Gladstone Regional Council

1770 Low Pressure Sewer Options & Costs Review

February 2018

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1. Introduction

1.1 Background

Gladstone Regional Council currently provides a sewerage service to the Township of Seventeen Seventy (1770). The existing system comprising a conventional gravity system that was originally established to service approximately 30 lots, and a low pressure collection network that was more recently constructed in approximately 2012. The low pressure system currently services in the order of 70 properties, with forecast implementation to cater for up to 99 in total. Collected sewage from 1770 is pumped to the Agnes Water Sewage Treatment Plant (STP) for treatment and effluent disposal.

The implementation of a low pressure sewerage system at 1770 followed previous options assessments commissioned by Miriam Vale Shire Council, including a study by GHD in 2005. The 2005 investigation evaluated conventional gravity reticulation, common effluent drainage system, vacuum sewerage and low pressure sewerage networks. The investigation identified a low pressure system as preferred on the basis of cost, land acquisitions, environmental and social impacts.

Notwithstanding, Council has received complaints from some property owners in regards to performance of the low pressure units and the costs associated with maintaining the units. GHD has been engaged to review a number of operation and maintenance models for the existing low pressure sewer system as well as the offer to abandon the existing low pressure sewerage system and installation of a conventional gravity system.

1.2 Purpose of this report

The purpose of this report is to:

- Review the feasibility of a gravity sewerage system at 1770 and develop high level costs for this option (Capex and Opex)
- Review Council developed spreadsheets of low pressure system operational and capital replacement/upgrade costs for various low pressure sewerage operational scenarios (6 no.)
- Develop a combined Net Present Value (NPV) analysis of the above options
- Provide commentary of the above financial analysis as well as additional constraints and opportunities of the 1770 sewerage conveyance options, so as to assist Council and the community in decisions moving forward for servicing the community.

1.3 Scope and limitations

This report: has been prepared by GHD for Gladstone Regional Council and may only be used and relied on by Gladstone Regional Council for the purpose agreed between GHD and the Gladstone Regional Council.

GHD otherwise disclaims responsibility to any person other than Gladstone Regional Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has prepared this report on the basis of information provided by Gladstone Regional Council and

others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The Cost Estimate has been prepared for the purpose of comparison between options and must not be used for any other purpose. The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change.

2. Sewerage Connection Overview

2.1 Sewerage Infrastructure

The town of 1770 is currently serviced by a combination of conventional gravity (approx. 30 lots) and low pressure (approx. 70 lots) sewerage systems. Collected sewage is conveyed through to Agnes Waters for treatment.

The roll out of low pressure units has occurred since 2012, with the approximate number of annual installations undertaken and forecast provided in the following table, as advised by Council.

Table 1 Overview of Scheduled 1770 Low Pressure Sewerage Installations

Year	Low Pressure Units Installed	Cumulative Operational Low Pressure Units
2012	10	10
2013	12	22
2014	12	34
2015	18	52
2016	6	58
2017	10	68
2018	9	77
2019	3	80
2020	3	83
2021	4	87
2022	3	90
2023	3	93
2024	3	96
2025	3	99

The low pressure sewerage units installed are Twin Stage Centrifugal OGP pumps (~1.8 L/s, 1.5 kW) installed in a 1,100 L moulded polyethylene chamber. These units were selected on the basis of suitability and robustness for high sand ingress risk. The electrical control panels installed were the Aquatec oneSMART models. Appendix A provided further details of the currently installed Aquatec low pressure units and controllers.

The above low pressure installation data has been used as a basis for cost estimation provided in this report for both historic installation (eg. for renewals) and forecast installation (eg. future capital expenditure).

It is possible that additional connections beyond 99 may occur post year 2025, however restriction of development due to appropriate land tenure/geography in the study area is likely to limit significant development.

Figure 1 provides an overview of the existing 1770 sewerage system including overview of the extent of existing low pressure and gravity systems.

LEGEND:

RM — EXISTING RISING MAIN/LOW PRESSURE SEWER NETWORK

S — EXISTING GRAVITY SEWER

N

GHD

GLADSTONE REGIONAL COUNCIL
1770 LOW PRESSURE SEWER OPTIONS

OVERVIEW OF EXISTING 1770 SEWERAGE INFRASTRUCTURE

Job Number 42-20430
Revision A
Date JAN 2018

Figure 01

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Plot Date: 5 February 2018 - 2:55 PM Plotted by: Marcello Macdonald Cad File No: G:\42\20430\CADD\Drawings\42-20430-FIG01.dwg

3. Sewerage Options

Council requested that the following sewerage system scenarios be investigated as part of this project:

- Option 1 - Status Quo (property owners Operate and Maintain (O&M) infrastructure located within property boundary ie. Low pressure sewerage pump station). Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).
- Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service since installation. Council will continue to operate and maintain infrastructure outside of property boundary.
- Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 10 years of service since installation. Council will continue to operate and maintain infrastructure outside of property boundary.
- Option 4 - Council to take over O&M of the existing low pressure sewer systems. Scenario includes provision for easements (to facilitate access for O&M service), Council funded annual pump out and annual O&M callout/inspection. This option has provision for Council to repair/replace any faulty pumps provided they have seen more than 10 years of service since installation.
- Option 4B - Council take over O&M of the existing low pressure sewer system with Remote Monitoring technology fitted to the pump unit electrical control system. Scenario includes provision for easements (to facilitate access for O&M service), Council funded annual pump out and annual O&M callout/inspection. However unlike Option 4, in which 100% of units is subject to pump out/callout, in Option 4B, Council call outs for maintenance of pumps and wet wells is reduced (by two thirds) on the assumption that ability to remotely monitor the systems will reduce Council's service intervention. This option has provision for Council to repair/replace any faulty pumps provided they have seen more than 10 years of service since installation.
- Option 5 – Council replace existing low pressure sewerage system holistically with a new gravity sewerage collection network.

Options 1, 2, 3, 4 and 4 B focus on the replacement of mechanical and electrical components of the low pressure sewerage pump station only. That is, no allowance for replacement of pump well civils or pipework (local and trunk delivery).

The gravity sewerage option has been evaluated on the basis of a high level concept design undertaken as part of this investigation. This design included evaluation of potential Equivalent Population (EP) loads to the network, which influenced infrastructure sizing in accordance with the Capricorn Municipal Development Guidelines (CMDG).

A more detailed overview of the details and key assumptions of the above, including basis for cost evaluation, is provided in the following sections.

3.1 Option 1 – Status Quo

This option represented the existing scenario in which the property owner owns and operates the low pressure sewerage system to the property boundary. Council intervene as required for the first year (effectively warranty period), thereafter the equipment is the responsibility of the property owner in regards to the operation and maintenance of the facility (including electricity,

which is estimated to typically be in the order of $20/yr). The customer is responsible after one year for the repair / replacement of equipment as required.

Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).

This scenario is similar to the gravity systems in that the property owner is responsible for all sewerage infrastructure within the property, and Council is responsible for infrastructure outside of the property

In this scenario, Council is responsible for the scheduled installation and warranty period for the new low pressure units identified in the growth projections of Table 1 (ie. approx. 30 additional units)

3.2 Option 2 – Property owners retain responsibility for O&M of Low Pressure Systems, Council repair/replace faulty pumps provided > 5 years of service

Option 2 is as per Option 1 and the existing scenario, however Council take responsibility for the repair/replacement of the Customer owned low pressure pump station, providing the unit has reached at least 5 years of service. For context, the pump specification sheet outlines an expected operational lifespan of 20 years.

No allowance for electrical control box or PLC is made in this scenario.

This option assumes that Council pays for installation of new scheduled connections (as per Table 1, plus the replacement costs of new units that reach 5 years of age as per scheduled installation defined in Table 1.

Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).

3.3 Option 3 – Property owners retain responsibility for O&M of Low Pressure Systems, Council repair/replace faulty pumps provided > 10 years of service

Option 3 is as per Option 2, however Council is obligated to replace/repair faulty low pressure pump systems only after 10 years of service. No allowance for electrical control box or PLC is made in this scenario.

Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).

3.4 Option 4 – Council take over O&M of low pressure sewer systems. Provision for easements and annual Council O&M service

For this option, Council becomes responsible for the operation and maintenance of the low pressure sewerage systems within the property boundary, as well as the trunk infrastructure of the network. Council would be responsible to address customer identified issues in accordance with agreed service levels.

For the purposes of this investigation, Council have proposed that provision for an Easement be included to ensure ease of access for preventative or reactive maintenance. The requirement or extent of this would need to be resolved by Council and property owners.

For the purposes if this investigation, it has conservatively been assumed that each low pressure unit of the network would be subject to an annual Council call out. In addition, allowance has been made for an annual pump out of the pump wells of debris or sludge and the replacement of the low pressure pump units, for every property, after they have reached 10 year service life (as defined in Table 1). In addition, for each pump changeover (ie. installation and every 10 yrs thereafter), the scenario makes allowance for Council to pay for the like-for-like replacement of the existing electrical control system (eg. OneSmart Control Panel with Optional PLC).

The financial modelling of the above is also replicated in the scenario of 20 years rather than 10, to provide a degree of sensitivity to the analysis.

On the basis that the existing low pressure pump stations do not have remote monitoring or alarming capability, Council would not be able to dismiss or address customer notified complaints of system performance without physically inspecting the property.

In this Option, the property owner would remain responsible for the power supply of the systems and for the notification to Council of any identified problems. Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).

3.5 Option 4B – Council take over O&M of low pressure sewer system, including retrofitting Remote Monitoring technology. Provision for easements and reduced annual Council O&M service due to remote unit viewing/serviceability

Option 4B is as per Option 4, however this option includes provision for installation of a new electrical/PLC control system with automated and remote access to Council of the low pressure sewerage systems. This would include remote alarming, visual monitoring of performance and set points, ability to remotely reset faults (where possible) and potentially, remote adjustment of settings. The system would use a SIM card system for SMS/Email communication and the cost of this communication facility would be paid by Council. Appendix A contains an example of the upgraded electrical control system and remote functionality that can be achieved (eg. OmniSmart-1000).

For the purposes of this investigation, allowance has been made for retrofitting this technology to all existing low pressure units as well as future installations, including those for 10 year pump replacements.

The financial modelling of the above is also replicated in the scenario of 20 years rather than 10, to provide a degree of sensitivity to the analysis.

This option assumes a reduction in Council's service intervention (call out and pump out of pump wells) is achieved through more vigilant monitoring by Council of the low pressure units via the installation of the remote monitoring and control system. For the purposes of this assessment, it has been assumed that only one third (33%) of the installed low pressure units require annual inspection.

In this Option, the property owner would remain responsible for the power supply of the systems and for the notification to Council of any other problems.

Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).

3.6 Option 5 – Council replace existing low pressure sewerage system holistically with a new gravity sewerage collection network

3.6.1 General

The above four options encompass low pressure sewerage reticulation as well as the existing gravity network. An alternative to the adoption of low pressure could potentially be a new gravity system which eliminates requirement for mech/elec infrastructure within the owner's property boundary. As part of this investigation, GHD has undertaken a concept design of a sewerage system that could be constructed to service existing and future house developments, and also integrate into the existing 1770 gravity/pressure trunk sewerage network.

3.6.2 Design Standards

The concept design is based on standards typically required by Council, namely Capricorn Municipal Development Guidelines (CMDG - Sewerage Network D12) and where not explicitly defined in CMDG, the Water Services Association of Australia (WSA 02-2014 V.3.1 - Gravity Sewerage Code of Australia).

The gravity sewerage design is based on survey data provided by Council and alignments were chosen to best utilise natural ground slope. Notwithstanding, pump stations were required to pump sewage over the hill at the northern most catchment.

Key design criteria adopted for the concept design area as follows:

- Average Dry Weather Flow (ADWF) 250 L/EP/d as per Table D12.06.01
- Wet Weather Flow (WWF) = 5 x ADWF as per Section D12.06
- Minimum grades for sewers – DN150 (1:150) and DN225 (1:290) as per Table D12.09.02
- Maximum spacing for sewer manholes – 120 m as per Table D12.08.02
- Design Equivalent Populations (EP) as per Table D12.C.01
- Maximum capacities for gravity sewers as per WSAA WSA 02-2014-3.1 Table 5.6.

In addition to the above, the gravity sewer depths were limited to 0.9 m at the shallowest (to enable gravity connection to properties) and a maximum depth of 3 m before a pump station or lift station was established (on the basis rock or sand is likely present throughout the network and that excavations deeper than that in such geology becomes excessive in cost).

3.6.3 EP Loads

Application of the CMDG Table D12.C.01 principles, the following EP loads to the 1770 concept gravity network apply (Refer Appendix A for area definition).

Table 2 Overview of EP loads to 1770 Gravity Network

Area	Description	Total Number of ET	EP/ET	EP
1	Residential Area - Northern Most (Endeavour Street, Banks Drive, Ocean Drive and Tupia Street)	50	2.6	130
2	Residential Area - (Parkinson Drive and Captain Cook Drive)	25	2.6	65
3	1770 Camping Ground	96	2.08	200

4	Residential Area - Along Captain Cook Drive, opposite Endeavour Park	23	2.6	60
5	Residential Area - (adjacent Elliot St)	4	2.6	10
6	Residential Area - (Elliot Street, Barton Street and Gaden Street)	44	2.6	114
7	1771 Marina Café	8	5.2	42
7	2 X Dock area and buildings	3.85	2.34	9
	Total			630

3.6.4 Design Overview

Adopting the above principles, the concept design is provided in Figure 2. The system effectively drains from north to south, terminating at the existing pump station adjacent to the 1770 boat ramp. Sewage from here is pumped back to Agnes Waters.

A summary of the gravity sewerage infrastructure included in the concept design is as follows:

- Total EP 630 EP
- DN100 Rising Main (DICL Tyton Xtreme) 900 m
- DN150 Gravity Main (DICL Tyton Xtreme) 1,600 m
- DN225 Gravity Main (DICL Tyton Xtreme) 800 m
- Pump Stations 4 no.
- Lift Stations (lifting to adjacent, shallower gravity main) 1 no.

Layout and long section of the concept gravity network is provided in Appendix B.

4. Cost Estimates

A breakdown of the cost estimates developed as part of this investigation is provided in Appendix C. On the basis capital and operational costs change annually as a function of sewerage infrastructure installed over the projected 28 year planning horizon (eg. staged installation of low pressure units, replacement of gravity pump station mech/elec etc), a summary of the total annual Capex and Opex costs for each option is most relevantly seen in the NPV section below. An inflation rate of 1.8% p.a has been adopted for this cost analysis.

All costs presented are exclusive of Goods and Services Tax (Ex GST).

4.1 Capital Costs (CAPEX)

4.1.1 Option 1 - Status Quo Operational Costs (OPEX)

The CAPEX costs to Council for this scenario are as follows:

- Installation of new low pressure sewerage pump stations as scheduled in Table 1 (ie. 31 no. remain). This includes an allowance of for the equivalent pump unit (Twin Stage Centrifugal OGP pump ~1.8 L/s, 1.5 kW – potentially Council may prefer the new OGT model – same cost and refer Appendix A) installed in a 1,100 L moulded polyethylene chamber and pipework, complete with controller and PLC as per current installations (eg. OneSmart 2 controller with optional PLC – refer Appendix A). The year 2017 (Dec) cost allowance for these units complete install is approximately $9,000 (Ex GST).
- The number of annual installs is as per Appendix Table C1 and ranges from 9-3 units.

4.1.2 Option 2 - Property owners retain responsibility for O&M of Low Pressure Systems, Council repair/replace faulty pumps provided > 5 years of service

The CAPEX costs to Council for this scenario are as per Option 1, plus:

- Allowance to replace the pump only for properties in which the pump has been installed for more than 5 years. The replacement pump unit is either the OGT (new technology) or OGP (existing) units, for a December 2017 installed price of price $3,200 (Ex GST), which includes $500 (Ex GST) for labour.
- As per table C2, the scenario accounts for 572 low pressure pumps being replaced over the 28 year study period, at an average of 20 units per annum.

4.1.3 Option 3 - Property owners retain responsibility for O&M of Low Pressure Systems, Council repair/replace faulty pumps provided > 10 years of service

The CAPEX costs to Council for this scenario is as per Option 2, however the frequency of pump replacement is significantly reduced as Council is only obligated to replace units that have seen 10 years of service life.

- As per Table C3, the scenario accounts for 287 low pressure pumps being replaced over the 28 year study period, at an average of 10 units per annum.
- The financial modelling of the above is also replicated in the scenario of 20 years rather than 10, to provide a degree of sensitivity to the analysis.

4.1.4 Option 4 – Council take over O&M of low pressure sewer systems. Provision for easements and annual Council O&M service

The CAPEX costs to Council for this scenario are as follows:

- Installation of new low pressure sewerage pump stations complete as scheduled in Table 1 (ie. 31 no. remain at $9,000 (Ex GST)), plus the installation of new pumps and electrical control boxes for pumps/electrics that have had 10 years of service life. This includes an allowance of for the equivalent pump unit (Twin Stage Centrifugal OGP pump ~1.8 L/s, 1.5 kW – or potentially Council may prefer the new OGT model – same cost and refer Appendix A), complete with controller and PLC as per current installations (eg. OneSmart 2 controller with optional PLC – refer Appendix A). The year 2017 (Dec) cost allowance for these replaced units complete install is $4,400 (Ex GST).
- The financial modelling of the above is also replicated in the scenario of 20 years rather than 10, to provide a degree of sensitivity to the analysis.
- In addition to the above, an allowance has been made to establish an access easement to each of the 99 connected properties to enable unrestricted Council access to the properties/low pressure systems. A nominal allowance of $5,000 (Ex GST) per easement has been included. This represents a significant cost (approx. $500k), which may be removed (or significantly negotiated) on the basis Council is taking on responsibility of the units.
- Refer Appendix C, Table C4 for cost breakdown.

4.1.5 Option 4B – Council take over O&M of low pressure sewer system, including retrofitting Remote Monitoring technology. Provision for easements and reduced annual Council O&M service due to remote unit viewing/serviceability

The CAPEX costs to Council for this scenario is as per Scenario 4, however:

- The option includes adoption of remote monitoring of the pump control system at a cost of $1,200 (Ex GST) (eg. OmniSmart 1000/LCD and communications card – refer Appendix A). Although the newer unit costs the same as the currently installed controllers, and the forecast 10 yearly replacements is the same as for Option 4, the allowance to replace all existing controllers as well as new 2018 installs amounts to higher cost (ie. 77 controllers in year 2018).
- The financial modelling of the above is also replicated in the scenario of 20 years rather than 10, to provide a degree of sensitivity to the analysis.
- An allowance for access easements is also made (ie. $5,000 (Ex GST) as per Option 3).
- Refer Appendix C, Table C4B for cost breakdown.

4.1.6 Option 5 – Council replace existing low pressure sewerage system holistically with a new gravity sewerage collection network

The CAPEX estimate for the for the gravity concept design is approximately $5.5 M (Ex GST) as per the breakdown in Table C5 of Appendix C.

The concept scheme comprises approximately 3.3 km of Council's typically preferred pipeline for this scenario – Ductile Iron Cement Lined (DICL) Tyton Xtreme pipeline (DN100-DN225). Adopted pipeline rates increased to account for the likely presence of rock for much of the alignment. Provision for emergency storage has been made at each of the pump stations.

Additional costs of note for this gravity option are associated with the fact the area is already established. For example, typically in designing a gravity sewerage network, the collection mains would run across the rear of the properties to enable efficient collection from adjacent houses. For 1770, the fact yards are established with pools, sheds, gardens etc, access to achieve common gravity mains is limited. The concept design is based on pipeline alignment within road reserves where possible. Notwithstanding, the presence of established properties has resulted in a Legals and Land Acquisition allowance of approximately $550k (Ex GST) and a Reinstatement allowance of approximately $320 k (Ex GST).

Although the gravity system is relatively robust, allowance has been made after 15 years of service to replace the mechanical and electrical components of the pump stations (Approximately $300k (Ex GST).

4.2 Operational Costs (OPEX)

4.2.1 Option 1 - Status Quo Operational Costs (OPEX)

In this option, the property owner is solely responsible for the operation and maintenance of the low pressure sewerage infrastructure within the property boundary. No scheduled OPEX costs for Council.

4.2.2 Option 2 - Property owners retain responsibility for O&M of Low Pressure Systems, Council repair/replace faulty pumps provided > 5 years of service

In this option, the property owner is solely responsible for the operation and maintenance of the low pressure sewerage infrastructure within the property boundary. No O&M costs beyond replacement of eligible faulty pumps is applicable, and these replacement labour costs are included in the CAPEX component

4.2.3 Option 3 - Property owners retain responsibility for O&M of Low Pressure Systems, Council repair/replace faulty pumps provided > 10 years of service

In this option, the property owner is solely responsible for the operation and maintenance of the low pressure sewerage infrastructure within the property boundary. No O&M costs beyond replacement of eligible faulty pumps is applicable, and these replacement labour costs are included in the CAPEX component.

4.2.4 Option 4 - Council take over O&M of low pressure sewer systems. Provision for easements and annual Council O&M service

Option 4 involves Council taking over O&M of the low pressure sewerage systems. The property owner continues to pay for the electricity costs of the units (nominally $20/yr).

For this option, Council's key O&M allowances would be for call outs to inspect pumps notified by the property owner as faulty. An allowance has been made for both a plumber and labourer for 2 hours per unit per year (Total callout cost of $432 (Ex GST) as per December 2017).

In addition, an annual allowance for vac-truck pump out of the base of the tanks has been made. This equates to $200 (Ex GST) as per December 2017 pricing.

4.2.5 Option 4B – Council take over O&M of low pressure sewer system, including retrofitting Remote Monitoring technology. Provision for

easements and reduced annual Council O&M service due to remote unit viewing/serviceability

The OPEX costs for Option 4B are generally as per Option 4, with the additional allowance of $60 per year (Ex GST) to enable remote monitoring of the low pressure pump stations. The controller manufacturer indicates this price may range from $30-$60/year depended on the data usage of the SIM card. A conservative allowance of $60 (Ex GST) has been adopted.

Inclusion of the remote monitoring enables the assumption the extent of Council O&M is reduced due to effective utilisation of the remote monitoring technology of the pump stations. Specifically, the call outs and pump outs have been assumed as one third (33%) of Option 4.

