LATE ITEMS AGENDA

Thursday 8 April 2021

commencing at 9:30am

Quilpie Shire Council Boardroom
50 Brolga Street, Quilpie

Ordinary Meeting of Council

6 April 2021

The Mayor and Council Members
Quilpie Shire Council
QUILPIE QLD 4480

Dear Members

Reference is hereby made to the Ordinary Meeting of the Quilpie Shire Council scheduled to be held at the Council Chambers, on ***Thursday, 8 April 2021,*** commencing at ***9:30am*****.**

An agenda for the Ordinary Meeting was forwarded to all Members on 1 April 2021. In addition to the agenda, please find attached a summary of "Late Items".

Yours faithfully

Justin Hancock
Chief Executive Officer

ORDINARY MEETING OF COUNCIL

AGENDA

Thursday 8 April 2021
Quilpie Shire Council Boardroom

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17 LATE ITEMS

17.1 (01/21) – Tender – Eromanga Water Treatment Plant Upgrade

IX:

Author: Acting Director of Engineering Services, Mr Brian Weeks

PURPOSE:

The purpose of this report is to provide a recommendation to Council for the Eromanga Water Treatment Plant - Upgrades

POLICY/LEGISLATION:

Local Government Act 2009

Local Government Regulation 2012

Council's Procurement Policy

CORPORATE PLAN:

2.2.1 Ensure Council's financial stability through responsible management and planning of finances and assets.

RECOMMENDATION:

That Council award the tender for Eromanga Water Treatment Plant Upgrade to Symonds and Bristow Pty Ltd for the amount of $99,609.13 excluding GST.

BACKGROUND:

The water supply system in Eromanga is a relatively complex system with four sub-artesian bores, raw water storage, media filtration, UV disinfection, micron prefiltration, RO membranes and breakpoint chlorine disinfection.

The system was commissioned in 2014, having had the system in operation for approximately six years, Quilpie Shire Council have identified a range of action items that will improve the operation of the facility. The implementation of these improvement items would be suited to a water treatment specialist.

The scope of works for the provision of services can be applied to three broad categories, these categories include, developing operating procedures, actioning identified improvement items and undertaking necessary maintenance of the plant.

The provision of these services by a water treatment specialist will improve the operational efficiency of the Plant for Quilpie Shire Council.

DISCUSSION:

On 4 February 2021 tender documents for the "Eromanga Water Treatment Plant – Upgrades" were advertised on LG Tenderbox which was viewed by one hundred and seventy-six (176) tenderers (see enclosed Tender Mailing List).

At the close of tenders 19 March 2021, four (4) submissions were received from:

1. Aqualyng ICES

2. Dowdens Pumping & Water Treatment

3. KW Electric Pty Ltd

4. Simmonds & Bristow Pty Ltd

FINANCIAL:

$ 99,609.13 Excluding G.S.T

CONSULTATION:

Nil

ATTACHMENTS:

Letter of Recommendation from Consulting Engineers

George Bourne & Associates
73 Elm Street // PO Box 169
Barcaldine, QLD, 4725

Enquiries : William Green
Email : wgreen@gbaengineers.com.au
Proj. No./Doc. ID : 200274/379670

Initials : WCG:JMC

1 April 2021

The Chief Executive Officer
Quilpie Shire Council
50 Brolga Street
QUILPIE QLD 4480

Attention : Justin Hancock

Dear Sir,

QUILPIE SHIRE COUNCIL
EROMANGA WATER TREATMENT PLANT - UPGRADES
LETTER OF RECOMMENDATION

On the 4th of February 2021 tender documents for the "Eromanga Water Treatment Plant – Upgrades" were advertised on LG Tenderbox which was viewed by one hundred and seventy-six (176) tenderers (see enclosed Tender Mailing List).

At the close of tenders 19th of March 2021, four (4) submissions were received from:

1. Aqualyng ICES
2. Dowdens Pumping & Water Treatment
3. KW Electric Pty Ltd
4. Simmonds & Bristow Pty Ltd

We recommend Simmonds & Bristow Pty Ltd in accordance with the attached tender analysis. Simmonds & Bristow have demonstrated that they have comprehensive experience managing, servicing, and constructing water treatment plants. Their demonstrated experience identified the successful completion of similar projects, relating to the provision of treated water from non-potable groundwater sources. Simmonds & Bristow tendered the second lowest cost from the four tenders submitted, despite not being the cheapest tenderer they were ranked as the preferred candidate as they demonstrated a comprehensive understanding of the scope of works, which was enhanced by their efforts to attend a site meeting. The Simmonds & Bristow response provided specific and practical recommendations to address the operational and maintenance issues described in the tender documents.

George Bourne & Associates
73 Elm Street // PO Box 169
Barcaldine, QLD, 4725

Should you require further information regarding the content of this letter, please do not hesitate to contact William Green of this office.

Yours faithfully

for **GEORGE BOURNE & ASSOCIATES**

Enclosures : (5)

1. Tender Mailing List
2. Tender Summary
3. Rfx Summary Report
4. Email – Tender Verification Response
5. Submissions Received

Tender Mailing List

Business	Received	Read Date	Submission
360 Engineering Pty Ltd	Yes	13/03/2021 19:52	None
ACRON PTY LTD	Yes	09/02/2021 11:32	None
AECOM AUSTRALIA PTY LTD	Yes	12/02/2021 09:18	None
Alliance Automation	Yes	09/02/2021 12:46	None
Alliance Automation Pty Ltd	Yes	09/02/2021 12:46	None
Alpha Concepts Pty Ltd	Yes	09/02/2021 10:59	None
Amiad Australia Pty Ltd	Yes	09/02/2021 16:19	None
Amiad Water Systems	Yes	12/03/2021 08:38	None
Aqseptence Group Pty Ltd	Yes	10/02/2021 08:40	None
AQSEPTENCE GROUP PTY LTD	Yes	10/02/2021 09:27	None
AQUACURE WATER TREATMENT PTY LTD	Yes	10/02/2021 14:48	None
Aqualyng ICES	Yes	10/02/2021 08:41	Responses received
Aquatec Maxcon Pty Ltd	Yes	09/02/2021 12:22	None
ARID TO OASIS SOLUTIONS PTY LTD	Yes	09/02/2021 11:59	None
Australian Coating Solutions Pty Ltd	Yes	01/03/2021 09:37	None
Australian Water Storage Group	Yes	19/02/2021 21:23	None
Automation Group	Yes	09/02/2021 12:08	None
Automation Group Pty Ltd	Yes	09/02/2021 12:08	None
Automation IT Pty Ltd	Yes	24/02/2021 08:13	None
AVK Flow Control	Yes	25/02/2021 08:23	None
Bluey Technologies Pty Ltd	Yes	17/02/2021 12:53	None
BMT COMMERCIAL AUSTRALIA PTY LTD	Yes	09/02/2021 10:58	None
Brandon and Associates Pty Ltd	Yes	09/02/2021 19:11	Declined to respond
Brown Electrical	Yes	09/02/2021 19:54	None
Burke Industries Pty Ltd	Yes	03/03/2021 05:19	None
Capricorn Plumbing & Building Supplies	Yes	08/03/2021 15:27	None
Capstone Collective	Yes	09/02/2021 11:46	None
Cardno QLD Pty Ltd	Yes	09/02/2021 11:07	None
CCA WINSLOW	Yes	23/02/2021 06:50	None
CEQ AUSTRALIA	Yes	09/02/2021 10:55	None

