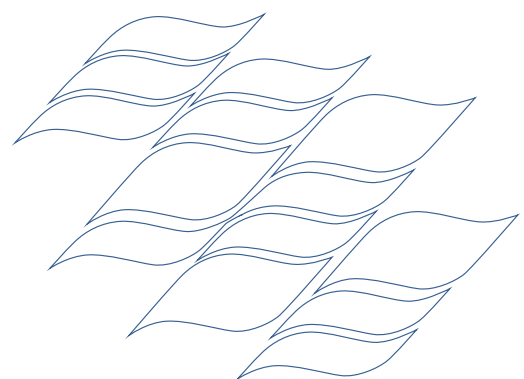
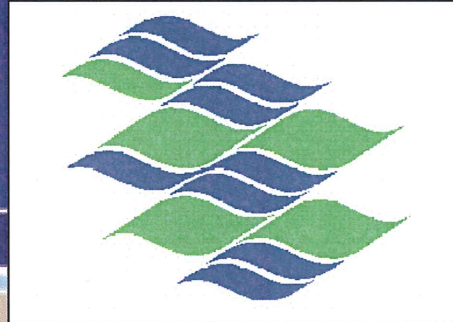


Appendix 9

[RETURN TO APPENDICES LIST](#)

System Leakage Management Plan (Gladstone Area Water Board)





Gladstone Area Water Board

**Registered Water
Service
Provider No. 200**

System Leakage Management Plan

Overview and Certification of System Leakage Management Plan

This plan is submitted to the Department of Natural Resources and Water for assessment of compliance under the Water Act 2000 and for approval of the System Leakage Management Plan (SLMP). The Plan has been reviewed and certified below by the CEO and an RPEQ as required by the Act.

TABLE 1: SERVICE PROVIDER INFORMATION

Service Provider Number	200
Service Provider Name	Gladstone Area Water Board
Date of Registration	22 February 2001
Date SLMP due	1 October 2007
Date of Submission	1 September 2008 (original submission 15 September 2007)

TABLE 2: OVERVIEW OF SYSTEM

Scheme Name	Scheme Type
Gladstone Area Water Board	Bulk Treated and Raw Water Supply

Certification:

This System Leakage Management Plan is accurate and appropriate for this Water Service Provider's infrastructure and registered services.

Certified by the CEO,
Gladstone Area Water Board

Signed:

Name: *Jim Grayson*

Date: *3-10-08*

Certified by the RPEQ,

Signed:

Name: *RICHARD WEST*

RPEQ number: *2912*

Date: *16/9/08*

INTRODUCTION

This Systems Leakage Management Plan (Plan), version September 2008, follows original submission of the plan, dated 15 September 2007, and discussions with officers of the Department of Natural Resources and Water.

This Plan will consider system losses over two years of data, 2006/07 and 2007/08. The September 2007 document discussed only 2006/7.

The plan does not include water discharged from the two water treatment plants, a normal operation of these plants, although these losses are constantly reviewed. The Plan also does not include water lost through other water service provider infrastructure (Discussed further in this Plan). The Plan does not include losses from sections of delivery pipe that are currently unmetered (Discussed further in this Plan).

DESCRIPTION OF SYSTEM

Gladstone Area Water Board (GAWB) is a Category 1 Water Authority and a registered Service Provider established under the *Water Act 2000*. It operates as a commercialised statutory authority responsible to the Minister for Natural Resources and Water (the Minister). GAWB owns and operates the Awoonga Dam on the Boyne River along with a network of delivery pipelines, water treatment plants and other bulk water distribution infrastructure throughout the Gladstone region of Central Queensland.

The main function of GAWB is to carry out the water activities decided by the Board of Directors (Board) in accordance with the requirements of the *Water Act 2000*.

GAWB owns and operates bulk treated (potable) and raw (non potable) water storage and supply system, which includes:

- The Awoonga Dam on the Boyne River in Calliope Shire;
- Delivery pipelines (121 km for delivery of untreated water to treatment plants and industrial customers, and 90 km for delivery of treated water to the Gladstone Regional Council water reticulation systems and to industrial consumers);
- Two water treatment plants located in Gladstone and at Yarwun;
- Untreated water pumping station at Awoonga, and treated water pumping stations at Benaraby, Calliope, Glen Eden, Boat Creek, Gladstone Water Treatment Plant (High Lift & Low Lift) and Yarwun Water Treatment Plant;
- Untreated water reservoirs at Gladstone (Fitzsimmons Street 50ML & 16ML) and Toolooa, and treated water reservoirs at Boyne Island, East End, Golegumma, South Gladstone, Mt Miller, Gladstone Clearwater and Yarwun Clearwater.

The map titled *Gladstone Area Water Board, Water Systems and Services Network* is found in Attachment B and describes the location of the system in relation to Gladstone and environs.

Gladstone Area Water Board provides water to power stations near Biloela in the Callide Valley, however the pump station and pipeline is owned and operated by SunWater, so for this reason, the volume of water these customers use (26,479 ML) has not been included in the data for this System Leakage Management Plan.

Water is recovered from the waste product of the treatment plants and is returned into the raw water system. This water is accounted in this Plan. However some unrecoverable water (backflushed solids from filters and clarifiers) is discharged to the sewerage system of Gladstone Regional Council and to evaporation ponds. This latter water/sludge is a normal operation of these plants and is not included in this plan.