4.2.6 Option 5 – Council replace existing low pressure sewerage system holistically with a new gravity sewerage collection network

Operational costs for the gravity option have been calculated as a function of capital cost. A two (2) year procurement/construction/commissioning period has been assumed with operational phase commencing 2020.

The adopted OPEX components for the gravity system area as follows:

- General O&M – 1% of civil infrastructure costs
- Mechanical / Electrical Maintenance – 3% of M/E infrastructure (assuming M/E accounts for 20% of the pump station capital costs).

4.3 Net Present Value (NPV)

This section presents the NPV analysis of the seven (6) options considered. The NPV utilises CAPEX and OPEX costs outlined in Sections 4.1 and 4.2 respectively. Refer also to Appendix C for further details. The NPV analysis values presented within this section have been developed for the purpose of financially comparing options only. A range of discount rates have been used ranging from 4% to 8%.

Table 3 presents the summary of the NPV analysis.

It is note that Options 3, 4 and 4B have the financial analysis repeated for the scenario of 20 years pump replacement rather than 10, so as to provide an increased degree of sensitivity to the analysis.

Table 3 NPV Assessment of 1770 Sewerage Options

Option 1 - Status Quo (property owners O&M infrastructure located within property boundary). Council maintains and operates infrastructure outside of the property boundary.	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 298,888.74	$257,541.81	$240,360.51	$225,070.96
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 1 (excl. GST)	**$ 298,888.74**	**$257,541.81**	**$240,360.51**	**$225,070.96**
Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 2,605,199.12	$1,519,615.30	$1,217,219.80	$1,002,166.25
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 2 (excl. GST)	**$ 2,605,199.12**	**$ 1,519,615.30**	**$ 1,217,219.80**	**$ 1,002,166.25**
Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 1,423,538.26	$831,377.16	$667,394.05	$550,796.35
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 3 (excl. GST)	**$ 1,423,538.26**	**$ 831,377.16**	**$ 667,394.05**	**$ 550,796.35**
Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 747,710.55	$467,300.12	$386,287.64	$327,676.65
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 3 (excl. GST)	**$ 747,710.55**	**$ 467,300.12**	**$ 386,287.64**	**$ 327,676.65**
Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 10 years)	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 2,340,281.83	$1,507,599.84	$1,273,695.60	$1,105,410.69
Operational Costs (OPEX)	$ 1,942,186.97	$1,099,316.94	$864,913.41	$698,606.07
TOTAL Option 4 (excl. GST)	**$ 4,282,468.81**	**$ 2,606,916.78**	**$ 2,138,609.01**	**$ 1,804,016.76**
Option 4-20YR - Council to take over O&M of the low pressure sewer systems (pump replacement 20 years)	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 1,411,018.73	$1,006,993.92	$887,174.29	$798,621.11
Operational Costs (OPEX)	$ 1,942,186.97	$1,099,316.94	$864,913.41	$698,606.07
TOTAL Option 4 (excl. GST)	**$ 3,353,205.71**	**$ 2,106,310.86**	**$ 1,752,087.70**	**$ 1,497,227.18**
Option 4B - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 2,324,156.96	$1,538,986.40	$1,314,810.03	$1,152,155.23
Operational Costs (OPEX)	$ 870,157.66	$489,134.32	$383,630.77	$308,985.06
TOTAL Option B1 (excl. GST)	**$ 3,194,314.62**	**$ 2,028,120.72**	**$ 1,698,440.80**	**$ 1,461,140.29**
Option 4B-20YR - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 1,648,329.25	$1,174,909.36	$1,033,703.62	$929,035.53
Operational Costs (OPEX)	$ 870,157.66	$489,134.32	$383,630.77	$308,985.06
TOTAL Option B1 (excl. GST)	**$ 2,518,486.91**	**$ 1,664,043.68**	**$ 1,417,334.39**	**$ 1,238,020.59**
Option 5 - New Gravity Sewerage Scheme	**Total Cost ($)**	**NPV (over 28 years) 4%**	**6%**	**8%**
Capital Works Cost (CAPEX)	$ 5,957,067.73	$5,877,984.77	$5,706,558.57	$5,543,850.09
Operational Costs (OPEX)				
General O&M (1% Civil)	$ 687,660.42	$398,775.25	$316,394.91	$257,253.55
Mech/Elec Maintenance (3% of M/E Infrastructure)	$ 239,362.84	$138,806.85	$110,131.66	$89,545.56
TOTAL Option 5 (excl. GST)	**$ 6,884,090.99**	**$6,415,566.87**	**$6,133,085.14**	**$5,890,649.20**

4.4 Summary

Key points of note from the cost assessment area as follows:

- The least expensive option for Council in terms of both CAPEX and OPEX is Option 1, Status Quo in which the property owners continue to own and operate the low pressure units independently. Council's cost is limited to the installation of the remaining 31 low pressure systems, at a total cost of approximately $300k (Ex GST).
- The most expensive CAPEX option is the installation of a new gravity sewerage system. The cost estimate for the Concept Design developed as part of this investigation is approximately $5.96 M (Ex GST). Although the OPEX costs are comparable to some of the low pressure sewerage options (although excludes power cost), the NPV is approximately three times the next cheapest option at approximately $6.1 M (Ex GST) for the 6% discount rate.
- For Option 2 and 3 in which the property owner maintains responsibility for the low pressure sewerage systems, Option 3, in which Council is not obligated to replace pumps unless they have achieved 10 years of service as oppose to Option 2's five years, is cheaper by approximately 50%, with a 6% NPV cost of $667 k (Ex GST). This NPV is reduced further again if the replacement obligation is stretched out to 20 years of service (ie. Option 3-20Yr $386k).
- The NPVs of the low pressure options where Council takes over O&M are more than the above owner maintained Options 2 and 3, however still cheaper than the gravity sewerage option.
- On the basis that the new remote monitoring pump controllers (eg. OmniSmart) cost the same in CAPEX as the existing PLC controllers, the CAPEX of the two Council operated and maintained low pressure scenarios is similar (Options 4 and 4B).
- The cheapest OPEX and overall NPV for the Council low pressure O&M scenarios is Option 4B in the scenario where allowance is made to replace only faulty pumps that have reached a service life of 20 years (NPV approximately $1.4 M at 6%). In the case where Option 4B makes allowance for replacement of faulty pumps that have seen 10 years of operation, this NPV increases approximately 20% to $1.7 M at 6%. The remote monitoring/operational functionality of the new smart controllers in Option 4B is assumed to reduce call outs to approximately one third of Options 4. That is, it is assumed that only one in three low pressure pump units would require Council site servicing per calendar year. It is understood that this rate is conservative in comparison to the current situation with the basic controllers installed.

5. Conclusion and Recommendations

5.1 Conclusion

Council has commissioned this report to investigate options for sewerage at the town of 1770. The assessment has included continuation of the existing scenario, as well as variations on the O&M obligations of Council with the existing low pressure sewerage systems. In addition and as a fundamental alternative, GHD has developed a concept design for a gravity sewerage network to service the area.

The following options were evaluated:

- Option 1 - Status Quo (property owners Operate and Maintain (O&M) infrastructure located within property boundary ie. Low pressure sewerage pump station). Council maintains and operates infrastructure outside of the property boundary (ie. bulk collection network).
- Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service since installation. Council will continue to operate and maintain infrastructure outside of property boundary.
- Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 10 years of service since installation. Council will continue to operate and maintain infrastructure outside of property boundary.
- Option 4 - Council to take over O&M of the existing low pressure sewer systems. Scenario includes provision for easements (to facilitate access for O&M service), Council funded annual pump out and annual O&M callout/inspection. This option has provision for Council to repair/replace any faulty pumps provided they have seen more than 10 years of service since installation.
- Option 4 B - Council take over O&M of the existing low pressure sewer system with Remote Monitoring technology fitted to the pump unit electrical control system. Scenario includes provision for easements (to facilitate access for O&M service), Council funded annual pump out and annual O&M callout/inspection. However unlike Option 4, in which 100% of units is subject to pump out/callout, in Option 4B, Council call outs for maintenance of pumps and wet wells is reduced (by two thirds) on the assumption that ability to remotely monitor the systems will reduce Council's service intervention. This option has provision for Council to repair/replace any faulty pumps provided they have seen more than 10 years of service since installation.
- Option 5 – Council replace existing low pressure sewerage system holistically with a new gravity sewerage collection network.

For all low pressure options above, Council maintains and operates infrastructure outside of the property boundary.

- The least expensive option for Council in terms of both CAPEX and OPEX is Option 1, Status Quo. Council's cost is limited to the installation of the remaining 31 low pressure systems, at a total cost of approximately $300k (Ex GST).
- The most expensive CAPEX option is the installation of a new gravity sewerage system. The cost estimate for the Concept Design developed as part of this investigation is approximately $5.96 M (Ex GST). Although the OPEX costs are comparable to some of the low pressure sewerage options, the NPV is approximately three times the next cheapest option at approximately $6.1 M (Ex GST) for the 6% discount rate. There remains

significant risk that this CAPEX could increase significantly in regards to the widespread presence of rock, which adds time and cost to construction. Allowance has been made for land acquisition for new infrastructure (such as the four pump stations) and also reinstatement of established properties that would be disrupted, however these costs have potential to significantly increase the gravity sewerage option.

- For Option 2 and 3 in which the property owner maintains responsibility for the low pressure sewerage systems, Option 3, in which Council is not obligated to replace pumps unless they have achieved 10 years of service as oppose to Option 2's five years, is cheaper by approximately 50%, with a 6% NPV cost of $667 k (Ex GST). Further NPV savings could be achieved is pump replacement is pushed out to 20 years (ie. NPV $386 k Option 3-20Yr).
- On the basis that the new remote monitoring pump controllers (eg. OmniSmart) cost the same in CAPEX as the existing PLC controllers, the CAPEX of the two Council operated and maintained low pressure scenarios is similar (Options 4 and 4B).
- The cheapest OPEX and overall NPV for the Council low pressure O&M scenarios is Option 4B (NPV approximately $1.7 M at 6%), which assumes that the remote monitoring/operational functionality of the new smart controllers can reduce call outs to approximately one third of Option 4. That is, it is assumed that only one in three low pressure pump units would require Council site servicing per calendar year. It is understood that this rate is conservative in comparison to the current situation with the basic controllers installed. Further reductions in NPV are achieved should the pump life replacement be pushed out to 20 years instead of 10 (ie. NPV $1.4 M at 6% for Option 4B-20Yr).

5.2 Recommendations

Gravity sewerage is not considered a preferred option on the basis of cost and logistics of construction. The area includes hills and rock which increase the requirements for pump/lift stations and cost of construction. In addition, the area comprises established properties with gardens, pools, fences, sheds etc, which restrict gravity sewer alignments and increase rehabilitation conflict/costs.

The low pressure system is established for existing areas of 1770. It is understood that Council is generally satisfied with the operation of this system.

Opportunity exists for Council to become involved in the operation and maintenance of these systems, instead of the current situation in which the property owner takes responsibility after the first one year of installation. Technology continues to improve, and the current controllers that enable remote alarming, viewing and setting adjustments have the potential to lessen the requirements of Council, that may have previously been the case.

The cost estimates for low pressure scenarios in which Council takes over O&M include an allowance of $5,000 (ex GST) per property for easements. It is considered that there may be potential to significantly reduce or remove this cost on the basis that the property owner is being relieved of this O&M responsibility (potential savings totalling approximately $500 k). As an alternative, Council may be able to establish a Memorandum of Understanding (MoU) for Council's authorised access to service the low pressure sewerage systems.

It is possible that the adoption of pump and controller replacement every 10 years may be conservative. The current pump manufacturer claims a 20 year design life on the pump specification sheets. The NPV assessment undertaken as part of this project has included scenarios in which the pump replacement is pushed to 20 years (electrical remains maximum 10). Uncertainty in actual pump/electrical life span remains, however the sensitivity assessment illustrates NPV savings associated with increased pump life. It is considered that the 20 year

pump life would represent the maximum operational life expectancy of this mechanical infrastructure.

Should Council not wish to continue the current property owner O&M of the low pressure units, it is recommended that Option 4B be considered further. That is, Council take over O&M of low pressure sewer system with Remote Monitoring technology fitted to the pump unit electrical control system. The use of the smart controllers is recommended on the basis they are equivalent in cost to the existing controllers/PLC, however they have the potential to significantly reduce the extent of Council call out and general OPEX costs (ie. some customer calls/complaints could be resolved remotely).

Appendices

Appendix A – Aquatec Low Pressure Sewerage Information

oneSMART

Aquatec's Pressure Sewer Control Panels

Tailored Control Panels for Aquatec's Pressure Sewer Systems

Aquatec – The number one choice in environmentally friendly pressure sewerage systems.

Document Set ID: 4055567
Version: 1, Version Date: 30/04/2018

aquatec

Control Panels

1oneSMART

Aquatec.

Because anything else is a compromise.

1-OneSmart is designed and built to Australian Standards and conditions and therefore fully complies with Australian Standards AS/NZS codes and standards for electrical and safety requirements.

Like all of Aquatec's pressure sewer products the 1-OneSmart controller is designed to last the life of the pressure sewer network and is the number one choice in long term monitoring and control of your pressure sewer assets.

Aquatec's 1-OneSmart control panels are tailored to Aquatec's Pressure Sewer Systems control and monitoring requirements. The latest technology is utlised to provide custom built products to suit individual requirements and proprietary Scada systems. From the Level 1 1-OneSmart control system through to level 3 full Scada monitoring and on line data logging system 1-OneSmart is the number 1 choice.

1-OneSMART the number 1 choice.

Complete Scada Systems.

Smart1 Features

Aquatec's 1-OneSmart1 control panel is the first choice for any pressure sewer projects and includes features such as:

- Fully complies with AS3000
- Poly carbonate IP56 enclosure
- Key lockable to 92268
- AC 3 rated motor contractor
- 90Db audible alarm with mute
- Individually fused circuits for alarm and control components
- High level alarm (low voltage) strobe light
- Pump panel circuit breaker

Optional features

- Generator Hatch
- Stainless steel control panel
- Under and over voltage protection
- Over pressure protection – CVP
- On / off switch

Smart2 Features

Aquatec's 1-OneSmart2 control panels provide additional features to protect and monitor the pressure sewer network. Inbuilt features includes:

- Fully complies with AS300
- 316 Stainless steel powder coated enclosure IP56
- Under and over voltage protection
- Over pressure protection – CVP
- Key lockable to 92268
- AC3 rated motor contractor
- 90 Db audible alarm with mute and inbuilt timer cutout
- On / off switch
- High level alarm (low voltage) strobe light
- Pump / panel circuit breaker
- Individually fused circuits for alarm and control components
- Customised labels

Optional features

- Generator Hatch
- Poly carbonate control panel
- PLC with LCD screen
- LCD display for pump and alarm operation
- Remote hand held key pad to perform operational functions, download logged data and remotely adjust settings
- Data login module for system analysis

Smart3 Features

Aquatec's 1-OneSmart3 is an advanced control and monitoring package which provides full remote communication wherever you are.

Quick programming from intuitive interface programs can be created and modified to suit individual requirements. The smart3 gives you complete monitoring and control capabilities remotely enabling you to manage your whole pressure sewer network.

1-OneSmart3 high level monitoring and remote control panel includes:

- PLC with LCD screen
- Telemetry and Scada pack tailored to suit authorities requirements
- Continuous accurate level monitoring
- Current sensing module
- Pump run interface and remote start stop
- LCD display for pump and alarm operation (optional)
- Interactive interfacing touch pad (optional)
- Remote hand held key pad to perform operation functions download logged data and remotely adjust settings
- RS 232 Modbus and ethernet communication modules
- Expansion modules up to 40 digital inputs outputs
- 4-20mA expansion module

Smart-3 capabilities.

Aquatec offers a wide range
of water and wastewater products.

- Packaged pumping stations
- Pumping, sewerage, stormwater
  and pollutant removal products
- Pressure sewer systems
- Water supply and process systems
- Sewerage and greywater treatment systems
- Dosing, metering and monitoring systems

aquatecenviro.com.au

OGP + Technical Specification

2-Stage Centrifugal
OGP+ 50Hz

Submersible Grinder Pump

Series: OGP+
1.5kW, 2875RPM, 50Hz
Compact Series For Automatic Level Control/Manual Operation

Description
The 2-stage centrifugal grinder pressure pump is designed to reduce domestic, commercial and industrial sewage to a finely ground slurry. With an International Protection Rating of IP68, Aquatec's pumps hold the highest levels of protection on the market today.

Discharge	32mm
Liquid Temperature	104°F (40°C) Continuous
Volute	Cast Iron ASTM A-48, Class 30
Motor Housing	Cast Iron ASTM A-48, Class 30
Seal Plate	Cast Iron ASTM A-48, Class 30
Impellers	
Design	12 Vane, Splitter-Type, Vortex, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
Material	85-5-5-5 Bronze
Shredding Ring	Hardened 440C Stainless Steel Rockwell® C-55.
Cutter	Hardened 440C Stainless Steel, Rockwell® C-55.
Shaft	416 Stainless Steel
Square Rings	Buna-N
Hardware	300 Series Stainless Steel
Paint	Industrial Grade 2 Part Epoxy
Seal	
Design	Single Mechanical, oil filled reservoir
Material	Rotating Faces - Silicon-Carbide Stationary Faces - Silicon-Carbide Elastomer - Buna-N Hardware -300 Series Stainless
Cord Entry	Custom Molded, IP68 Quick Connect, for Sealing and Strain Relief
Cord	
Automatic	CSA/UL Approved 12/5 Type SOW
Upper Bearing	
Design	Single Row, Angular Contact Ball
Lubrication	Oil
Load	Radial & Thrust
Lower Bearing	
Design	Single Row, Angular Contact Ball
Lubrication	Oil
Load	Radial & Thrust
Motor	
Design	NEMA L- Single Phase Torque Curve, Oil-Filled, Squirrel Cage Induction
Insulation	Class F
Single Phase	Capacitor Start / Capacitor Run
Check Valve	
Body	Cast Iron ASTM A-48, Class 30
Seat	Bronze ASTM C836
Flap	Fiber Reinforced Buna
Level Control	Options include Pressure Transducer, ESPS Pressure Switch, Float Switch.
Optional Equipment	Cord Length, C-Channel Check Valve Kit for Guide Channel mounting of pumps

OGP + Technical Specification

2-Stage Centrifugal
OGP+ 50Hz

Motor Data

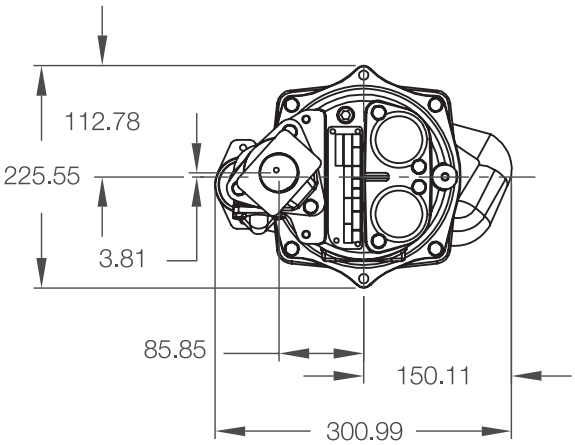
Model No	OGP20X2C
Part No	119525A
kW	1.5
Phases	1~
Volt	230
Hz	50
Rpm (Nom)	2875
No. of Poles	2

Nema Start Code	H
Full Load Amps	17.0
Locked Rotor Amps	65.0
Cord Size	12/5
Cord Type	SOW
Cord O.D.	.71 (18)
± .02 (.5) In (mm)	

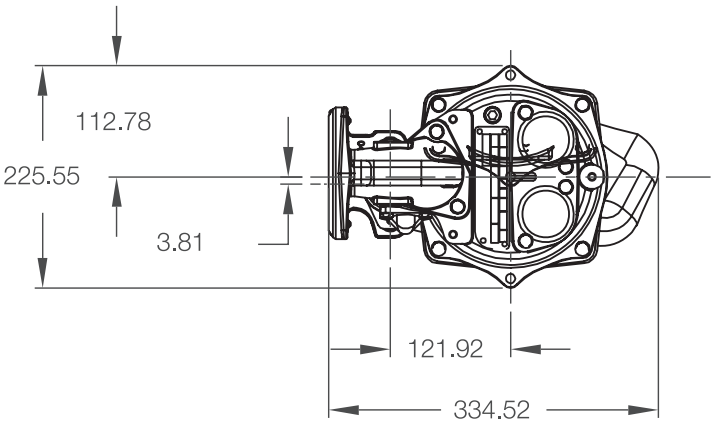
Important

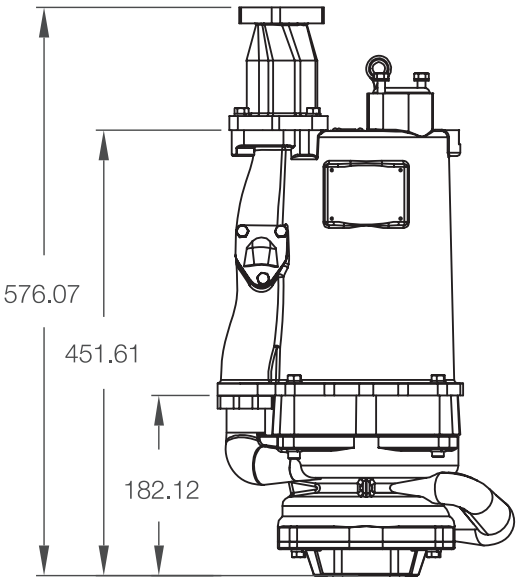
1. Pump may be operated "dry" for extended periods without damage to motor and/or seals.
2. This pump is appropriate for those applications specified as class i division ii hazardous locations.
3. This pump is not appropriate for those applications specified as class i division i hazardous locations.

