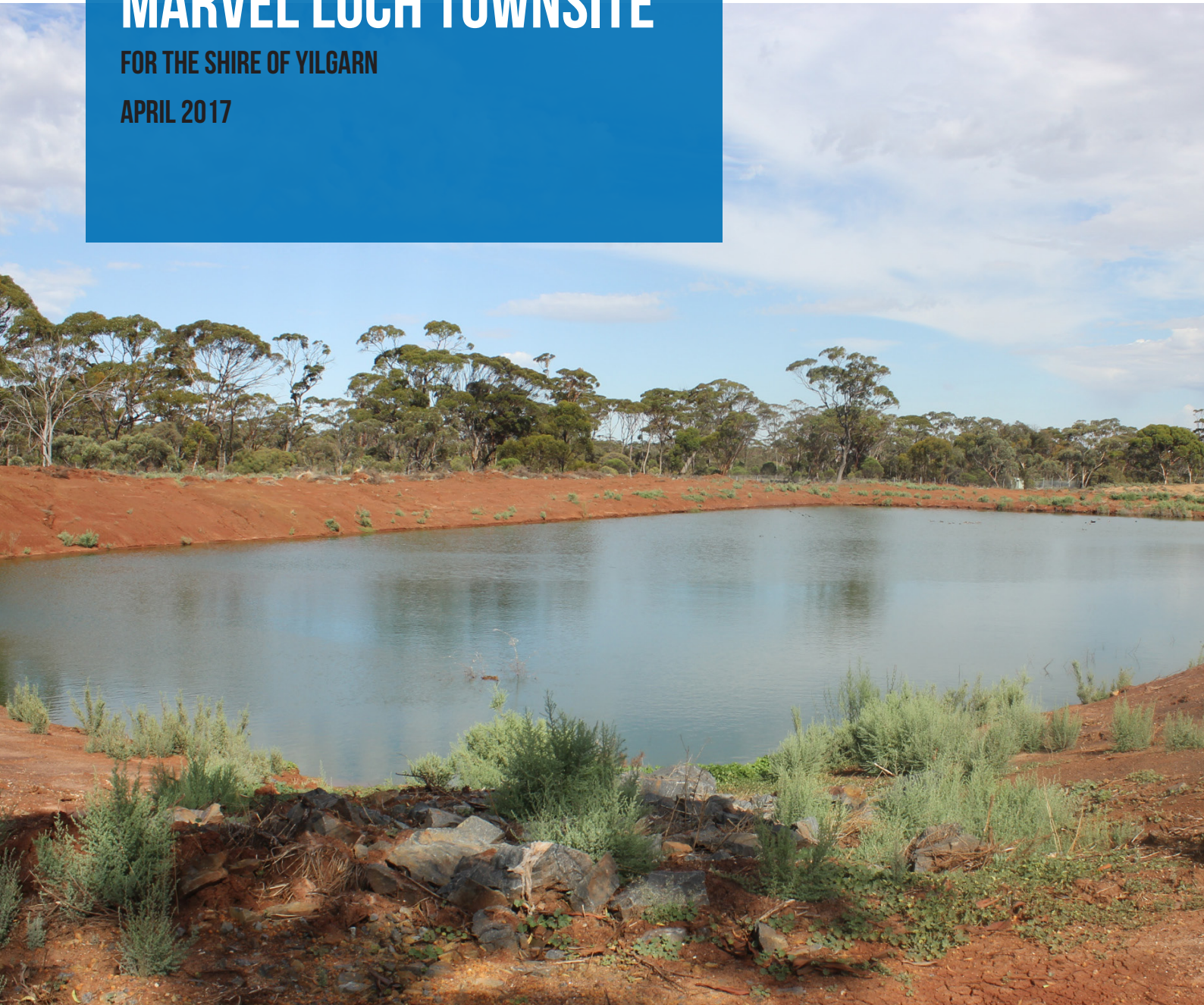


ASSET CONDITION REPORT MARVEL LOCH TOWNSITE

FOR THE SHIRE OF YILGARN

APRIL 2017



Document Controls

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1 INTRODUCTION

1.1 Background

In 1985, the Shire of Yilgarn installed a semi-deep sewer scheme in the Marvel Loch townsite. This enabled most properties to connect to the scheme while also using on-site septic tanks on each property. The effluent disposal scheme consists of 5.691 km of combined gravity and rising mains reticulated sewage pipes, two collection and pump stations (one located on Lenneberg Street and the other on Overington Street), plus a series of three evaporation ponds located north of the townsite off the Old Marvel Loch Road.

There are several mining camps connected to the sewage system ranging from 24 beds up to 96 beds, as well as a pub, corner store, commercial and residential properties.

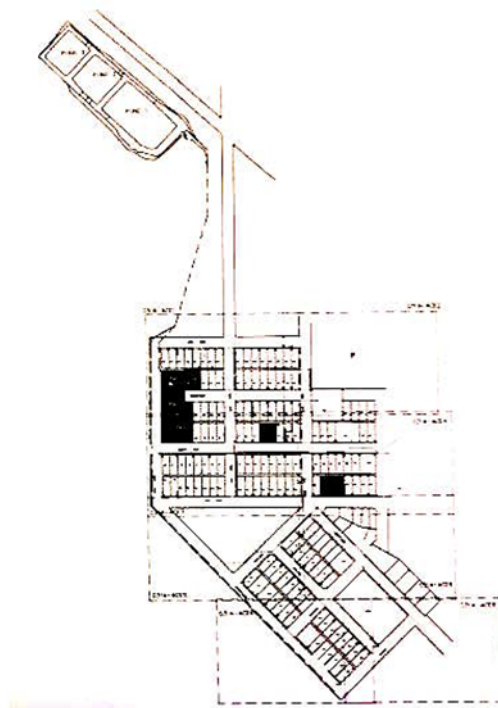


Figure 1: Marvel Loch townsite sewer scheme

1.2 Document Purpose

The Shire seeks to obtain the following:

- A detailed condition report on all aspects of the Marvel Loch sewer system, including:
 - Access chambers
 - Gravity mains
 - Pressure mains
 - Sewerage pump stations
- An updated asset register and financial plan taking into consideration the condition report
- A report detailing any improvements or changes that may be made to the sewer system and an explanation as to the efficiencies in operation and expenditure the improvements will bring
- Comments on alternate options, if any, to the current semi-deep sewer system, including onsite treatment (leach drain) systems or other options within the townsite.

1.3 Location

Marvel Loch is a small mining townsite some 33 km south-east of Southern Cross, with Southern Cross being approximately a 370 km drive from Perth.

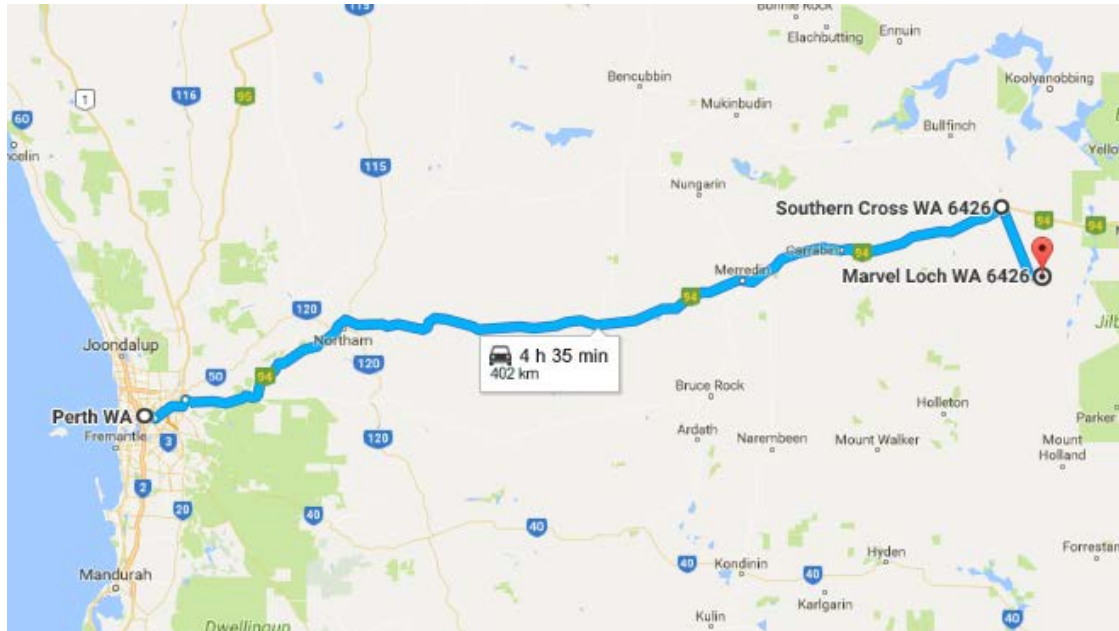


Figure 2: Location of Marvel Loch from Perth

2 CONDITION ASSESSMENT

2.1 General

The Standard Asset Condition Ranking table (refer Table 1) will be used as the condition ranking system of all assets.