The Plan considers the separate systems for delivery of raw and treated water.

DETAILS OF SYSTEM

Schematic Drawings

Drawing D4025 Treated Water System Schematic and D3042 for Raw Water System Schematic show details of the raw and treated systems. Drawings D4025 and 3042 are found in Appendix A.

System Statistics

Raw Water Bulk Pump Station	1
Treatment Plants	2
Reservoirs	10
Booster Pump Stations	4
Customer Connections	48

Age of System

Tables showing the age of both the raw water and treated water systems are shown in Attachment C.

Within the raw water system there are 27.5Km of above ground pipe and 93.5Km of below ground pipe, totalling 121Km, which altogether have an average age of 19 years. Within the treated water system there are 2Km of above ground pipe and 88Km of below ground pipe, totalling 90Km, which have an average age of 24 years.

The total distance of pipe in both systems is 211Km, of which 29.5 Km (14%) is above ground and 181.5Km (86%) is below ground.

The average age of pipes within the treated water system is 24 years. The average age of pipes within the raw water system is 19 years. The average age of both the treated and raw water systems is 21 years (total length times age/total length).

Discussion

Raw Water Pipework:

The tables in Attachment C show some sections of the pipe are approaching their mid lives. The Awoonga Gladstone 700mm pipeline is 41 years old, the GWTP Supply 450mm pipeline is 37 years old and the QAL 375mm pipeline is 39 years old. All three pipelines are experiencing problems that include loss of concrete lining and corrosion. The latter pipeline is located in very corrosive environments.

Treated Water Pipework:

Both the South Gladstone to Tooloooa 300mm pipeline, the Golegumma Reservoir Supply 300mm pipelines and the Backup 300mm Pipeline Supply to South Gladstone Reservoir are over 60 years old and at the end of their lives. These pipelines are known to have leakage concerns. The GWTP to Glenlyon Road L/Lift 375 mm pipeline is at mid life.

ESTIMATES OF LEAKAGE

The following tables provides estimates of system leakage. Note that no allowance has been made in this data to account for meter inaccuracy.

2006/07 Data

Raw Water Delivery System

Parameter	Units	Estimate
Reference Year Used	N/A	2006/2007
Water Supplied	Megalitres/year	28234
Metered Consumption	Megalitres/yr	15996
Unbilled Authorised	Megalitres/yr	11765
Current Water Leakage	Megalitres/yr	473
Percentage Loss		1.68%

27740 ML is the total water pumped from Awoonga Dam an amount of 493 ML for recovered water has been added to this, recovered water is the backwashing water that is fed back into the raw water systems from the Gladstone Water Treatment Plant, giving a raw system total of 28234 ML.

Note: Unbilled authorised consumption is the metered water supplied directly to both treatment plants.

2006/07 Data Treated Water Delivery System

Parameter	Units	Estimate
Reference Year Used	N/A	2006/2007
Water Supplied	Megalitres/year	9601
Metered Consumption	Megalitres/yr	9223
Unbilled Authorised	Megalitres/yr	169
Current Water Leakage	Megalitres/yr	209
Percentage Loss		2.18%

Note: In 2006/07, 1667ML was supplied directly from the treatment plants to Gladstone Regional Council pipelines.

2007/08 Data Total Raw Water Delivery System

Parameter	Units	Estimate
Reference Year Used	N/A	2007/2008
Water Supplied	Megalitres/year	27701
Metered Consumption	Megalitres/yr	16678
Unbilled Authorised	Megalitres/yr	10467
Current Water Leakage	Megalitres/yr	556
Percentage Loss		2%

27217 ML is the total water pumped from Awoonga Dam an amount of 484 ML for recovered water has been added to this, recovered water is the backwashing water that is fed back into the raw water systems from the Gladstone Water Treatment Plant, giving a raw system total of 27701 ML.

Note: Unbilled authorised consumption is the metered water supplied directly to both treatment plants.

2007/08 Data Total Treated Water System

Parameter	Units	Estimate
Reference Year Used	N/A	2007/2008
Water Supplied	Megalitres/year	8451
Metered Consumption	Megalitres/yr	8270
Unbilled Authorised	Megalitres/yr	147
Current Water Leakage	Megalitres/yr	34
Percentage Loss		0.40%

Note: In 2007/08, 1440MI was supplied directly from the treatment plants to Gladstone Regional Council pipelines.

Discussion

Meter inaccuracy is not considered in the data above. Some of the meters are nearing the end of their lives and some are suspected of being inaccurate. As identified in this Plan GAWB is progressively replacing these old meters with electro-magnetic types. These flow meters have a stated accuracy of less than 1% and are supplied with NATA certified calibration certification and an electronic "finger-print" which enables the in-field monitoring of calibration drift.

Pipelines that would indicate negative losses (meter inaccuracy) have been assumed nil within the above tables.

As stated previously in this report water/sludge discharged from the treatment plants is metered but has been excluded from the above figures as these losses are not considered to be system leakage.

The figures listed in the above tables are all metered and read on a monthly basis. This data is recorded monthly on a central spreadsheet that is used for the purpose of both billing and system balancing.

Meters are generally located at the start of pipelines and at the end. However currently there are some pipelines where there are no meters at the end of pipelines. GAWB has a program of relocating customer and system meters to the end of pipelines so as to better reflect and monitor system leakage.