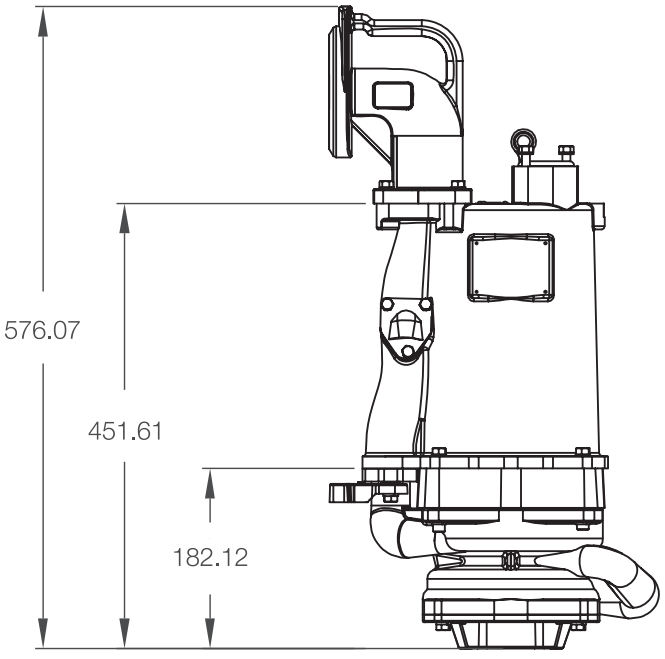
Free Standing



C-Channel Mounted







OGP+ Performance Curve
2 Stage Centrifugal

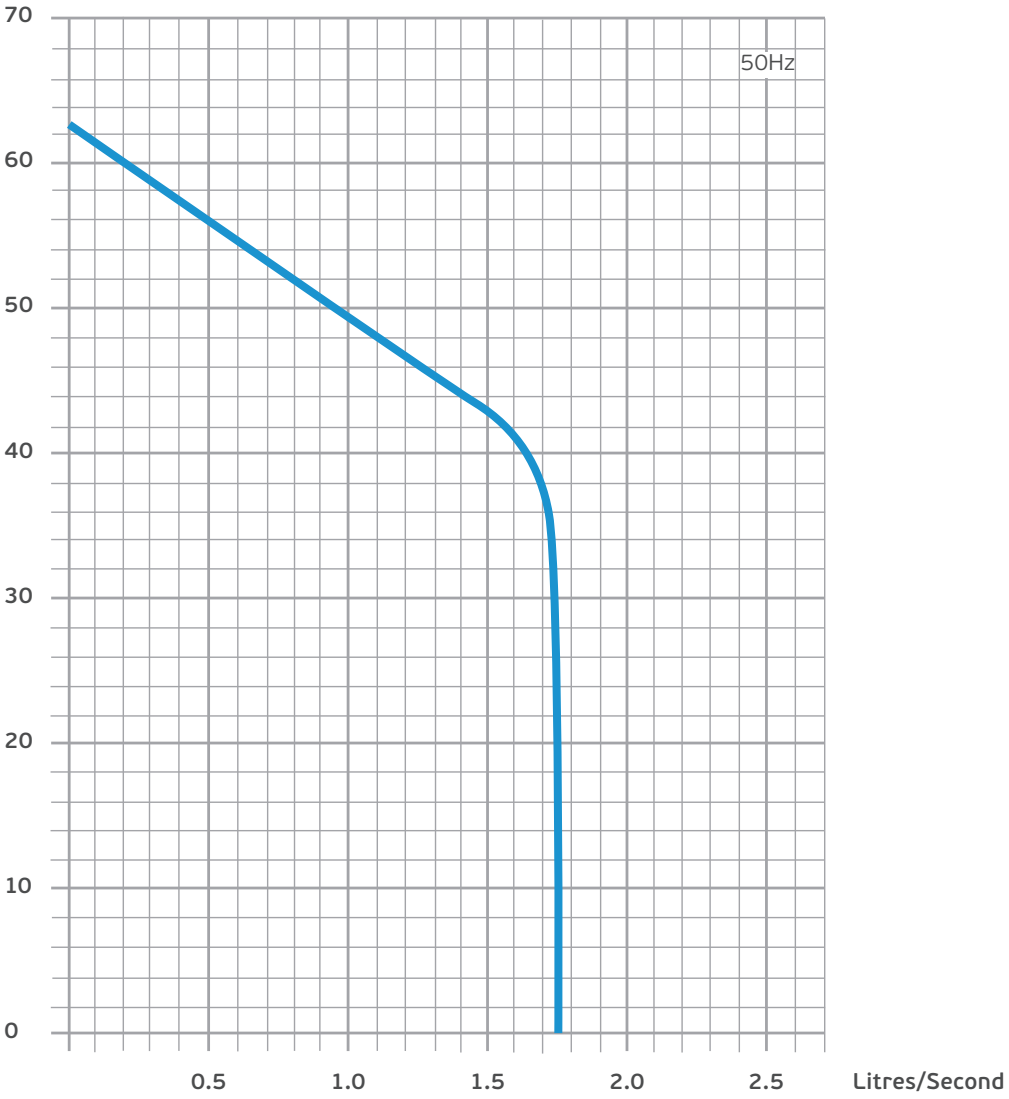
Series OGP+
1.5kw, 2875RPM, 50Hz

Performance curve includes impact of integral anti-siphon and check valve.

Testing is performed with water, specific gravity 1.0 @ 20°C, other fluids may vary performance.

Performance Curve

Metres Head



Curve According to ISO 9906

OGT Technical Specification

Turbine Technology
OGT 50Hz 1~

Submersible Grinder Pump

Series: OGT
.75kW, 2850RPM, 50Hz 1~

Description
Aquatec's Omni Grind Turbine pump combines high head capabilities with low amp technology to offer a 20 year expected pump life.

The Grinder Pump is designed to reduce domestic sewage to a finely ground slurry. With an International Protection Rating of IP68, Aquatec's pumps hold the highest levels of protection on the market today.

Discharge	32mm BSP-F
Liquid Temperature	104°F (40°C) Continuous
Motor Housing	Cast Iron ASTM A-48, Class 30
Seal Plate	Cast Iron ASTM A-48, Class 30
Suction Casing	Cast Iron ASTM A-48, Class 30
Impeller	Stainless Steel with Abrasion Resistant Coating
Shredding Ring	Hardened 440C Stainless Steel Rockwell® C-55.
Cutter	Hardened 440C Stainless Steel, Rockwell® C-55.
Shaft	416 Stainless Steel
Square Rings	Buna-N
O-Rings	Buna-N
Hardware	316 Series Stainless Steel
Paint	Axalta™ Corlar® Epoxy
Seal	
Design	Single Mechanical
Material	Rotating Faces - Silicon-Carbide Stationary Faces - Silicon-Carbide Elastomer - Buna-N Hardware -300 Series Stainless
Cord Entry	Custom Moulded, Quick Connect, for Sealing and Strain Relief. Rated IP68
Cord	
Type	CSA/UL Approved SOW (quick disconnect)
Manual	14/3
Automatic	12/5
Upper Bearing	
Design	Single Row, Ball, Oil Lubricated
Load	Radial
Lower Bearing	
Design	Single Row, Ball, Oil Lubricated
Load	Radial & Thrust
Motor	
Design	Oil-Filled Squirrel Cage Induction
Insulation	Class F
Type	Capacitor Start / Capacitor Run
Optional Equipment	Additional Cord Length, C-Channel Check Valve Kit for Guide Channel mounting of pumps

OGT Technical Specification

Turbine Technology
OGT 50Hz 1~

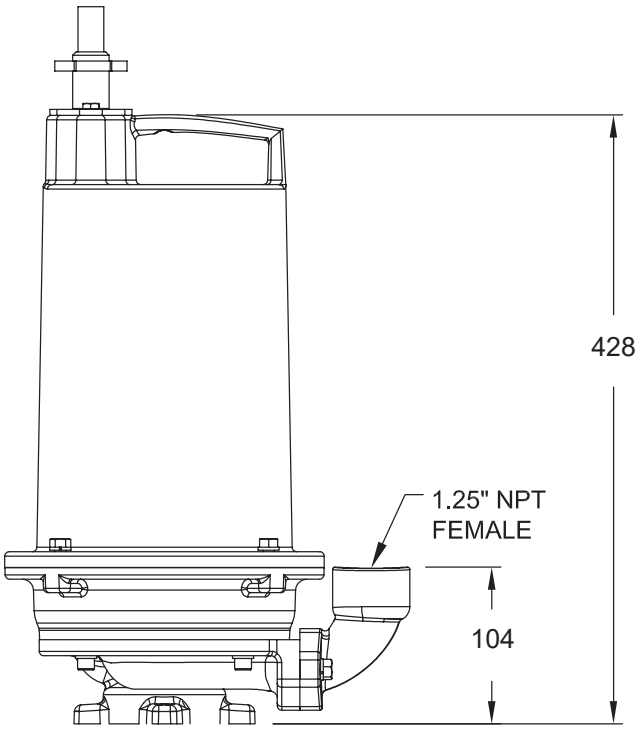
Motor Data - Model OGT 10S2AU

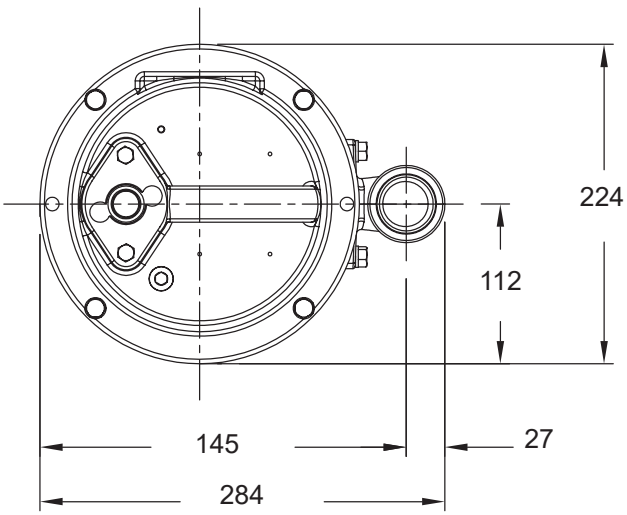
Model No	OGT10S2AU
Part No	139736
kW	0.75
Phases	1~
V	240
Hz	50
Rpm (Nom)	2850
No. of Poles	2

Nema Start Code	D
Full Load Amps	8.2
Locked Rotor Amps	25.9
Cord Size (external level control)	12/5
Cord Size (inbuilt level control)	12/5
Cord Type	SOW
Cord O.D.	18mm
Cord Length	15m

Important

1) Pump may operate to 80 meters without damage to pump
2) Refer to operational manual for amp draw above 50m
3) Pump may be operated "Dry" for extended periods without damage to motor and/or seals
4) This pump is not appropriate for those applications specified as class | division | hazardous locations





OGT Performance Curve
Turbine Technology

Series OGT
0.75kW, 2850RPM, 50Hz

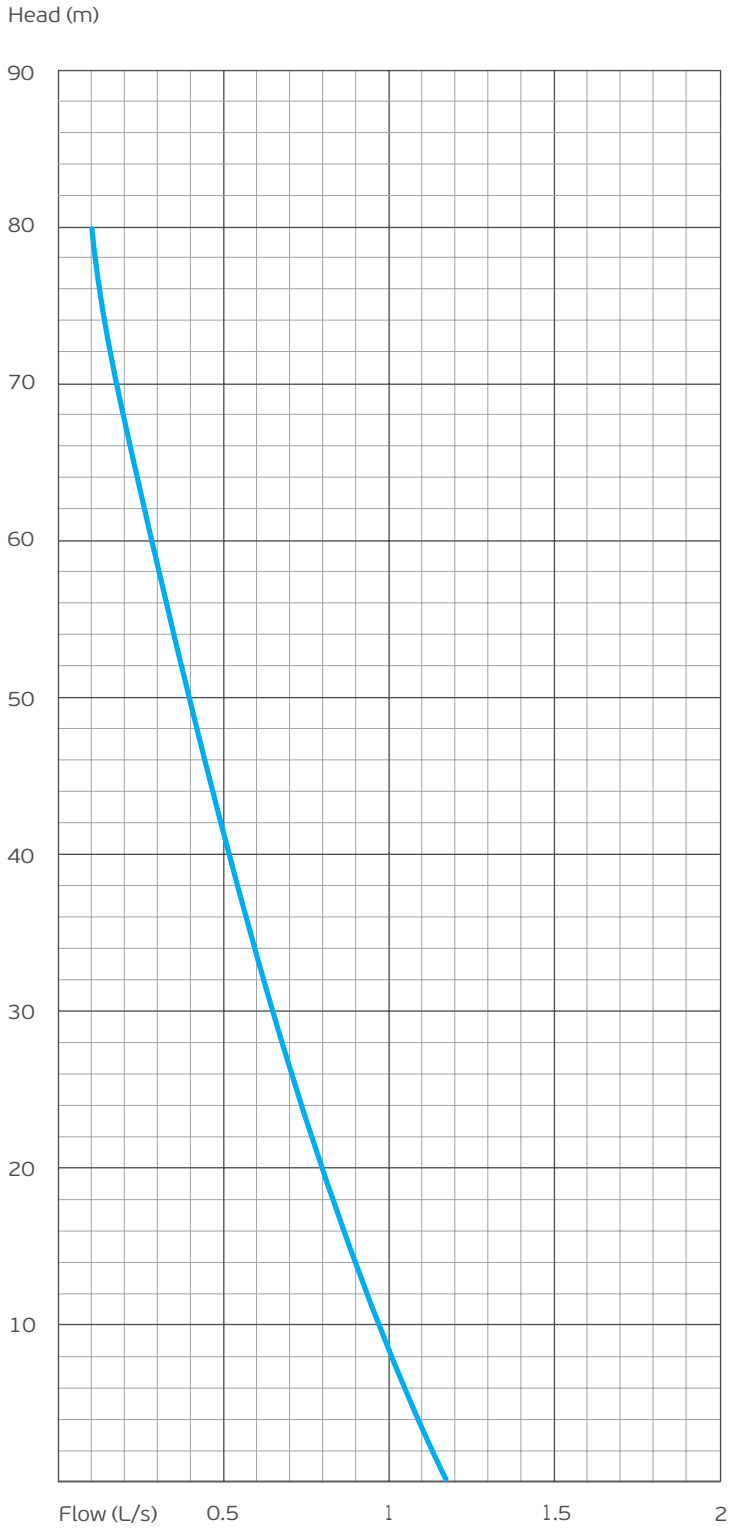
Performance curve includes impact of integral anti-siphon and check valve.

Testing is performed with water, specific gravity 1.0 @ 20°C, other fluids may vary performance.

Pump Design head 50m Refer to Notes 1 & 2.

Performance Curve

Metres/Head



OmniSmart Controller

The OmniSmart controller is a fully automated pre-programmed device that accurately controls flows within your reticulation systems prioritising pump operation to optimise your pressure sewer network.

Aquatec's Omnismart controller thinks outside the box, by:

- Integrating your system into the surrounding sewer connections;
- Can be retrofitted to upgrade existing pressure sewer installations
- Optimising the whole network by analysing usage and flow to iron out the peaks and troughs.

This optimisation:

- Increases the life of your whole network;
- Self-scouring rising mains by creating daily 'flushing waves';
- Prioritises operation after power failure based on effluent levels in each tank;
- Improves flow and minimises retention issues;
- Reduces both capital and operation expenditure;
- Reduces additional infrastructure/ maintenance requirements; and
- Reduces whole of life costs by increasing the life expectancy of existing assets.

	OS1000 Series		*OS6000 Series*	
Features	***1000A***	***1000B***	***6000A***	***6000B***
Key lockable IP65 polycarbonate green enclosure	•	•	•	•
Backing plate for easy mounting on wall or post	•	•	•	•
90Db audible alarm with automatic mute, night time chirp and self-correction	•	•	•	•
External mute button for audible alarm	•	•	•	•
Strobe light for fault notification and identification	•	•	•	•
Automatic and manual pump modes	•	•	•	•
Microprocessor based operation with upgradeable firmware and is fully programmable	•	•	•	•
Compatible with level switches or hydrostatic transducers	•	•	•	•
Back up high level float switch compatible	•	•	•	•
Brown out/Low voltage protection	•	•	•	•
High voltage protection	•	•	•	•
Adjustable Over Pressure Protection	•	•	•	•
Motor current monitoring and protection for both low and high amps	•	•	•	•
Real time Clock (date and time)	•	•	•	•
Pump protection for Anti-seize, excessive run time and motor starts	•	•	•	•
Adjustable pump and alarm activation points	•	•	•	•
Adjustable Alarm delays	•	•	•	•
LED system status indication	•	•	•	•
Internal status history (last 2500 events including motor state, adjustable fluid levels granularity, configurational changes and alarms)	•	•	•	•
USB Plug and Play administration interface and history	•	•	•	•
SCOP Compatible for improved system health and diurnal curve flattening	•	•	•	•
Controller behaviour and activation based on time of day and fluid levels	•	•	•	•
Adjustable start delay after power failure based on fluid levels	•	•	•	•
Automatic scouring, time delay, and storage modes	•	•	•	•
Output to control external devices	•	•	•	•
Battery Backup for Alarms, fluid levels, history, and telemetry/SMS	●	•	•	•
Hours run and pump start counter*		•	•	•
Backlit LCD screen for system status, diagnostics and fluid level	●	•	●	●
Telemetry/SCADA RS485 and RS232 MODBUS (see telemetry flyer)			•	●
Telemetry/SCADA 3G Cellular and DNP3 (see telemetry flyer)				•
Email Alarm notifications				•
Remote Diagnostics, pump control and administration				•
FTP support of historical event data transfer				•

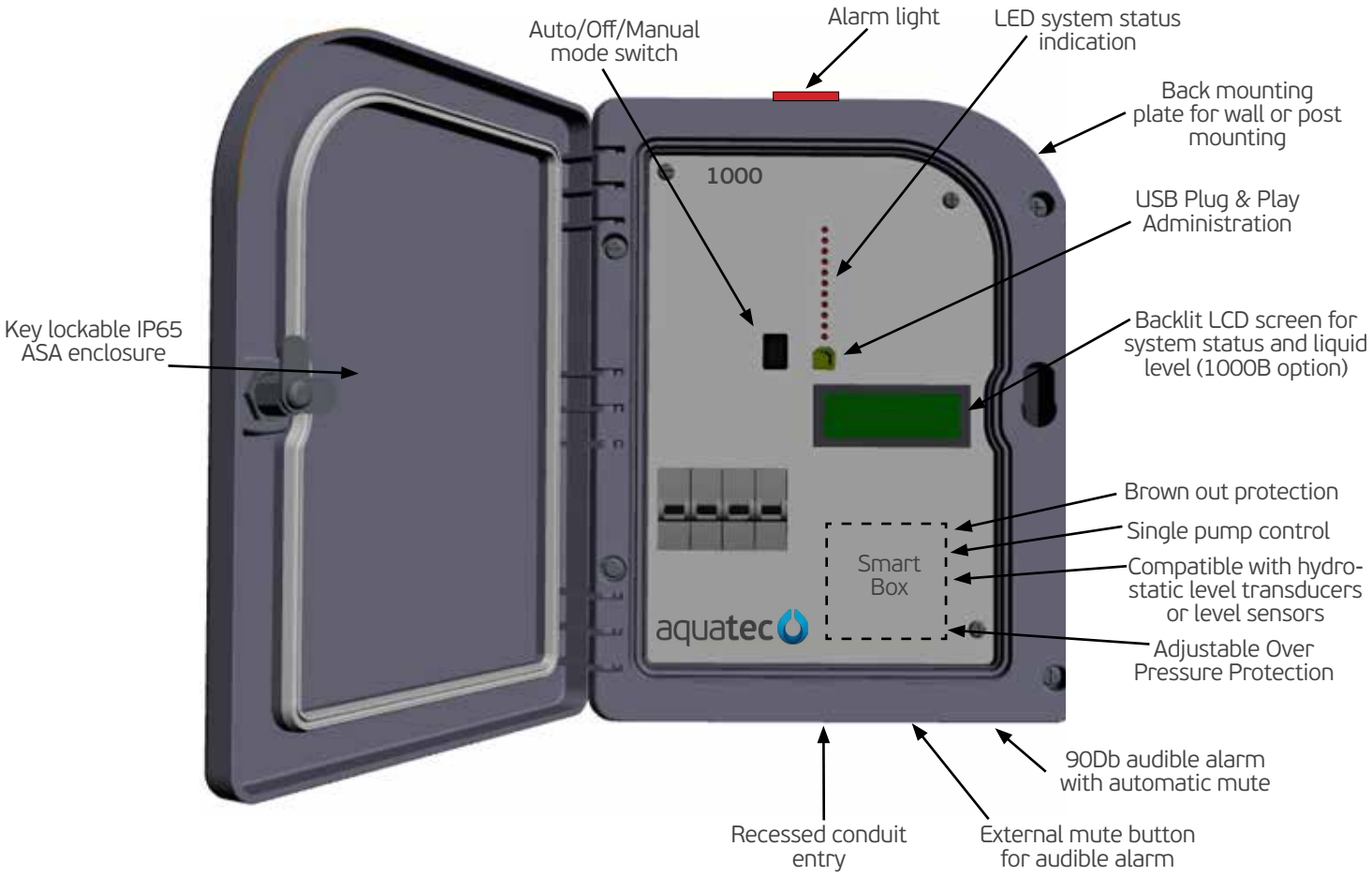
• Standard
● Optional
* Available via USB on 1000A

OmniSmart - 1000

Document Set ID: 4055567
Version: 1, Version Date: 30/04/2018

OmniSmart - 1000

Aquatec's OmniSmart 1000 Series controllers have been built specifically for the pressure sewer market. The Microprocessor based circuit board provides the flexibly to not only meet your current requirements, but also meet future requirements as they are needed.



Additional Functionality

- High-level alarm strobe light
- Adjustable pump and alarm activation points
- Adjustable start delay after power failure based on fluid levels
- Hours run and pump start counter
- Pump Start/Stop timers including minimum and maximum times
- Manual mode to test/run pump
- Battery Backup for Alarms, strobe, fluid level and status history (1000B option)
- Anti-seize activation
- Motor current and voltage sensing
- System & Pump protection settings with time delays
- Timer based output to activate solenoid for mains water addition

Technical Specifications - OmniSmart1000

Manufacture	Aquatec Fluid Systems Australian owned & built
Inputs	4 digital inputs 1 Analog Input
System Input	USB plug and play administration port
Processor	Microprocessor based operation with upgradeable firmware
Display	Backlit LCD (1000B option) displaying: • Fluid level model • Current main voltage • Pump Status • Current draw • Motor Run, off or delay time • Fluid Level • Battery Status • Input statuses • Fault information
LED System Status	• Fault Indicator • Main Power • Mains power low • Motor Indicator • High Level Alarm • Over Pressure Protection • Probe Indicator • Battery Status
Supported Fluid Level Control	Inbuilt Level Control External Level Control • Differential • Individual • Hydrostatic transducer (0-5v. 0-10v, 4-20mA)
Additional Controls	Support for external high level alarm switch and Over Pressure Protection switch
History	Internal Memory with status history
Battery Backup	Battery Backup (1000B option) for Alarms, Strobe, fluid level & status history on power failure
Real Time Clock	Internal real time clock with date & time
System Power Supply	Single phase 240 Volts 50Hz

Subject to change. Correct as at date of printing.