Business	Received	Read Date	Submission
Challenger Valves & Actuators	Yes	18/02/2021 14:12	None
Civil Pipe Supplies	Yes	09/02/2021 11:11	None
CIVILPIPES	Yes	09/02/2021 11:11	None
CJETS CIVIL AND MECHANICAL	Yes	10/02/2021 13:23	Declined to respond
CLEANAWAY EQUIPMENT SERVICES PTY LTD	Yes	10/02/2021 19:21	None
COMPLEX CIVIL INFRASTRUCTURE SERVICES PTY LTD	Yes	11/03/2021 09:20	None
Conspectus (Qld) Pty Ltd	Yes	16/03/2021 17:48	None
CONSULTJR STRATEGIC ENGINEERING SERVICES PTY LTD	Yes	12/02/2021 09:12	None
Control Logic Pty Ltd	Yes	09/02/2021 11:02	None
CRC Electrical & Refrigeration	Yes	09/02/2021 10:58	None
CV SERVICES PTY LTD	Yes	09/02/2021 11:40	None
DE.MEM-AKWA PTY LTD	Yes	09/02/2021 11:00	None
De.mem-Akwa Pty Ltd	Yes	09/02/2021 11:25	None
DE.MEM-AKWA PTY LTD	Yes	09/02/2021 11:25	None
Dowdens Group	Yes	09/02/2021 11:12	None
Dowdens Pumping & Water Treatment	Yes	09/02/2021 10:56	Responses received
Dowdens Pumping and Water Treatment	Yes	09/02/2021 11:15	None
DOWNER PIPETECH PTY LIMITED	Yes	08/03/2021 10:07	None
Dynapumps QLD	Yes	09/02/2021 12:22	Declined to respond
E2DESIGNLAB	Yes	15/02/2021 12:35	None
EDgineering	Yes	19/02/2021 23:44	None
EJ	Yes	17/02/2021 12:02	Declined to respond
Electro Motives	Yes	10/02/2021 09:37	None
Engeny Water Management	Yes	09/02/2021 11:16	Declined to respond
EpiMax	Yes	23/02/2021 14:33	None
Essential Water and Energy Services	Yes	09/02/2021 13:20	Declined to respond
Everything Water Australia P/L	Yes	25/02/2021 08:33	None
Evoqua Water Technologies	Yes	09/02/2021 11:51	None
FABRIC SOLUTIONS AUSTRALIA PTY LTD	Yes	15/03/2021 08:50	None

Business	Received	Read Date	Submission
Fewster Brothers Contracting Pty Ltd	Yes	09/02/2021 12:49	None
FITT RESOURCES PTY LIMITED	Yes	04/03/2021 09:17	None
FloatPac Solar	Yes	12/02/2021 22:40	None
Fusion Piping Pty Ltd	Yes	23/02/2021 18:26	None
Future-Plus Environmental	Yes	17/02/2021 13:16	Declined to respond
FUTURE-PROOF SOLUTIONS PTY LTD	Yes	24/02/2021 09:12	None
GANDEN Pty Ltd	Yes	16/02/2021 08:19	None
George Bourne & Associates	Yes	09/02/2021 16:42	Declined to respond
GHD	Yes	09/02/2021 14:28	None
GHD Digital	Yes	10/02/2021 09:42	Declined to respon
GRUNDFOS PUMPS PTY. LTD.	Yes	09/02/2021 10:54	None
GULF CIVIL PTY LTD	Yes	10/02/2021 11:41	None
Hague Plumbing Civil and Gas	Yes	16/03/2021 21:37	None
Hartecs Group	Yes	09/02/2021 11:07	None
Heaton Plant and Pipeline	Yes	09/02/2021 11:45	None
heaton plant and pipeline	Yes	09/02/2021 14:20	None
HH CIVIL PTY LTD	Yes	08/03/2021 10:26	None
HMA Flow & Industrial Pty Ltd	Yes	11/02/2021 15:12	None
Hornick Constructions Pty Ltd	Yes	10/02/2021 09:19	None
Hygrade Water Australia Limited Partnership	Yes	24/02/2021 11:31	None
Hygrade Water Infrastructure	Yes	24/02/2021 11:31	None
Infrastructure Rehabilitation Services Pty Ltd	Yes	09/03/2021 17:49	None
Inspections X-Ray and Testing	Yes	09/02/2021 10:57	None
Iplex Pipelines Australia Pty Ltd	Yes	10/02/2021 10:28	Declined to respond
JLN Electrical	Yes	07/03/2021 14:32	None
Kehoe Myers Consulting Engineers Pty Ltd	Yes	11/02/2021 08:44	None
KELAIR PUMPS AUSTRALIA PTY LTD	Yes	16/02/2021 14:52	None
KSB Pumps Australia	Yes	09/02/2021 16:22	None

Business	Received	Read Date	Submission
KW ELECTRIC PTY LTD	Yes	09/02/2021 16:02	Responses received
Liquitek Pty Ltd	Yes	09/02/2021 19:00	Non
M2P ENGINEERING PTY LTD	Yes	09/02/2021 18:09	None
MARCON AGENCIES PTY LTD	Yes	05/03/2021 11:07	None
Mass Products (previously known as Mass Products Pty Ltd)	Yes	23/02/2021 12:54	None
Mass Products Pty Ltd	Yes	23/02/2021 12:54	None
McFaul & Co Engineers Pty Ltd	Yes	12/02/2021 07:39	None
MEINHARDT AUSTRALIA PTY LTD	Yes	12/02/2021 17:11	None
MFE Pty Ltd	Yes	09/02/2021 11:57	None
MIPAC PTY LTD	Yes	12/02/2021 09:48	None
Moloney & Sons Engineering	Yes	09/02/2021 10:55	None
Moloney & Sons Engineering	Yes	10/02/2021 12:40	None
MORRIS WATER PTY LTD	Yes	15/02/2021 14:05	None
NETZSCH Australia Pty Ltd	Yes	09/02/2021 11:04	None
Newlands Civil Construction Pty Ltd	Yes	09/02/2021 10:58	None
Next Generation Electrix	Yes	23/02/2021 07:54	None
North Queensland Hardfacing Pty Ltd	Yes	12/03/2021 12:39	Declined to respond
northern water	Yes	15/03/2021 09:12	None
NQ Water Services Pty Ltd	Yes	09/02/2021 11:56	Declined to respond
NTS Group Pty Ltd	Yes	15/03/2021 11:54	None
Nuflow Technologies	Yes	09/03/2021 08:58	None
Nutrien Water	Yes	10/02/2021 10:57	None
Orion Project Consulting Pty Ltd	Yes	09/03/2021 10:13	None
P H E PTY. LTD.	Yes	18/03/2021 09:34	None
PACH GROUP PTY LTD	Yes	25/02/2021 11:10	None
Pensar Building	Yes	09/02/2021 11:29	Declined to respond
Pensar Civil Pty Ltd	Yes	09/02/2021 11:29	Declined to respond
Pezzimenti Tunnelbore	Yes	17/03/2021 07:16	None
Pipe Hawk Utility Management	Yes	24/02/2021 14:17	None
PLATINUM AQUATICS	Yes	26/02/2021 12:44	None