LEAKAGE REDUCTION MEASURES

Whilst the current system losses in both the raw and treated water networks appear low GAWB has prepared a program of works with the following issues in mind:

- ✓ When considering the accuracy of current meters, the above losses are considerable in volumetric and financial terms.

- ✓ Some meters are approaching the end of their lives and more accurate meters are now available.
- ✓ Sections of the network are approaching middle age when failures could be expected to be more frequent.
- ✓ Sections of the network are approaching the end of their lives and failures are therefore immanent. Several of these pipelines have already been identified for replacement.
- ✓ Sections of the network are located in corrosive marine environments that are particularly aggressive for ferrous materials.
- ✓ Sectorisation and pressure reduction of the network is desirable for monitoring and reducing leakage.
- ✓ There are some meters that are obviously incorrect (negative losses) that will need replacement.
- ✓ Whilst the overall losses appear small some pipelines are relatively high; Mount Larcom 100mm Pipeline Supply (up to 6%) and South Gladstone Reservoir to Calliope (up to 4%). These pipelines will be identified for future action.

Leakage Reduction Measures planned by GAWB are as follows:

[Replacement of the main Awoonga Dam to Toolooa pipeline meter has already been completed in 2006/07 financial year.]

Measure	Scope	Comments	Cost
District Metering Sectorisation	BSL Raw Water Connection	Install 300mm Flow Meter to monitor BSL Delivery Infrastructure	\$60,600.00
	Hanson Road Inlet (Fitz St)	Install 450 mm Flow Meter to monitor Hanson Road Trunk Main	\$21,500.00
	South Gladstone Reservoir Inlet	Install 600mm Flow Meter to monitor delivery system to South Gladstone Res from the GWTP	\$26,600.00
	Fitz St 50ML (Investigation)	Design of Flow Meter installation	\$20,000.00
	Mt Miller Reservoir Inlet	Replace Flow Meter to monitor delivery from YWTP to Mt Miller Res	\$16,200.00
	Gollegumma Inlet	Install Flow Meter to monitor Benaraby System	\$16,200.00
	GCC Retic Hanson Road	Install Flow Meter to monitor High Lift Pump Flow to Round Hill Res	\$28,800.00
	CA Treated Water Connection	Monitor 150mm Treated Water Trunk Main	\$17,800.00

Measure	Scope	Comments	Cost
	Serrant Road Flow Meter	Monitor Serrant Road Trunk Main and use for PRV control	\$16,200.00
		Total in 08/09	\$223,900
		District Metering 09/10	\$190,000
Flow Metering	Upgrading of Flow Meters 2007-08	This program is to replace any meters that don't meet testing standards and or may still be the old style helical meters that require upgrading.	\$60,000
		Flow Meters 2008-2011	\$60,000
Monitoring and Reporting	Upgrade the telemetry throughout the system and introduce operational data storage and reporting system.	This will allow for more accurate and timely indication of leaks in the field. This system will eventually be set up in line with the sectorisation meters and be able to determine loss in the system according to a pre set value for the section. The total cost of this project is \$470k but the realisation of cost for the purpose of leakage management is more in the order of \$300k	\$300,000
Pressure Management	Serrant Rd Flow Modulated PRV	Install new PRV to manage system pressure in the Serrant Road system	\$33,000.00
	BSL Raw Water (Replacement)	Replace existing non working PRV to manage pressure in the BSL raw delivery system	\$11,000.00
Speed and Quality of Repairs	Across the entire system	This will be improved via more accurate reporting from the functions listed above enabling teams to attend sites more effectively and perform repairs in a timelier manner.	\$0

Measure	Scope	Comments	Cost
Data Logging GSM	This is considered to be surplus to requirements at this time but will be used in the future to assist in pressure management.	Existing Data Loggers to be redeployed	\$0
Pipeline and Asset Management	Across the entire system	This involves the engagement of a consultant to establish accurate remaining life on assets and allow a replacement strategy to be developed. This will minimise the amount of failures and leaks in the system once established correctly.	\$25,000
		Ongoing Asset Management:	\$14,000
Active Leakage Control	Engage contracted services for leak detection	Step testing of mains to isolate leaks and pinpointing using a correlator	\$20,000
		Ongoing Leak Detection:	\$60,000
Material Selection	See Pipeline and Asset management	Appropriate material selection will be undertaken for any pipeline replacement.	
Total			\$996,900

Discussion

The leakage measures are further explained as follows:

District Sectorisation

Sectorisation plans consist of monitoring the inflow and the outflow from trunk mains. By sectorising the system leakage can be monitored in any trunk main by subtracting the inflow from the outflow of the same main. Benefits of sectorisation will include:

- Prompt identification and response to leaks to reduce leak running times;
- Provides localised information of the location of the leaks;
- Constant monitoring of the system to monitor system performance; and
- knowledge of how the system operates and where water is going.

GAWB intends to complete sectorisation which with an upgraded telecommunication system will allow for instantaneous identification of pipe bursts. This information will be fed into pipeline replacement strategies.

The location of PRV and sectorisation water meters is shown in Attachment B; Schematic titled Recommended PRV and Flow Meter Installations – Raw Water and Schematic titled Recommended Flow Meter Installations – Treated Water

Flow Metering

Accurate flow metering of the water supply network is an important component of the demand management cycle. Inaccurate flow metering will result in inflated levels of apparent losses within the system. To achieve the necessary high degree of accuracy, electro-magnetic flow meters will be installed on all mains (sectorisation) and customer connections.