OmniSmart Controller

We wish to highlight the many benefits of Aquatec's OmniSmart 1000 controller.

The OmniSmart pump controller comes standard with the following and does not require telemetry.

- USB plug and play to upload control settings or download up to 2500 historical events
- LED System indication to give:
    - General Fault
    - Mains power voltage ok
    - Mains power voltage fault
    - Pump on
    - High level alarm
    - Over pressure
    - Level status
    - Back up battery status
    - Modbus data activity
    - Mobile device status
    - Mobile signal status

Additionally the OmniSmart's will provide:

- Brown out (low voltage) protection
- Over voltage protection
- Compatible with all types of level sensors
- Over pressure protection
- 90dB alarm
- External mute button
- Non encroaching generator plug mounting
- Auto/off/ manual switch

Additionally the strobe flashes in different sequences to indicate the following giving the customer an external (visual) alarm identification:

1. Power failure
2. High level alarm
3. Motor max runtime exceeded
4. Over pressure protection
5. Motor over current
6. Motor under current
7. Battery fault
8. Probe fault

Power failure scenario

The OmniSmart has a number of options when it comes to recovering from a power failure scenario. The first and most simplest is that a pump delay window is defined. This staggers the startup of the OmniSmart's throughout this window to spread the load on the reticulation

system. The OmniSmart's are prioritized based on the fluid level within the tank. The fuller they are, the closer to the start of the window they begin to pump. This is all achieved without the need for telemetry, as the pumps also monitor the pressure within the reticulation and will bow-out gracefully if they see pressures too high, allowing it to retry later. There are more sophisticated recovery schemes which we offer that can be pre-programmed into the OmniSmart's based on SCOP.

The OmniSmart 1000 can then be upgraded to a OmniSmart 6000 via an economical plug in module to provide:

- 3G SMS and email notification
- DMP Scada control
- Modbus RS232 and RS485
- Remote SMS or Telemetry pump control and set point control/adjustment

Remote operational capabilities:

- Programmed maintenance
- Self-scouring rising mains
- Prioritise operation after power failure based on effluent level
- Adjustable pumping level set points
- Change operation mode
- Shut-down of specific pumps
- Stop and re-start specific sites

Remote monitoring capabilities:

- Blockage Indication
- Capacity readings
- Full control of individual or multiple sites
- Complete visibility of pump system locations
- Tank storage levels

Withholding Pumping During Storm Events

The OmniSmart6000 series have an 'Inhibit' command that can be remotely set via DNP3. As part of inhibiting the OmniSmart, it also requests a time to be inhibited for. The time is there as a safety net in the event that connection is lost with the SCADA master and consequently the OmniSmart wouldn't otherwise be able to be un-inhibited. There is also an 'Empty Tank' command which can be used prior to the storm to pump the tank down from its current level to the stop level.

Using these two commands in conjunction with each other allows you to have the maximum storage available prior to the storm and then withhold pumping during and after the storm events until the receiving point or further downstream regains capacity.

Another way of coming at the same problem and dealing with (not only) storms but temporary capacity issues within your network, is to setup interlocks between the downstream pump stations and the OmniSmart's. This then automates the entire process of expectation handling of temporary capacity problems and pump station outages within your network, so long as all the pump stations and OmniSmart's are connected to the same SCADA master. Having this tight integration between assets is another reason why we recommend adding the OmniSmart's to your own SCADA system, instead of having them isolated on their own hosted platform.

Aquatec can preprogram the OmniSmart 1000 to provide a controlled pressure sewer system with or without remote monitoring. We do this using SCOP (Sequence Control Operation Philosophy).
This allows us to check pipe sizes, scouring velocities, retention times and pressures throughout the system during standard operation as well as after prolonged power failures. This information is then used to individually pre-program each OmniSmart in the factory via our SCOP process which flattens out the diurnal curve (flow peaks) in the system during the day. Utilizing this methodology, telemetry isn't required and will achieve these benefits without the onerous ongoing monthly telecommunication or hosting costs. If you choose, you can add the telemetry upgrade to a small sample of OmniSmart's for monitoring areas within your system or to give you advance working with problem clients/sites.

The main benefits are:

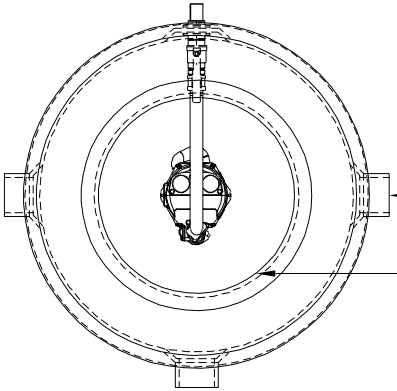
- Creates flushing waves when a small number (first stage) of pumps are installed to gain scouring velocity and keep retention times within WSAA low risk requirements
- Reduce retention times in pipes by sequencing when pumps start in the system i.e. flows can be held back to pump an non peak times
- Flatten diurnal curve (flows in the system) reducing the pipe sizing requirement and reducing the load on the sewerage treatment plant.

If this information needs to be monitored or controlled remotely then it's as simple as adding a module to the OmniSmart 1000 to upgrade it to a OmniSmart 6000.

Hosting of the system by outside companies, Aquatec strongly recommend that each Authority do not consider hosting the Pressure sewer System via outside companies.

The risks involved in this include:

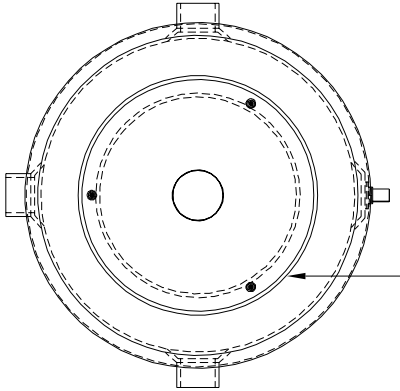
- Risk of losing IP gained from operational experiences
- Risk of an outside corporation having access to your data
- Risk of communications going down and therefore no control
- Risk of having a separate in house and outsourced hosting system
- Risk of ongoing expenses approximately $100.00 p/a that either council have to wear or the local community.



INLET CONNECTIONS

Ø565 CLEAR OPENING

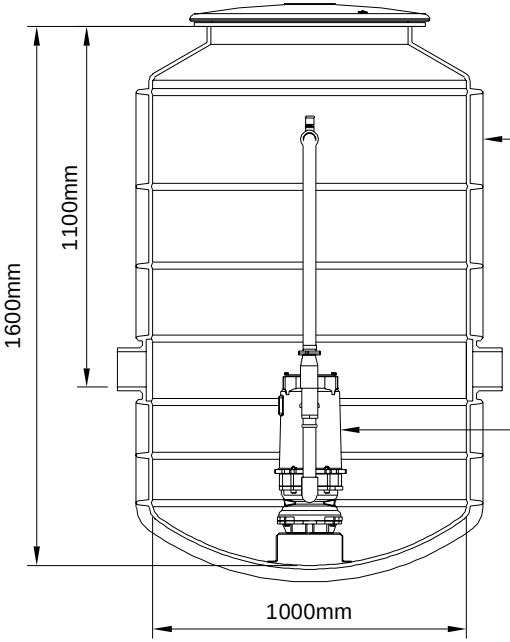
PLAN VIEW - LID REMOVED



LOW PROFILE
POLYETHYLENE
COVER RATED
TO 519 KG (CLASS A)

PLAN VIEW

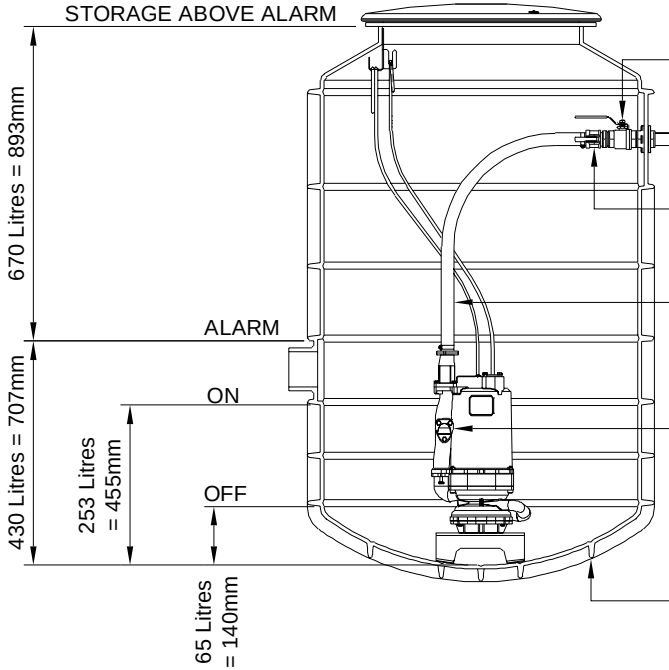
FLEXIBLE
CONNECTOR
Ø100mm TO
INLET PIPE



MOULDED
POLYETHYLENE
CHAMBER

OGP 2 STAGE
CENTRIFUGAL
PUMP

SECTIONAL SIDE ELEVATION



Ø32mm GR316 STAINLESS STEE
BALL ISOLATION VALVE

Ø32mm GR316 STAINLESS STEE
BSP-M OUTLET

Ø32mm GR316 STAINLESS STEE
CAMLOCK QUICK DISCONNECT

FLEXIBLE PN16
DISCHARGE PIPE

NON-RETURN
ANTI-SYPHON VALVE

DOMED BASE TO ELIMINATE
SOLIDS BUILD UP

SECTIONAL ELEVATION

REV	AMENDMENT	APP	DATE
B	MINOR AMENDMENTS	JS	28-11-14
A	GENERAL REVISION	JS	29-01-14

Aquatec Fluid Systems PTY LTD / ABN - 94 114 944 026
2 Provincial Crescent, Shepparton VIC 3630
T 1300 088 555 / E info@aquatecenviro.com.au

aquatec

Designed - AQT
Drawn - KWJ
Approved - JS

Scale - NTS @ A1

PRESSURE SEWER PUMP UNIT
SIMPLEX OGP 1100L
FREE STANDING MODEL

Drawing No. P.E.S.O.1100.FS
Revision B
File Location / Name

Pumps

With an International Protection Rating of IP68, Aquatec's pumps hold the highest levels of protection on the market today.

Omni Grind Turbine - OGT

- New innovation technology
- Low amp turbine technology
- Residential, industrial and commercial applications
- Smaller cutter radius for greater ability to grind fibrous materials
- Special Aerospace Industry coating to prevent wear from abrasive products
- Non-contact pumping assembly with minimal wearing parts
- Flows up to 1.2l/s giving higher scouring velocities
- Capable and tested to operate at 80m continuously giving greater flexibility for network design
- Certified by BSI to NSF/ANS146
- Class F motor insulation
- Highest cutting force of any pressure sewer pump

Omni Grind Plus - OGP

- For commercial, industrial and large scale residential applications
- Recessed vortex impellers for higher flows with reduced wear
- Flows up to 1.75l/s
- Capable and tested to operate at 60m
- 1.5kw motor
- Available in single or three phase
- Hydraulically balanced
- Class F motor insulation

Optional Accessories

Aquatec offers a wide range of Optional Accessories to meet or improve on your project specifications. Our Technical Consultants make recommendations for enhancements to your Pressure Sewer System based on budgets and the unique demands of your application.

Key Optional Accessories include:

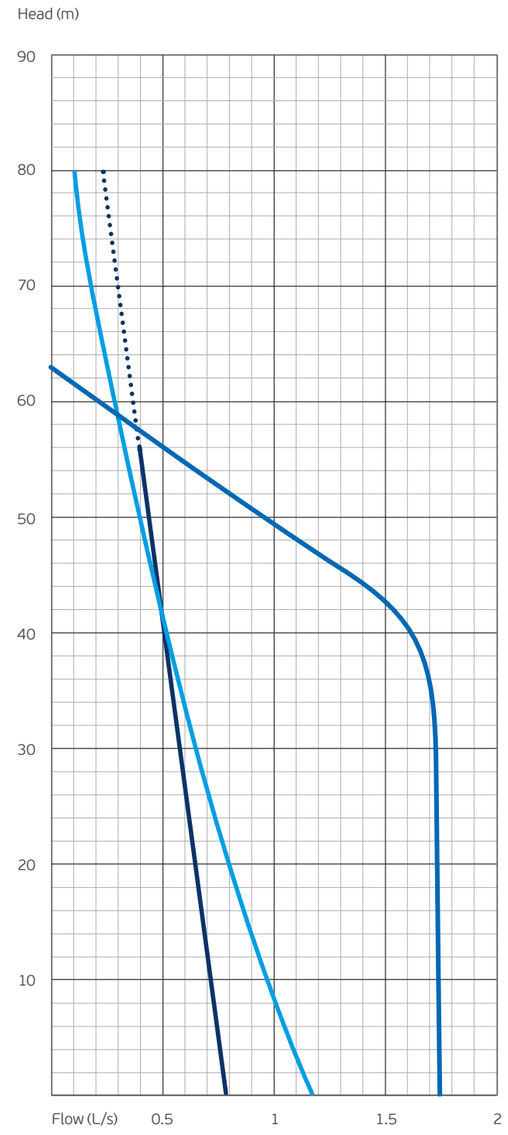
- Full Range of Custom Chambers
- External Storage Vessels
- Service trailers and equipment
- Access Covers
- Odour Controls
- Swiftlift Pump Trolley

Pump Upgrades

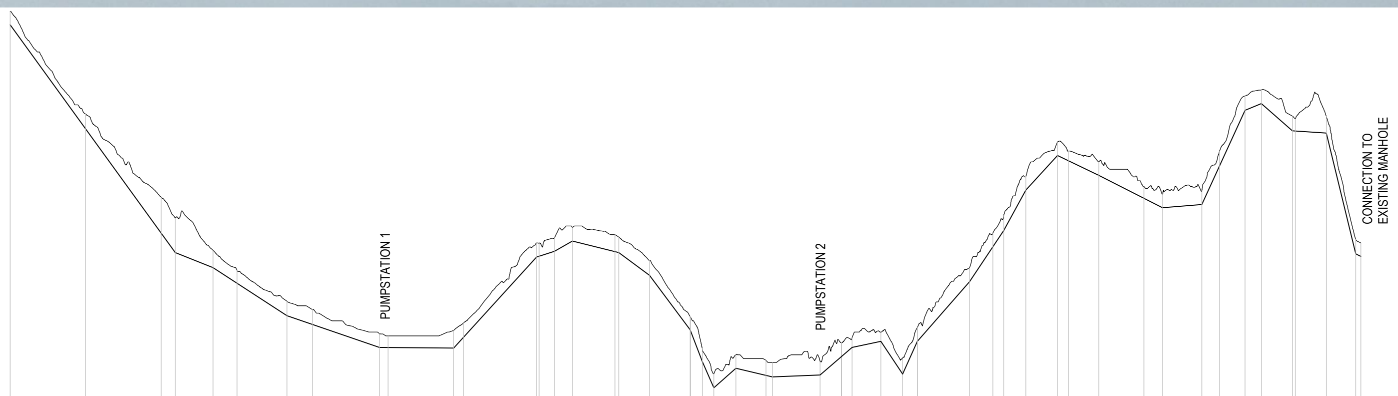
Upgrade kits with new components purpose-built for existing networks are designed to retrofit into your existing system for trouble free operation.

Grinder Pump Performance Comparison

- OGT Regenerative Turbine
- OGP 2 Stage Centrifugal
- Progressing Cavity (for comparison)



Appendix B – Gravity Sewer Concept Design



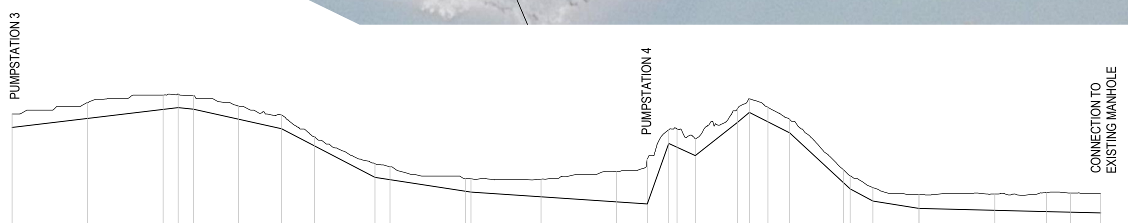
PIPE TYPE: DN150 GRAVITY SEWER | DN100 SEWER RISING MAIN | DN150 GRAVITY SEWER

PIPE GRADE (%): -13.77% -3.98% -6.47% -3.43% -0.07% 10.94% 3.27% 5.66% -2.47% -7.39% -13.43% -26.02% 22.58% 8.72% -2.33% 0.38% 8.58% 2.18% -15.00% 22.17% 11.37% 14.96% 18.01% 10.99% -4.82% -5.04% 0.79% 21.69% 4.31% -8.81% -0.65% -40.97% -5.00%

DATUM RL. 18.0

CHAINAGE	DEPTH TO INVERT	PIPE INVERT LEVEL	EXISTING SURFACE
0.000	0.900	50.038	50.938
50.000	0.983	43.150	44.133
100.000	2.402	36.263	38.666
109.172	2.281	35.000	37.281
134.314	1.152	34.000	35.152
150.000	0.861	32.985	33.845
183.030	0.949	30.847	31.796
200.000	0.985	30.265	31.250
244.311	0.900	28.747	29.647
250.000	0.757	28.743	29.500
293.420	1.152	28.711	29.863
300.000	0.934	29.431	30.365
348.172	0.947	34.700	35.647
350.000	0.881	34.760	35.641
360.000	0.900	35.086	35.986
371.894	0.900	35.759	36.659
400.000	1.114	35.065	36.179
402.637	1.028	35.000	36.028
422.926	1.000	33.500	34.500
449.729	0.885	29.900	30.785
450.000	0.916	29.830	30.746
457.746	0.880	27.814	28.694
465.388	0.900	26.089	26.989
480.000	0.900	27.362	28.262
500.000	0.997	26.896	27.894
504.114	0.949	26.801	27.750
535.777	0.900	26.921	27.821
550.000	0.903	28.142	29.045
556.942	0.632	28.737	29.369
575.920	0.598	29.152	29.750
590.274	1.034	26.998	28.032
600.000	0.900	29.154	30.054
600.000	0.900	29.154	30.054
634.610	0.910	33.088	33.998
650.000	0.897	35.390	36.288
657.183	0.972	36.465	37.437
671.932	0.922	39.122	40.044
692.766	0.900	41.412	42.312
700.000	0.637	41.063	41.701
720.000	0.900	40.100	41.000
750.000	0.769	38.589	39.357
762.291	0.923	37.969	38.892
788.281	0.932	38.174	39.105
800.000	0.987	40.715	41.702
816.927	0.961	44.386	45.347
827.607	0.900	44.846	45.746
848.146	0.975	43.037	44.011
850.000	0.831	43.024	43.855
870.541	1.117	42.891	44.008
889.994	0.954	34.921	35.874
893.510	0.900	34.745	35.645

LONGITUDINAL SECTION - TUPIA ST - CAPTAIN COOK DR



PIPE TYPE: DN100 SEWER RISING MAIN | DN225 GRAVITY SEWER | DN100 SEWER RISING MAIN

PIPE GRADE (%): 1.20% -1.18% -2.20% -5.21% -1.55% -0.66% 28.10% -4.56% 7.84% 8.36% -5.10% -9.21% -5.47% -1.56% -0.25% -0.25%

DATUM RL. -4.0

CHAINAGE	DEPTH TO INVERT	PIPE INVERT LEVEL	EXISTING SURFACE
0.000	0.900	7.850	8.750
50.000	1.049	8.451	9.500
100.000	0.942	9.053	9.995
110.017	0.900	9.174	10.074
120.000	0.900	9.056	9.956
150.000	0.866	8.396	9.261
178.355	0.900	7.771	8.671
200.000	0.606	6.644	7.250
240.000	0.900	4.561	5.461
250.000	0.844	4.406	5.250
300.000	0.868	3.632	4.500
303.523	0.900	3.578	4.478
350.000	1.156	3.272	4.428
400.000	1.995	2.942	4.937
420.242	2.950	2.809	5.759
434.438	0.908	6.797	7.706
440.000	1.214	6.544	7.758
451.931	1.099	6.000	7.099
480.000	0.900	8.201	9.101
487.756	0.900	8.850	9.750
500.000	0.966	8.225	9.191
514.511	0.900	7.485	8.385
550.000	0.836	4.216	5.052
554.495	0.855	3.803	4.658
569.541	0.900	2.979	3.879
600.000	0.900	2.504	3.404
600.000	0.900	2.504	3.404
650.000	1.073	2.377	3.450
684.128	1.261	2.291	3.552
700.000	1.270	2.251	3.521
720.118	1.300	2.200	3.500

LONGITUDINAL SECTION - CAPTAIN COOK DR

LOCATION OF PUMPSTATIONS, RISING MAINS, GRAVITY SEWERS AND ASSOCIATED LONGITUDINAL SECTIONS ARE INDICATIVE REPRESENTATION ONLY AND ARE TO BE CONFIRMED DURING DETAIL DESIGN.