Business	Received	Read Date	Submission
PRACTICAL ENGINEERING INVESTMENTS PTY LTD	Yes	09/02/2021 13:44	None
Precast Civil Industries - Toowoomba Tanks	Yes	04/03/2021 14:24	None
PRECAST CIVIL INDUSTRIES PTY LTD	Yes	12/02/2021 07:56	Declined to respond
Professional Pump Services & Irrigation	Yes	11/02/2021 09:04	None
PROFESSIONAL PUMP SERVICES & IRRIGATION	Yes	09/02/2021 16:58	None
PSA Engineering	Yes	09/02/2021 14:19	None
Pumping Irrigation & Machinery Services	Yes	09/02/2021 14:46	None
PVE Civil Solutions Pty Ltd	Yes	19/02/2021 14:37	None
Queensland Lining Co.	Yes	09/02/2021 13:06	None
R & T Pumps	Yes	19/02/2021 16:04	None
Re-Pump Australia Pty Ltd	Yes	11/02/2021 07:04	Declined to respond
Re-Pump Australia Pty Ltd	Yes	11/02/2021 07:04	Declined to respond
Re-Pump Australia Pty Ltd	Yes	03/03/2021 13:44	None
Re-Pump Australia Pty ltd	Yes	11/02/2021 07:04	Declined to respond
REMONDIS AQUA AUSTRALIA PTY LIMITED	Yes	09/02/2021 11:05	None
RMA Engineers	Yes	09/02/2021 11:13	None
Roadpak Industries PTY LTD	Yes	08/03/2021 13:07	None
Rotork Australia Pty	Yes	16/03/2021 17:10	None
Satintouch	Yes	09/02/2021 11:41	None
SCHNEIDER ELECTRIC AUST PTY LIMITED	Yes	10/03/2021 15:24	None
Seepex Australia Pty. Ltd.	Yes	09/02/2021 11:36	None
SEQ Systems & Solutions Pty Ltd	Yes	15/02/2021 11:55	Declined to respond
SESL AUSTRALIA	Yes	15/03/2021 08:28	Declined to respond
Simmonds & Bristow Pty Ltd	Yes	09/02/2021 14:59	Responses received
SJ Electric	Yes	09/02/2021 11:01	Declined to respond
SLADE INDUSTRIES MAINTENANCE PTY LTD	Yes	09/02/2021 13:44	Declined to respond

Business	Received	Read Date	Submission
SLR Consulting Australia Pty Ltd	Yes	10/02/2021 07:56	Declined to respond
Smart Lock Group	Yes	19/02/2021 09:57	None
SMEC Australia Pty Ltd	Yes	09/02/2021 10:57	Declined to respond
Southern Cross Directional Drilling	Yes	18/03/2021 10:05	Declined to respond
Southern Cross Reservoir Services Australia	Yes	18/02/2021 10:35	None
SPLITS AND BUTT POLY WELDING	Yes	03/03/2021 19:04	None
Stantec	Yes	09/02/2021 11:38	None
Suncoast Waste Water Management	Yes	09/02/2021 10:55	None
Suncoast Waste Water Management	Yes	09/02/2021 11:17	None
TEW Solutions	Yes	10/02/2021 10:40	None
The Pump House	Yes	09/02/2021 11:47	Declined to respond
The Trustee for The ATM Tanks Group Trading Trust	Yes	17/02/2021 09:36	None
Thermo Fisher Scientific	Yes	09/02/2021 10:55	None
Tolbra Earthmovers & Haulage Pty Ltd	Yes	18/03/2021 15:59	None
Tonkin Consulting	Yes	15/02/2021 10:22	None
Toowoomba & Surat Basin Enterprise	Yes	09/02/2021 11:08	None
Toowoomba Concrete Tanks Pty Ltd	Yes	22/02/2021 10:18	None
Treadwell	Yes	19/03/2021 08:07	None
TRILITY	Yes	09/02/2021 11:11	None
VAN DAMME PROJECTS PTY LTD	Yes	15/02/2021 20:40	Declined to respond
VEOLIA WATER AUSTRALIA PTY LTD	Yes	25/02/2021 09:18	None
Vinidex Pty Ltd	Yes	09/02/2021 10:56	Declined to respond
VOR ENVIRONMENTAL AUSTRALIA PTY LTD	Yes	25/02/2021 15:28	None
W.A. CROMARTY & COMPANY PROPRIETARY LIMITED	Yes	09/02/2021 11:49	Declined to respond
WASTE WATER WORKS	Yes	09/02/2021 11:38	Declined to respond
Water Infrastructure Services	Yes	19/03/2021 08:20	None
Watertec Engineering P/L	Yes	24/02/2021 08:20	None
Weldlok	Yes	16/02/2021 07:47	None

Business	Received	Read Date	Submission
Witthoft Engineering Pty Ltd	Yes	09/02/2021 10:55	None
Wolff Power	Yes	09/02/2021 11:27	Declined to respond
Xylem Water Solutions Australia Limited	Yes	15/02/2021 14:05	None
Xypex Australia	Yes	09/02/2021 14:58	None

Tender Summary

Tender Summary

Council: Quilpie Shire Council
Job Title: Eromanga Water Treatment Plant - Upgrades
Job No: 200274
Closing Date/Time: 19th March 2021

				Aqualyng ICES		Dowdens Pumping & Water Treatment		KW Electric Pty Ltd		Simmonds & Bristow Pty Ltd	
Item	**Description**	**Unit**	**Qty**	**Rate**	**Amount**	**Rate**	**Amount**	**Rate**	**Amount**	**Rate**	**Amount**
1	Establishment/ Insurances	Each	1	$ 3,464.29	$ 3,464.29	$ 27,150.00	$ 27,150.00	$ 1,500.00	$ 1,500.00	$ 17,055.50	$ 17,055.50
2	Prepare an Operational Manual (Category 1 Items 1 to 9)	Each	1	$ 3,571.43	$ 3,571.43	$ 59,900.00	$ 59,900.00	$27,800.00	$ 27,800.00	$ 24,288.00	$ 24,288.00
3	Design, Install and Commission System Improvements (Category 2 items 10 to 17)										
3.1	Item 10 (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	Each	1	$ 5,714.29	$ 5,714.29	$ 7,800.00	$ 7,800.00	$13,800.00	$ 13,800.00	$ 11,643.50	$ 11,643.50
3.2	Item 11 Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.	Each	1	$ 857.14	$ 857.14	$ 2,490.00	$ 2,490.00	$ 5,850.00	$ 5,850.00	$ 1,364.00	$ 1,364.00
3.3	Item 12 Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	Each	1	$ 1,428.57	$ 1,428.57	$ 1,980.00	$ 1,980.00	$ 5,850.00	$ 5,850.00	$ 990.00	$ 990.00
3.4	Item 13 Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	Each	1	$ 857.14	$ 857.14	$ 2,210.00	$ 2,210.00	$ 2,350.00	$ 2,350.00	$ 748.00	$ 748.00
3.5	Item 14 Ensure that the chlorine tank low level alarm exists and functions and does shut the plant once activated.	Each	1	$ 285.71	$ 285.71	$ 1,450.00	$ 1,450.00	$ 2,500.00	$ 2,500.00	$ 682.00	$ 682.00
3.6	Item 15 Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	Each	1	$ 7,857.14	$ 7,857.14	$ 9,960.00	$ 9,960.00	$ 4,850.00	$ 4,850.00	$ 1,364.00	$ 1,364.00
3.7	Item 16 Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	Each	1	$ 12,857.14	$ 12,857.14	$ 15,960.00	$ 15,960.00	$14,200.00	$ 14,200.00	$ 17,188.88	$ 17,188.88
3.8	Item 17 Develop a system for the storage of sodium hypochlorite that results in shorter holding times.	Each	1	$ 17,857.14	$ 17,857.14	$ 250.00	$ 250.00	$ 3,280.00	$ 3,280.00	$ 5,260.75	$ 5,260.75
4	Investigate cause of elevated RO membrane EC and provide recommendation (Category 3).	Each	1	$ 8,142.86	$ 8,142.86	$ 3,750.00	$ 3,750.00	$ 3,200.00	$ 3,200.00	$ 3,608.00	$ 3,608.00
5	Undertake a site inspection and system assessment 11 months after the date for practical completion.	Each	1	$ 5,857.14	$ 5,857.14	$ 2,800.00	$ 2,800.00	$ 4,800.00	$ 4,800.00	$ 9,009.00	$ 9,009.00
6	General Cleanup/Disestablishment	Each	1	$ 357.14	$ 357.14	$ 15,200.00	$ 15,200.00	$ 2,256.00	$ 2,256.00	$ 6,407.50	$ 6,407.50
			Subtotal	$	69,107.13	$	150,900.00	$	92,236.00	$	99,609.13
			GST (10%)	$	6,910.71	$	15,090.00	$	9,223.60	$	9,960.91
			TOTAL	$	76,017.84	$	165,990.00	$	101,459.60	$	109,570.04
			Comments:								

