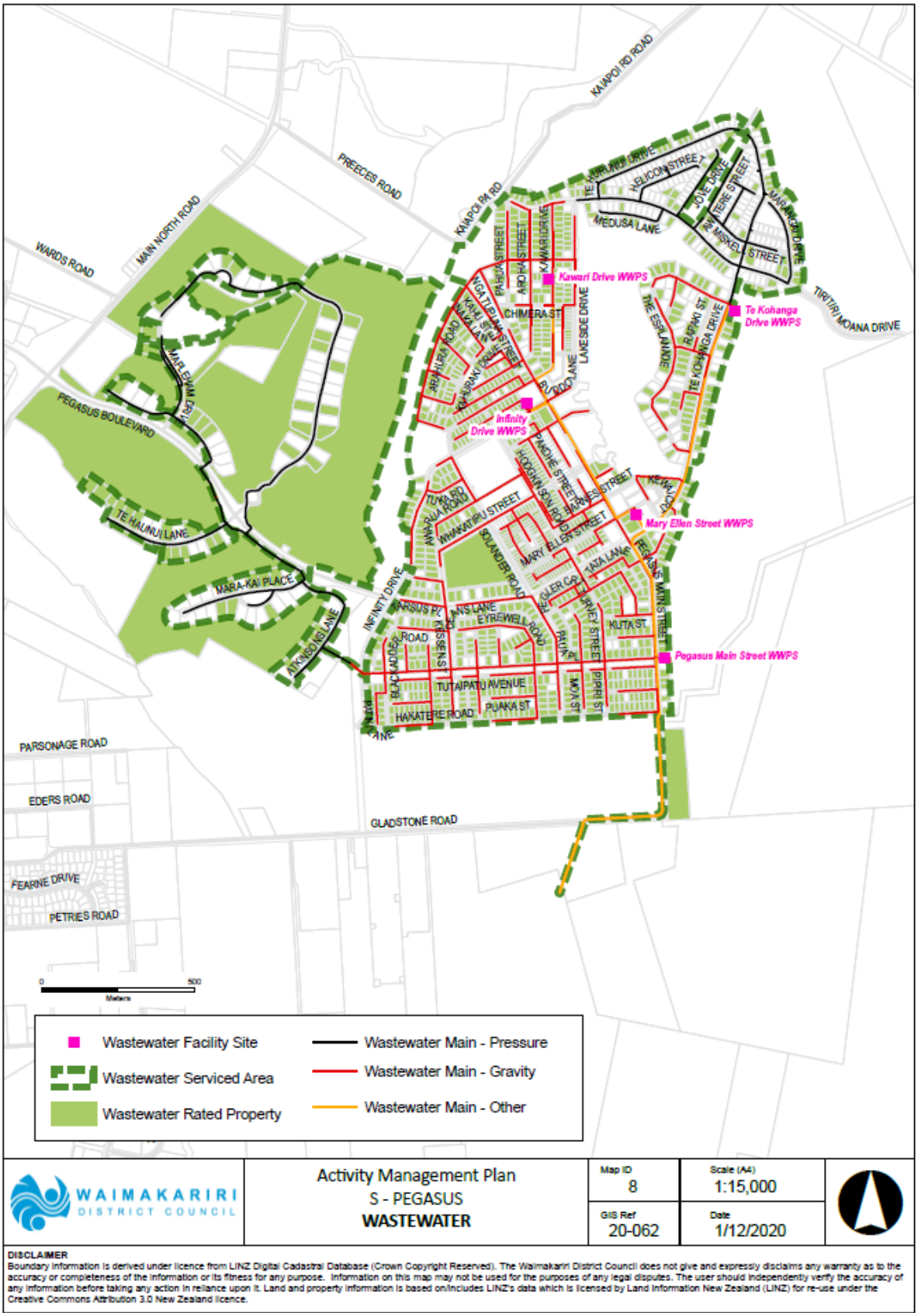


Figure 14: Pegasus Wastewater Supply Statistics

Pegasus Wastewater Statistics

Pegasus | 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	64	176	101	257	309	339	403	465	554	522	572	503	370
Average Dry Weather Flow	m^3/day	-	170	101	241	295	338	403	452	547	520	566	498	363
Peak Daily Flow	m^3/day	64	327	246	1,036	725	467	534	665	770	772	793	707	634
Peak Weekly Flow	m^3/day	64	327	246	523	456	362	435	566	682	595	639	583	483
Peak Monthly Flow	m^3/day	34	319	202	403	401	360	422	546	609	562	619	552	444
Peak Instantaneous Flow	L/s	-	-	-	-	-	-	-	-	-	-	-	-	-
Peak Month		Jun	Sep	Sep	Jun	Jun	Jun	May	Apr	Jan	Jun	Apr		
Peak Week		Week 26	Week 39	Week 39	Week 26	Week 25	Week 27	Week 52	Week 16	Week 9	Week 52	Week 14		
Peak Day		15/06/2010	18/09/2010	15/09/2011	17/06/2013	26/06/2014	28/06/2015	6/06/2016	14/04/2017	11/01/2018	14/11/2018	1/04/2020		
Peak Day Rainfall	mm	15.2	0	0.1	74.5	4	0	0	38	48.6	0	0.2		
Peak Day Weather		Storm	Wet	Wet	Storm	Wet	Wet	Dry	Storm	Storm	Wet	Wet		
Total Annual Volume	m^3	1,020	64,427	37,062	94,254	113,353	124,276	147,909	170,578	203,368	191,675	209,989	184,704	135,689
Rating Connections		81	80	163	428	613	739	840	912	986	1,088	1,205		
Rating Charges		99	98	181	-	656	784	895	977	1,059	1,168	1,287		
Average Daily Flow per Connection	L/con/day	787	2,194	620	600	504	458	480	510	562	480	475	501	688
Peak Daily Flow per Connection	L/con/day	787	4,093	1,511	2,421	1,183	631	636	730	781	710	658	703	1,335
Data Quality		n/a	low	low	very high	very high	very high	very high	very high	high	high	high		