LEGEND:

- RM — PROPOSED RISING MAIN
- S — PROPOSED GRAVITY SEWER
- S — EXISTING PROPERTY SEWER
- CATCHMENT AREA

N

GLADSTONE REGIONAL COUNCIL
1770 LOW PRESSURE SEWER OPTIONS

GRAVITY SEWER CONCEPT DESIGN

Job Number	42-20430
Revision	A
Date	JAN 2018

Figure B1

Level 1, 42 Sturt Street Townsville QLD 4810 Australia **T** 61 7 4720 0400 **F** 61 7 4772 6514 **E** tsvmail@ghd.com **W** www.ghd.com

Plot Date: 5 February 2018 - 2:56 PM Plotted by: Marcello Macdonald Cad File No: G:\42\20430\CADD\Drawings\42-20430-FIGA1.dwg

Appendix C – Cost Estimates

TABLE C1

Option 1 - Status Quo(property owners O&M infrastructure located within property boundary). Council maintains and operates infrastructure outside of the property boundary.																	
YEAR		2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Council Costs - CAPEX																	
New Scheduled Installation Costs Only																	
	Cost of a new pump	$2,700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227	$ 3,285	$ 3,345	$ 3,405	$ 3,466
	Cost of a new Control Box and PLC	$1,200		$ 1,222	$ 1,244	$ 1,266	$ 1,289	$ 1,312	$ 1,336	$ 1,360	$ 1,384	$ 1,409	$ 1,434	$ 1,460	$ 1,486	$ 1,513	$ 1,540
	Cost of 1,100 L Tank, pipework etc	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510	$ 2,555	$ 2,601	$ 2,648	$ 2,696
	Cost of Installation (plumber/electrician)	$500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598	$ 608	$ 619	$ 631	$ 642
	General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988	$ 3,042	$ 3,097	$ 3,153	$ 3,209
	Total Low New Pressure Installation	$9,000		$9,162	$9,327	$9,495	$9,666	$9,840	$10,017	$10,197	$10,381	$10,568	$10,758	$10,951	$11,148	$11,349	$11,553
	Number of pumps to be installed by Council (New installations Only)			9	3	3	4	3	3	3	3	0	0	0	0	0	0
	Total Annual Cost to Install new Low Pressure Pump Stations Only			**$ 82,458**	**$ 27,981**	**$ 28,484**	**$ 38,663**	**$ 29,519**	**$ 30,050**	**$ 30,591**	**$ 31,142**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Number of properties connected			77	80	83	87	90	93	96	99	99	99	99	99	99	99
	Rationalised Cost per Connection Only			$ 1,070.88	$ 349.76		$ 444.40	$ 327.99	$ 323.12	$ 318.66	$ 314.57	$ -	$ -	$ -	$ -	$ -	$ -
	Total Council CAPEX Costs			**$ 82,458**	**$ 27,981**	**$ 28,484**	**$ 38,663**	**$ 29,519**	**$ 30,050**	**$ 30,591**	**$ 31,142**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Total Council OPEX Costs			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

TABLE C1

Option 1 - Status Quo(property owners O&M infrastructure located within property boundary). Council maintains and operates infrastructure outside of the property boundary.															
YEAR		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Council Costs - CAPEX																
New Scheduled Installation Costs Only																
	Cost of a new pump	$ 3,528	$ 3,592	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of a new Control Box and PLC	$ 1,568	$ 1,596	$ 1,625	$ 1,654	$ 1,684	$ 1,714	$ 1,745	$ 1,777	$ 1,809	$ 1,841	$ 1,874	$ 1,908	$ 1,943	$ 1,978	$ 2,013
	Cost of 1,100 L Tank, pipework etc	$ 2,744	$ 2,794	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	Cost of Installation (plumber/electrician)	$ 653	$ 665	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	General earthworks and construction costs	$ 3,267	$ 3,326	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Low New Pressure Installation	$11,761	$11,973	$12,189	$12,408	$12,631	$12,859	$13,090	$13,326	$13,566	$13,810	$14,058	$14,311	$14,569	$14,831	$15,098
	Number of pumps to be installed by Council (New installations Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Annual Cost to Install new Low Pressure Pump Stations Only	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Number of properties connected	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	Rationalised Cost per Connection Only	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Total Council CAPEX Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Total Council OPEX Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Table C2

Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.													
YEAR		2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Council Costs - CAPEX														
New Installation and Replacement of Pump Costs (>5yr)														
	Cost of a new pump	$2,700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227	$ 3,285
	Cost of Installation (plumber/electrician)	$500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598	$ 608
	Total Cost per pump replaced			$ 3,258	$ 3,316	$ 3,376	$ 3,437	$ 3,499	$ 3,562	$ 3,626	$ 3,691	$ 3,757	$ 3,825	$ 3,894
	Number of pumps to be installed by Council (New installations + >5 yr Replacement)			31	15	21	10	13	34	18	24	10	13	34
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 5 yrs			**$ 100,986**	**$ 49,744**	**$ 70,895**	**$ 34,367**	**$ 45,481**	**$ 121,092**	**$ 65,261**	**$ 88,582**	**$ 37,573**	**$ 49,725**	**$ 132,390**
New Tank Installations														
	Number of new low pressure pump station installations			9	3	3	4	3	3	3	3	0	0	0
	Cost of a new Control Box and PLC	$1,200		$ 1,222	$ 1,244	$ 1,266	$ 1,289	$ 1,312	$ 1,336	$ 1,360	$ 1,384	$ 1,409	$ 1,434	$ 1,460
	Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510	$ 2,555
	General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988	$ 3,042
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$5,800		$5,904	$6,011	$6,119	$6,229	$6,341	$6,455	$6,571	$6,690	$6,810	$6,933	$7,058
	Total Per Low New Pressure Installation (Excl Pump & Plumber)			**$53,139.60**	**$18,032.04**	**$18,356.61**	**$24,916.04**	**$19,023.40**	**$19,365.82**	**$19,714.41**	**$20,069.27**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected			77	80	83	87	90	93	96	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 5 yrs			$ 2,001.63	$ 847.19	$ 1,075.31	$ 681.41	$ 716.72	$ 1,510.30	$ 885.17	$ 1,097.48	$ 379.53	$ 502.27	$ 1,337.27
	Total Council CAPEX Costs			**$ 154,125**	**$ 67,776**	**$ 89,251**	**$ 59,283**	**$ 64,505**	**$ 140,458**	**$ 84,976**	**$ 108,651**	**$ 37,573**	**$ 49,725**	**$ 132,390**

Table C2

Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.													
YEAR		2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Council Costs - CAPEX													
New Installation and Replacement of Pump Costs (>5yr)													
	Cost of a new pump	$ 3,345	$ 3,405	$ 3,466	$ 3,528	$ 3,592	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070
	Cost of Installation (plumber/electrician)	$ 619	$ 631	$ 642	$ 653	$ 665	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754
	Total Cost per pump replaced	$ 3,964	$ 4,035	$ 4,108	$ 4,182	$ 4,257	$ 4,334	$ 4,412	$ 4,491	$ 4,572	$ 4,654	$ 4,738	$ 4,823
	Number of pumps to be installed by Council (New installations + >5 yr Replacement)	18	24	10	13	34	18	24	10	13	34	18	24
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 5 yrs	**$ 71,350**	**$ 96,846**	**$ 41,079**	**$ 54,364**	**$ 144,742**	**$ 78,007**	**$ 105,882**	**$ 44,912**	**$ 59,436**	**$ 158,246**	**$ 85,285**	**$ 115,760**
New Tank Installations													
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0
	Cost of a new Control Box and PLC	$ 1,486	$ 1,513	$ 1,540	$ 1,568	$ 1,596	$ 1,625	$ 1,654	$ 1,684	$ 1,714	$ 1,745	$ 1,777	$ 1,809
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,601	$ 2,648	$ 2,696	$ 2,744	$ 2,794	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165
	General earthworks and construction costs	$ 3,097	$ 3,153	$ 3,209	$ 3,267	$ 3,326	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$7,185	$7,314	$7,446	$7,580	$7,716	$7,855	$7,996	$8,140	$8,287	$8,436	$8,588	$8,742
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected	99	99	99	99	99	99	99	99	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 5 yrs	$ 720.71	$ 978.24	$ 414.94	$ 549.13	$ 1,462.04	$ 787.95	$ 1,069.51	$ 453.65	$ 600.36	$ 1,598.44	$ 861.47	$ 1,169.30
	Total Council CAPEX Costs	**$ 71,350**	**$ 96,846**	**$ 41,079**	**$ 54,364**	**$ 144,742**	**$ 78,007**	**$ 105,882**	**$ 44,912**	**$ 59,436**	**$ 158,246**	**$ 85,285**	**$ 115,760**

Table C2

Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.							
YEAR		2041	2042	2043	2044	2045	2046
Council Costs - CAPEX							
New Installation and Replacement of Pump Costs (>5yr)							
	Cost of a new pump	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of Installation (plumber/electrician)	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per pump replaced	$ 4,910	$ 4,999	$ 5,089	$ 5,180	$ 5,273	$ 5,368
	Number of pumps to be installed by Council (New installations + >5 yr Replacement)	10	13	34	18	24	10
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 5 yrs	**$ 49,102**	**$ 64,981**	**$ 173,010**	**$ 93,242**	**$ 126,561**	**$ 53,683**
New Tank Installations							
	Number of new low pressure pump station installations	0	0	0	0	0	0
	Cost of a new Control Box and PLC	$ 1,841	$ 1,874	$ 1,908	$ 1,943	$ 1,978	$ 2,013
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$8,900	$9,060	$9,223	$9,389	$9,558	$9,730
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected	99	99	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 5 yrs	$ 495.98	$ 656.38	$ 1,747.58	$ 941.84	$ 1,278.39	$ 542.25
	Total Council CAPEX Costs	**$ 49,102**	**$ 64,981**	**$ 173,010**	**$ 93,242**	**$ 126,561**	**$ 53,683**

Table C3

Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of the property boundary.													
YEAR		2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Council Costs - CAPEX													
New Installation and Replacement of Pump Costs (>10yr)													
	Cost of a new pump	2700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227
	Cost of Installation (plumber/electrician)	500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598
	Total Cost per pump replaced			$ 3,258	$ 3,316	$ 3,376	$ 3,437	$ 3,499	$ 3,562	$ 3,626	$ 3,691	$ 3,757	$ 3,825
	Number of pumps to be installed by Council (New installations + > 10 yr Replacement)			9	3	3	4	13	15	15	21	6	10
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 10 yrs			**$ 29,318**	**$ 9,949**	**$ 10,128**	**$ 13,747**	**$ 45,481**	**$ 53,423**	**$ 54,385**	**$ 77,509**	**$ 22,544**	**$ 38,250**
New Tank Installations													
	Number of new low pressure pump station installations			9	3	3	4	3	3	3	3	0	0
	Cost of a new Control Box and PLC	$1,200		$ 1,222	$ 1,244	$ 1,266	$ 1,289	$ 1,312	$ 1,336	$ 1,360	$ 1,384	$ 1,409	$ 1,434
	Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510
	General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$5,800		$5,904	$6,011	$6,119	$6,229	$6,341	$6,455	$6,571	$6,690	$6,810	$6,933
	Total Per Low New Pressure Installation (Excl Pump & Plumber)			**$53,139.60**	**$18,032.04**	**$18,356.61**	**$24,916.04**	**$19,023.40**	**$19,365.82**	**$19,714.41**	**$20,069.27**	**$0.00**	**$0.00**
New Tank Installations													
	Number of properties connected			77	80	83	87	90	93	96	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 10 yrs			$ 1,070.88	$ 349.76	$ 343.19	$ 444.40	$ 716.72	$ 782.68	$ 771.86	$ 985.64	$ 227.72	$ 386.36
	Total Council CAPEX Costs			**$ 82,458**	**$ 27,981**	**$ 28,484**	**$ 38,663**	**$ 64,505**	**$ 72,789**	**$ 74,099**	**$ 97,578**	**$ 22,544**	**$ 38,250**

Table C3

Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of the property boundary.														
YEAR		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Council Costs - CAPEX														
New Installation and Replacement of Pump Costs (>10yr)														
	Cost of a new pump	$ 3,285	$ 3,345	$ 3,405	$ 3,466	$ 3,528	$ 3,592	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070
	Cost of Installation (plumber/electrician)	$ 608	$ 619	$ 631	$ 642	$ 653	$ 665	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754
	Total Cost per pump replaced	$ 3,894	$ 3,964	$ 4,035	$ 4,108	$ 4,182	$ 4,257	$ 4,334	$ 4,412	$ 4,491	$ 4,572	$ 4,654	$ 4,738	$ 4,823
	Number of pumps to be installed by Council (New installations + > 10 yr Replacement)	9	3	3	4	13	15	15	21	6	10	9	3	3
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 10 yrs	**$ 35,044**	**$ 11,892**	**$ 12,106**	**$ 16,432**	**$ 54,364**	**$ 63,857**	**$ 65,006**	**$ 92,647**	**$ 26,947**	**$ 45,720**	**$ 41,889**	**$ 14,214**	**$ 14,470**
New Tank Installations														
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cost of a new Control Box and PLC	$ 1,460	$ 1,486	$ 1,513	$ 1,540	$ 1,568	$ 1,596	$ 1,625	$ 1,654	$ 1,684	$ 1,714	$ 1,745	$ 1,777	$ 1,809
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,555	$ 2,601	$ 2,648	$ 2,696	$ 2,744	$ 2,794	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165
	General earthworks and construction costs	$ 3,042	$ 3,097	$ 3,153	$ 3,209	$ 3,267	$ 3,326	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$7,058	$7,185	$7,314	$7,446	$7,580	$7,716	$7,855	$7,996	$8,140	$8,287	$8,436	$8,588	$8,742
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
New Tank Installations														
	Number of properties connected	99	99	99	99	99	99	99	99	99	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 10 yrs	$ 353.98	$ 120.12	$ 122.28	$ 165.98	$ 549.13	$ 645.02	$ 656.63	$ 935.82	$ 272.19	$ 461.82	$ 423.12	$ 143.58	$ 146.16
	Total Council CAPEX Costs	**$ 35,044**	**$ 11,892**	**$ 12,106**	**$ 16,432**	**$ 54,364**	**$ 63,857**	**$ 65,006**	**$ 92,647**	**$ 26,947**	**$ 45,720**	**$ 41,889**	**$ 14,214**	**$ 14,470**

Table C3

Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of the property boundary.							
YEAR		2041	2042	2043	2044	2045	2046
Council Costs - CAPEX							
New Installation and Replacement of Pump Costs (>10yr)							
	Cost of a new pump	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of Installation (plumber/electrician)	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per pump replaced	$ 4,910	$ 4,999	$ 5,089	$ 5,180	$ 5,273	$ 5,368
	Number of pumps to be installed by Council (New installations + > 10 yr Replacement)	4	13	15	15	21	6
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 10 yrs	**$ 19,641**	**$ 64,981**	**$ 76,328**	**$ 77,702**	**$ 110,741**	**$ 32,210**
New Tank Installations							
	Number of new low pressure pump station installations	0	0	0	0	0	0
	Cost of a new Control Box and PLC	$ 1,841	$ 1,874	$ 1,908	$ 1,943	$ 1,978	$ 2,013
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$8,900	$9,060	$9,223	$9,389	$9,558	$9,730
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
New Tank Installations							
	Number of properties connected	99	99	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 10 yrs	$ 198.39	$ 656.38	$ 770.99	$ 784.87	$ 1,118.59	$ 325.35
	Total Council CAPEX Costs	**$ 19,641**	**$ 64,981**	**$ 76,328**	**$ 77,702**	**$ 110,741**	**$ 32,210**

Table C3-20

Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of the property boundary.													
YEAR		2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Council Costs - CAPEX													
New Installation and Replacement of Pump Costs (>20yr)													
	Cost of a new pump	2700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227
	Cost of Installation (plumber/electrician)	500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598
	Total Cost per pump replaced			$ 3,258	$ 3,316	$ 3,376	$ 3,437	$ 3,499	$ 3,562	$ 3,626	$ 3,691	$ 3,757	$ 3,825
	Number of pumps to be installed by Council (New installations + > 20 yr Replacement)			9	3	3	4	3	3	3	3	0	0
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 20 yrs			**$ 29,318**	**$ 9,949**	**$ 10,128**	**$ 13,747**	**$ 10,496**	**$ 10,685**	**$ 10,877**	**$ 11,073**	**$ -**	**$ -**
New Tank Installations													
	Number of new low pressure pump station installations			9	3	3	4	3	3	3	3	0	0
	Cost of a new Control Box and PLC	$1,200		$ 1,222	$ 1,244	$ 1,266	$ 1,289	$ 1,312	$ 1,336	$ 1,360	$ 1,384	$ 1,409	$ 1,434
	Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510
	General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$5,800		$5,904	$6,011	$6,119	$6,229	$6,341	$6,455	$6,571	$6,690	$6,810	$6,933
	Total Per Low New Pressure Installation (Excl Pump & Plumber)			**$53,139.60**	**$18,032.04**	**$18,356.61**	**$24,916.04**	**$19,023.40**	**$19,365.82**	**$19,714.41**	**$20,069.27**	**$0.00**	**$0.00**
New Tank Installations													
	Number of properties connected			77	80	83	87	90	93	96	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 10 yrs			$ 1,070.88	$ 349.76	$ 343.19	$ 444.40	$ 327.99	$ 323.12	$ 318.66	$ 314.57	$ -	$ -
	Total Council CAPEX Costs			**$ 82,458**	**$ 27,981**	**$ 28,484**	**$ 38,663**	**$ 29,519**	**$ 30,050**	**$ 30,591**	**$ 31,142**	**$ -**	**$ -**

Table C3-20

Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of the property boundary.														
YEAR		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Council Costs - CAPEX														
New Installation and Replacement of Pump Costs (>20yr)														
	Cost of a new pump	$ 3,285	$ 3,345	$ 3,405	$ 3,466	$ 3,528	$ 3,592	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070
	Cost of Installation (plumber/electrician)	$ 608	$ 619	$ 631	$ 642	$ 653	$ 665	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754
	Total Cost per pump replaced	$ 3,894	$ 3,964	$ 4,035	$ 4,108	$ 4,182	$ 4,257	$ 4,334	$ 4,412	$ 4,491	$ 4,572	$ 4,654	$ 4,738	$ 4,823
	Number of pumps to be installed by Council (New installations + > 20 yr Replacement)	0	0	0	0	10	12	12	18	6	10	9	3	3
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 20 yrs	**$ -**	**$ -**	**$ -**	**$ -**	**$ 41,818**	**$ 51,085**	**$ 52,005**	**$ 79,411**	**$ 26,947**	**$ 45,720**	**$ 41,889**	**$ 14,214**	**$ 14,470**
New Tank Installations														
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cost of a new Control Box and PLC	$ 1,460	$ 1,486	$ 1,513	$ 1,540	$ 1,568	$ 1,596	$ 1,625	$ 1,654	$ 1,684	$ 1,714	$ 1,745	$ 1,777	$ 1,809
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,555	$ 2,601	$ 2,648	$ 2,696	$ 2,744	$ 2,794	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165
	General earthworks and construction costs	$ 3,042	$ 3,097	$ 3,153	$ 3,209	$ 3,267	$ 3,326	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$7,058	$7,185	$7,314	$7,446	$7,580	$7,716	$7,855	$7,996	$8,140	$8,287	$8,436	$8,588	$8,742
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
New Tank Installations														
	Number of properties connected	99	99	99	99	99	99	99	99	99	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 10 yrs	$ -	$ -	$ -	$ -	$ 422.41	$ 516.01	$ 525.30	$ 802.13	$ 272.19	$ 461.82	$ 423.12	$ 143.58	$ 146.16
	Total Council CAPEX Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ 41,818**	**$ 51,085**	**$ 52,005**	**$ 79,411**	**$ 26,947**	**$ 45,720**	**$ 41,889**	**$ 14,214**	**$ 14,470**

Table C3-20

Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of the property boundary.							
YEAR		2041	2042	2043	2044	2045	2046
Council Costs - CAPEX							
New Installation and Replacement of Pump Costs (>20yr)							
	Cost of a new pump	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of Installation (plumber/electrician)	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per pump replaced	$ 4,910	$ 4,999	$ 5,089	$ 5,180	$ 5,273	$ 5,368
	Number of pumps to be installed by Council (New installations + > 20 yr Replacement)	4	3	3	3	3	0
	Total Annual Cost to Install new Low Pressure Pumps and Replace Pumps aged > 20 yrs	**$ 19,641**	**$ 14,996**	**$ 15,266**	**$ 15,540**	**$ 15,820**	**$ -**
New Tank Installations							
	Number of new low pressure pump station installations	0	0	0	0	0	0
	Cost of a new Control Box and PLC	$ 1,841	$ 1,874	$ 1,908	$ 1,943	$ 1,978	$ 2,013
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$8,900	$9,060	$9,223	$9,389	$9,558	$9,730
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
New Tank Installations							
	Number of properties connected	99	99	99	99	99	99
	Rationalised Cost per New Connection and Replacement of Pumps > 10 yrs	$ 198.39	$ 151.47	$ 154.20	$ 156.97	$ 159.80	$ -
	Total Council CAPEX Costs	**$ 19,641**	**$ 14,996**	**$ 15,266**	**$ 15,540**	**$ 15,820**	**$ -**