Throughout both the raw and treated systems there are still the old type helical meters in service. It is planned to assess each connection that has these meters and replace them as required with the more accurate flow tube type meters. Additionally meters will be installed at point of supply.

Electro-magnetic flow meters have the advantage of providing a 420mA signal that will provide input to the proposed telemetry system (see Monitoring and Reporting).

Monitoring and Reporting

The proposed telemetry system will sample and report instantaneous flows and pressures at each water meter. The system will allow for alarming should flows in a particular sector become unmatched or pressure fluctuation occur, allowing more rapid response for pipe burst and ease of leak detection.

Pressure Management

The Boyne Island raw line is located within a very harsh environment along salt flats and acid sulphate soils. By replacing the inoperable PRV on this line it will manage the pressure within this main and prolong its life. The Serrant Road raw water main has, through monitoring of pressure, sustained significant pressure spikes. The introduction of a PRV to this main will increase the lines workable life.

Pipeline and Asset Management

Condition assessments will be completed on all pipelines. Condition assessments will include internal inspections of some pipelines with known lining problems. This together with a detailed assessment of leakage will be used to develop a replacement strategy for the system

The BSL pipeline through the QAL Red Mud Dam is under investigation for relocation. This pipeline, although in mid life, is planned for replacement in the future. Material selection will form an important element in the design as it will be relocated through an aggressively corrosive environment. The Golegumma, Mount Larcom 100mm Pipeline Supply and South Gladstone Reservoir to Calliope will also be investigated for replacement.

At the end of 2008/09 year the GAWB system will be fully sectorised and managed via telemetry. The ongoing costs over the next five years will focus more on the leak detection technology (capital expenditure) and repair/replacement strategies developed this year by the Pipeline and Asset Management Consultant. This will incur ongoing costs in the order of \$14,000 over the next 4 years for detection, in addition to normal operational maintenance expenditure for repairs and replacement.

In addition GAWB has budgeted for replacement of sections of trunk mains which have been identified as close to failure due to age and corrosion. These costs have not been included in the SLMP costs as they are considered to be prudent asset management and critical to security of supply, however GAWB expect that this will contribute to leakage reduction if not now in the future.

LEAKAGE REDUCTION PROGRAM

Whilst the current low leakage estimate is low in consideration of the inaccuracy of several meters, the high value of water, the age of several pipelines nearing end of life, GAWB considers the Plan consistent with best practice within the water industry.

Leakage will continue to be monitored and indeed with more accurate meters installed on some pipelines may increase in the short term. However in the longer term GAWB is confident these measures will keep losses low.

The following program of works is planned:

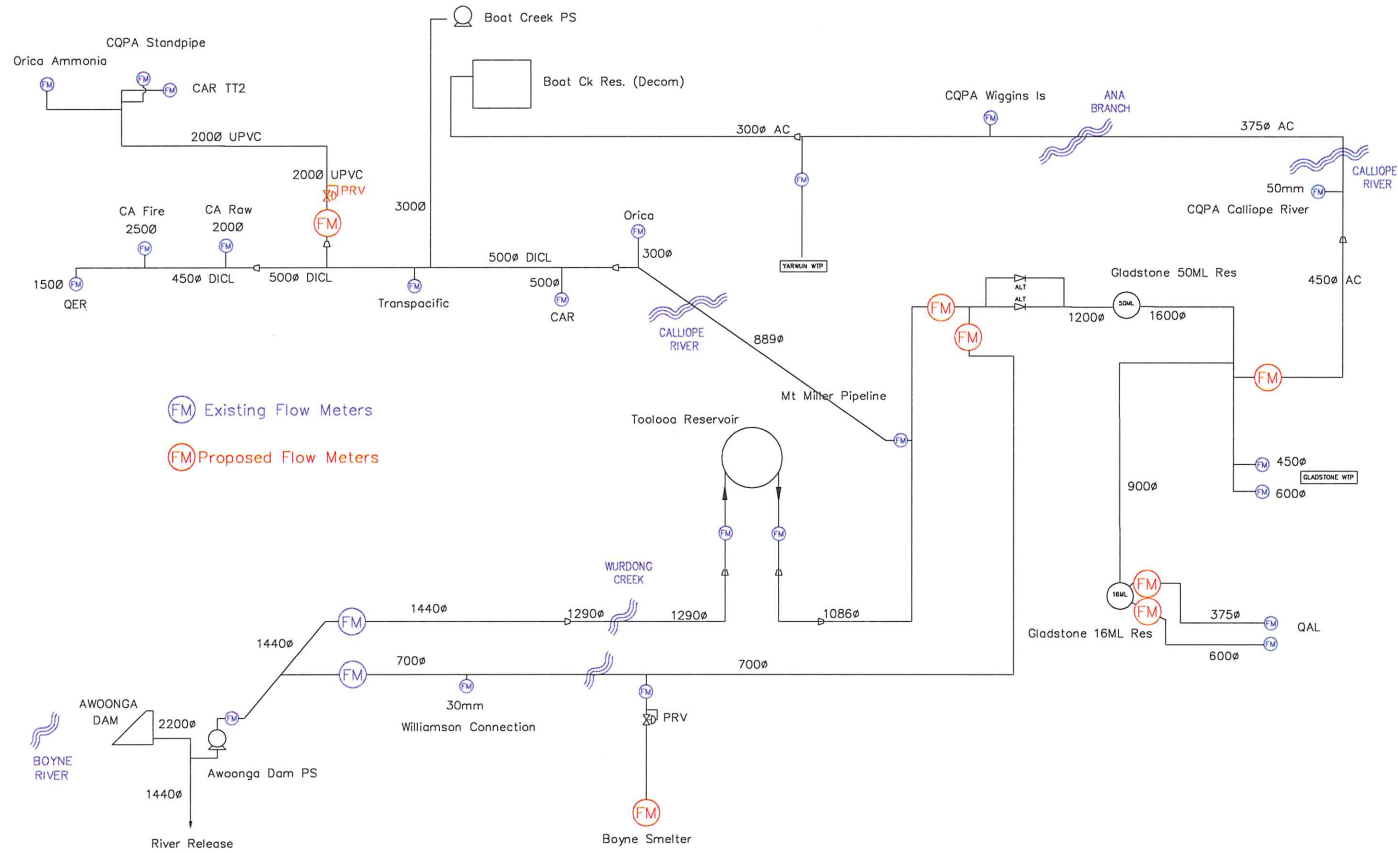
Measure	Budget Estimate					Source of funding
	Year 08/09	Year 09/10	Year 10/11	Year 11/12	Year 12/13	
District Metering	\$223,900	\$190,000	0	0	0	Revenue
Flow Meter Replacement	\$60,000	\$15,000	\$15,000	\$15,000	\$15,000	Revenue
Monitoring and Reporting	\$300,000	0	0	0	0	Revenue
Pressure Management	\$44,000	0	0	0	0	Revenue
Pipeline and Asset Management	\$25,000	\$5,000	\$5,000	\$2,000	\$2,000	Revenue
Active Leakage Control	\$20,000	\$20,000	\$20,000	\$10,000	\$10,000	Revenue
Totals:	\$672,900	\$230,000	\$40,000	\$27,000	\$27,000	