Table 1: Standard asset condition rankings

Ranking	Description of Condition
1	Very Good Condition
	Only normal maintenance required
2	Minor Defects Only
	Minor maintenance required (5%)
3	Maintenance Required to Return to Accepted Level of Service
	Significant maintenance required (10% to 20%)
4	Requires Renewal
	Significant renewal/upgrade required (20% to 40%)
5	Asset Unserviceable
	Over 50% of asset requires replacement

2.2 Sewer Gravity Network

River Engineering have undertaken a site inspection and document investigation to determine the condition of the Marvel Loch town sewer network, pumping stations and wastewater treatment ponds (WWTP) to compile a detailed Asset Condition Report.

The investigation was comprised visual inspection of all assets and the flow path. During the site visit, the access chamber manholes could not be lifted and inspection openings could not be found, therefore access to the gravity sewers and access chambers could not be achieved.

2.2.1 Gravity Sewer

From the gravity sewer route walk, there is no evidence of any blockage resulting in the overflow of sewage. There may have been some evidence of infiltration around Access Chamber 1A18 which will need further investigation (refer to Figure 6 below).

2.2.2 Access Chambers

Each access chamber was inspected and recorded with the overall visual inspection of the access chamber lid. Generally, each lid appeared to be in good condition with the exception of a small number of damaged chambers as shown in Table 2 below.

Table 2: Condition of asset chambers

Asset No	Street/Lot Location	Dimensions		Condition	
		Diameter mm	Photo Ref *	Ranking	Comment
AC1A1	At Pump Station PW001 on Lenneberg Street	1040	1896 to 1818	1	
AC1A2	Directly E of 1A1 on Clough Street	1040	1945 1946	1	
AC1A3	Directly N of 1A2 on Clough Street	1040	1947 1948	1	
AC1A4	Directly N of 1A3 on Clough Street	1040	1949 1950	1	
AC1A5	Directly N of 1A4 on Clough Street	1040	1951 1952	3	Cover surround damaged
AC1A6	In ROW S of L110 Horan Street	1040	1953 1954	1	
AC1A7	In middle of L203 Lenneberg Street W of A8	1040	1955 1956 1957 1958	1	Manhole inside camp site with discharge directly into manhole
AC1A8	In ROW E of A7 S of L75/74 Williamson Street	1040	1960 1961	1	
AC1A9	E of A8 in line with ROW in Aurum Street	1040	1962 1963	1	Unable to locate
AC1A10	Corner Aurum and Williamson Streets outside L89	1040	1965 1966	1	
AC1A11	N of A10 in line with ROW in Aurum Street	1040	1967 1968	1	
AC1A12	Corner Aurum and Horan Streets outside L104 Horan St	1040	1969 1970	1	
AC1A13	E of A11 in ROW N of L91 Williamson Street	1040	1971 1972	1	
AC1A14	Corner Argent and Williamson Streets outside L196 Argent St	1040	1973 1974	1	
AC1A15	Directly S of 1A14 in line with ROW in Argent Street	1040	1975 1976		Not able to locate
AC1A16	S of 1A15 corner Lenneberg and Argent Streets o/side L129	1040	1977 1978		Not able to locate
AC1A17	Directly S of A9 in line with ROW o/side L152 King Street	1040	1980 1981	3	Cover surround damaged
AC1A18	E of A17 in ROW N of L147 King Street	1040	1982 1983 1986 1987 1988 1989	4	Not able to locate Suspect chamber collapsed
AC1A19	E of A18 in ROW N of 143 King Street	1040	1984 1985		Not able to locate
AC1A20	E of A9 in ROW N of L58 Lenneberg Street	1040			Not able to locate
AC1A21	E of A9 in ROW N of L63 Lenneberg Street	1040			Not able to locate
AC1A22	S of 1A2 in Clough Street in line with ROW	1040		1	

Asset No	Street/Lot Location	Dimensions		Condition	
		Diameter mm	Photo Ref *	Ranking	Comment
AC1A23	N of 1A12 in Aurum Street N of Horan Street	1040	1892 1893 1894 1895	1	The previous asset register does not match the access chamber drawing (drawing number 0214/ACE1). The access chamber drawing takes precedence.
AC1B1	At Pump Station PS2 corner Overington and Lee Streets	1040	1922 to 1939 1991 1992	1	
AC1B2	NE of PS2 on corner Overington and Lee Streets o/side L185	1040	1993 1994	1	
AC1B3	NW of B2 corner Overington and Ronchi Streets o/side L25	1040	1995 1996	1	
AC1B4	NW of 1B3 on Overington Street outside L28	1040	1997 1998	1	
AC1B5	W of 1B4 on Overington Street outside L29	1040	1999 2000	1	
AC1B6	NE of B2 on Lee Street in line with ROW o/side L185	1040	2001 2002	2	Minor erosion
AC1B7	NW of B6 on Ronchi Street in line with ROW o/side L25	1040	2003 2004	1	
AC1B8	NW of 1B7 in ROW N or L30 Overington Street	1040	2005 2006	1	
AC1B9	NE of 1B7 corner Ronchi and Oxide Streets o/side L9	1040	2007 2008	2	Minor damage
AC1B10	NW of 1B9 corner Cheney and Oxide Streets o/side L16	1040	2009 2010	1	
AC1B11	NE of 1B10 on Cheney Street in line with ROW o/side L1	1040	2011 2012	1	
AC1B12	NE of 1B9 on Ronchi Street in line with ROW o/side L8	1040	2013 2014	3	Minor erosion
ACOB13	NE of B6 corner Lee and Oxide Streets o/side L200	1040	2015 to 2019	2	Potential erosion
AC1B14	NE of 1B11 corner Burbidge and Cheney Streets o/side L1	1040	2021 2022	1	
AC1B15	E of 1B14 N side of Burbidge St o/side L207	1040	2023 2024	1	
AC1B16	SE of 1B15 on Burbidge Street o/side L207/217	1040	2025 2026	1	
AC1B17	NE of 1B16 at side of L207 Burbidge Street	1040	2027	1	
AC1B18	EES of 1B17 at rear of L215 Burbidge Street	1040	2028	1	

* Photos of each asset will be submitted to the Shire as a separate folder and will not be incorporated into this report.



Figure 3: Access Chamber AC1A5 needs replacing



Figure 4: Evidence of no pretreatment (i.e. septic tanks) of waste within camp at AC1A7



Figure 5: Overflow from camp water tank eroding around AC1B13



Figure 6: AC1A18 could not be found. Evidence of erosion in area

2.3 Pump Stations and Pressure Main

A visual inspection of the pumping station structure, pressure main and overflow tanks was completed. Where possible, the flow, pressure, pump flow characteristics and motor details were noted. Operational data of motor current and voltage was recorded enabling the operational condition of the pumps to be determined.

The following instrumentation is used for the testing the pumps:

- FLUKE 83 III Multimeter - Voltage
- FLUKE 39 Power Meter - Running Current
- FLUKE 80i-500s AC Current Probe
- TECLOCK Tachometer "H".

Some of the information for the pumps was no longer available due to the age of the installation. In this instance, the information for the current model of the same size was used for the analysis.

With respect to the pressure main and overflow tanks, a visual investigation was completed from the surface with no apparent damage to the system encountered.

2.3.1 Pump Station

Operational data of motor current and voltage was recorded enabling the operational condition of the pumps to be determined. Pump details and operating points are contained in Appendix A4 below.

From this, we determined the pumps are operating at their respective design duties and are in good condition.

The pumping stations photograph reference as follows (note these will be provided as a separate folder to this report):

- IMG 1896 to 1918 PS1 (PW001)
- IMG 1822 to 1936 PS2 (PW002).