Table C4

Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 10 years)																
YEAR		2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Council Costs - CAPEX																
New Installation and Replacement of Pump Costs (>10yr)																
	Cost of a new pump	$2,700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227	$ 3,285	$ 3,345	$ 3,405
	Cost of a new Control Box and PLC	$1,200		$ 1,222	$ 1,244	$ 1,266	$ 1,289	$ 1,312	$ 1,336	$ 1,360	$ 1,384	$ 1,409	$ 1,434	$ 1,460	$ 1,486	$ 1,513
	Cost of Installation (plumber/electrician)	$500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598	$ 608	$ 619	$ 631
	Total Cost per Pump and Control/PLC replaced			$ 4,479	$ 4,560	$ 4,642	$ 4,725	$ 4,811	$ 4,897	$ 4,985	$ 5,075	$ 5,166	$ 5,259	$ 5,354	$ 5,450	$ 5,548
	Number of pumps to be installed by Council (New installations + > 10 yr Replacement)			9	3	3	4	13	15	15	21	6	10	9	3	3
	Total Annual Cost to Install new Low Pressure Pumps and Controllers and Replace Pumps aged > 10 yrs			**$ 40,313**	**$ 13,679**	**$ 13,926**	**$ 18,902**	**$ 62,537**	**$ 73,457**	**$ 74,779**	**$ 106,575**	**$ 30,998**	**$ 52,593**	**$ 48,186**	**$ 16,351**	**$ 16,645**
New Tank Installations																
	Number of new low pressure pump station installations			9	3	3	4	3	3	3	3	0	0	0	0	0
	Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510	$ 2,555	$ 2,601	$ 2,648
	General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988	$ 3,042	$ 3,097	$ 3,153
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$4,600		$4,683	$4,767	$4,853	$4,940	$5,029	$5,120	$5,212	$5,306	$5,401	$5,498	$5,597	$5,698	$5,801
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)			**$42,145.20**	**$14,301.27**	**$14,558.69**	**$19,761.00**	**$15,087.52**	**$15,359.10**	**$15,635.56**	**$15,917.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected			77	80	83	87	90	93	96	99	99	99	99	99	99
Easements																
	Capital cost per connection	$5,000.00		$5,000.00	$ 5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Annual Easement Cost			**$385,000.00**	**15,000.00**	**15,000.00**	**20,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Council CAPEX Costs			**$467,458.00**	**$42,980.75**	**$43,484.40**	**$58,662.83**	**$92,624.22**	**$103,815.66**	**$105,414.34**	**$137,491.72**	**$30,998.02**	**$52,593.30**	**$48,185.99**	**$16,351.11**	**$16,645.43**
	Total Council CAPEX Costs per Connection			**$6,070.88**	**$537.26**	**$523.91**	**$674.29**	**$1,029.16**	**$1,116.30**	**$1,098.07**	**$1,388.81**	**$313.11**	**$531.25**	**$486.73**	**$165.16**	**$168.14**
Council Costs - OPEX																
Callouts																
	Hourly rate for a plumber	$ 36.84														
	Hourly rate for a labourer	$ 34.25														
	On-costs/Overhead 88.34%	$ 62.80														
	Vehicle Hourly Rate	$ 10.00														
	Total hourly rate	$ 143.89														
	Minimum call out cost (2 hours of ordinary pay = 1 hour 20 min															
	Assume call out is 2 hours	1.50	hourly pay for overtime													
	Cost per callout	$ 431.67														
	Percentage of houses doing a call out each year	100%														
	Number of Callouts per year			77	80	83	87	90	93	96	99	99	99	99	99	99
	Total Annual Cost of Call outs			**$ 33,238.80**	**$ 34,533.82**	**$ 35,828.84**	**$ 37,555.53**	**$ 38,850.54**	**$ 40,145.56**	**$ 41,440.58**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**
	Rationalised annual Call Out Cost per connection			**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**
Pump outs																
	Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$200.00		$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20
	Number of pump outs per year	100.00%														
				77	80	83	87	90	93	96	99	99	99	99	99	99
	Total Annual Vac-Truck pump out costs			**$15,677.20**	**$16,581.18**	**$17,512.63**	**$18,687.03**	**$19,679.38**	**$20,701.40**	**$21,753.83**	**$22,837.44**	**$23,248.51**	**$23,666.99**	**$24,092.99**	**$24,526.67**	**$24,968.15**
	Rationalised annual Vac-Truck Pump Out of Pump Well per connection			$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20
	Total Council OPEX Costs			**$48,916**	**$51,115**	**$53,341**	**$56,243**	**$58,530**	**$60,847**	**$63,194**	**$65,573**	**$65,984**	**$66,403**	**$66,829**	**$67,262**	**$67,704**
	Total Council Operation Costs per Connection			$635.27	$638.94	$642.67	$646.47	$650.33	$654.27	$658.28	$662.35	$666.51	$670.73	$675.04	$679.42	$683.88
	Total Cost (CAPEX + OPEX)			**$516,374.00**	**$94,095.75**	**$96,825.87**	**$114,905.39**	**$151,154.14**	**$164,662.62**	**$168,608.75**	**$203,064.76**	**$96,982.13**	**$118,995.89**	**$115,014.58**	**$83,613.38**	**$84,349.18**
	Rationalised Total Costs (CAPEX + OPEX)			**$6,706.16**	**$1,176.20**	**$1,166.58**	**$1,320.75**	**$1,679.49**	**$1,770.57**	**$1,756.34**	**$2,051.16**	**$979.62**	**$1,201.98**	**$1,161.76**	**$844.58**	**$852.01**

Table C4

Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 10 years)																	
YEAR		2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Council Costs - CAPEX																	
New Installation and Replacement of Pump Costs (>10yr)																	
	Cost of a new pump	$ 3,466	$ 3,528	$ 3,592	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of a new Control Box and PLC	$ 1,540	$ 1,568	$ 1,596	$ 1,625	$ 1,654	$ 1,684	$ 1,714	$ 1,745	$ 1,777	$ 1,809	$ 1,841	$ 1,874	$ 1,908	$ 1,943	$ 1,978	$ 2,013
	Cost of Installation (plumber/electrician)	$ 642	$ 653	$ 665	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per Pump and Control/PLC replaced	$ 5,648	$ 5,750	$ 5,854	$ 5,959	$ 6,066	$ 6,175	$ 6,286	$ 6,400	$ 6,515	$ 6,632	$ 6,751	$ 6,873	$ 6,997	$ 7,123	$ 7,251	$ 7,381
	Number of pumps to be installed by Council (New installations + > 10 yr Replacement)	4	13	15	15	21	6	10	9	3	3	4	13	15	15	21	6
	Total Annual Cost to Install new Low Pressure Pumps and Controllers and Replace Pumps aged > 10 yrs	**$ 22,593**	**$ 74,750**	**$ 87,803**	**$ 89,383**	**$ 127,389**	**$ 37,052**	**$ 62,865**	**$ 57,597**	**$ 19,545**	**$ 19,896**	**$ 27,006**	**$ 89,349**	**$ 104,951**	**$ 106,840**	**$ 152,268**	**$ 44,288**
New Tank Installations																	
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,696	$ 2,744	$ 2,794	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,209	$ 3,267	$ 3,326	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$5,905	$6,011	$6,120	$6,230	$6,342	$6,456	$6,572	$6,691	$6,811	$6,934	$7,058	$7,185	$7,315	$7,446	$7,580	$7,717
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Easements																	
	Capital cost per connection	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Annual Easement Cost	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Council CAPEX Costs	**$22,593.40**	**$74,750.26**	**$87,802.80**	**$89,383.25**	**$127,389.01**	**$37,052.00**	**$62,864.90**	**$57,596.82**	**$19,544.52**	**$19,896.32**	**$27,005.94**	**$89,349.16**	**$104,950.90**	**$106,840.02**	**$152,268.39**	**$44,288.35**
	Total Council CAPEX Costs per Connection	**$228.22**	**$755.05**	**$886.90**	**$902.86**	**$1,286.76**	**$374.26**	**$635.00**	**$581.79**	**$197.42**	**$200.97**	**$272.79**	**$902.52**	**$1,060.11**	**$1,079.19**	**$1,538.06**	**$447.36**
Council Costs - OPEX																	
Callouts																	
	Hourly rate for a plumber																
	Hourly rate for a labourer																
	On-costs/Overhead 88.34%																
	Vehicle Hourly Rate																
	Total hourly rate																
	Minimum call out cost (2 hours of ordinary pay = 1 hour 20 min																
	Assume call out is 2 hours																
	Cost per callout																
	Percentage of houses doing a call out each year																
	Number of Callouts per year	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	Total Annual Cost of Call outs	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**
	Rationalised annual Call Out Cost per connection	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**
Pump outs																	
	Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$256.74	$261.36	$266.07	$270.86	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
	Number of pump outs per year																
		99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	Total Annual Vac-Truck pump out costs	**$25,417.57**	**$25,875.09**	**$26,340.84**	**$26,814.98**	**$27,297.65**	**$27,789.00**	**$28,289.21**	**$28,798.41**	**$29,316.78**	**$29,844.48**	**$30,381.69**	**$30,928.56**	**$31,485.27**	**$32,052.00**	**$32,628.94**	**$33,216.26**
	Rationalised annual Vac-Truck Pump Out of Pump Well per connection	$256.74	$261.36	$266.07	$270.86	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
	Total Council OPEX Costs	**$68,153**	**$68,611**	**$69,076**	**$69,551**	**$70,033**	**$70,525**	**$71,025**	**$71,534**	**$72,052**	**$72,580**	**$73,117**	**$73,664**	**$74,221**	**$74,788**	**$75,365**	**$75,952**
	Total Council Operation Costs per Connection	$688.42	$693.04	$697.74	$702.53	$707.41	$712.37	$717.42	$722.57	$727.80	$733.13	$738.56	$744.08	$749.71	$755.43	$761.26	$767.19
	Total Cost (CAPEX + OPEX)	**$90,746.57**	**$143,360.95**	**$156,879.24**	**$158,933.83**	**$197,422.26**	**$107,576.61**	**$133,889.71**	**$129,130.83**	**$91,596.90**	**$92,476.41**	**$100,123.23**	**$163,013.32**	**$179,171.77**	**$181,627.62**	**$227,632.93**	**$120,240.21**
	Rationalised Total Costs (CAPEX + OPEX)	**$916.63**	**$1,448.09**	**$1,584.64**	**$1,605.39**	**$1,994.16**	**$1,086.63**	**$1,352.42**	**$1,304.35**	**$925.22**	**$934.11**	**$1,011.35**	**$1,646.60**	**$1,809.82**	**$1,834.62**	**$2,299.32**	**$1,214.55**

Table C4-20YR

Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 20 years)															
YEAR		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Council Costs - CAPEX															
New Installation and Replacement of Pump Costs (>20yr)															
	Cost of a new pump	$2,700	$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227	$ 3,285	$ 3,345	$ 3,405
	Cost of a new Control Box and PLC	$1,200	$ 1,222	$ 1,244	$ 1,266	$ 1,289	$ 1,312	$ 1,336	$ 1,360	$ 1,384	$ 1,409	$ 1,434	$ 1,460	$ 1,486	$ 1,513
	Cost of Installation (plumber/electrician)	$500	$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598	$ 608	$ 619	$ 631
	Total Cost per Pump and Control/PLC replaced		$ 4,479	$ 4,560	$ 4,642	$ 4,725	$ 4,811	$ 4,897	$ 4,985	$ 5,075	$ 5,166	$ 5,259	$ 5,354	$ 5,450	$ 5,548
	Number of pumps to be installed by Council (New installations + > 20 yr Replacement)		9	3	3	4	3	3	3	3	0	0	0	0	0
	Total Annual Cost to Install new Low Pressure Pumps and Controllers and Replace Pumps aged > 20 yrs		**$ 40,313**	**$ 13,679**	**$ 13,926**	**$ 18,902**	**$ 14,432**	**$ 14,691**	**$ 14,956**	**$ 15,225**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
New Tank Installations															
	Number of new low pressure pump station installations		9	3	3	4	3	3	3	3	0	0	0	0	0
	Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100	$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510	$ 2,555	$ 2,601	$ 2,648
	General earthworks and construction costs	$2,500	$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988	$ 3,042	$ 3,097	$ 3,153
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$4,600	$4,683	$4,767	$4,853	$4,940	$5,029	$5,120	$5,212	$5,306	$5,401	$5,498	$5,597	$5,698	$5,801
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)		**$42,145.20**	**$14,301.27**	**$14,558.69**	**$19,761.00**	**$15,087.52**	**$15,359.10**	**$15,635.56**	**$15,917.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected		77	80	83	87	90	93	96	99	99	99	99	99	99
Easements															
	Capital cost per connection	$5,000.00	$5,000.00	$ 5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Annual Easement Cost		**$385,000.00**	**15,000.00**	**15,000.00**	**20,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Council CAPEX Costs		**$467,458.00**	**$42,980.75**	**$43,484.40**	**$58,662.83**	**$44,519.07**	**$45,050.41**	**$45,591.32**	**$46,141.96**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Total Council CAPEX Costs per Connection		**$6,070.88**	**$537.26**	**$523.91**	**$674.29**	**$494.66**	**$484.41**	**$474.91**	**$466.08**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Council Costs - OPEX															
Callouts															
	Hourly rate for a plumber	$ 36.84													
	Hourly rate for a labourer	$ 34.25													
	On-costs/Overhead 88.34%	$ 62.80													
	Vehicle Hourly Rate	$ 10.00													
	Total hourly rate	$ 143.89													
	Minimum call out cost (2 hours of ordinary pay = 1 hour 20 min														
	Assume call out is 2 hours	1.50	hourly pay for overtime												
	Cost per callout	$ 431.67													
	Percentage of houses doing a call out each year	100%													
	Number of Callouts per year		77	80	83	87	90	93	96	99	99	99	99	99	99
	Total Annual Cost of Call outs		**$ 33,238.80**	**$ 34,533.82**	**$ 35,828.84**	**$ 37,555.53**	**$ 38,850.54**	**$ 40,145.56**	**$ 41,440.58**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**
	Rationalised annual Call Out Cost per connection		**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**
Pump outs															
	Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$200.00	$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20
	Number of pump outs per year	100.00%													
			77	80	83	87	90	93	96	99	99	99	99	99	99
	Total Annual Vac-Truck pump out costs		**$15,677.20**	**$16,581.18**	**$17,512.63**	**$18,687.03**	**$19,679.38**	**$20,701.40**	**$21,753.83**	**$22,837.44**	**$23,248.51**	**$23,666.99**	**$24,092.99**	**$24,526.67**	**$24,968.15**
	Rationalised annual Vac-Truck Pump Out of Pump Well per connection		$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20
	Total Council OPEX Costs		**$48,916**	**$51,115**	**$53,341**	**$56,243**	**$58,530**	**$60,847**	**$63,194**	**$65,573**	**$65,984**	**$66,403**	**$66,829**	**$67,262**	**$67,704**
	Total Council Operation Costs per Connection		$635.27	$638.94	$642.67	$646.47	$650.33	$654.27	$658.28	$662.35	$666.51	$670.73	$675.04	$679.42	$683.88
	Total Cost (CAPEX + OPEX)		**$516,374.00**	**$94,095.75**	**$96,825.87**	**$114,905.39**	**$103,048.99**	**$105,897.37**	**$108,785.73**	**$111,715.00**	**$65,984.11**	**$66,402.59**	**$66,828.59**	**$67,262.27**	**$67,703.75**
	Rationalised Total Costs (CAPEX + OPEX)		**$6,706.16**	**$1,176.20**	**$1,166.58**	**$1,320.75**	**$1,144.99**	**$1,138.68**	**$1,133.18**	**$1,128.43**	**$666.51**	**$670.73**	**$675.04**	**$679.42**	**$683.88**

Table C4-20YR

Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 20 years)																	
YEAR		2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Council Costs - CAPEX																	
New Installation and Replacement of Pump Costs (>20yr)																	
	Cost of a new pump	$ 3,466	$ 3,528	$ 3,592	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of a new Control Box and PLC	$ 1,540	$ 1,568	$ 1,596	$ 1,625	$ 1,654	$ 1,684	$ 1,714	$ 1,745	$ 1,777	$ 1,809	$ 1,841	$ 1,874	$ 1,908	$ 1,943	$ 1,978	$ 2,013
	Cost of Installation (plumber/electrician)	$ 642	$ 653	$ 665	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per Pump and Control/PLC replaced	$ 5,648	$ 5,750	$ 5,854	$ 5,959	$ 6,066	$ 6,175	$ 6,286	$ 6,400	$ 6,515	$ 6,632	$ 6,751	$ 6,873	$ 6,997	$ 7,123	$ 7,251	$ 7,381
	Number of pumps to be installed by Council (New installations + > 20 yr Replacement)	0	10	12	12	18	6	10	9	3	3	4	3	3	3	3	0
	Total Annual Cost to Install new Low Pressure Pumps and Controllers and Replace Pumps aged > 20 yrs	**$ -**	**$ 57,500**	**$ 70,242**	**$ 71,507**	**$ 109,191**	**$ 37,052**	**$ 62,865**	**$ 57,597**	**$ 19,545**	**$ 19,896**	**$ 27,006**	**$ 20,619**	**$ 20,990**	**$ 21,368**	**$ 21,753**	**$ -**
New Tank Installations																	
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,696	$ 2,744	$ 2,794	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,209	$ 3,267	$ 3,326	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump & Plumber)	$5,905	$6,011	$6,120	$6,230	$6,342	$6,456	$6,572	$6,691	$6,811	$6,934	$7,058	$7,185	$7,315	$7,446	$7,580	$7,717
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
	Number of properties connected	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Easements																	
	Capital cost per connection	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Annual Easement Cost	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Council CAPEX Costs	**$0.00**	**$57,500.20**	**$70,242.24**	**$71,506.60**	**$109,190.58**	**$37,052.00**	**$62,864.90**	**$57,596.82**	**$19,544.52**	**$19,896.32**	**$27,005.94**	**$20,619.04**	**$20,990.18**	**$21,368.00**	**$21,752.63**	**$0.00**
	Total Council CAPEX Costs per Connection	**$0.00**	**$580.81**	**$709.52**	**$722.29**	**$1,102.94**	**$374.26**	**$635.00**	**$581.79**	**$197.42**	**$200.97**	**$272.79**	**$208.27**	**$212.02**	**$215.84**	**$219.72**	**$0.00**
Council Costs - OPEX																	
Callouts																	
	Hourly rate for a plumber																
	Hourly rate for a labourer																
	On-costs/Overhead 88.34%																
	Vehicle Hourly Rate																
	Total hourly rate																
	Minimum call out cost (2 hours of ordinary pay = 1 hour 20 min																
	Assume call out is 2 hours																
	Cost per callout																
	Percentage of houses doing a call out each year																
	Number of Callouts per year	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	Total Annual Cost of Call outs	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**	**$ 42,735.60**
	Rationalised annual Call Out Cost per connection	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**	**$ 431.67**
Pump outs																	
	Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$256.74	$261.36	$266.07	$270.86	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
	Number of pump outs per year																
		99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	Total Annual Vac-Truck pump out costs	**$25,417.57**	**$25,875.09**	**$26,340.84**	**$26,814.98**	**$27,297.65**	**$27,789.00**	**$28,289.21**	**$28,798.41**	**$29,316.78**	**$29,844.48**	**$30,381.69**	**$30,928.56**	**$31,485.27**	**$32,052.00**	**$32,628.94**	**$33,216.26**
	Rationalised annual Vac-Truck Pump Out of Pump Well per connection	$256.74	$261.36	$266.07	$270.86	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
	Total Council OPEX Costs	**$68,153**	**$68,611**	**$69,076**	**$69,551**	**$70,033**	**$70,525**	**$71,025**	**$71,534**	**$72,052**	**$72,580**	**$73,117**	**$73,664**	**$74,221**	**$74,788**	**$75,365**	**$75,952**
	Total Council Operation Costs per Connection	$688.42	$693.04	$697.74	$702.53	$707.41	$712.37	$717.42	$722.57	$727.80	$733.13	$738.56	$744.08	$749.71	$755.43	$761.26	$767.19
	Total Cost (CAPEX + OPEX)	**$68,153.17**	**$126,110.89**	**$139,318.68**	**$141,057.18**	**$179,223.83**	**$107,576.61**	**$133,889.71**	**$129,130.83**	**$91,596.90**	**$92,476.41**	**$100,123.23**	**$94,283.19**	**$95,211.05**	**$96,155.61**	**$97,117.17**	**$75,951.86**
	Rationalised Total Costs (CAPEX + OPEX)	**$688.42**	**$1,273.85**	**$1,407.26**	**$1,424.82**	**$1,810.34**	**$1,086.63**	**$1,352.42**	**$1,304.35**	**$925.22**	**$934.11**	**$1,011.35**	**$952.36**	**$961.73**	**$971.27**	**$980.98**	**$767.19**