Criteria
- Expereince in identical work within QSC 50%
- Expereince in identical work outside QRC 40%
- Expereince in similar work in remote region 35%
- Experince in similar work in populated areas 30%
- Experience with related work not covering entire scope 250%
- Expereince not closely related to scope 20% or less

EXPERIENCE (50%)	35%	40%	35%	40%
Comments: Capability and experience	*Experienced in design and construction of water treatment services. Good understanding of implementing treatment systems in small and remote schemes. Previous experience with upgrading WTP Systems. No site visit assumptions made relating to actions.*	*Experienced in design and constuction of water treatment services. Experience with PLC re-design.*	*Experience in the programming and commissioning of the Eromanga WTP when it was installed. Experience in writing PLC codes and design of WTP. Very experienced personnel in relation to WTP design. No site visit assumptions made relating to actions.*	*Experience in WTP upgrades similar to the tender scope of works. Experience in providing expert advise of WTP upgrade strategies. Key Personnel has extensive experience in developing plans and operating procedures.*
PRICE (30%)	30%	14%	22%	21%
Comments:	*1*	*4*	*2*	*3*
QUALITY OF TENDER RESPONSE (10%)	6%	8%	6%	8%
Comments:	*Very detailed submission however lacks detailed understanding of the system. Exceeded submission page limit.*	*Detailed methodology for specific tender items. Great understanding with tender scope of works.*	*Methodology provides sufficient detail however, no reference to tender items and their execution.*	*Very detailed submission. Provides a detailed methodology that corresponds to the scope of works.*
ATTENDANCE A SITE INSPECTION (10%)	0%	10%	0%	10%
Comments:	*No attendance*	*Attended site inspection*	*No attendance*	*Attended Site Inspection*
TOTAL WEIGHTINGS (OUT OF 100%)	71%	72%	63%	79%

Tenders opened & assessed by Carl Talaman

Recommendation: Simmonds and Bristow Pty Ltd

Tender Summary

Council: Quilpie Shire Council
Job Title: Eromanga Water Treatment Plant - Upgrades
Job No: 200274
Closing Date/Time: 19th March 2021

Daywork Rates

	Aqualying ICES			Dowdens Pumping & Water Treatment			KW Electric Pty Ltd			Simmonds & Bristow Pty Ltd		
	Rate			Rate			Rate			Rate		
Labour Description	**Normal**	**Time & Half**	**Double Time**	**Normal**	**Time & Half**	**Double Time**	**Normal**	**Time & Half**	**Double Time**	**Normal**	**Time & Half**	**Double Time**
Consultant	$175.00	N/A	N/A									
Plumber	$125.00	$185.00	$215.00	$100.00	$150.00	$200.00						
Electrician	$135.00	$195.00	$225.00	$120.00	$180.00	$240.00	$95.00	$226.00	$135.00			
Technician	$120.00	$180.00	$210.00									
Managing Director/Principal Engineer										$400.00	To be confirmed	To be confirmed
Chief Professional										$280.00	To be confirmed	To be confirmed
Project Manager				$120.00	$150.00	N/A				$280.00	To be confirmed	To be confirmed
Sennior Professional										$220.00	To be confirmed	To be confirmed
Professional										$160.00	To be confirmed	To be confirmed
Administrator										$90.00	To be confirmed	To be confirmed
Project/Process Engineer				$150.00	$200.00							
Programmer				$210.00	$300.00	N/A						
Electrical Engineer							$220.00					
Process Engineer							$220.00					
Water Engineer							$220.00					
Software Engineer							$220.00					
Plant Description	**Rate/Hr**			**Rate/Hr**			**Rate/Hr**			**Rate/Hr**		
Option 1: Using Aqua-Report remote monitoring system	$5,500.00											

Tender Summary

Council: Quilpie Shire Council
Job Title: Eromanga Water Treatment Plant - Upgrades
Job No: 200274
Closing Date/Time: 19th March 2021