Findings from these inspections are described in the tables below.

Table 3: Wet well inspection findings

Asset No	Street/Lot Location	Dimensions		Volume
		Diameter m	Depth m	
PW001	Lot 1	1.5	4.0	7.069 m ³
	Lenneberg Street			
PW002	UCL	1.5	4.0	7.069 m ³
	Overington Street			

Table 4: Pump set inspection findings

Asset No	Type	Make	Model	KW Rating	Flow Capacity
PS001	Pump 1 PW001	Flygt	NP3127.160 SH246	7.4 Kw	19Lts/sec
PS002	Pump 2 PW001	Flygt	NP3127.160 SH246	7.4 Kw	19Lts/sec
PS003	Pump 1 PW002	Flygt	3102-170 HT	4.4 Kw	4.1Lts/sec *
PS004	Pump 2 PW002	Flygt	3102-170 HT	4.4 Kw	4.1Lts/sec *

* This differs from the flowrate provide in the previous asset report but after further investigation is deemed correct based on the pump curve provided in figure 7 below.

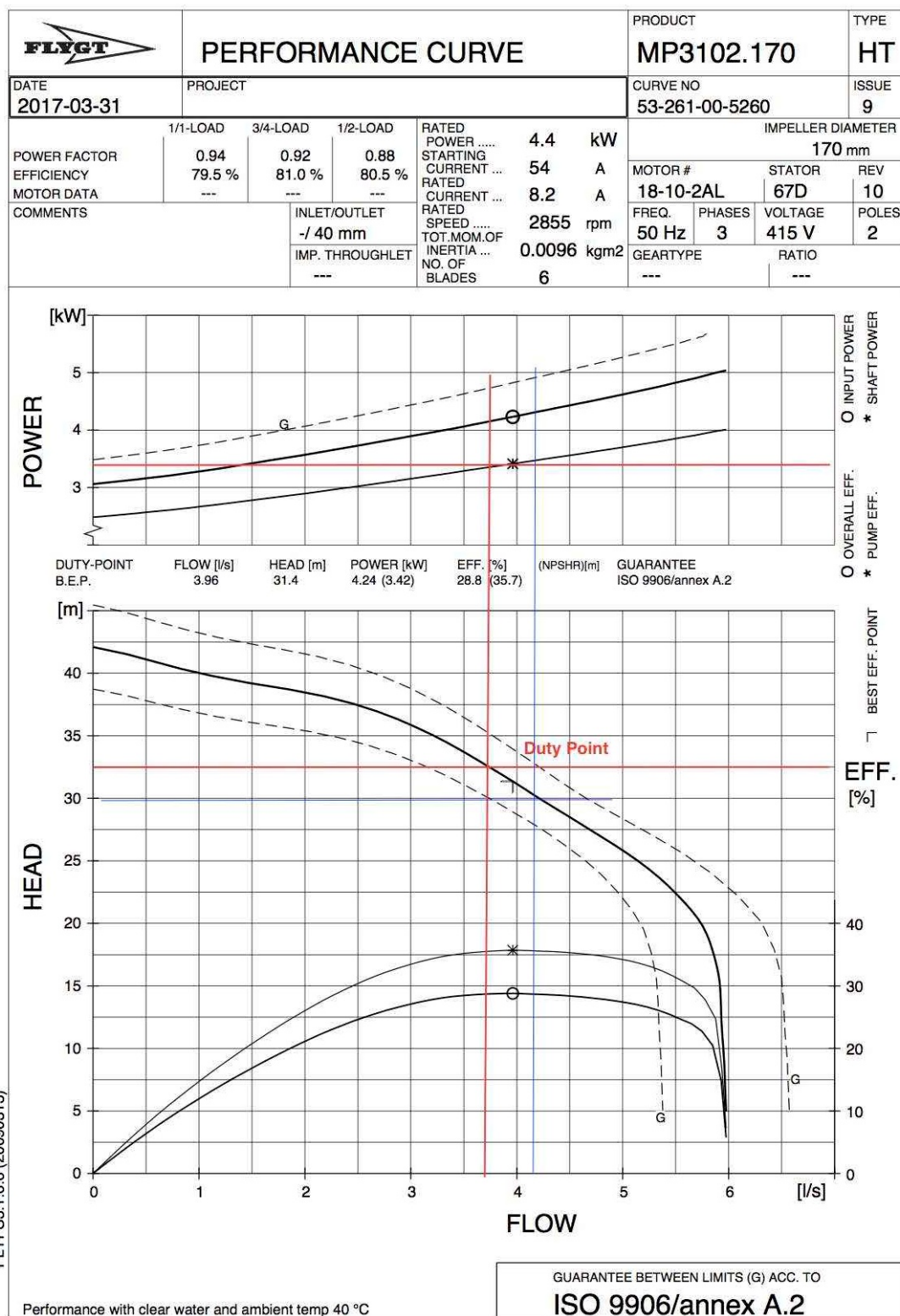


Figure 7: Pump curve of PW002 (PS2)

Table 5: Motor controls inspection findings

Asset No	Type	Make	Model
MC001	Auto/Manual	James Reid Electric Controls Pty Ltd	Standard Duplex Control Panel
MC002	Auto/Manual	James Reid Electric Controls Pty Ltd	Standard Duplex Control Panel

2.3.1.1 Pumping Station PW001

This pumping station is in good condition and structurally sound. Minor repairs to the fence are required. Comments on this inspection are provided in Table 6 below.

Table 6: Pumping Station PW001 inspection findings

Item	Description	Condition	Comments
1	Pump chamber	1	Good condition
2	Pump chamber covers	1	Good condition
3	Guide rails	1	Good condition
4	Pumps	1	Pump 1 is running current well with no excessive vibration. Pump 2 is currently out of services with a tag stating it is due for replacement of a check valve. It is assumed that Pump 2 is functioning correctly. This can be reviewed once the check valve is replaced
5	Pipework and valves	2	Appears in good condition. Pump 2 check valve needs replacing
6	Control panel	2	Isolator door interlock needs replacing. High level alarm not functioning
7	Fence	2	Good condition Needs minor maintenance and tightening
8	Potable water supply	1	Good condition. Backflow prevention device needs servicing (last stamped June 2015)
9	Access	1	Good condition and sound

2.3.1.2 Pumping Station PW002

PW002 is currently being upgraded. The pumping station requires the following work to be completed, as commented in Table 7 below.

Table 7: Pumping Station PW002 inspection findings

Item	Description	Condition	Comments
1	Pump chamber	1	Good condition
2	Pump chamber covers	Works in progress	Wet well cover to be replaced with wooden board currently secured
3	Guide rails	Works in progress	Both pumps need new guide rails. Currently operating with one submersible pump hanging from a chain
4	Pumps	1	Please note that according to the pump curves in Appendix A5, the pump flow rate is 3.7l/sec not 15l/sec as stated
5	Pumps	1	Pump 1 is running well with no excessive vibration
6	Pipework and valves	Works in progress	Pressure main discharge temporary main to be reconfigured once new guide rails installed and pumps operating again. Currently the pressure main area is within an open trench which will need backfilling
7	Control panel	2	Operational. Isolator door interlock needs replacing. Internal wiring needs to be tidied up. High level alarm not functioning
8	Fence	1	Good condition
9	Potable water supply	1	Good condition. Backflow prevention device needs servicing (last stamped June 2015)
10	Access	1	Good condition and sound

2.3.2 Pressure Main

The Pressure Mains is in good condition.

The pressure main from PW001 (PS1) entering the wastewater treatment ponds has been upgraded with two pipe materials now installed. To identify both pipe materials, we have added asset no RM0004A to Table 8 below.



Figure 8: Pressure main entering wastewater treatment ponds

There is currently work being undertaken at PW002 (PS2) where a temporary bypass has been installed externally to the wet well. Once this work is complete, the bypass should be removed reverting back to the original set-up with the trench backfilled.