Table C4B

Option 4B- Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)																			
YEAR	2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Council Costs - CAPEX																			
New Installation and Replacement of Pump Costs (>10yr)																			
Cost of a new pump	$2,700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227	$ 3,285	$ 3,345	$ 3,405	$ 3,466	$ 3,528	$ 3,592	$ 3,657
Cost of Installation (plumber/electrician)	$500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598	$ 608	$ 619	$ 631	$ 642	$ 653	$ 665	$ 677
Total Cost per pump replaced			$3,258	$3,316	$3,376	$3,437	$3,499	$3,562	$3,626	$3,691	$3,757	$3,825	$3,894	$3,964	$4,035	$4,108	$4,182	$4,257	$4,334
Number of pumps to be replaced			9	3	3	4	13	15	15	21	6	10	9	3	3	4	13	15	15
Total Cost to replace all pumps in year			**$29,318.40**	**$9,948.71**	**$10,127.79**	**$13,746.78**	**$45,481.23**	**$53,422.95**	**$54,384.57**	**$77,508.89**	**$22,544.01**	**$38,249.68**	**$35,044.35**	**$11,891.72**	**$12,105.77**	**$16,431.56**	**$54,363.82**	**$63,856.58**	**$65,006.00**
Number of properties connected			77	80	83	87	90	93	96	99	99	99	99	99	99	99	99	99	100
New Tank Installations																			
Number of new low pressure pump station installations			9	3	3	4	3	3	3	3	0	0	0	0	0	0	0	0	0
Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510	$ 2,555	$ 2,601	$ 2,648	$ 2,696	$ 2,744	$ 2,794	$ 2,844
General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988	$ 3,042	$ 3,097	$ 3,153	$ 3,209	$ 3,267	$ 3,326	$ 3,386
Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	$4,600		$4,683	$4,767	$4,853	$4,940	$5,029	$5,120	$5,212	$5,306	$5,401	$5,498	$5,597	$5,698	$5,801	$5,905	$6,011	$6,120	$6,230
Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)			**$42,145.20**	**$14,301.27**	**$14,558.69**	**$19,761.00**	**$15,087.52**	**$15,359.10**	**$15,635.56**	**$15,917.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Remote Monitoring Capability																			
Upgrade PLC Control box	$1,200.00		$1,221.60	$1,243.59	$1,265.97	$1,288.76	$1,311.96	$1,335.57	$1,359.61	$1,384.09	$1,409.00	$1,434.36	$1,460.18	$1,486.46	$1,513.22	$1,540.46	$1,568.19	$1,596.41	$1,625.15
Number of PLC Control Boxes to be installed by Council (New installations + > 10 yr Replacement)			77	3	3	4	3	3	3	3	0	0	77	3	3	4	3	3	3
Total Annual Cost to Install new PLC Control Boxes and Replace PLC Control Boxes aged > 10 yrs			**$94,063.20**	**$3,730.77**	**$3,797.92**	**$5,155.04**	**$3,935.88**	**$4,006.72**	**$4,078.84**	**$4,152.26**	**$0.00**	**$0.00**	**$112,433.97**	**$4,459.39**	**$4,539.66**	**$6,161.84**	**$4,704.56**	**$4,789.24**	**$4,875.45**
Easements																			
Capital cost per connection	$5,000.00		$5,000.00	$ 5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Annual Easement Cost			**$385,000.00**	**15,000.00**	**15,000.00**	**20,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Council CAPEX Costs			**$550,526.80**	**$42,980.75**	**$43,484.40**	**$58,662.83**	**$79,504.63**	**$87,788.78**	**$89,098.97**	**$112,578.15**	**$22,544.01**	**$38,249.68**	**$147,478.32**	**$16,351.11**	**$16,645.43**	**$22,593.40**	**$59,068.39**	**$68,645.83**	**$69,881.45**
Total Council CAPEX Costs per Connection			**$7,149.70**	**$537.26**	**$523.91**	**$674.29**	**$883.38**	**$943.97**	**$928.11**	**$1,137.15**	**$227.72**	**$386.36**	**$1,489.68**	**$165.16**	**$168.14**	**$228.22**	**$596.65**	**$693.39**	**$698.81**
Council Costs - OPEX																			
Callouts																			
Hourly rate for a plumber	$ 36.84																		
Hourly rate for a labourer	$ 34.25																		
On-costs/Overhead 88.34%	$ 62.80																		
Vehicle Hourly Rate	$ 10.00																		
Total hourly rate	$ 143.89																		
Minimum call out cost (2 hours of ordinary pay = 1 hour 20 min																			
Assume call out is 2 hours	1.50	hourly pay for overtime																	
Cost per callout	$ 431.67																		
Percentage of houses doing a call out each year	33%																		
Number of Callouts per year			26	27	28	29	30	31	32	33	33	33	33	33	33	33	33	33	33
Total Annual Cost of Call outs			**$ 11,223.49**	**$ 11,655.16**	**$ 12,086.84**	**$ 12,518.51**	**$ 12,950.18**	**$ 13,381.85**	**$ 13,813.53**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**
Rationalised annual Call Out Cost per connection			**$ 145.76**	**$ 145.69**	**$ 145.62**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 142.45**
Pump outs																			
Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$200.00		$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20	$256.74	$261.36	$266.07	$270.86
Number of pump outs per year	33.00%		26	27	28	29	30	31	32	33	33	33	33	33	33	33	33	33	33
Total Annual Vac-Truck pump out costs			**$5,293.60**	**$5,596.15**	**$5,907.88**	**$6,229.01**	**$6,559.79**	**$6,900.47**	**$7,251.28**	**$7,612.48**	**$7,749.50**	**$7,889.00**	**$8,031.00**	**$8,175.56**	**$8,322.72**	**$8,472.52**	**$8,625.03**	**$8,780.28**	**$8,938.33**
Rationalised annual Vac-Truck Pump Out of Pump Well per connection			$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20	$256.74	$261.36	$266.07	$270.86
Remote monitoring																			
Estimated cost per connection for remote monitoring	$60.00		$61.08	$62.18	$63.30	$64.44	$65.60	$66.78	$67.98	$69.20	$70.45	$71.72	$73.01	$74.32	$75.66	$77.02	$78.41	$79.82	$81.26
Number of Connections to be remotely monitored			77	80	83	87	90	93	96	99	99	99	99	99	99	99	99	99	99
Total monitoring cost per annum			**$4,703.16**	**$4,974.36**	**$5,253.79**	**$5,606.11**	**$5,903.81**	**$6,210.42**	**$6,526.15**	**$6,851.23**	**$6,974.55**	**$7,100.10**	**$7,227.90**	**$7,358.00**	**$7,490.44**	**$7,625.27**	**$7,762.53**	**$7,902.25**	**$8,044.49**
Total Council OPEX Costs			**$21,220**	**$22,226**	**$23,249**	**$24,354**	**$25,414**	**$26,493**	**$27,591**	**$28,709**	**$28,969**	**$29,234**	**$29,504**	**$29,779**	**$30,058**	**$30,343**	**$30,633**	**$30,928**	**$31,228**
Total Council Operation Costs per Connection			$276	$278	$280	$280	$282	$285	$287	$290	$293	$295	$298	$301	$304	$306	$309	$312	$315
Total Cost (CAPEX + OPEX)			**$571,747.05**	**$65,206.42**	**$66,732.90**	**$83,016.46**	**$104,918.42**	**$114,281.51**	**$116,689.92**	**$141,287.06**	**$51,513.27**	**$67,483.97**	**$176,982.41**	**$46,129.87**	**$46,703.79**	**$52,936.39**	**$89,701.14**	**$99,573.56**	**$101,109.47**
Rationalised Total Costs (CAPEX + OPEX)			**$7,425.29**	**$815.08**	**$804.01**	**$954.21**	**$1,165.76**	**$1,228.83**	**$1,215.52**	**$1,427.14**	**$520.34**	**$681.66**	**$1,787.70**	**$465.96**	**$471.76**	**$534.71**	**$906.07**	**$1,005.79**	**$1,011.09**

Table C4B

Option 4B- Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)													
YEAR		2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Council Costs - CAPEX													
New Installation and Replacement of Pump Costs (>10yr)													
	Cost of a new pump	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of Installation (plumber/electrician)	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per pump replaced	$4,412	$4,491	$4,572	$4,654	$4,738	$4,823	$4,910	$4,999	$5,089	$5,180	$5,273	$5,368
	Number of pumps to be replaced	21	6	10	9	3	3	4	13	15	15	21	6
	Total Cost to replace all pumps in year	**$92,646.56**	**$26,946.91**	**$45,719.93**	**$41,888.60**	**$14,214.20**	**$14,470.05**	**$19,640.69**	**$64,981.21**	**$76,327.93**	**$77,701.83**	**$110,740.65**	**$32,209.71**
	Number of properties connected	101	102	103	104	105	106	107	108	109	110	111	112
New Tank Installations													
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	$6,342	$6,456	$6,572	$6,691	$6,811	$6,934	$7,058	$7,185	$7,315	$7,446	$7,580	$7,717
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Remote Monitoring Capability													
	Upgrade PLC Control box	$1,654.40	$1,684.18	$1,714.50	$1,745.36	$1,776.77	$1,808.76	$1,841.31	$1,874.46	$1,908.20	$1,942.55	$1,977.51	$2,013.11
	Number of PLC Control Boxes to be installed by Council (New installations + > 10 yr Replacement)	3	0	0	77	3	3	4	3	3	3	3	0
	Total Annual Cost to Install new PLC Control Boxes and Replace PLC Control Boxes aged > 10 yrs	**$4,963.21**	**$0.00**	**$0.00**	**$134,392.59**	**$5,330.32**	**$5,426.27**	**$7,365.26**	**$5,623.37**	**$5,724.59**	**$5,827.64**	**$5,932.53**	**$0.00**
Easements													
	Capital cost per connection	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Annual Easement Cost	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Council CAPEX Costs	**$97,609.76**	**$26,946.91**	**$45,719.93**	**$176,281.18**	**$19,544.52**	**$19,896.32**	**$27,005.94**	**$70,604.58**	**$82,052.52**	**$83,529.47**	**$116,673.18**	**$32,209.71**
	Total Council CAPEX Costs per Connection	**$966.43**	**$264.19**	**$443.88**	**$1,695.01**	**$186.14**	**$187.70**	**$252.39**	**$653.75**	**$752.78**	**$759.36**	**$1,051.11**	**$287.59**
Council Costs - OPEX													
Callouts													
	Hourly rate for a plumber												
	Hourly rate for a labourer												
	On-costs/Overhead 88.34%												
	Vehicle Hourly Rate												
	Total hourly rate												
	Minimum call out cost (2 hours of ordinary pay = 1 hour 20												
	Assume call out is 2 hours												
	Cost per callout												
	Percentage of houses doing a call out each year												
	Number of Callouts per year	33	33	33	33	33	33	33	33	33	33	33	33
	Total Annual Cost of Call outs	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**
	Rationalised annual Call Out Cost per connection	**$ 141.04**	**$ 139.66**	**$ 138.30**	**$ 136.97**	**$ 135.67**	**$ 134.39**	**$ 133.13**	**$ 131.90**	**$ 130.69**	**$ 129.50**	**$ 128.34**	**$ 127.19**
Pump outs													
	Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
	Number of pump outs per year	33	33	33	33	33	33	33	33	33	33	33	33
	Total Annual Vac-Truck pump out costs	**$9,099.22**	**$9,263.00**	**$9,429.74**	**$9,599.47**	**$9,772.26**	**$9,948.16**	**$10,127.23**	**$10,309.52**	**$10,495.09**	**$10,684.00**	**$10,876.31**	**$11,072.09**
	Rationalised annual Vac-Truck Pump Out of Pump Well pe	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
Remote monitoring													
	Estimated cost per connection for remote monitoring	$82.72	$84.21	$85.72	$87.27	$88.84	$90.44	$92.07	$93.72	$95.41	$97.13	$98.88	$100.66
	Number of Connections to be remotely monitored	99	99	99	99	99	99	99	99	99	99	99	99
	Total monitoring cost per annum	**$8,189.29**	**$8,336.70**	**$8,486.76**	**$8,639.52**	**$8,795.03**	**$8,953.35**	**$9,114.51**	**$9,278.57**	**$9,445.58**	**$9,615.60**	**$9,788.68**	**$9,964.88**
	Total Council OPEX Costs	**$31,534**	**$31,845**	**$32,162**	**$32,484**	**$32,812**	**$33,147**	**$33,487**	**$33,833**	**$34,186**	**$34,545**	**$34,910**	**$35,282**
	Total Council Operation Costs per Connection	$319	$322	$325	$328	$331	$335	$338	$342	$345	$349	$353	$356
	Total Cost (CAPEX + OPEX)	**$129,143.47**	**$58,791.81**	**$77,881.62**	**$208,765.38**	**$52,357.02**	**$53,043.03**	**$60,492.88**	**$104,437.87**	**$116,238.39**	**$118,074.27**	**$151,583.38**	**$67,491.87**
	Rationalised Total Costs (CAPEX + OPEX)	**$1,278.65**	**$576.39**	**$756.13**	**$2,007.36**	**$498.64**	**$500.41**	**$565.35**	**$967.02**	**$1,066.41**	**$1,073.40**	**$1,365.62**	**$602.61**

Table C4B-20

Option 4B-20 - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)																		
YEAR	2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Council Costs - CAPEX																		
New Installation and Replacement of Pump Costs (>20yr)																		
Cost of a new pump	$2,700		$ 2,749	$ 2,798	$ 2,848	$ 2,900	$ 2,952	$ 3,005	$ 3,059	$ 3,114	$ 3,170	$ 3,227	$ 3,285	$ 3,345	$ 3,405	$ 3,466	$ 3,528	$ 3,592
Cost of Installation (plumber/electrician)	$500		$ 509	$ 518	$ 527	$ 537	$ 547	$ 556	$ 567	$ 577	$ 587	$ 598	$ 608	$ 619	$ 631	$ 642	$ 653	$ 665
Total Cost per pump replaced			$3,258	$3,316	$3,376	$3,437	$3,499	$3,562	$3,626	$3,691	$3,757	$3,825	$3,894	$3,964	$4,035	$4,108	$4,182	$4,257
Number of pumps to be replaced			9	3	3	4	3	3	3	3	0	0	0	0	0	0	10	12
Total Cost to replace all pumps in year			**$29,318.40**	**$9,948.71**	**$10,127.79**	**$13,746.78**	**$10,495.67**	**$10,684.59**	**$10,876.91**	**$11,072.70**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$41,818.33**	**$51,085.27**
Number of properties connected			77	80	83	87	90	93	96	99	99	99	99	99	99	99	99	99
New Tank Installations																		
Number of new low pressure pump station installations			9	3	3	4	3	3	3	3	0	0	0	0	0	0	0	0
Additional Costs to above for 1,100L Tank and pipework for new installations	$2,100		$ 2,138	$ 2,176	$ 2,215	$ 2,255	$ 2,296	$ 2,337	$ 2,379	$ 2,422	$ 2,466	$ 2,510	$ 2,555	$ 2,601	$ 2,648	$ 2,696	$ 2,744	$ 2,794
General earthworks and construction costs	$2,500		$ 2,545	$ 2,591	$ 2,637	$ 2,685	$ 2,733	$ 2,782	$ 2,833	$ 2,884	$ 2,935	$ 2,988	$ 3,042	$ 3,097	$ 3,153	$ 3,209	$ 3,267	$ 3,326
Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	$4,600		$4,683	$4,767	$4,853	$4,940	$5,029	$5,120	$5,212	$5,306	$5,401	$5,498	$5,597	$5,698	$5,801	$5,905	$6,011	$6,120
Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)			**$42,145.20**	**$14,301.27**	**$14,558.69**	**$19,761.00**	**$15,087.52**	**$15,359.10**	**$15,635.56**	**$15,917.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Remote Monitoring Capability																		
Upgrade PLC Control box	$1,200.00		$1,221.60	$1,243.59	$1,265.97	$1,288.76	$1,311.96	$1,335.57	$1,359.61	$1,384.09	$1,409.00	$1,434.36	$1,460.18	$1,486.46	$1,513.22	$1,540.46	$1,568.19	$1,596.41
Number of PLC Control Boxes to be installed by Council (New installations + > 10 yr Replacement)			77	3	3	4	3	3	3	3	0	0	77	3	3	4	3	3
Total Annual Cost to Install new PLC Control Boxes and Replace PLC Control Boxes aged > 10 yrs			**$94,063.20**	**$3,730.77**	**$3,797.92**	**$5,155.04**	**$3,935.88**	**$4,006.72**	**$4,078.84**	**$4,152.26**	**$0.00**	**$0.00**	**$112,433.97**	**$4,459.39**	**$4,539.66**	**$6,161.84**	**$4,704.56**	**$4,789.24**
Easements																		
Capital cost per connection	$5,000.00		$5,000.00	$ 5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Annual Easement Cost			**$385,000.00**	**15,000.00**	**15,000.00**	**20,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**15,000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Council CAPEX Costs			**$550,526.80**	**$42,980.75**	**$43,484.40**	**$58,662.83**	**$44,519.07**	**$45,050.41**	**$45,591.32**	**$46,141.96**	**$0.00**	**$0.00**	**$112,433.97**	**$4,459.39**	**$4,539.66**	**$6,161.84**	**$46,522.89**	**$55,874.51**
Total Council CAPEX Costs per Connection			**$7,149.70**	**$537.26**	**$523.91**	**$674.29**	**$494.66**	**$484.41**	**$474.91**	**$466.08**	**$0.00**	**$0.00**	**$1,135.70**	**$45.04**	**$45.86**	**$62.24**	**$469.93**	**$564.39**
Council Costs - OPEX																		
Callouts																		
Hourly rate for a plumber	$ 36.84																	
Hourly rate for a labourer	$ 34.25																	
On-costs/Overhead 88.34%	$ 62.80																	
Vehicle Hourly Rate	$ 10.00																	
Total hourly rate	$ 143.89																	
Minimum call out cost (2 hours of ordinary pay = 1 hour 20 min																		
Assume call out is 2 hours	1.50	hourly pay for overtime																
Cost per callout	$ 431.67																	
Percentage of houses doing a call out each year	33%																	
Number of Callouts per year			26	27	28	29	30	31	32	33	33	33	33	33	33	33	33	33
Total Annual Cost of Call outs			**$ 11,223.49**	**$ 11,655.16**	**$ 12,086.84**	**$ 12,518.51**	**$ 12,950.18**	**$ 13,381.85**	**$ 13,813.53**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**
Rationalised annual Call Out Cost per connection			**$ 145.76**	**$ 145.69**	**$ 145.62**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**	**$ 143.89**
Pump outs																		
Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$200.00		$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20	$256.74	$261.36	$266.07
Number of pump outs per year	33.00%		26	27	28	29	30	31	32	33	33	33	33	33	33	33	33	33
Total Annual Vac-Truck pump out costs			**$5,293.60**	**$5,596.15**	**$5,907.88**	**$6,229.01**	**$6,559.79**	**$6,900.47**	**$7,251.28**	**$7,612.48**	**$7,749.50**	**$7,889.00**	**$8,031.00**	**$8,175.56**	**$8,322.72**	**$8,472.52**	**$8,625.03**	**$8,780.28**
Rationalised annual Vac-Truck Pump Out of Pump Well per connection			$203.60	$207.26	$211.00	$214.79	$218.66	$222.60	$226.60	$230.68	$234.83	$239.06	$243.36	$247.74	$252.20	$256.74	$261.36	$266.07
Remote monitoring																		
Estimated cost per connection for remote monitoring	$60.00		$61.08	$62.18	$63.30	$64.44	$65.60	$66.78	$67.98	$69.20	$70.45	$71.72	$73.01	$74.32	$75.66	$77.02	$78.41	$79.82
Number of Connections to be remotely monitored			77	80	83	87	90	93	96	99	99	99	99	99	99	99	99	99
Total monitoring cost per annum			**$4,703.16**	**$4,974.36**	**$5,253.79**	**$5,606.11**	**$5,903.81**	**$6,210.42**	**$6,526.15**	**$6,851.23**	**$6,974.55**	**$7,100.10**	**$7,227.90**	**$7,358.00**	**$7,490.44**	**$7,625.27**	**$7,762.53**	**$7,902.25**
Total Council OPEX Costs			**$21,220**	**$22,226**	**$23,249**	**$24,354**	**$25,414**	**$26,493**	**$27,591**	**$28,709**	**$28,969**	**$29,234**	**$29,504**	**$29,779**	**$30,058**	**$30,343**	**$30,633**	**$30,928**
Total Council Operation Costs per Connection			$276	$278	$280	$280	$282	$285	$287	$290	$293	$295	$298	$301	$304	$306	$309	$312
Total Cost (CAPEX + OPEX)			**$571,747.05**	**$65,206.42**	**$66,732.90**	**$83,016.46**	**$69,932.86**	**$71,543.15**	**$73,182.27**	**$74,850.87**	**$28,969.26**	**$29,234.29**	**$141,938.06**	**$34,238.15**	**$34,598.02**	**$36,504.83**	**$77,155.64**	**$86,802.24**
Rationalised Total Costs (CAPEX + OPEX)			**$7,425.29**	**$815.08**	**$804.01**	**$954.21**	**$777.03**	**$769.28**	**$762.32**	**$756.07**	**$292.62**	**$295.30**	**$1,433.72**	**$345.84**	**$349.47**	**$368.74**	**$779.35**	**$876.79**

Table C4B-20

Option 4B-20 - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)														
YEAR		2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Council Costs - CAPEX														
New Installation and Replacement of Pump Costs (>20yr)														
	Cost of a new pump	$ 3,657	$ 3,722	$ 3,789	$ 3,858	$ 3,927	$ 3,998	$ 4,070	$ 4,143	$ 4,218	$ 4,293	$ 4,371	$ 4,449	$ 4,529
	Cost of Installation (plumber/electrician)	$ 677	$ 689	$ 702	$ 714	$ 727	$ 740	$ 754	$ 767	$ 781	$ 795	$ 809	$ 824	$ 839
	Total Cost per pump replaced	$4,334	$4,412	$4,491	$4,572	$4,654	$4,738	$4,823	$4,910	$4,999	$5,089	$5,180	$5,273	$5,368
	Number of pumps to be replaced	12	18	6	10	9	3	3	4	3	3	3	3	0
	Total Cost to replace all pumps in year	**$52,004.80**	**$79,411.33**	**$26,946.91**	**$45,719.93**	**$41,888.60**	**$14,214.20**	**$14,470.05**	**$19,640.69**	**$14,995.66**	**$15,265.59**	**$15,540.37**	**$15,820.09**	**$0.00**
	Number of properties connected	100	101	102	103	104	105	106	107	108	109	110	111	112
New Tank Installations														
	Number of new low pressure pump station installations	0	0	0	0	0	0	0	0	0	0	0	0	0
	Additional Costs to above for 1,100L Tank and pipework for new installations	$ 2,844	$ 2,895	$ 2,947	$ 3,000	$ 3,054	$ 3,109	$ 3,165	$ 3,222	$ 3,280	$ 3,339	$ 3,399	$ 3,461	$ 3,523
	General earthworks and construction costs	$ 3,386	$ 3,447	$ 3,509	$ 3,572	$ 3,636	$ 3,702	$ 3,768	$ 3,836	$ 3,905	$ 3,975	$ 4,047	$ 4,120	$ 4,194
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	$6,230	$6,342	$6,456	$6,572	$6,691	$6,811	$6,934	$7,058	$7,185	$7,315	$7,446	$7,580	$7,717
	Total Per Low New Pressure Installation (Excl Pump, Controller & Plumber)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Remote Monitoring Capability														
	Upgrade PLC Control box	$1,625.15	$1,654.40	$1,684.18	$1,714.50	$1,745.36	$1,776.77	$1,808.76	$1,841.31	$1,874.46	$1,908.20	$1,942.55	$1,977.51	$2,013.11
	Number of PLC Control Boxes to be installed by Council (New installations + > 10 yr Replacement)	3	3	0	0	77	3	3	4	3	3	3	3	0
	Total Annual Cost to Install new PLC Control Boxes and Replace PLC Control Boxes aged > 10 yrs	**$4,875.45**	**$4,963.21**	**$0.00**	**$0.00**	**$134,392.59**	**$5,330.32**	**$5,426.27**	**$7,365.26**	**$5,623.37**	**$5,724.59**	**$5,827.64**	**$5,932.53**	**$0.00**
Easements														
	Capital cost per connection	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Annual Easement Cost	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Council CAPEX Costs	**$56,880.25**	**$84,374.54**	**$26,946.91**	**$45,719.93**	**$176,281.18**	**$19,544.52**	**$19,896.32**	**$27,005.94**	**$20,619.04**	**$20,990.18**	**$21,368.00**	**$21,752.63**	**$0.00**
	Total Council CAPEX Costs per Connection	**$568.80**	**$835.39**	**$264.19**	**$443.88**	**$1,695.01**	**$186.14**	**$187.70**	**$252.39**	**$190.92**	**$192.57**	**$194.25**	**$195.97**	**$0.00**
Council Costs - OPEX														
Callouts														
	Hourly rate for a plumber													
	Hourly rate for a labourer													
	On-costs/Overhead 88.34%													
	Vehicle Hourly Rate													
	Total hourly rate													
	Minimum call out cost (2 hours of ordinary pay = 1 hour 20													
	Assume call out is 2 hours													
	Cost per callout													
	Percentage of houses doing a call out each year													
	Number of Callouts per year	33	33	33	33	33	33	33	33	33	33	33	33	33
	Total Annual Cost of Call outs	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**	**$ 14,245.20**
	Rationalised annual Call Out Cost per connection	**$ 142.45**	**$ 141.04**	**$ 139.66**	**$ 138.30**	**$ 136.97**	**$ 135.67**	**$ 134.39**	**$ 133.13**	**$ 131.90**	**$ 130.69**	**$ 129.50**	**$ 128.34**	**$ 127.19**
Pump outs														
	Estimated Cost to Vac-truck accumulated material in the base of the pump wells	$270.86	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
	Number of pump outs per year	33	33	33	33	33	33	33	33	33	33	33	33	33
	Total Annual Vac-Truck pump out costs	**$8,938.33**	**$9,099.22**	**$9,263.00**	**$9,429.74**	**$9,599.47**	**$9,772.26**	**$9,948.16**	**$10,127.23**	**$10,309.52**	**$10,495.09**	**$10,684.00**	**$10,876.31**	**$11,072.09**
	Rationalised annual Vac-Truck Pump Out of Pump Well pe	$270.86	$275.73	$280.70	$285.75	$290.89	$296.13	$301.46	$306.89	$312.41	$318.03	$323.76	$329.59	$335.52
Remote monitoring														
	Estimated cost per connection for remote monitoring	$81.26	$82.72	$84.21	$85.72	$87.27	$88.84	$90.44	$92.07	$93.72	$95.41	$97.13	$98.88	$100.66
	Number of Connections to be remotely monitored	99	99	99	99	99	99	99	99	99	99	99	99	99
	Total monitoring cost per annum	**$8,044.49**	**$8,189.29**	**$8,336.70**	**$8,486.76**	**$8,639.52**	**$8,795.03**	**$8,953.35**	**$9,114.51**	**$9,278.57**	**$9,445.58**	**$9,615.60**	**$9,788.68**	**$9,964.88**
	Total Council OPEX Costs	**$31,228**	**$31,534**	**$31,845**	**$32,162**	**$32,484**	**$32,812**	**$33,147**	**$33,487**	**$33,833**	**$34,186**	**$34,545**	**$34,910**	**$35,282**
	Total Council Operation Costs per Connection	$315	$319	$322	$325	$328	$331	$335	$338	$342	$345	$349	$353	$356
	Total Cost (CAPEX + OPEX)	**$88,108.27**	**$115,908.25**	**$58,791.81**	**$77,881.62**	**$208,765.38**	**$52,357.02**	**$53,043.03**	**$60,492.88**	**$54,452.32**	**$55,176.05**	**$55,912.81**	**$56,662.82**	**$35,282.17**
	Rationalised Total Costs (CAPEX + OPEX)	**$881.08**	**$1,147.61**	**$576.39**	**$756.13**	**$2,007.36**	**$498.64**	**$500.41**	**$565.35**	**$504.19**	**$506.20**	**$508.30**	**$510.48**	**$315.02**