		Aqualyng ICES	Dowdens Pumping & Water Treatment	KW Electric Pty Ltd	Simmonds & Bristow Pty Ltd
(a)	**Contact Details for the purposes of tender assessment as below:**				
	Name of Contact:	Mark Collen	Bradley Thomas	Ian Kennedy	Matthew Reid
	Address:	3/11 Palmer Place Murarrie 4172, Queensland, Australia	U24/140 Wecker Road, Mansfield, Qld 412	UNIT 2/17 COMMERCE CIRCUIT, YATALA, QLD, 4207	40 Reginald Street Rocklea QLD 4106
	Telephone No. (BH):	436614157	(07) 3828 7001	07 3287 2766	07 3434 3800
	Telephone No. (AH):	436614157			1800 620 690
	Mobile No:	436614157	418444926	0458 363 014	0417 177 217
	Facsimile No:		(07) 3828 7056		07 3434 3899
	Email:	mark.collen@aqualying.com	bradley.thomas@dowdens.com.au	kwe@kwelectric.com.au	sales@simmondsbristow.com.au
(b)	**ABN or ACN:**	99086243772	88 154 375 685 / 154 375 685	83 624 617 938	33 010 252 418
(c)	**Provide a statement of facts in detail as to the Tenderer's previous experience and achievements in performing similar or comparable work and its resources and ability to carry out the works.**	Aqualyng ICES specialises in water treatment solutions and services to deliver improvements to plant productivity and profitability through operational efficiency, reduction in operations costs and downtime. Aqualyng ICES is a privately-owned global service provider of water treatment and environmental solutions to the Mining, Oil & Gas, Power, Healthcare, Food and Beverage and General Manufacturing sectors. Aqualyng ICES provides: Operation & Maintenance Services Consulting Services Capital Projects & Development Plant Rental Services WTP Parts & Consumables	2017: Dowdens upgraded the wastewater treatment plant (WWTP) at Coppabella, for Aurizon. The upgrade included the installation of new filtration / polishing processes and decommissioning of obsolete processes without interrupting the operation the overall WWTP process. - 2017: Dowdens upgraded the chemical dosing systems at the WTP in Clermont, for Isaac Regional Council. - 2018: Dowdens upgraded the WTP at the Saraji Mine, for BMA. The upgrade included the replacement of an old, underperforming clarifier with an improved equivalent clarifier with minimal disruption to potable water supply to the mine. - 2019: Dowdens upgraded the PLC for the Boby WTP in Moranbah, for Isaac Regional Council - 2019: Dowdens designed and constructed a new WTP for the township of Nebo, for the Isaac Regional Council. The WTP is capable of producing 2 ML/d of potable water. Dowdens has infield project resources located in both Brisbane and Mackay to service the above referenced projects as well as many others that Dowdens has completed in the last 4 years. Our Project resources include; Project Managers, Engineers, Draftspersons, Project Co-oridinators, Electricians, Plumbers, Fitters and T/A's with a wealth of experience working in the Municipal, Mining and Industrial industries throughout Queensland.	**Mining/Resources Industry** • Spring Gully Pond Telemetry, Origin Energy APLNG. Instrumentation, solar, batteries, RTUs • Site support QCLNG Delivery Station, Roma • Site supervision, electrical reticulation and lighting at Moranbah • Major gas pipeline for QCLNG. Electrical design of equipment. Review of equipment and contractors • Construction and Commissioning of two D.C. electric face shovels with static drives and state of the art control. Construction and commissioning of eight 240 tonne diesel electric haul trucks at Paraburdoo. • Design, procurement, construction and commissioning of a 500,000 tpa C.I.P. gold plant at Ravenswood. • Detailed Electrical Design and specification of major modifications to the de-sanding process at Nabalco's bauxite plant in Gove. • Engineering procurement of switchgear for South Walker Creek, Coal mine **Water and Wastewater Projects.** • Design, specifications and inspection of water treatment, pumping and telemetry at Stradbroke Island, Capalaba, Image Flat Landers Shute and Buderim. • Design, Specification of a Hydro power generation scheme at the Landers Shute WTP and Baroon Pocket Dam. • Design, specifications and contract administration of water pollution control works to 70,000 persons at Capalaba, Nambour, Suncoast, Burpengary East, Thursday Island, Bribie Island, Cleveland, and Maroochydore. • Design, specification and contract administration of Foul air removal, Backwash return pumps Fine Screens and the Disinfection Facilities at the Lower Molongolo Water Quality Control Centre. • Design, specification and contract administration of a floating raw water pump station with high voltage motors at Herring Lagoon on Stradbroke Island. • Design, specification and contract administration of numerous water and sewerage pump stations. • Design, specification and contract administration for telemetry-based SCADA systems for Redland Shire Council, Noosa Council, Maroochy Shire Council, Caloundra City Council. • Waste to Energy composting plant, Yatala. • Food Organic Waste Organic power plant, Byron Bay Other experiences attached with submission	1. PROJECT ONE Alpha & Jericho WTP Electrical and Control Systems Upgrade Client Name: Barcaldine Regional Council Contract Value: $100,900.00 2. PROJECT TWO Heron Island Resort RO WTP Condition Assessment, Renewal Strategy and RO Membrane Replacement Client Name: Aldesta Heron Island Pty Ltd Contract Value: $125,000 3. PROJECT THREE Couran Cove Resort RO WTP Operation and Maintenance Client Name: South Stradbroke Caretaking Services Pty Ltd Contract Value: $260,000 (for 2020 period including projects) Other projects in a similar field that have been completed over the previous 12 months include: • University of Queensland – Gatton Campus – Advice on Laboratory waste treatment and suitability for treatment by existing STP • Tangalooma Island Resort – Drinking Water Quality Assessment, Monitoring Program and Management Plan • Aldesta Heron Island Pty Ltd – Heron Island Environmental Protection Order (EPO) Investigation • Bombardier – QR New Generation Rolling Stock Project, potable water supply system risk assessment • Parks & Wildlife Services Tasmania – STP process review and environmental compliance assessment and various other advisory projects
(d)	**Provide a construction programme showing the dates by which or the times within which the various stages or parts of the works are to be completed or executed. The program should be in a Gantt Chart type format and preferably electronically generated.**	Procurement- 19/03/21-12/04/21 Tender award sign off – 19/03/21-12/04/21 Site Survey- 19/03/21-23/04/21 Document Survey- 26/03/21-7/05/21 Drawing/Document preparation- 10/05/21-21/05/21 Site works- 17/05/21-21/05/21 Training videos/documentation preparation- 24/05/21-04/06/21 Presentation- 07/06/21-11/06/21	Preliminaries: Project Kick-off/Site Meeting - 10 May to 11 May 2021 Design: 12 May -14 May 2021 Drafting: 17 May - 18 May 2021 Programming PLC/HMI: 18 May - 8 June 2021 Procurement: 27 May - 18 June 2021 Delivery to site: 21 June - 35 June 2021 Site Mobilisation: 5 July - 6 July 2021 Installation: 7 July - 10 July 2021 Commissioning: 10 July - 13 July 2021 Site Demobilisation: 13 July - 14 July 2021 Handover: 13 July - 13 July 2021	Prepare HSEQ Plan-26/04/21 - 30/04/21 Initial site visit-05/03/21 - 5/05/21 Provide critique develop PLC code-6/05/21 - 26/05/21 Second site visit-27/05/21 - 9/06/21 Review with QSC on site -10/06/21 - 10/06/21 Submit Draft Operating instructions-11/06/21 - 1/07/21 QSC review -2/07/21 - 15/07/21 Submit Final Documentation- 16/07/21 - 29/07/21	Establishment and insurances: 12/04/21 - 25/06/21 Category 1: Operations Manual - 5/05/21 - 7/07/21 Category 2: Systems improvement - 5/05/21 - 24/06/21 Category 3: System Maintenance - 28/06/21 - 21/07/21
(e)	**Provide an estimated monthly cash flow schedule.**	Milestone 1 - Deposit 30%: $20,732.14 Milestone 2 - Deposit 60%: $41,464.28 Milestone 3 - Deposit 10%: $6,910.710	Deposit: 30% to accompany official purchase order Milestone 1: 30% upon completion of all off-site works and site mobilisation has been scheduled Milestone 2: 30% upon completion of on-site works Milestone 3: 10% upon completion of commissioning		1. First Invoice 30th April 2021 – Initial Site inspection and information gathering – approximately $12,500 (ex GST) 2. Second Invoice 31st May 2021 – Design upgrades and procurement of equipment and materials - $12,500 (ex GST) 3. Third Invoice 30th June 2021 – Progress payment - $15,000 (ex GST) 4. Fourth Invoice 30th July 2021 – Progress payment assuming Site Works completed - $25,000 5. Final Invoice on Practical Completion – Balance of Contract
(f)	**Provide details of proposed subcontractors.**	Industrial Software - PLC Program	Welcon - PLC / HMI code amendments	Richard Thew - Process Engineer Michael Simms - Water Engineer Nick Cumming - Software and Instrumentation Engineer	Our Site Works, Operation and Maintenance team is headed up by Gary Green (see attached profile) who will also provide specialist input to Electrical and Control Systems scope. Gary will be supported by a qualified Operator/Maintainer Technician and will manage the subcontractors: • SAGE Automation • Krave Electrical Subcontractors will be engaged and contracted under a purchase order with conditions, that clearly states the scope of work, and special requirements or standards, delivery times and price. Subcontractors when used on site will be supervised by our staff to ensure their practices comply with Council's requirements, particularly site security/access, fitness to work, safety and environmental controls.
(g)	**Provide details of proposed suppliers.**	Prominent - Dosing pumps Sigura - MC-5 chlorination System Evoqua - Deplox 5	Polymaster - Poly Tank Prominent - Dosing pumps, chemical tank level switches Vitchem - RO Membranes IMCD - Antiscalant Welcon - Control components Towner Raindrop - uPVC pipe and fittings Haymans - Electrician components REX - Flights to / from site Eromanga Hotel/Motel - Accommodation for Dowdens personnel	Depolox D400M - Chlorine analyser	• HACH Australia (instrumentation) • Local plumbing and electrical suppliers (e.g. Reece Plumbing, Haymans Electrical, etc. as required)
(h)	**Provide details of key personnel.**	1. Mark Collen Mark Collen holds an Honours degree in Industrial chemistry from University of Technology Sydney. He is a highly skilled industrial chemist with 20+ years industry experience having worked for tier one water treatment companies such as Nalco and Veolia Water. 2. Marcus Cordingley holds a Bachelor of Science (Australian Environmental Studies) from Griffith University and a Graduate Diploma of Education. He has worked with several industry leading companies on a wide variety of water treatment applications over the last 20 years. 3. Jamie Loughran holds a Bachelor of Business (Logistics and Operations Management) and BSc (Chemistry) from the University of Southern Queensland. He has worked in the water industry for 10+ years. 4. Esther Reimann Esther Reiman holds an advanced Diploma in Business and Accounting with an initial career as a qualified Physics Laboratory Scientist (R&D sector).	1. Project Manager: Paul Timms 2. Project / Process Engineer: Brad Thomas 3. Electrician: Mitchell Tomley 4. Plumber: Blake Brown	1. Ian Kennedy - Electrical Engineer & Project Manager 2. Richard Thew - Process Engineer 3. Michael Simms - Water Engineer 4. Nick Cumming - Software and Instrumentation Engineer	1. Matthew Reid - Chief Engineer / ESS Manager - Water Engineering & Drinking Water Quality 2. Gary Green - Acting Operations & Maintenance Manager All key management staff are covered by alternates. Key technical staff are also covered by alternates from the depth of expertise across the organisation. See the Alternatives below: 1. Terrence Allen - Senior Process Engineer - Process Support Water/Wastewater Engineer 2. Fiona Milnes - Environmental Scientist - Water Quality Scientific Support 3. Linda Nyamaswe - Environmental Engineer - Water Quality Scientific and Engineering Support 4. Stephanie Gaurvit - Process Engineer - Process Support Water/Wastewater Engineer 5. Amelie Perrault - Project Coordinator