Attachment A

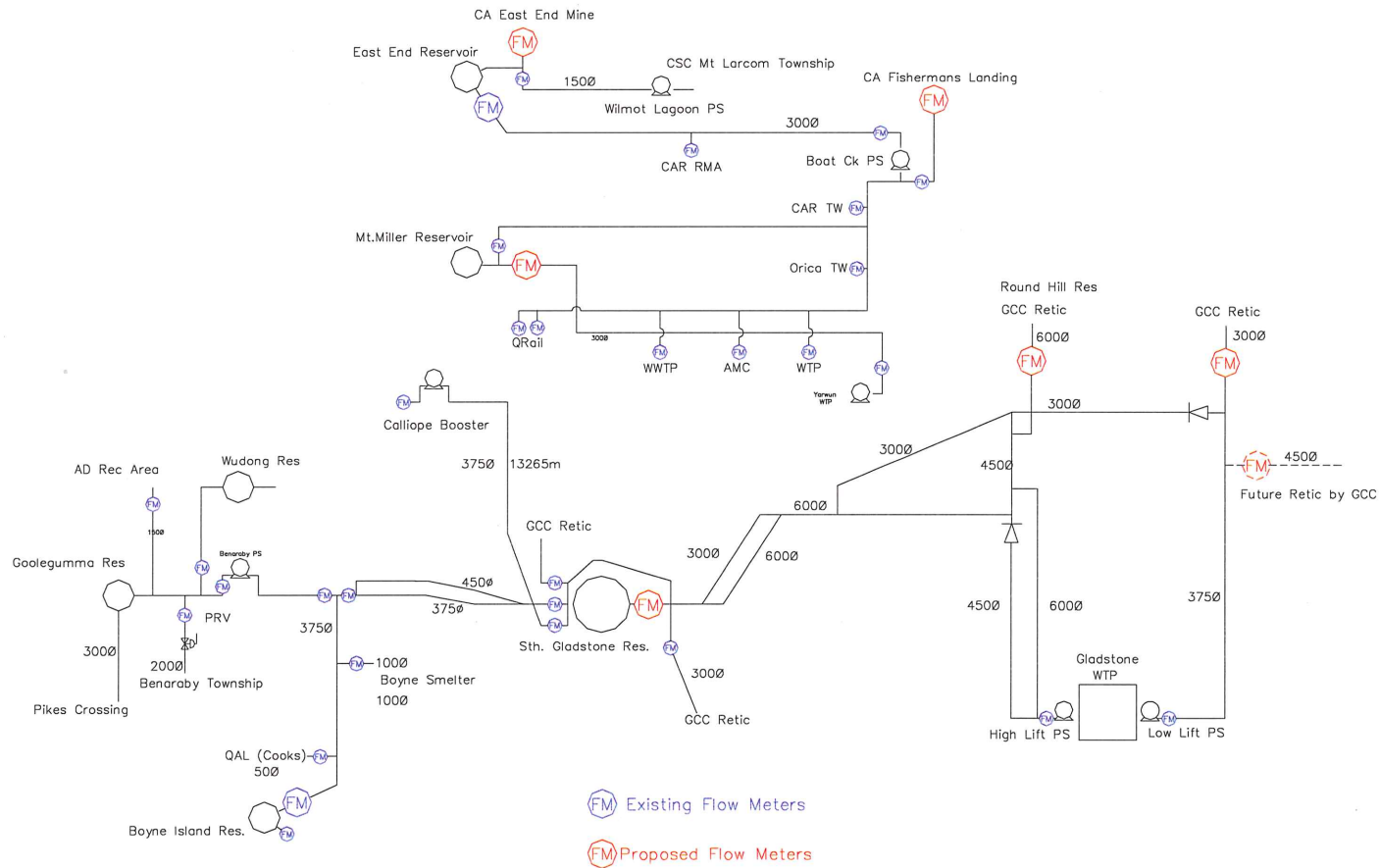
The following plans form Attachment B:

1. Schematic titled *Recommended PRV and Flow Meter Installations – Raw Water*
2. Schematic titled *Recommended Flow Meter Installations – Treated Water*

RECOMMENDED PRV AND FLOW METER INSTALLATIONS – RAW WATER



RECOMMENDED FLOW METER INSTALLATIONS – TREATED WATER

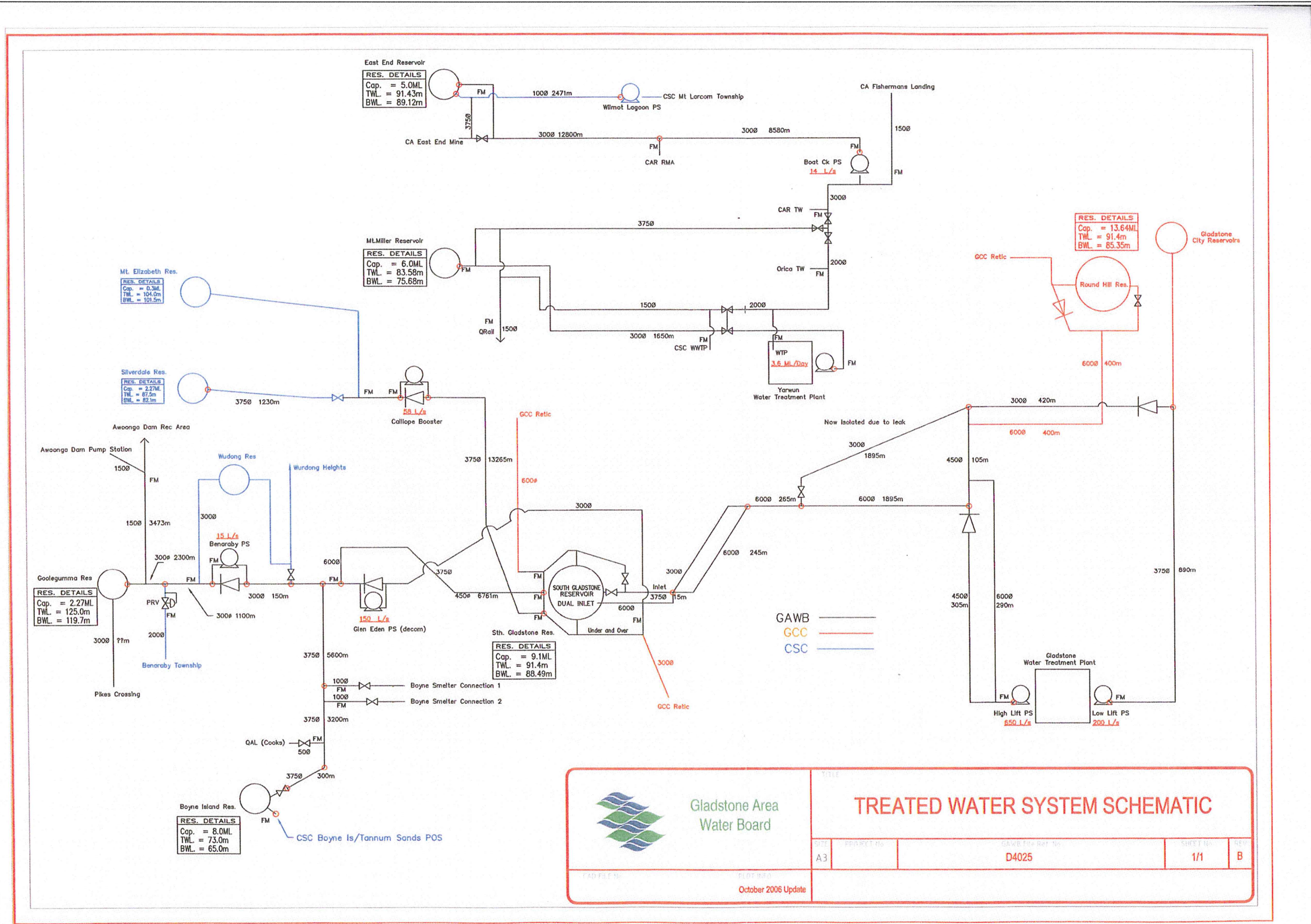


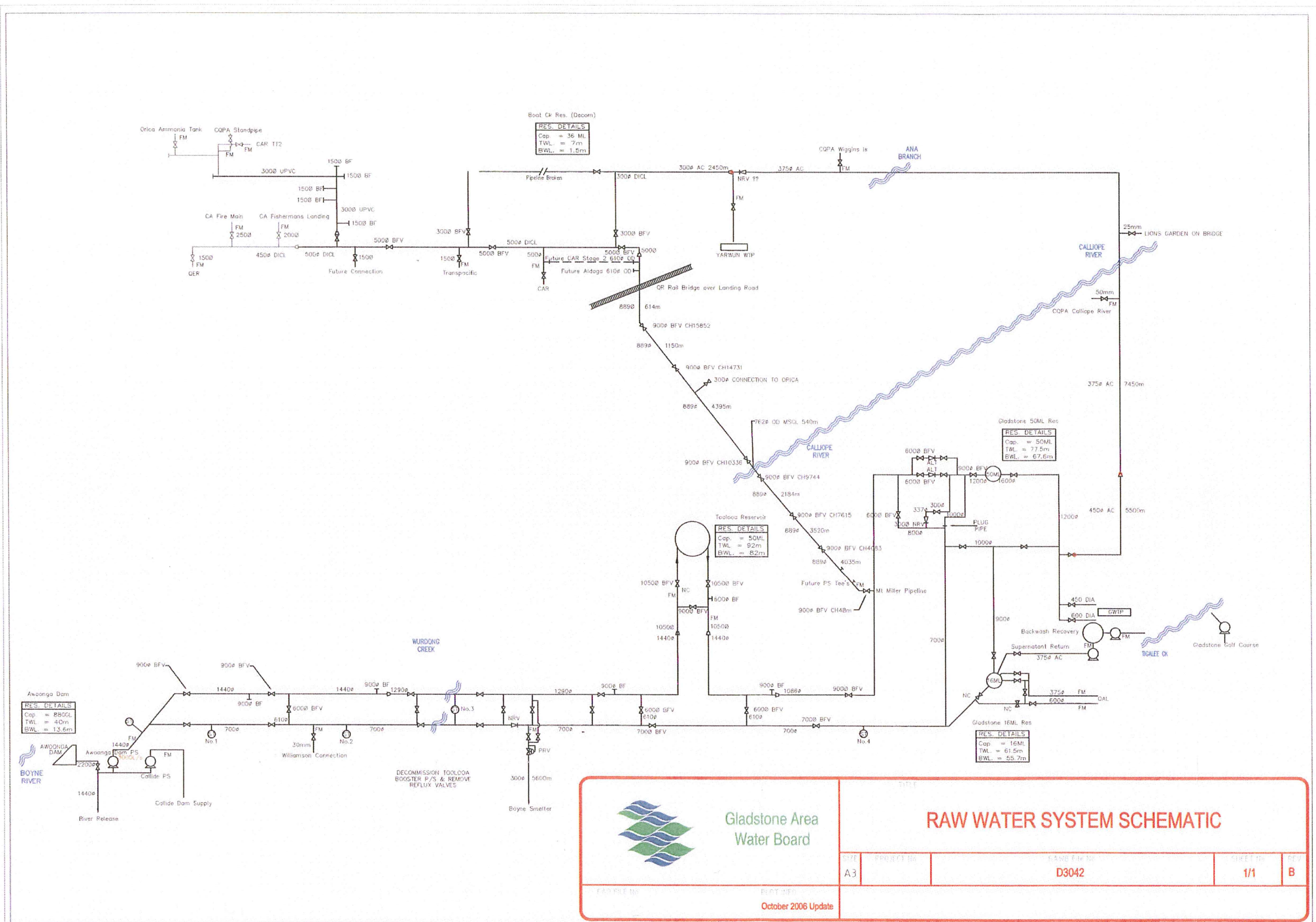
Attachment B


The following plans form Attachment A:

1. Map titled *Gladstone Area Water Board, Water Systems and Services Network*
2. Drawing D4025 titled *Treated Water System Schematic*
3. Drawing D3042 titled *Raw Water System Schematic*







 <p>Gladstone Area Water Board</p>	RAW WATER SYSTEM SCHEMATIC			
	PROJECT No	ISSUE No	DATE	BY
	A3		D3042	B
TABLE No	PLOT No			
	October 2006 Update			

Attachment C

The following tables form Attachment C:

1. Raw Water Pipeline Age
2. Treated Water Pipeline Age

RAW WATER PIPELINES						
Asset ID	Age	Asset Description	Length	Above	Below	Km Age
868	41	Awoonga Gladstone 700mm Pipeline - Node 11- 31	24260	24260		995
871	20	Awoonga - Gladstone 1290mm Pipeline - Node 89 - 109	8100	1100	7000	162
2256	9	Fisermans Landing Pipeline Pipe Serrant Road to Suncor Energy	1195		1195	11
2257	9	Fisermans Landing Pipeline Pipe Branch Line at QCL Rail Bridge	115		115	1
2258	9	Fisermans Landing Pipeline Pipe Branch Line to Boat Creek Reservoir	145		145	1
2259	9	Fisermans Landing Pipeline Pipe Offtake to QCL	47		47	0
2255	9	Fisermans Landing Pipeline Pipe QCL Rail Bridge to Serrant Road	3870		3870	35
2497	7	Suncor Energy Supply Pipework & Fittings (Flow Meter Installation)	1		1	0
2507	9	Awoonga RW2 1440mm Pipeline node 113 to 133	17992		17992	162
2508	9	Kirkwood road to Gladstone Res. 1085mm Pipeline	7216		7216	65
2623	8	Orica - Serrant Road Supply 300mm DICL Pipeline Node 167 - 188	35		35	0
2624	8	Orica - Serrant Road Supply 300mm DICL Pipeline Node 188 - 189	1213		1213	10
2625	8	Orica - Serrant Road Supply 300mm DICL Pipeline Node 189 - 190	452		452	4
2626	8	Orica - Serrant Road Supply 300mm DICL Pipeline Node 190 - 191	82		82	1
2627	8	Orica - Serrant Road Supply 300mm DICL Pipeline Node 191 - 192	174		174	1
2565	8	RW1 1440mm Pipeline Node 81 - 89	8238		8238	66
855	26	Boyne Smelter 300mm Raw Water Supply Node 106 - 188	5570	2000	3570	145
872	14	GWTP 600mm Pipeline Supply	570		570	8
873	37	GWTP 450mm Pipeline Supply Node 54 - 184	570		570	21
880	24	QCL Mine Site Supply Pipeline	534		534	13
886	18	Boat Creek Supply Pipeline 450mm. Node 79 - 136	5500		5500	99
887	18	Boat Creek Supply Pipeline 375mm. Node 136 - 137	7450		7450	134
TBA	2	Mt. Miller Pipeline	16500		16500	33
888	26	Boat Creek Supply Pipeline 300mm. Node 139 - 141	2450		2450	64
889	18	YWTP Supply Pipeline 300mm. Node 138 - 140	400		400	7
890	15	Calliope River Xing - Pipes 280m of 700 dia MSCL, Weld On Bridge	280	280		4
893	23	Fisherman's Landing 150mm Pipeline Supply Node 182 - 183	3000		3000	69
895	18	Ticor 150mm Pipeline Supply Node 158 to 159	400		400	7
1501	39	QAL 375mm Pipeline Supply Node 64 - 186	2670		2670	104
1502	37	QAL 600mm Pipeline Node 72 - 187	2240		2240	83
Total Raw Water Distance Klm.			121.269		Total Km Age	2305
			Total Above Ground	27.64	Av Age	19
				Total Below ground	93.629	

TREATED WATER PIPELINES					
Age	Asset Description	Dimension Attribute 1	Above	Below	Km Age
60	South Gladstone to Toolooa 300mm Pipeline Node 13 - 26	6600		6600	396
13	Benaraby Booster Supply 300mm Pipes & Fittings Node 26 - 34	7100		7100	92
65	Golegumma Reservoir Supply 300mm Pipework Node 35 - 37	1100		1100	72
13	Golegumma reservoir to Awoonga Recreation 3473m of 150mm Pipeline	3473		3473	45
26	East End Reservoir 300mm Pipeline Supply Node 178 - 179	23000		23000	598
	Mount Larcom 100mm Pipeline Supply	Sold to CSC			
21	BSL Off-take to Boyne Island Res, 375mm Pipework Node 27-32	3500		3500	74
13	Boyne Smelter Supply 150mm Pipework	150		150	2
22	South Gladstone Reservoir to Calliope Booster 375mm Pipeline Node 16A -17	13265		13265	292
	Calliope Treated Mt Elizabeth Reservoir Supply 375mm Pipeline	Sold to CSC			
	Calliope Silverdale Reservoir 375mm Pipeline Supply Node 19 - 21	Sold to CSC			
35	GWTP to Glenlyon Road L/Lift 375mm Pipeline Node 2- 4	890		890	31
29	GWTP to Glenlyon Road 450mm Pipeline Node 3-6	305		305	9
15	GWTP to Glenlyon Road 600mm Pipeline Node 3-7A	310		310	5
65	Backup 300mm Pipeline Supply to South Gladstone Reservoir Node 8 - 4	2315		2315	150
19	Gladstone Round Hill Reservoir 600mm Node 9-11 NOT GAWB's	800		800	15
24	South Gladstone Reservoir 600mm Pipeline Node 7-13	2160		2160	52
29	South Gladstone Reservoir 300mm Pipeline Node 13-14	245		245	7
18	YWTP to Mt. Miller 300mm Pipeline Supply Node 51 - 52	1650		1650	30
21	Toolooa to Boyne Smelter Off take 375mm Pipeline Node 26-27	5600	2000	3600	118
29	450mm H/Lift AC Pipeline Glenlyon Road X-ing Node 7- 9	105		105	3
29	Glenlyon Road to South Gladstone Reservoir 600mm Pipeline Node 13 - 14	245		245	7
2	South Gladstone Res. To toolooa Pipeline	6906		6906	14
27	Boat Creek to Cement Australia 150mm Pipeline	5300		5300	143
10	Mt Miller Treated 150mm Main Purchased from CSC, Orica ringmain	2400		2400	24
10	Mt Miller Treated 200mm Main Purchased from CSC Orica ringmain	1100		1100	11
10	Mt Miller treated 375mm main purchased from CSC, Orica ringmain.	1500		1500	15
Total Treated Water Distance Km.		90.019		Total Km Age	2204
		Total Above Ground	2.000	Av Age	24
			Total Below ground	88.019	
Total Distance Raw & Treated Pipelines			211.29		
Total Above Ground			29.64	14.03%	
Total Below			181.65	85.97%	