Figure 9: Temporary pressure main bypass at PW002 (PS2)

Table 8: Condition of pressure main

Asset No	Street/Lot Location	Dimensions		Material	Condition Ranking	Comments
		Diameter mm	Length m			
RM0001	From Pump Station No 1 to W end of Horan Street	110	251.0	HDPE	1	
RM0002	From W end of Horan Street new to N of IS.2 W of 1A21 (P1)	110	102.5	HDPE	1	
RM0003	From N of IS.2 W of 1A21 to just E of sewage ponds	100	~ 530.0	UPVC	1	
RM0004	From just E of sewage ponds new to pond fence	110	100.5	HDPE	1	
RM0004a	From sewage ponds fence to Pond No 1	100	20	uPVC	2	Inadequate pipe supports. Flowmeter should be installed at a lower part of the pressure main to ensure that 100% of the pipe is flooded

Asset No	Street/Lot Location	Dimensions		Material	Condition Ranking	Comments
		Diameter mm	Length m			
RM0005	From Pump Station No 2 to Pump Station No 1	63	841.0	HDPE	1	Bypass to be removed and reverted back to the original design with backfilling of the trench
RM0006	Within Pump Station No 1 new P1 between P2 and RM0001	110	14.4	HDPE	1	
RM0007	Within Pump Station No 1 new P2 between P1 and RM0005	63	15.3	HDPE	1	

2.4 Wastewater Treatment Ponds

The Wastewater Treatment Ponds (WWTP), comprising primary, secondary and tertiary ponds and reuse system, were visually inspected. Where available, operational data was collected and OH&S requirements checked. A visual inspection of the reuse equipment and pumping system was undertaken. Where possible the flow, pressure, pump flow characteristics and motor details were noted.

Before we can assess the condition of the asset, it is necessary to determine basic data on the system. The Marvel Loch townsite semi-deep sewer scheme enables most properties to connect to the scheme, while also using onsite septic tanks to remove solids.

The WWTP comprises a series of three evaporation ponds which appear to be working satisfactorily. There is no evidence of wastewater overflowing any of the three ponds, with the tertiary pond appearing to be less than half full on the day of inspection. We therefore assume that the evaporation and infiltration volume of the WWTP is in excess of the incoming sewerage flow from the Marvel Loch townsite.

The ponds were inspected and detailed in photos IMG 1829 to 1891 and described in the following tables.

Table 9: Pond inspection findings

Primary Treatment Pond						
Asset No	Dimensions			Volume	Material	
	Length m	Width m	Depth m		Embankments	Liner
WT 001	85.0	42.5	1.35	4,876.9m ³	Clay earth	Nil

Secondary Pond						
Asset No	Dimensions			Volume	Material	
	Length m	Width m	Depth m		Embankments	Liner
WT 002	51.0	50.0	1.1	2,805.0m ³	Clay earth	Nil

Tertiary Pond						
Asset No	Dimensions			Volume	Material	
	Length m	Width m	Depth m		Embankments	Liner
WT 003	44.5	44.5	1.1	2,178.2 m ³	Clay earth	Nil

Table 10: Fence inspection findings

Asset No	Type	Height	Gates Width	Lock Type
WT 004	Linkmesh	2.2 m	3.6 m	Padlock

The asset is generally operational and in fair condition. Some maintenance is required to ensure it remains in a good and safe working condition, as commented in Table 11.

Table 11: Wastewater treatment pond condition and comments

Item	Description	Condition	Comments
1	Primary treatment pond inlet pipework	2	Inadequate pipe supports. Flowmeter should be installed at a lower part of the pressure main to ensure that 100% of the pipe is flooded
2	Primary Treatment Pond (1)	2	Good condition Trees and scrub needs removal and tank wall compacted
3	Pond 1/ 2 interconnecting pipework	4	Needs unblocking / replacement.
4	Pond 1/ 2 intermediate wall	4	Erosion due to overflowing- needs repair and compaction
5	Secondary Treatment Pond (2)	2	Good condition Trees and scrub needs removal and tank wall compacted
6	Pond 2/3 interconnecting pipework	4	Needs unblocking / replacement See below
7	Pond 2/3 intermediate wall	4	Needs repair and compaction See below
8	Tertiary Treatment Pond (3)	2	Good condition Trees and scrub needs removal and tank wall compacted
9	Tertiary treatment pond overflow	4	No overflow provided. Recommended to install overflow pipe or channel
10	Fence	2	Needs fallen trees removed, and minor maintenance and tightening
11	Gate	1	Good condition and locked
12	Access	2	Road good condition Access around tank needs compaction
13	Signage	4	No hazard signs on main gate or asset signage installed



Figure 10: Broken interconnecting pipe between primary and secondary ponds



Figure 11: Erosion between primary and secondary ponds



Figure 12: Blocked pipes between secondary and tertiary ponds



Figure 13: Access around all ponds need compacting/grading



Figure 14: Damage to pond fencing

2.5 Effluent Reuse

The effluent reuse system has been abandoned and much of the equipment removed.

Table 12: Effluent reuse inspection findings and comments

Item	Description	Condition	Comments
1	Reuse chlorine storage shed	1	Shed in good condition
2	Reuse chlorine storage shed equipment	5	Equipment missing
3	Reuse filtration shed	2	Shed in good condition Door needs replacing Lighting functioning
4	Reuse chlorine dosing equipment	5	Equipment missing
5	Reuse pumping equipment	5	Equipment not operational
6	Access	1	Road good condition
7	Signage	2	Faded and needs replacing



Figure 15: Reuse filtration shed

3 LIST OF IMPROVEMENTS

The township has adopted a Septic Tank Effluent Disposal (STED) scheme where each lot has a septic tank (owned and maintained by the lot owner/resident) with the leachate from each tank discharging into the Local Authorities Sewer scheme where it is pumped to evaporation ponds.

We have considered several alternative options to this STED scheme as follows;

3.1 Individual Leach Drains

The first option considered was for each lot installed with a septic tank, together with any future lots, would require their own leach drains system installed. This will enable the current gravity sewers, pump stations and evaporation ponds to be decommissioned and the responsibility of the system maintenance to transfer to the lot owners/residents.

There will be considerable opposition from the lot owners with such a proposal due to the cost and inconvenience associated with the installation of the leach drain system. Due to the poor infiltration of the soils in the region the size of the leach drains will be quite excessive and may not be achievable on some lots or even if this is possible, the removal of structures (i.e. sheds) may be required.

The individual leach drain option is not recommended.

3.2 Combined Leach Drains

The second option considered is similar to the individual leach drain option above with the exception that the leach drains will be combined for the whole townsite and therefore, be the responsibility of the Local Authority.

There will be two combined leach drains located in the vicinity of the current pump stations. Therefore, the current gravity sewer network is still required whereas the pump stations and evaporation ponds can be decommissioned.

A large area will be required for each leach drain due to the poor infiltration rate of the soil. This will increase the capital cost for the construction of such a system.

The advantage is that the sewer scheme infrastructure is reduced which will present a reduction in operation and maintenance costs, for instance the proposed system will not require any power.

The risk of the proposed system is that the resident do not maintain their septic tank system. It could be said that this risk is also present with the current system, however, the current system has more ability to cope with solids within the evaporation ponds whereas the proposed system will be susceptible to leach drain blockages with a build up of solids.

Although there will be a reduced operation and maintenance cost of the combined leach drain option, the high capital cost associated with changing the system makes this option cost prohibitive. Therefore, this option is not recommended.

3.3 Preferred Option

Based on the two alternative options considered above we recommend the current STED system installed is the preferred way to treat Marvel Loch's wastewater.

3.4 Long Term Expenditure

Refer to Appendix B Financial Plan.

3.5 Most Efficient and Cost Effective System

3.5.1 Gravity Sewer and Access Chambers

There are a number of access chambers and inspection openings that have been covered over during the regrading of roads and laneways. It is recommended that these are located and readjusted so they are accessible in the future to reduce maintenance time if future blockages occur.

The access chamber covers are rusted to a point where it is very difficult to remove them without a crane. There is a benefit to remove all covers and grease the lid frames to make access easier. During this exercise, it will be worth inspection of the chambers and amending this report accordingly.

Damaged access chamber lids and erosion can be a problem for vehicles and pedestrians. Damaged lids should be replaced with erosion eradicated, and lid levels adjusted to mitigate the risk of damage to vehicles or pedestrians.

If access chambers need replacing, it will be more cost effective to replace these with maintenance shafts providing the following recommendations are not exceeded:

- Three consecutive maintenance shafts can be used on DN150 or DN225 sewer, providing the distance between access chambers of not greater than 400 m.