Tender Summary

Council: Quilpie Shire Council
Job Title: Eromanga Water Treatment Plant - Upgrades
Job No: 200274
Closing Date/Time: 19th March 2021

		Aqualyng ICES	Dowdens Pumping & Water Treatment	KW Electric Pty Ltd	Simmonds & Bristow Pty Ltd
(i)	**Provide dot point details of the proposed work methods to be adopted for the major items of work. Details should include type & number of construction plant &/or equipment to be used**	1. Submit plan to QSC 2. Visit site - conduct preliminary survey, measurements, observations, interviews with stakeholders (plumbing, maintenance team, etc) 3. Download software code from plant for modification. 4. Install modern for updating program. 5. Provide drawings for changes, chlorine monitoring unit install including any process changes for HMI system. 6. Install calcium hypochlorite (chlorination) unit, move CIP tank. 7. Provide all documentation and film training video. 8. Present plant, documentation, and video including training session. 9. Any other issues.	Conduct project kick-off meeting on-site with Dowdens and QSC personnel to finalise scope of works and introduce Dowdens project personnel. - Attempt to recover PLC / HMI codes from existing control panel (if QSC are unable to provide beforehand), take a material take-off approved scope of works. - Off-site, procure materials required, amend PLC / HMI code, prepare documents, schedule freight and personnel mobilisation. - Package and ship required materials and tools to site. - Mobilise to site, Dowdens' infield personnel will DIDO to Eromanga from Brisbane, Dowdens' commissioning engineer will FIFO to Quilpie from Brisbane and Dowdens' Sub-contractor Welcon will FIFO to Quilpie from Brisbane. - Setup / configure the WTP to run during the night so that upgrade works can be progressed during each day without impacting potable water supply to town. On occasion, the potable reticulation pumps may need to be powered down temporarily to allow our electrician to electrically terminate and new equipment and instrumentation to be installed, as part of the approved upgrade scope of works, in the main control panel. - Infield plumber will, during the plant shutdowns, complete all mechanical component upgrades as per the approved upgrade scope of works. - Dowdens' programmer sub-contractor will download and test the amended PLC / HMI code as part of the plant recommissioning process as per the approved upgrade scope of works. - Dowdens will investigate high permeate conductivity issue and replace components as required. - Dowdens will recommission the amended processes with a detailed commissioning document detailing tasks completed and performance achieved. - Conduct detailed operator training on how to operate the WTP and adjust the operating parameters, for when the raw water quality fluctuates, to ensure the target treated water quality is maintained. - Handover plant to QSC - Tidy site and demobilise	1. Prepare and submit the kW electric HSEQ Plan to the QSC Superintendent / Principal's Representative for review and acceptance. 2. Initial site visit by kw electric's Electrical Engineer to: -Commence the project including discussing the project with the QSC Superintendent / Principal's Representative; - Gather information including plant operating data and download the PLC & HMI code; -Inspect the current state of the instruments, PLC IO wiring and electrical controls/wiring; -Inspect and document (photograph) the potential location(s) for the chlorine residual analyser / controller and associated cable routing; and -Thoroughly photo document the WTP. 3. Provide a critique (prepared by kW electric's Process Engineer [subconsultant] in technical memorandum format) of the prior operations reports and the identified remedial actions. 4. Second site visit by kw electric Process Engineer, Software Engineer[subconsultant] and Electrician to: -Inspect the site and review the plant's operation; -Discuss the project objectives and resolve any initial operating issues with the QSC Superintendent / Principal's Representative and the plant operator; -Check the identified problematic components / controls (note the exclusions from the tender); -Install and commission the new chlorine analyser; -Load the revised PLC & HMI code and conduct a site acceptance test; -Submit the draft simplified operating instructions prepared by kW electric's Process Engineer to the QSC Superintendent / Principal's Representative for comment whilst the team is on site; and -Review the QSC comments and action all issues. 5. Submit final documentation to the QSC Superintendent / Principal's Representatives. 6. Third site visit 11 months by kW electric's Process Engineer after completion to report (prepared by kW electric's Process Engineer in technical memorandum format) on the plant's revised operating status.	Item 0: Establishment and Insurances Item 1: Prepare procedure for opening of the media filters, and the removal and replacement of the media Item 2: Establish a formal monthly preventive maintenance task to observe backwash water flow through the site glass and record the time taken for the water to clear Item 3: Trend pre and post media filter pressures and display these for easy access and interpretation and process control changes Item 4: Prepare procedure for the operation and maintenance of the UV disinfection system Item 5: Develop a schematic of the flow paths through the RO membrane units Item 6: Trend pre and post RO membrane pressures and display for easy access and interpretation and process control changes Item 7: Trend pre and post RO membrane EC and display for easy access and interpretation and process control changes, in particular membrane replacement Item 8: Produce a simple yet comprehensive Operating Manual for the Water Treatment Plant – maximum 10 pages if possible Item 9: Document an ongoing maintenance program for the RO system, including follow up inspection and maintenance after completion of contracted works Item 10: (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes Item 11: Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this Item 12: Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly Item 13: Modify the SCADA to include an operator adjustable EC setpoint on the touch screen Item 14: Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated Item 15: Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure Item 16: Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing Item 17: Develop a system for the storage of sodium hypochlorite that results in shorter holding times Item 18: Investigate the elevated post RO membrane EC and provide recommendations. (i.e.due to failed membranes, or faulty seals, etc.)
(j)	**Provide a list of alternative materials and/or equipment and their details, if alternatives are nominated.**	Calcium Hypo chlorite system MC-5	Item 9- Replacement parts, consumables and chemicals have not been included and will quoted / charge as appropriate. Item 10 • 1000L poly tank • 1 set of valves, pipework Item 15 • Prominent Dosing Pumps • Cables (remote start, alarm relay) • Chemical Tank Level Switch Item 16 • Prominent pH / Residual free chlorine analyser / controller • pH and residual free chlorine probes Item 17 • Chemical drum bund suitable for 20L drums Item 18 • Chemicals to complete chemical clean of installed RO membranes Item 25		N/A
(k)	**Area of Site required for the works, in particular if larger than what is provided for in the Contract.**	Plant area to move CIP tank.	Area required will depend on options / variations approved by Council. Nominally an approx. 1m2 area will be required, currently occupied by a chemical storage bund, would be required to house a new CIP tank immediately outside the WTP building. Any other temporary works, such as laydown and cutting station, will be setup in the available free space on-site and will not impact the access to and operation of the WTP.		The area listed in the scope of work and sited on inspection is sufficient.
(l)	**Status of Quality Assurance System/Accreditation.**	ISO9001_2015 2020 ISO45001_2018 2020	Does not hold formal Accreditation.	Third Party Accredited: AS/NZS 4801: Safety OHSAS 18001: Safety ISO 14001: Environment ISO 9001: Quality	BSI: ISO 9001:2015 Certificate Number: FS 520982 SAI Global: Acknowledgement of Application ISO 14001: Environmental ISO 45001: 2018 Occupational Health and Safety Management Systems
(m)	**Public liability cover Policy No.**	BN-CAS-19-410367-A	XL INSURANCE COMPANY LIMITED VERTEX ABN:36 083 570 441 Policy # AU00004306LI20A Expiration: 24/09/2021 Amount Covered: $20,000,000.00	141AN00140COM	Insurance Company: Chubb Insurance Australia Limited Policy Number : SGL0002728 Expiry Date: 28 August 2021 Indemnified Amount: AUD 20,000,000
(n)	**Workcover status.**	Policy number: WHA990316204	WORK COVER QUEENSLAND Policy # WAD120899183 Expiration Date: 30/09/2021	WPR180345363	Policy Number : WAA810766965 Expiry Date: 30 September 2021
(o)	**Provide a list of assumptions made in the tender.**	•Simple access to site •rapid availability of documents as required •Access to PLC code readily available and modification of code able to be conducted using standards means. •Age of PLC does not preclued access to standard ethanet cable, mobile access to allow off site programming is present •access to permeate sampling points •access to personnel for training, all within normal hours (8am-4pm) •CIP tank of 200L easy to move no crane required •wiring to CIP tank is minimal •local electrician to to electrical work assume 3 hours on site	Item 1 • Performance of Media Filters, as is, is suitable for the RO and will not be modified by Dowdens • Replacement of media is not required as part of these works Item 3 • Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost. • Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware. Item 4 Performance of UV unit, as is, is suitable for the RO and will not be modified by Dowdens • Replacement of UV lamp, thimble or other components is not required as part of these works Item 6 • Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost. • Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware. Item 7 • Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost. • Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware. Item 8 • Document will be based on the Troubleshooting Guide Dowdens prepared for the Nebo WTP in 2019 with the addition of corrective actions for critical faults. • In the event of major process failure, such as failed RO membranes or pump motor fault, Dowdens assumes the affected equipment or process unit will be isolated and / or by-passed until the issue is investigated by the appropriate personnel / contractor. Item 9 • Dowdens have made allowances for one of our technicians to travel to / from Eromanga once every 3 months to complete a service on the process and perform the recommended preventative maintenance tasks (i.e. CIP of RO membranes, calibrate instruments, etc.) Item 10 • Council has no objections to the proposed location of the new tank. Item 11 • Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost. Item 12 • Dowdens assumes that either QSC will be able to provide native files, with notations, for both	For this tender, kW electric assumes that: 1. All prior documentation for the WTP will be found and provided to kW electric on contract award. 2. The QSC nominated staff or representatives including the operator will be available when kW electric staff or sub-consultants are on site. 3. The WTP instruments are all in working order and calibrated; 4. The PLC and HMI are in working order and the PLC and HMI code can be uploaded; 5. The PLC input and output wiring and the control wiring is sound with no faults or disconnections or work arounds. If there are any faults or disconnections or work arounds, kW electric will document them for Council; and 6. The existing PLC/HMI can trend data. For this tender, kW electric exclude: 1. Replacing any WTP instruments that are not in working order. This can be undertaken for QSC if required as a variation to the Contract Sum; 2. Calibrating any WTP instruments that are not calibrated; and 3. Rectifying any faults or disconnections or work arounds in the PLC input and output wiring and the control wiring. 4. Any civil works needed to move equipment	These prices do not include: • Design and installation of dedicated Data Historian and proprietary data trending software • Licence costs involved with the SWIMS system • Additional meetings other than those indicated in our offer (this proposal) • Design or safety (e.g. HAZOP) workshops • We have assumed that if successful we will be able to book accommodation in Eromanga for the duration of the Site Works (well in advance and avoiding peak tourist periods). If this is not possible we will require a variation order for the additional daily travel and expenses (vehicle and fuel) from Quilpie to Eromanga • This proposal is valid for 30 days, from date of issue.