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GLADSTONE REGIONAL COUNCIL

Table C5 - New Gravity Sewerage Scheme

Item	Description	Quantity	Unit	Unit Rate	Amount
1	**PRELIMINARIES**				
	Management Plans, Quality Plans, Site Establishment, Traffic Control, Environmental Management etc	5%	Item	(Item 2+3)	$ 149,805.00
	Site Preparation and Earthworks (Clearing / Grubbing Only)	2%	Item	(Item 2+3)	$ 59,922.00
	Sub-Total (excl GST)				**$209,727.00**
2	**SUPPLY AND INSTALL GRAVITY SEWERAGE MAIN**				
	Supply and Install DN150 DICL Tyton Xtreme Gravity Main (0.9-2m)	1120	m	500.00	560,000.00
	Supply and Install DN150 DICL Tyton Xtreme Gravity Main (2-3m)	480	m	650.00	312,000.00
	Supply and Install DN225 DICL Tyton Xtreme Gravity Main (0.9-2m)	560	m	560.00	313,600.00
	Supply and Install DN225 DICL Tyton Xtreme Gravity Main (2-3m)	240	m	700.00	168,000.00
	Supply and Install Concrete Manholes	55	ea	2,500.00	137,500.00
	Sub-Total (excl GST)				**$ 1,491,100.00**
3	**SUPPLY AND INSTALL SEWAGE PUMP STATIONS AND RISING MAIN**				
	Pump Station 1 (Approx 1 L/s)	1	ea	$ 250,000.00	250,000.00
	Pump Station 2 (Approx 2 L/s)	1	ea	$ 250,000.00	250,000.00
	Relift Pump Station 3 (Approx 6-7 L/s)	1	ea	$ 300,000.00	300,000.00
	Pump Station 4 (Approx 8 L/s)	1	ea	$ 300,000.00	300,000.00
	Supply and Install DN100 **DICL Tyton Xtreme** Pressure Main	900	m	$ 450.00	405,000.00
	Sub-Total (excl GST)				**$ 1,505,000.00**
	Sub Total (Items 1, 2 & 3)				**$ 3,205,827.00**
	Testing and Commissioning	2%	Item		$ 64,116.54
	Valve/Fittings for Pipeline	2%	Item		$ 64,116.54
	Miscellaneous Equipment	5%	Item		$ 160,291.35
	Reinstatement (Roads, Gardens, Pavement, Fences etc)	10%	Item		$ 320,582.70
	Sub Total Infrastructure (excl GST)				**$ 3,654,642.78**
	Contingencies	30%	Item		$ 1,096,392.83
	Engineering, Survey, Design	15%	Item		$ 548,196.42
	Legals, Land Acquisition	15%	Item		$ 548,196.42
	Project and Construction Management	3%	Item		$ 109,639.28
	Sub Total Project Costs (excl GST)				**$ 2,302,424.95**
	TOTAL (EXCLUDING GST)				**5,957,067.73**

Table C5 - New Gravity Sewerage Scheme

Council Costs - OPEX	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Replacement Mech&Elec After 15 Yrs												
General O&M (1% Civil)				$ 20,003	$ 20,363	$ 20,730	$ 21,103	$ 21,483	$ 21,870	$ 22,263	$ 22,664	$ 23,072
Mech/Elec Maintenance (3% of M/E Infrastructure)				$ 6,963	$ 7,088	$ 7,216	$ 7,346	$ 7,478	$ 7,612	$ 7,750	$ 7,889	$ 8,031

Council Costs - OPEX	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Replacement Mech&Elec After 15 Yrs							$ 750,564					
General O&M (1% Civil)	$ 18,961	$ 19,302	$ 19,650	$ 20,003	$ 20,363	$ 20,730	$ 21,103	$ 21,483	$ 21,870	$ 22,263	$ 22,664	$ 23,072
Mech/Elec Maintenance (3% of M/E Infrastructure)	$ 6,600	$ 6,719	$ 6,840	$ 6,963	$ 7,088	$ 7,216	$ 7,346	$ 7,478	$ 7,612	$ 7,750	$ 7,889	$ 8,031

Council Costs - OPEX	2041	2042	2043	2044	2045	2046
Replacement Mech&Elec After 15 Yrs						
General O&M (1% Civil)	$ 18,961	$ 19,302	$ 19,650	$ 20,003	$ 20,363	$ 20,730
Mech/Elec Maintenance (3% of M/E Infrastructure)	$ 6,600	$ 6,719	$ 6,840	$ 6,963	$ 7,088	$ 7,216

Appendix D – Net Present Value

Project: 1770 Low Pressure Sewer System Option and Cost Review
Job Number: 42-20430
Title: Net Present Value - Options Assessment

CLIENTS PEOPLE PERFORMANCE

Option 1 - Status Quo (property owners O&M infrastructure located within property boundary). Council maintains and operates infrastructure outside of the property boundary.	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 298,888.74	$257,541.81	$240,360.51	$225,070.96
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 1 (excl. GST)	**$ 298,888.74**	**$257,541.81**	**$240,360.51**	**$225,070.96**

Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 2,605,199.12	$1,519,615.30	$1,217,219.80	$1,002,166.25
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 2 (excl. GST)	**$ 2,605,199.12**	**$ 1,519,615.30**	**$ 1,217,219.80**	**$ 1,002,166.25**

Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 1,423,538.26	$831,377.16	$667,394.05	$550,796.35
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 3 (excl. GST)	**$ 1,423,538.26**	**$ 831,377.16**	**$ 667,394.05**	**$ 550,796.35**

Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 747,710.55	$467,300.12	$386,287.64	$327,676.65
Operational Costs (OPEX)	$ -	$0.00	$0.00	$0.00
TOTAL Option 3 (excl. GST)	**$ 747,710.55**	**$ 467,300.12**	**$ 386,287.64**	**$ 327,676.65**

Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 10 years)	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 2,340,281.83	$1,507,599.84	$1,273,695.60	$1,105,410.69
Operational Costs (OPEX)	$ 1,942,186.97	$1,099,316.94	$864,913.41	$698,606.07
TOTAL Option 4 (excl. GST)	**$ 4,282,468.81**	**$ 2,606,916.78**	**$ 2,138,609.01**	**$ 1,804,016.76**

Option 4-20YR - Council to take over O&M of the low pressure sewer systems (pump replacement 20 years)	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 1,411,018.73	$1,006,993.92	$887,174.29	$798,621.11
Operational Costs (OPEX)	$ 1,942,186.97	$1,099,316.94	$864,913.41	$698,606.07
TOTAL Option 4 (excl. GST)	**$ 3,353,205.71**	**$ 2,106,310.86**	**$ 1,752,087.70**	**$ 1,497,227.18**

Option 4B - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 2,324,156.96	$1,538,986.40	$1,314,810.03	$1,152,155.23
Operational Costs (OPEX)	$ 870,157.66	$489,134.32	$383,630.77	$308,985.06
TOTAL Option B1 (excl. GST)	**$ 3,194,314.62**	**$ 2,028,120.72**	**$ 1,698,440.80**	**$ 1,461,140.29**

Option 4B-20YR - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 1,648,329.25	$1,174,909.36	$1,033,703.62	$929,035.53
Operational Costs (OPEX)	$ 870,157.66	$489,134.32	$383,630.77	$308,985.06
TOTAL Option B1 (excl. GST)	**$ 2,518,486.91**	**$ 1,664,043.68**	**$ 1,417,334.39**	**$ 1,238,020.59**

Option 5 - New Gravity Sewerage Scheme	Total Cost ($)	NPV (over 28 years) 4%	6%	8%
Capital Works Cost (CAPEX)	$ 5,957,067.73	$5,877,984.77	$5,706,558.57	$5,543,850.09
Operational Costs (OPEX)				
General O&M (1% Civil)	$ 687,660.42	$398,775.25	$316,394.91	$257,253.55
Mech/Elec Maintenance (3% of M/E Infrastructure)	$ 239,362.84	$138,806.85	$110,131.66	$89,545.56
TOTAL Option 5 (excl. GST)	**$ 6,884,090.99**	**$6,415,566.87**	**$6,133,085.14**	**$5,890,649.20**

Project: 1770 Low Pressure Sewer System Option and Cost Review
Job Number: 42-20430
Title: Net Present Value - Options Assessment

	($)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital Works Cost (CAPEX)	$ 298,888.74	$ 82,458.00	$ 27,980.75	$ 28,484.40	$ 38,662.83	$ 29,519.07	$ 30,050.41	$ 30,591.32	$ 31,141.96	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 1 (excl. GST)	**$ 298,888.74**															
Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 2,605,199.12	$ 154,125.20	$ 67,775.59	$ 89,251.12	$ 59,283.00	$ 64,504.63	$ 140,457.85	$ 84,975.89	$ 108,650.85	$ 37,573.36	$ 49,724.58	$ 132,389.78	$ 71,350.30	$ 96,846.14	$ 41,078.91	$ 54,363.82
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 2 (excl. GST)	**$ 2,605,199.12**															
Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 1,423,538.26	$ 82,458.00	$ 27,980.75	$ 28,484.40	$ 38,662.83	$ 64,504.63	$ 72,788.78	$ 74,098.97	$ 97,578.15	$ 22,544.01	$ 38,249.68	$ 35,044.35	$ 11,891.72	$ 12,105.77	$ 16,431.56	$ 54,363.82
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 3 (excl. GST)	**$ 1,423,538.26**															
Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 747,710.55	$ 82,458.00	$ 27,980.75	$ 28,484.40	$ 38,662.83	$ 29,519.07	$ 30,050.41	$ 30,591.32	$ 31,141.96	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,818.33
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 3 (excl. GST)	**$ 747,710.55**															
Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 10 years)	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 2,340,281.83	$ 467,458.00	$ 42,980.75	$ 43,484.40	$ 58,662.83	$ 92,624.22	$ 103,815.66	$ 105,414.34	$ 137,491.72	$ 30,998.02	$ 52,593.30	$ 48,185.99	$ 16,351.11	$ 16,645.43	$ 22,593.40	$ 74,750.26
Operational Costs (OPEX)	$ 1,942,186.97	$ 48,916.00	$ 51,115.00	$ 53,341.47	$ 56,242.56	$ 58,529.92	$ 60,846.96	$ 63,194.41	$ 65,573.04	$ 65,984.11	$ 66,402.59	$ 66,828.59	$ 67,262.27	$ 67,703.75	$ 68,153.17	$ 68,610.69
TOTAL Option 4 (excl. GST)	**$ 4,282,468.81**															
Option 4-20YR - Council to take over O&M of the low pressure sewer systems (pump replacement 20 years)	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 1,411,018.73	$ 467,458.00	$ 42,980.75	$ 43,484.40	$ 58,662.83	$ 44,519.07	$ 45,050.41	$ 45,591.32	$ 46,141.96	$ -	$ -	$ -	$ -	$ -	$ -	$ 57,500.20
Operational Costs (OPEX)	$ 1,942,186.97	$ 48,916.00	$ 51,115.00	$ 53,341.47	$ 56,242.56	$ 58,529.92	$ 60,846.96	$ 63,194.41	$ 65,573.04	$ 65,984.11	$ 66,402.59	$ 66,828.59	$ 67,262.27	$ 67,703.75	$ 68,153.17	$ 68,610.69
TOTAL Option 4 (excl. GST)	**$ 3,353,205.71**															
Option 4B - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 2,324,156.96	$ 550,526.80	$ 42,980.75	$ 43,484.40	$ 58,662.83	$ 79,504.63	$ 87,788.78	$ 89,098.97	$ 112,578.15	$ 22,544.01	$ 38,249.68	$ 147,478.32	$ 16,351.11	$ 16,645.43	$ 22,593.40	$ 59,068.39
Operational Costs (OPEX)	$ 870,157.66	$ 21,220.25	$ 22,225.67	$ 23,248.50	$ 24,353.63	$ 25,413.79	$ 26,492.74	$ 27,590.95	$ 28,708.91	$ 28,969.26	$ 29,234.29	$ 29,504.10	$ 29,778.76	$ 30,058.36	$ 30,343.00	$ 30,632.76
TOTAL Option B1 (excl. GST)	**$ 3,194,314.62**															
Option 4B-20YR - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 1,648,329.25	$ 550,526.80	$ 42,980.75	$ 43,484.40	$ 58,662.83	$ 44,519.07	$ 45,050.41	$ 45,591.32	$ 46,141.96	$ -	$ -	$ 112,433.97	$ 4,459.39	$ 4,539.66	$ 6,161.84	$ 46,522.89
Operational Costs (OPEX)	$ 870,157.66	$ 21,220.25	$ 22,225.67	$ 23,248.50	$ 24,353.63	$ 25,413.79	$ 26,492.74	$ 27,590.95	$ 28,708.91	$ 28,969.26	$ 29,234.29	$ 29,504.10	$ 29,778.76	$ 30,058.36	$ 30,343.00	$ 30,632.76
TOTAL Option B1 (excl. GST)	**$ 2,518,486.91**															
Option 5 - New Gravity Sewerage Scheme	**Total Cost ($)**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Capital Works Cost (CAPEX)	$ 5,957,067.73	$ 2,978,533.87	$ 2,978,533.87													
Operational Costs (OPEX)																
General O&M (1% Civil)	$ 687,660.42			$ 20,003.43	$ 20,363.50	$ 20,730.04	$ 21,103.18	$ 21,483.04	$ 21,869.73	$ 22,263.39	$ 22,664.13	$ 23,072.08	$ 23,487.38	$ 23,910.15	$ 24,340.54	$ 24,778.67
Mech/Elec Maintenance (3% of M/E Infrastructure)	$ 239,362.84			$ 6,962.85	$ 7,088.19	$ 7,215.77	$ 7,345.66	$ 7,477.88	$ 7,612.48	$ 7,749.50	$ 7,889.00	$ 8,031.00	$ 8,175.56	$ 8,322.72	$ 8,472.52	$ 8,625.03

Project: 1770 Low Pressure Sewer System Option and Cost Review
Job Number: 42-20430
Title: Net Present Value - Options Assessment

	($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 298,888.74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 1 (excl. GST)	**$ 298,888.74**														

Option 2 - Property owners retain responsibility for O&M infrastructure located within property, however Council repair/replace faulty pumps provided they have seen more than 5 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 2,605,199.12	$ 144,741.59	$ 78,007.20	$ 105,881.78	$ 44,911.52	$ 59,435.91	$ 158,245.81	$ 85,285.19	$ 115,760.43	$ 49,101.71	$ 64,981.21	$ 173,009.97	$ 93,242.20	$ 126,560.74	$ 53,682.85
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 2 (excl. GST)	**$ 2,605,199.12**														

Option 3 - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 10 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 1,423,538.26	$ 63,856.58	$ 65,006.00	$ 92,646.56	$ 26,946.91	$ 45,719.93	$ 41,888.60	$ 14,214.20	$ 14,470.05	$ 19,640.69	$ 64,981.21	$ 76,327.93	$ 77,701.83	$ 110,740.65	$ 32,209.71
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 3 (excl. GST)	**$ 1,423,538.26**														

Option 3-20YR - Property owners retain responsibility for O&M infrastructure located within property, however Council will repair/replace any faulty pumps provided they have seen more than 20 years of service. Council will continue to operate and maintain infrastructure outside of property boundary.	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 747,710.55	$ 51,085.27	$ 52,004.80	$ 79,411.33	$ 26,946.91	$ 45,719.93	$ 41,888.60	$ 14,214.20	$ 14,470.05	$ 19,640.69	$ 14,995.66	$ 15,265.59	$ 15,540.37	$ 15,820.09	$ -
Operational Costs (OPEX)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL Option 3 (excl. GST)	**$ 747,710.55**														

Option 4 - Council to take over O&M of the low pressure sewer systems (pump replacement 10 years)	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 2,340,281.83	$ 87,802.80	$ 89,383.25	$ 127,389.01	$ 37,052.00	$ 62,864.90	$ 57,596.82	$ 19,544.52	$ 19,896.32	$ 27,005.94	$ 89,349.16	$ 104,950.90	$ 106,840.02	$ 152,268.39	$ 44,288.35
Operational Costs (OPEX)	$ 1,942,186.97	$ 69,076.44	$ 69,550.58	$ 70,033.24	$ 70,524.60	$ 71,024.80	$ 71,534.01	$ 72,052.38	$ 72,580.08	$ 73,117.28	$ 73,664.15	$ 74,220.87	$ 74,787.60	$ 75,364.54	$ 75,951.86
TOTAL Option 4 (excl. GST)	**$ 4,282,468.81**														

Option 4-20YR - Council to take over O&M of the low pressure sewer systems (pump replacement 20 years)	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 1,411,018.73	$ 70,242.24	$ 71,506.60	$ 109,190.58	$ 37,052.00	$ 62,864.90	$ 57,596.82	$ 19,544.52	$ 19,896.32	$ 27,005.94	$ 20,619.04	$ 20,990.18	$ 21,368.00	$ 21,752.63	$ -
Operational Costs (OPEX)	$ 1,942,186.97	$ 69,076.44	$ 69,550.58	$ 70,033.24	$ 70,524.60	$ 71,024.80	$ 71,534.01	$ 72,052.38	$ 72,580.08	$ 73,117.28	$ 73,664.15	$ 74,220.87	$ 74,787.60	$ 75,364.54	$ 75,951.86
TOTAL Option 4 (excl. GST)	**$ 3,353,205.71**														

Option 4B - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 2,324,156.96	$ 68,645.83	$ 69,881.45	$ 97,609.76	$ 26,946.91	$ 45,719.93	$ 176,281.18	$ 19,544.52	$ 19,896.32	$ 27,005.94	$ 70,604.58	$ 82,052.52	$ 83,529.47	$ 116,673.18	$ 32,209.71
Operational Costs (OPEX)	$ 870,157.66	$ 30,927.73	$ 31,228.02	$ 31,533.71	$ 31,844.90	$ 32,161.70	$ 32,484.19	$ 32,812.50	$ 33,146.71	$ 33,486.93	$ 33,833.28	$ 34,185.87	$ 34,544.80	$ 34,910.20	$ 35,282.17
TOTAL Option B1 (excl. GST)	**$ 3,194,314.62**														

Option 4B-20YR - Council take over O&M of low pressure sewer system with Remote Monitoring (Reduce call out cost (1/3) due to moitoring and assistance with preventative maintence)	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 1,648,329.25	$ 55,874.51	$ 56,880.25	$ 84,374.54	$ 26,946.91	$ 45,719.93	$ 176,281.18	$ 19,544.52	$ 19,896.32	$ 27,005.94	$ 20,619.04	$ 20,990.18	$ 21,368.00	$ 21,752.63	$ -
Operational Costs (OPEX)	$ 870,157.66	$ 30,927.73	$ 31,228.02	$ 31,533.71	$ 31,844.90	$ 32,161.70	$ 32,484.19	$ 32,812.50	$ 33,146.71	$ 33,486.93	$ 33,833.28	$ 34,185.87	$ 34,544.80	$ 34,910.20	$ 35,282.17
TOTAL Option B1 (excl. GST)	**$ 2,518,486.91**														

Option 5 - New Gravity Sewerage Scheme	Total Cost ($)	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Capital Works Cost (CAPEX)	$ 5,957,067.73	$ 292,676.01													
Operational Costs (OPEX)															
General O&M (1% Civil)	$ 687,660.42	$ 25,224.68	$ 25,678.73	$ 26,140.94	$ 26,611.48	$ 27,090.49	$ 27,578.11	$ 28,074.52	$ 28,579.86	$ 29,094.30	$ 29,618.00	$ 30,151.12	$ 30,693.84	$ 31,246.33	$ 31,808.76
Mech/Elec Maintenance (3% of M/E Infrastructure)	$ 239,362.84	$ 8,780.28	$ 8,938.33	$ 9,099.22	$ 9,263.00	$ 9,429.74	$ 9,599.47	$ 9,772.26	$ 9,948.16	$ 10,127.23	$ 10,309.52	$ 10,495.09	$ 10,684.00	$ 10,876.31	$ 11,072.09

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
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