3.5.2 Pump Stations and Pressure Main

Warning signs should be installed on each pump station gate.

Refurbishment of pump station PW002 is to be completed as soon as possible to mitigate the risk of falling through the wooden wet well cover or closure of the open trench.

When the PW002 submersible pumps are scheduled for replacement, it is recommended these are changed to grinder/macerator type submersible pumps. This will mitigate the risk of blockage by pumping into the DN63 pressure main. This risk is increased with the camps appearing to be discharging raw sewerage into the sewer network (i.e. no septic tank pre-treatment), together with possible risk from the lack of septic tank maintenance within the township.

The two pump station pressure mains combine into one as it runs to the WWTP. Just before the DN63 pressure main from PW002 it connects into the main DN150 pressure main. It is recommended that a DN63 check valve is installed to provide greater security to the system as follows:

- Reduce the risk of PW001 pumping to PW002 in the event of the check valve within PW002 not operating correctly
- Reduce this risk of PW002 pump solids into the DN63 pressure main and blocking the pipe

- Reduce the risk of PW001 excessive sewerage contamination should the DN63 pressure main malfunction.

3.5.3 Wastewater Treatment Ponds

Warning signs to be installed at the access gates around the WWTP.

The balancing pipe between the ponds is eroded and should be repaired before serious erosion occurs which will undermine the pond structure.

Further grading and compaction is required around the site to reduce erosion risk and enable safe vehicle access around the ponds.

Vegetation should be removed around the balancing pipes and access tracks.

An overflow on the tertiary pond should be provided to enable the control of waste overflow should the pond become full. This can be done by either pipe or overland channel.

3.5.4 Effluent Reuse

The warning signs at the reuse plant location should be upgraded.

The current system is not in use as there does not seem to be a public open space within Marvel Loch that justifies the operational and maintenance expenditure of this infrastructure. Therefore, it is recommended that the equipment is removed, cleaned and stored for future local authority use. The power feed to the shed can then be disconnected.

If there is a need to improve public open spaces within Marvel Loch, then the system will need a complete overhaul including the installation of chlorination equipment to achieve the necessary approvals of using the reuse water.



APPENDIX A

Asset Management Register



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Sewer Pipes

Asset No	Street/Lot Location	Dimensions			Material	Pressure Rating	Grade 1:X	GPS Location		Construction Date	Replacement Value (\$) (2007)	Drawing No	Comments
		Diameter mm	Length from Centre to Centre of Access Chamber m	Depth m				East	North				
	Gravity Mains												
GP0001	Pump Station No 1 pump pit to 1A1	150	1.8		PVC					pre-Oct 93	\$1,000	16109A Diag 5 of 6	0-214 - ACE3
GP0002	from 1A1 to 1A2	150	30.2		PVC		27			Feb-95	\$6,000	16109A Diag 3 of 6	0-214 - ACE3
GP0003	from 1A2 to 1A3	150	28.1		PVC		26			Feb-95	\$6,000	16109A Diag 3 of 6	0-214 - ACE3
GP0004	from 1A3 to 1A4	150	87.2		PVC		35			Feb-95	\$13,000	16109A Diag 3 of 6	0-214 - ACE1
GP0005	from 1A4 to 1A5	150	57.3		PVC		115			Feb-95	\$6,000	16109A Diag 3 of 6	0-214 - ACE1
GP0006	from 1A5 to 1A6	100	61.8		PVC		269			Feb-95	\$3,000	16109A Diag 3 of 6	0-214 - ACE1
GP0007	from 1A6 to IS.2 N of L86	100	87.0		PVC		94			Feb-95	\$7,500	16109A Diag 3 of 6	0-214 - ACE1
GP0008	from A7 to A8	150	76.5		PVC					pre-Oct 93	\$13,000	16109A Diag 3 of 6	0-214 - ACE3
GP0009	from A8 to A9	150	64.3		PVC					pre-Oct 93	\$6,000	16109A Diag 3 of 6	0-214 - ACE3
GP0010	from A9 to end pipe N of L64	150	149.5		PVC					pre-Oct 93	\$17,000	16109A Diag 3 of 6	0-214 - ACE3
GP0011	from A9 to A10	150	77.4		PVC					pre-Oct 93	\$13,000	16109A Diag 3 of 6	0-214 - ACE1
GP0012	from A10 to A11	150	54.4		PVC					pre-Oct 93	\$6,000	16109A Diag 3 of 6	0-214 - ACE1
GP0013	from A11 to 1A12	150	58.5		PVC		366			Feb-95	\$6,000	16109A Diag 3 of 6	0-214 - ACE1
GP0014	from 1A12 to IS.1 N of L101	150	75.4		PVC		397			Feb-95	\$6,000	16109A Diag 3 of 6	0-214 - ACE1
GP0015	from IS.1 N of L101 to IS.2 N of L97	150	73.0		PVC		384			Feb-95	\$13,000	16109A Diag 3 of 6	0-214 - ACE1
GP0016	from 1A12 to 1A23	100	77.5		PVC		298			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE1
GP0017	from A11 to A13	150	49.3		PVC					pre-Oct 93	\$6,000	16109A Diag 3 of 6	0-214 - ACE1
GP0018	from A13 to pipe junction in ROW N of L96	150	98.0		PVC					pre-Oct 93	\$13,000	16109A Diag 3 of 6	0-214 - ACE1
GP0019	from pipe junction to just N of 1A14 Argent St	100	92.2		PVC					pre-Oct 93	\$6,500	16109A Diag 3 of 6	0-214 - ACE2
GP0020	from 1A14 to IS.1 heading W	100	97.1		PVC		294			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE1
GP0021	from IS.1 W of 1A14 to A10	100	95.5		PVC		298			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE1
GP0022	from 1A14 to 1A15	100	79.8		PVC		59			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE2,4
GP0023	from 1A15 to 1A16	100	79.0		PVC		46			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE4
GP0024	from 1A16 to IS.2 N of L136	100	147.3		PVC		295			Feb-95	\$7,500	16109A Diag 3 of 6	0-214 - ACE4
GP0025	from A9 to A17	150	133.7		PVC					pre-Oct 93	\$17,000	16109A Diag 3 of 6	0-214 - ACE3
GP0026	from A17 to A18	150	109.8		PVC					pre-Oct 93	\$13,000	16109A Diag 3 of 6	0-214 - ACE3
GP0027	from A18 to 1A19	100	116.1		PVC		44.8			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE3,4
GP0028	from 1A19 to IS.2	100	113.7		PVC		292			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE4
GP0029	from A9 to 1A20	150	10.2		PVC		9			Feb-95	\$2,000	16109A Diag 3 of 6	0-214 - ACE3
GP0030	from 1A20 to 1A3	150	46.2		PVC		92			Feb-95	\$6,000	16109A Diag 3 of 6	0-214 - ACE3
GP0031	from 1A21 to IS.2 N of Horan St	100	169.2		PVC		151			Feb-95	\$7,500	16109A Diag 3 of 6	0-214 - ACE3
GP0032	from 1A2 to 1A22	100	97.0		PVC		180			Feb-95	\$6,500	16109A Diag 3 of 6	0-214 - ACE3
GP0033	from 1A22 to IS.2 N of L153	100	149.3		PVC		38			Feb-95	\$7,500	16109A Diag 3 of 6	0-214 - ACE3
GP0034	from A11 across Aurum St to nowhere	150	22.0		PVC					pre-Oct 93	\$6,000	16109A Diag 3 of 6	
GP0035	Pump Station No 2 pump pit to B1	100	1.8		PVC					pre-Oct 93	\$1,000	16109A Diag 5 of 6	0-214 - ACE7
GP0036	from B1 to B2	100	28.8		PVC					pre-Oct 93	\$3,000	16109A Diag 2 of 6	0-214 - ACE7
GP0037	from B2 to IS.1 S of L189 heading NW	100	94.1		PVC		42			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0038	from IS.1 S of L189 to 1B3	100	99.0		PVC		45			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0039	from 1B3 to 1B4	100	83.0		PVC		231			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0040	from 1B4 to 1B5	100	4.0		PVC					pre-Oct 93	\$1,000	16109A Diag 2 of 6	0-214 - ACE7
GP0041	from 1B5 to end of pipe S of L32	100	57.1		PVC					pre-Oct 93	\$3,000	16109A Diag 2 of 6	0-214 - ACE7
GP0042	from B2 to B6	100	55.2		PVC					pre-Oct 93	\$3,000	16109A Diag 2 of 6	0-214 - ACE7
GP0043	from B6 to IS.1 N of L189 heading NW	100	94.1		PVC		41			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0044	from IS.1 N of L189 to 1B7	100	97.0		PVC		50			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0045	from 1B7 to 1B8	100	107.1		PVC		275			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0046	from 1B8 to IS.2	100	40.2		PVC		22			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE5
GP0047	from 1B7 to 1B9	100	81.3		PVC		26			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0048	from 1B9 to IS.1 S of L13 heading NW	100	94.1		PVC		276			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE6
GP0049	from IS.1 S of L13 to 1B10	100	73.9		PVC		273			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE5