Tender Summary

Council: Quilpie Shire Council
Job Title: Eromanga Water Treatment Plant - Upgrades
Job No: 200274
Closing Date/Time: 19th March 2021

		Aqualyng ICES	Dowdens Pumping & Water Treatment	KW Electric Pty Ltd	Simmonds & Bristow Pty Ltd
(p)	**Provide a list of any qualifications of the tender offer.**	Mark Collen holds an Honours degree in Industrial chemistry from University of Technology Sydney. He is a highly skilled industrial chemist with 20+ years industry experience having worked for tier one water treatment companies such as Nalco and Veolia Water. Marcus Cordingley holds a Bachelor of Science (Australian Environmental Studies) from Griffith University and a Graduate Diploma of Education. He has worked with several industry leading companies on a wide variety of water treatment applications over the last 20 years. Jamie Loughran holds a Bachelor of Business (Logistics and Operations Management) and BSc (Chemistry) from the University of Southern Queensland. He has worked in the water industry for 10+ years. Esther Reiman holds an advanced Diploma in Business and Accounting with an initial career as a qualified Physics Laboratory Scientist (R&D sector).	Fees associated with holding Bank Guarantees (2* 2.5% of Contract Value) have been accounted for in our offer. - Liability Clause 14.2 - Cross Liability clause will not be required as the insurances will not be in the joint names (as per AS4905:2002). - Dowdens propose to reduce Liquidated Damages to $0 per day with the final milestone payment of 10% claimable only after successful recommissioning of the upgraded WTP processes and conclusion of the recommended additional Operator Training. Dowdens has a reputation from not walking away from our Clients and always meet our contractual obligations. - Recommended additional scope of works detailed in the attached technical proposal.	Ian Kennedy - Electrical Engineer & Project Manager Richard Thew - Process Engineer Michael Simms - Water Engineer Nick Cumming - Software and Instrumentation Engineer	Part A - Item8 Contractor's security Partially Compliant We will not provide a bank guarantee. We offer in substitution either 5% retention for security or a Bank Check in favour of council to the value of 5% of the Contract Sum. Part A- 14 Delay Damages, rate (subclause 20.6) Non-Compliant Simmonds & Bristow won't accept the delay damages. Part A- Arbitration (subclause 27.3) Partially Compliant Simmonds & Bristow requests that "Arbitration" be replaced with the "Mediation". We feel this is a more practical and sensible resolution method in this circumstance. Part B-25A(c)(i) costs reasonably necessarily and not prematurely incurred by the Contractor up to the date of termination. Partially Compliant Simmonds & Bristow don't accept this clause change to: Part B-25A(c)(i) costs reasonably necessarily and not prematurely incurred by the Contractor up to the date of termination with 25% for profit. The reason for this change is that if the Principle wishes to terminate the contract, we would include the profit earned and the cost of work to date. It is unreasonable only to pay the cost without the profit.
(q)	**Other information the tenderer may consider relevant to the tender.**	Total combined experience of Aqualyng is around 200 years	Dowdens have not made any allowances to rectify the current issues with remote access to the existing HMI. However, whilst on-site, Dowdens will investigate and provide advice to Council for consideration and prepare an offer to supply install part of the solution if appropriate to do so.		1. Simmonds and Bristow Pty Ltd is a Brisbane-based, private Australian company. We provide an extensive range of scientific & engineering, operation & maintenance and operator training services for the water industry to Business, Industry and Government since 1965. We currently have approximately 47 staff members, with a network of operation and maintenance staff from Far North Queensland to Perisher Valley (Southern NSW). Simmonds & Bristow are fully certified by national and international accreditations and licenses as below (see Attachment Certificates): • All work is carried out in accordance with ISO9001, third party certified (BSI) quality assurance systems. • NATA Accreditation ISO17025 • We offer the services of two RPEQ engineering professionals, David Bristow (RPEQ 3810) and Matthew Reid (RPEQ 17636) • We hold a valid labour hire licence under the labour Hire (QLD) Act (License LHL-02237-P3R5M) • Registered Training Organisation (RTO Code 1735) since 1995 for the provision of water and sewerage plant & network operator training. 2. Simmonds & Bristow (S&B) is committed to the health and safety of all people at the workplace and to complying with the safety requirements outlined in the tender documents. Our WHSMS documents and policies and the allied processes we have adopted are consistent with the requirements outlined in: • Work Health and Safety Act 2011 (Qld) • Work Health and Safety Regulation 2011 (Qld) • How to Manage Work Health and Safety Risks Code of Practice 2011 (Qld).
Signed Tender Form					
Signed Schedule of Rates		☑	☑	☑	☑
Signed Daywork Rates		☑	☑	☑	☑
Signed Addendums		☐	☐	☐	☐
Date Received		25-Feb-21	19-Mar-21	19-Mar-21	19-Mar-21
Time Received		2:55pm	2:38pm	2:48pm	4:42pm
Other Comments					

Rfx Summary Report

GEORGE BOURNE & ASSOCIATES

Request for :

Eromanga Water Treatment Plant - Upgrades

VP reference Number : VP226689

Buyer reference Number : 200274

Opens 09/Feb/21 : Closes 19/Mar/21 05:00 PM E. Australia Standard Time

Cut-off date for supplier queries : Tuesday 16/Mar/21 05:00 PM E. Australia Standard Time

This request is not finalized.