Asset No	Street/Lot Location	Dimensions			Material	Pressure Rating	Grade 1:X	GPS Location		Construction Date	Replacement Value (\$) (2007)	Drawing No	Comments
		Diameter mm	Length from Centre to Centre of Access Chamber m	Depth m				East	North				
GP0050	from 1B10 to 1B11	100	56.8		PVC		284			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE5
GP0051	from 1B11 to IS.2	100	87.0		PVC		32			Feb-95	\$6,500	16109A Diag 2 of 6	0-214 - ACE6
GP0052	from 1B9 to 1B12 heading NE	100	56.8		PVC		19			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0053	from 1B12 to IS.2 S of L6 heading NW	100	46.8		PVC		94			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0054	from B6 to B13 heading NE	100	79.8		PVC					pre-Oct 93	\$6,500	16109A Diag 2 of 6	0-214 - ACE7
GP0055	from B13 to IS.2 S of L200 heading NW	100	29.2		PVC					pre-Oct 93	\$3,000	16109A Diag 2 of 6	0-214 - ACE7
GP0056	from 1B11 to 1B14	100	55.3		PVC		66			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0057	from 1B14 to 1B15	100	33.0		PVC		66			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0058	from 1B15 to 1B16	100	34.0		PVC		67			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0059	from 1B16 to 1B17	100	24.9		PVC		36			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0060	from 1B17 to 1B18	100	63.2		PVC		36			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0061	from 1B18 to IS.2 at the rear of L	100	23.5		PVC		36			Feb-95	\$3,000	16109A Diag 2 of 6	0-214 - ACE6
GP0062													
GP0063	TOTAL LENGTH GRAVITY MAINS =		4366.3										
GP0064													
GP0065													
GP0066													
Rising Mains													
RM0001	From Pump Station No 1 to W end of Horan St	110	251.0		HDPE	Class 9				pre-Oct 93	\$17,000	16109A Diag 3 of 6	0-214 - ACE3
RM0002	from W end of Horan St new to N of IS.2 W of 1A21 (P1)	110	102.5		HDPE	Class 9				Feb-95	\$13,000	16109A Diag 3 of 6	0314-AC06 SHT 6 OF 6
RM0003	from N of IS.2 W of 1A21 to just E of Sewage Ponds	100	~ 530.0		UPVC	Class 6				pre-Oct 93	\$30,000	16109A Diag 3 & 4 of	0314-AC06 SHT 6 OF 7
RM0004	from just E of Sewage Ponds new to Pond No 1	110	100.5		UPVC	Class 9				Feb-95	\$13,000	16109A Diag 4 of 6	0314-AC06 SHT 6 OF 8
RM0005	from Pump Station No 2 to Pump Station No 1	63	841.0		HDPE	Class 9				pre-Oct 93	\$45,000	16109A Diag 2 & 3 of	0-214 - ACE5, 7, 3
RM0006	Within Pump Station No 1 new P1 between P2 & RM0001	110	14.4		HDPE	Class 9				Feb-95	\$1,000	16109A Diag 5 of 6	0-214 - ACE3
RM0007	Within Pump Station No 1 new P2 between P1 & RM0005	63	15.3		HDPE	Class 9				Feb-95	\$1,000	16109A Diag 5 of 6	0-214 - ACE3
RM0008													
	TOTAL LENGTH OF RISING MAINS =		1324.7										

Access Chamber

Asset No	Street/Lot Location	Dimensions		Construction Materials			GPS Location		Construction Date	Replacement Value (\$) (2007)	Drawing No	Revised Drawing No
		Diameter mm	Depth m	Base	Liner	Cover	East	North				
AC01A1	At Pump Station PS1 on Lenneberg St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE3
AC01A2	Directly E of 1A1 on Clough St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE3
AC01A3	Directly N of 1A2 on Clough St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE3
AC01A4	Directly N of 1A3 on Clough St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE1
AC01A5	Directly N of 1A4 on Clough St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE1
AC01A6	In ROW S of L110 Horan St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE1
AC00A7	In middle of L203 Lenneberg St W of A8	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE3
AC00A8	In ROW E of A7 S of L75/74 Williamson St	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE3
AC00A9	E of A8 in line with ROW in Aurum St	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE3
AC0A10	Cnr Aurum & Williamson Sts outside L89	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE1
AC0A11	N of A10 in line with ROW in Aurum St	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE1
AC1A12	Cnr Aurum & Horan Sts outside L104 Horan St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE1
AC0A13	E of A11 in ROW N of L91 Williamson St	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE1
AC1A14	Cnr Argent & Williamson Sts outside L196 Argent St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE2
AC1A15	Directly S of 1A14 in line with ROW in Argent St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE4
AC1A16	S of 1A15 cnr Lenneberg & Argent Sts o/side L129	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE4
AC0A17	Directly S of A9 in line with ROW o/side L152 King St	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE3
AC0A18	E of A17 in ROW N of L147 King St	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE3
AC1A19	E of A18 in ROW N of 143 King St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE4
AC1A20	S of A7 in L203 Lenneberg St & E of 1A3	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE3
AC1A21	E of A20 in ROW N of L63 Lenneberg St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE3
AC1A22	S of 1A2 in Clough St in line with ROW	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE3
AC1A23	N of 1A12 in Aurum St N of Horan St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE1
AC00B1	At Pump Station PS2 cnr Overington & Lee Sts	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE7
AC00B2	NE of PS2 on cnr Overington & Lee Sts o/side L185	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE7
AC01B3	NW of B2 cnr Overington & Ronchi Sts o/side L25	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE7
AC01B4	NW of 1B3 on Overington St outside L28	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE7
AC01B5	W of 1B4 on Overington St outside L29	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE7
AC00B6	NE of B2 on Lee St in line with ROW o/side L185	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE7
AC01B7	NW of B6 on Ronchi St in line with ROW o/side L25	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE7
AC01B8	NW of 1B7 in ROW N or L30 Overington St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE5
AC01B9	NE of 1B7 cnr Ronchi & Oxide Sts o/side L9	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE6
AC1B10	NW of 1B9 cnr Cheney & Oxide Sts o/side L16	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE5
AC1B11	NE of 1B10 on Cheney St in line with ROW o/side L1	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE5
AC1B12	NE of 1B9 on Ronchi St in line with ROW o/side L8	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE6
AC0B13	NE of B6 cnr Lee & Oxide Sts o/side L200	1040		Concrete	Concrete	Concrete			pre-Oct-93	\$2,500	16109A Drg 6	0-214 - ACE7
AC1B14	NE of 1B11 cnr Burbidge & Cheney Sts o/side L1	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE4
AC1B15	E of 1B14 N side of Burbidge St o/side L207	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE6
AC1B16	SE of 1B15 on Burbidge St o/side L207/217	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE6
AC1B17	NE of 1B16 at side of L207 Burbidge St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE6
AC1B18	EES of 1B17 at rear of L215 Burbidge St	1040		Concrete	Concrete	Concrete			Feb-95	\$2,500	16109A Drg 6	0-214 - ACE6

Pump Station

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Wet Well

Asset No	Street/Lot Location	Dimensions		Volume	Set Point			Construction Materials			GPS Location		Construction Date	Replacement Value (\$) (2007)	Drawing No	Comments
		Diameter mm	Depth m		High Level	Pump On	Pump Off	Base	Liner	Cover	East	North				
PW001	Lot 1	1500	4.0	7.069 m3	1.15 m	0.800 m	0.300 m	Concrete	Concrete	Concrete			pre-Oct 93	\$2,000.00	16109A Diag 5 of 6	
	Lenneberg St														0214-ACE3	
	Marvel Loch															
PW002	UCL	1500	4.0	7.069 m3	1.15 m	0.800 m	0.300 m	Concrete	Concrete	Concrete			pre-Oct 93	\$2,000.00	0214-ACE7	
	Overington St															
	Marvel Loch															

Pump Sets

Asset No	Type	Make	Model	KW Rating	Flow Capacity	Construction Date/ Installation Date	Replacement Value (\$) (2007)	Drawing No	Comments
PS001	Pump Motor 1	Flygt	3127			pre-Oct 93	\$5,000.00	16109A Diag 5 of 6	Non-grinding pumps
PS002	Pump 1	Flygt	3127		20Lts/sec	pre-Oct 93	\$5,000.00	16109A Diag 5 of 6	Non-grinding pumps
PS001	Pump Motor 1	Flygt	NP3127.160 SH246	7.4 Kw	19Lts/sec	Oct-15	\$6,250.00	0214-ACE3	Non-grinding self-cleaning pumps 415 V; 50 Hz; 13 A; Rated Speed 2895 1/min; Pump 19L/sec
PS002	Pump 1	Flygt	NP3127.160 SH246	7.4 Kw	19Lts/sec	Oct-15	\$6,250.00	0314-AC05 SHT 6 OF 7	Non-grinding self-cleaning pumps 415 V; 50 Hz; 13 A; Rated Speed 2895 1/min; Pump 19L/sec
PS003	Pump Motor 2	Flygt	3102			pre-Oct 93	\$5,000.00		
PS004	Pump 2	Flygt	3102-170 HT	4.4Kw	4.1 Lts/sec	pre-Oct 93	\$5,000.00	0214-ACE7	
PS005	Pump 2 Spare	Flygt	3102-170 HT	4.4Kw	4.1 Lts/sec	2009	\$6,666.00	0314-AC05 SHT 6 OF 7	Non-grinding pump purchased Dec 09

Motor Controls

Asset No	Type	Make	Model	Rating	Construction Date/ Installation Date	Replacement Value (\$) (2007)	Drawing No	Comments
MC001	Auto/Manual	James Reid Electric Conctrols Pty Ltd	Standard Duplex Pump	415V/240V	pre-Oct 93	\$2,000.00		4 Floats (Alarm Top, Start Pump 2, Start Pump 1, Pumps Off
MC002	Auto/Manual	James Reid Electric Conctrols Pty Ltd	Standard Duplex Pump	415V/240V	pre-Oct 93	\$2,000.00		4 Floats (Alarm Top, Start Pump 2, Start Pump 1, Pumps Off

Appurtenances

Asset No	Asset Type	Description	Pipe Details			Construction Date/ Installation Date	Replacement Value (\$) (2007)	Drawing No	Comments
			Size mm	Material	Pressure Rating				
AP001	Valve	100 Diam CI 'John' Gate Valve	100	Cast Iron		pre-Oct 93	\$1,500.00		
AP001	Valve	100 Diam Ball Valve	100	PVC		04/4/08	\$	0314-AC05 SHT 6 OF 8	Gate valves (2) were replaced as brass ones considered leaky. Barrel
AP002	NRV	100 Diam CI 'John' Check Valve	100	CI		pre-Oct 93	\$1,500.00	0314-AC05 SHT 6 OF 9	
AP003	Valve	100 Diam CI 'John' Gate Valve	100	CI		pre-Oct 93	\$1,500.00	0314-AC05 SHT 6 OF 10	
AP004	NRV	100 Diam CI 'John' Check Valve	100	CI		pre-Oct 93	\$1,500.00	0314-AC05 SHT 6 OF 11	

Waste Water Treatment Plant

Street/Lot Location Reserve 40746 Lot 201 Old Marvel Loch Road, Marvel Loch

Land Title Marvel Loch Sewer Ponds

Primary Treatment Ponds

Asset No	Dimensions			Volume	Material		Inlet Pipe		Outlet Pipe		Replacement Value (\$) (2007)	Construction Date	Drawing No	Comments
	Length m	Width m	Depth m		Embankments	Liner	Size	Type	Size	Type				
WT001	85.0	42.5	1.35	4,876.9m3	Clay earth	Nil	110	HDPE	100	HDPE	\$250,000	pre-Oct 93	16109A Diag 4 of 6	
													0314-AC06 SHT 6 OF 6	

Primary Treatment Imhoff Tank - Nil

Asset No	Dimensions		Volume	Construction Material			Inlet Pipe		Outlet Pipe		Replacement Value (\$) (2007)	Construction Date	Drawing No	Comments
	Diameter m	Depth m		Outer Tank	Inner Tank	Walkways	Size	Type	Size	Type				
WT001	None													
WT002	None													

Secondary Ponds

Asset No	Dimensions			Volume	Material		Inlet Pipe		Outlet Pipe		Replacement Value (\$) (2007)	Construction Date	Drawing No	Comments
	Length m	Width m	Depth m		Embankments	Liner	Size	Type	Size	Type				
WT002	51.0	50.0	1.1	2,805.0m3	Clay earth	Nil	100	HDPE	100	HDPE	\$100,000	pre-Oct 93	16109A Diag 4 of 6	
													0314-AC06 SHT 6 OF 6	

Tertiary Ponds

Asset No	Dimensions			Volume	Material		Inlet Pipe		Outlet Pipe		Replacement Value (\$) (2007)	Construction Date	Drawing No	Comments
	Length m	Width m	Depth m		Embankments	Liner	Size	Type	Size	Type				
WT003	44.5	44.5	1.1	2178.2 m3	Clay earth	Nil	100	HDPE	100	HDPE	\$100,000	pre-Oct 93	16109A Diag 4 of 6	
													0314-AC06 SHT 6 OF 6	

Fencing

Asset No	Type	Height	Gates Width	Lock Type	Replacement Value (\$) (2007)	Construction Date	Drawing No	Comments
WT004	Linkmesh	2.2 m	3.6 m	Padlock	\$10,000	pre-Oct 93	0314-AC06 SHT 6 OF 6	

Effluent Reuse

Storage

Asset No	Dimensions			Construction Material			Inlet Pipe		Outlet Pipe		GPS Location		Street/Location	Construction Date	Replacement Value (\$)	Drawing No	Comments
	Diameter m	Depth m	Volume	Floor	Walls	Roof	Size	Type	Size	Type	East	North					
ER001	5.0	~ 2.5	45,460Lts	PVC	PVC	PVC	50mm	Blueline Poly	50mm	Flexi/Blueline			Reserve 12591 King St				
													Marvel Loch				

Pumping

Asset No	Type	Make	Model	KW Rating	Flow Capacity	Street/Location	Construction Date	Replacement Value (\$)	Drawing No	Comment
ER005	Pump Motor 1	ERARA	2CDX 120/	2.2		Res 40746 Lot 201		\$5,000.00		Onga Pressure & recharge unit on top of pump - Serial No B04019567; Manufr 2002; 435kPa 2.0 Bar 24Lts
ER006	Pump Filter 1	Amiad	2 x Pods		24 Lts	Old Marvel Loch Rd				2 sand pods in series with own Amiad control system
ER007	Pump Motor 2	Stalker	COMP3 CD	1.0		Reserve 12591 King St		\$3,000.00		Serial No 1020792 240V/12.3A Impeller Diam 163mm
ER008	Pump Filter 2	None				Marvel Loch				

ASSET
DECOMMISSIONED
2016

Control and Monitoring

Asset No	Type	Make	Model	Rating	Street/Location	Replacement Value (\$)	Drawing No	Comment
ER011	Sprinkler Timber	Superior Controls Co	Stirling 4		Res 40746 Lot 201			
					Old Marvel Loch Rd			
ER012	Springler Timber	Netafim Quality Works			Reserve 12591 King St	\$1,000.00		
					Marvel Loch			

Disinfection

Asset No	Type	Make	Model	Street/Location	Construction Date	Replacement Value (\$)	Drawing No	Comment
ER015	CI Gas Injection	Wallace & Tiernan	Regulator& RotaMeter combined on cylinder & Injector unit	ML Sewer Ponds	1986	\$1,600.00		CI gas dosing occurs when effluent pump is on causing a vaccum to pull gas into effluent feed line it is a manual system

Reticulation

Asset No	Street/Lot Location	Dimensions			Material	Grade	GPS Location		Construction Date	Replacement Value (\$)	Drawing No	Comments
		Diameter m	Lenght m	Depth m			East	North				
ER019	Reserve 12591 King Street Marvel Loch	25-50mm		0.30-0.50	PVC	Highpress				\$8,000.00		



APPENDIX B

Financial Plan



Annual Operations and Maintenance Budget

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Output Values	
NPV	\$ 1,174,356
Annuity	-\$ 79,755

Year No	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Escalation	1.1475	1.1877	1.2293	1.2723	1.3168	1.3629	1.4106	1.4600	1.5111	1.5640	1.6187	1.6753	1.7340	1.7947	1.8575	1.9225	1.9898
Discount	0.7773	0.7299	0.6853	0.6435	0.6042	0.5674	0.5327	0.5002	0.4697	0.4410	0.4141	0.3888	0.3651	0.3428	0.3219	0.3022	0.2838

Asset	Maintenance Type	Frequency	Cost Estimate	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Access Chambers			\$5,200																	
Access Chambers - Type 1	Routine & Breakdown	Annual	\$2,200	\$2,525	\$2,613	\$3,000	\$3,075	\$3,152	\$3,231	\$3,312	\$3,395	\$3,480	\$3,567	\$3,656	\$3,747	\$3,815	\$3,948	\$4,086	\$4,230	\$4,378
	Preventative	5 yearly	\$3,000	\$0	\$3,563	\$0	\$0	\$0	\$0	\$4,232	\$0	\$0	\$0	\$0	\$5,026	\$0	\$0	\$0	\$0	\$5,969
	Restorative	None	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Access Chambers - Type 2	Routine & Breakdown			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Preventative			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Restorative			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Mains			\$15,700																	
Gravity Mains - Code A	Routine & Breakdown	Annual	\$1,100	\$1,262	\$1,306	\$1,500	\$1,537	\$1,575	\$1,614	\$1,654	\$1,695	\$1,737	\$1,780	\$1,824	\$1,870	\$1,907	\$1,974	\$2,043	\$2,115	\$2,189
	Preventative	5 yearly	\$1,500	\$0	\$0	\$1,844	\$0	\$0	\$0	\$0	\$2,190	\$0	\$0	\$0	\$0	\$2,601	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$2,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,920	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Mains - Code B	Routine & Breakdown	Annual	\$1,100	\$1,262	\$1,306	\$1,500	\$1,537	\$1,575	\$1,614	\$1,654	\$1,695	\$1,737	\$1,780	\$1,824	\$1,870	\$1,907	\$1,974	\$2,043	\$2,115	\$2,189
	Preventative	5 yearly	\$1,500	\$0	\$0	\$1,844	\$0	\$0	\$0	\$0	\$2,190	\$0	\$0	\$0	\$0	\$2,601	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$2,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,920	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Mains - Code C	Routine & Breakdown			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Preventative			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Restorative			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Mains - Code D	Routine & Breakdown			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Preventative			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Restorative			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pressure Mains	Routine & Breakdown	Annual	\$1,500	\$1,721	\$1,782	\$2,000	\$2,050	\$2,101	\$2,153	\$2,207	\$2,262	\$2,318	\$2,376	\$2,435	\$2,496	\$2,601	\$2,692	\$2,786	\$2,884	\$2,985
	Preventative	5 yearly	\$2,000	\$0	\$0	\$2,459	\$0	\$0	\$0	\$0	\$2,920	\$0	\$0	\$0	\$0	\$3,468	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$3,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,380	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sewerage Pump Station			\$53,700																	
Pumps	Routine & Breakdown	Annual	\$15,000	\$17,213	\$17,815	\$20,000	\$20,500	\$21,010	\$21,530	\$22,070	\$22,620	\$23,180	\$23,760	\$24,350	\$24,960	\$26,010	\$26,920	\$27,862	\$28,838	\$29,847
	Preventative	5 yearly	\$20,000	\$0	\$0	\$24,585	\$0	\$0	\$0	\$0	\$29,199	\$0	\$0	\$0	\$0	\$34,680	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$30,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$43,799	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controls	Routine & Breakdown	Annual	\$2,500	\$2,869	\$2,969	\$3,500	\$3,587	\$3,677	\$3,769	\$3,863	\$3,959	\$4,058	\$4,159	\$4,263	\$4,369	\$4,335	\$4,487	\$4,644	\$4,806	\$4,974
	Preventative	5 yearly	\$3,000	\$0	\$0	\$3,688	\$0	\$0	\$0	\$0	\$4,380	\$0	\$0	\$0	\$0	\$5,202	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$4,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,840	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Wet Well	Routine & Breakdown	Annual	\$2,200	\$2,525	\$2,613	\$3,000	\$3,075	\$3,152	\$3,231	\$3,312	\$3,395	\$3,480	\$3,567	\$3,656	\$3,747	\$3,815	\$3,948	\$4,086	\$4,230	\$4,378
	Preventative	5 yearly	\$3,000	\$0	\$0	\$3,688	\$0	\$0	\$0	\$0	\$4,380	\$0	\$0	\$0	\$0	\$5,202	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$4,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,840	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Waste Water Treatment Plant			\$30,600																	
Primary	Routine & Breakdown	Annual	\$2,000	\$2,295	\$2,375	\$2,500	\$2,562	\$2,626	\$2,692	\$2,759	\$2,828	\$2,899	\$2,971	\$3,045	\$3,121	\$3,468	\$3,589	\$3,715	\$3,845	\$3,980
	Preventative	10 yearly	\$3,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,380	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Restorative	30 yearly	\$5,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Secondary	Routine & Breakdown	Annual	\$1,200	\$1,377	\$1,425	\$1,600	\$1,640	\$1,681	\$1,723	\$1,766	\$1,810	\$1,855	\$1,901	\$1,948	\$1,997	\$2,081	\$2,154	\$2,229	\$2,307	\$2,388
	Preventative	10 yearly	\$2,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,920	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Restorative	30 yearly	\$5,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Tertiary	Routine & Breakdown	Annual	\$1,200	\$1,377	\$1,425	\$1,475	\$1,527	\$1,580	\$1,635	\$1,693	\$1,752	\$1,813	\$1,877	\$1,942	\$2,010	\$2,081	\$2,154	\$2,229	\$2,307	\$2,388
	Preventative	10 yearly	\$2,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,920	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Restorative	30 yearly	\$5,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Appurtenances - Fencing	Routine & Breakdown	Annual	\$2,200	\$2,525	\$2,613	\$3,000	\$3,075	\$3,152	\$3,231	\$3,312	\$3,395	\$3,480	\$3,567	\$3,656	\$3,747	\$3,815	\$3,948	\$4,086	\$4,230	\$4,378
	Preventative	5 yearly	\$3,000	\$0	\$0	\$3,688	\$0	\$0	\$0	\$0	\$4,380	\$0	\$0	\$0	\$0	\$5,202	\$0	\$0	\$0	\$0
	Restorative	10 yearly	\$5,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,300	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Effluent Re-use			-																	
Storage	Routine & Breakdown	Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Preventative	5 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Restorative	10 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pressure Mains	Routine & Breakdown	Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Preventative	5 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Restorative	10 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumping	Routine & Breakdown	Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Preventative	5 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Restorative	10 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Controls	Routine & Breakdown	Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Preventative	5 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Restorative	10 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reticulation	Routine & Breakdown	Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Preventative	5 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Restorative	10 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Appurtenances - Disinfecting Unit	Routine & Breakdown	Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Preventative	5 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Restorative	10 yearly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	Future Value		\$ 12,803,352	\$36,950	\$36,950	\$41,807	\$84,870	\$44,165	\$45,281	\$46,423	\$51,834	\$181,663	\$50,037	\$51,305	\$52,599	\$58,960	\$114,790	\$57,789	\$59,811	\$61,905
	Net Present Value		\$ 1,174,356	\$28,722	\$26,969	\$28,651	\$54,614	\$26,686	\$25,690	\$24,731	\$25,928	\$85,324	\$22,067	\$21,245	\$20,452	\$21,526	\$39,351	\$18,602	\$18,078	\$17,568
	Annuity		-\$ 79,755																	

Modified JPH 2017

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Output Values		
NPV	\$	168,354
Annuity	-\$	11,434

04/10/17

Capital and Maintenance Expenditure