4 Supplier responses as of the 31/Mar/21 03:54 PM

Request created by:
WILLIAM GREEN (wgreen@gbaengineers.com.au)

You have attached 3 documents to this request. You can find them in this zip file under '/RFXDocs/'

Quilpie Shire Council

Details of the request

Eromanga Water Treatment Plant - Upgrades

Estimated Value	$150,000 to 300,000 (hidden from suppliers)
Budgeted Value	Unknown

Buyer Details

Business:	GEORGE BOURNE & ASSOCIATES	
Location:	73 Elm St Barcaldine 4725, Queensland, Australia	
Web Site:	http://quilpie.qld.gov.au	
Business Overview:	The Shire of Quilpie is a local government area in South West Queensland, Australia. It covers an area of 67,633.5 square kilometres (26,113.4 sq mi), and its administrative centre is the town of Quilpie.	
Contact:	*Contact Name:*	WILLIAM GREEN
	Position:	Project Manager
	Main Phone:	0474148882
	Mobile Phone:	None Provided
	Email:	wgreen@gbaengineers.com.au
	Local Group:	Engineering Services

Dates:

Can be responded between:	09/Feb/21 and 19/Mar/21 05:00 PM E. Australia Standard Time
Supplier query cut-off:	Tuesday 16/Mar/21 05:00 PM (E. Australia Standard Time)
Decision Date:	09/Apr/21

What's required

The water supply system in Eromanga is a relatively complex system with four sub-artesian bores, raw water storage, media filtration, UV disinfection, micron prefiltration, RO membranes and breakpoint chlorine disinfection. The system was commissioned in 2014, having had the system in operation for approximately six years, Quilpie Shire Council have identified a range of action items that will improve the operation of the facility. The implementation of these improvement items would be suited to a water treatment specialist.
The scope of works for the provision of services can be applied to three broad categories, these categories include, developing operating procedures, actioning identified improvement items and undertaking necessary maintenance of the plant. The provision of these services by a water treatment specialist will improve the operational efficiency of the Plant for Quilpie Shire Council.

The following supplier lists were selected

1. Water & Sewage (Type: Public)

The following categories were selected

- Water & Sewage

1. Water & Sewage Treatment Plant Construction

Suppliers notified of this request

1 : 1300Locate via Water & Sewage
2 : 360 Engineering via Water & Sewage
3 : 360 Engineering Pty Ltd via Water & Sewage
4 : A C WHALAN (QUEENSLAND) PTY LTD via Water & Sewage
5 : A1 Earthworks Qld Pty Ltd via Water & Sewage
6 : AAA Industrial Services via Water & Sewage
7 : AAA Industrial Services via Water & Sewage
8 : AAU Construction & Maintenance Pty Ltd via Water & Sewage
9 : ABB Australia via Water & Sewage
10 : ABB AUSTRALIA PTY LIMITED via Water & Sewage
11 : Abergeldie Constructions Pty Ltd via Water & Sewage
12 : Abletech Underground VacX via Water & Sewage
13 : Absolut Constructions via Water & Sewage
14 : ABSOLUTE PIPE & FITTINGS via Water & Sewage
15 : Acciona Agua Australia Pty Ltd via Water & Sewage
16 : ACCIONA INFRASTRUCTURE AUSTRALIA PTY LTD via Water & Sewage
17 : ACE Environmental Solutions via Water & Sewage
18 : ACO PTY LTD via Water & Sewage
19 : ACOR Consultants (QLD) Pty Ltd via Water & Sewage
20 : ACRON PTY LTD via Water & Sewage
21 : ACRON PTY LTD via Water & Sewage
22 : ACTIVE WATER CO PTY LTD via Water & Sewage
23 : Adroit Piping Systems via Water & Sewage
24 : Advance Fire Technology Pty Ltd via Water & Sewage
25 : ADVANCED CONCRETE ENGINEERING PTY LTD via Water & Sewage
26 : Advanced Construction Projects via Water & Sewage
27 : Advanced Enviro-Septic via Water & Sewage
28 : AE Group Civil + Mining via Water & Sewage
29 : AEC Group Pty Ltd via Water & Sewage
30 : AECOM via Water & Sewage
31 : Aecom Australia Pty Ltd via Water & Sewage
32 : AECOM AUSTRALIA PTY LTD via Water & Sewage
33 : Aeramix Pty Ltd via Water & Sewage
34 : AESSEAL Australia Pty Ltd via Water & Sewage
35 : Aestec Services via Water & Sewage
36 : Ago Vires Pty Ltd via Water & Sewage
37 : AIR-MET SCIENTIFIC PTY. LTD. via Water & Sewage
38 : Airlie Excavations via Water & Sewage
39 : AirMet Scientific via Water & Sewage
40 : AIZER PLUMBING SOLUTIONS PTY LTD via Water & Sewage
41 : AK Gas & Plumbing via Water & Sewage
42 : AKILLIES PLUMBING PTY LTD via Water & Sewage
43 : Akwa Facility Maintenance via Water & Sewage
44 : Akzo Nobel Coatings Pty Ltd via Water & Sewage
45 : Akzo Nobel Pty Limited via Water & Sewage
46 : AkzoNobel via Water & Sewage
47 : Alder Constructions Pty Ltd via Water & Sewage

48 : ALIWELD POWER PTY LTD via Water & Sewage
49 : All Waste Water Solutions via Water & Sewage
50 : All Water Solutions via Water & Sewage
51 : AllenCon Pty Ltd via Water & Sewage
52 : AllGrid Energy via Water & Sewage
53 : Alliance Automation via Water & Sewage
54 : Alliance Automation Pty Ltd via Water & Sewage
55 : ALLIED CONCRETE CUTTING & DRILLING PTY LTD via Water & Sewage
56 : ALLSTAR INFRASTRUCTURE PTY LTD via Water & Sewage
57 : Allstrong Locksmiths via Water & Sewage
58 : Alpha Concepts Pty Ltd via Water & Sewage
59 : Amiad Australia Pty Ltd via Water & Sewage
60 : Amiad Water Systems via Water & Sewage
61 : Anthony Maloney Consulting via Water & Sewage
62 : APMS operations via Water & Sewage
63 : Aqseptence Group Pty Ltd via Water & Sewage
64 : AQSEPTENCE GROUP PTY LTD via Water & Sewage
65 : AQUA Projects & Strategic Asset Solutions via Water & Sewage
66 : AQUA WISE via Water & Sewage
67 : Aqua Wise via Water & Sewage
68 : AQUACURE WATER TREATMENT PTY LTD via Water & Sewage
69 : Aquaflow (NQ) Pty Ltd via Water & Sewage
70 : Aqualyng ICES via Water & Sewage (has responded)
71 : AQUALYNG ICES PTY LTD via Water & Sewage
72 : AQUAPS PTY LIMITED via Water & Sewage
73 : Aquarius Precast (Supplier no longer exists)
74 : Aquarius Precast (Supplier no longer exists)
75 : AQUASTREAM PTY LTD via Water & Sewage
76 : Aquatec Maxcon Pty Ltd via Water & Sewage
77 : AQUATEC MAXCON PTY LTD via Water & Sewage
78 : Aquatic Weed Harvester Pty Ltd via Water & Sewage
79 : Aquip Flowservices via Water & Sewage
80 : Arboriculture Contractors Australia via Water & Sewage
81 : ARID TO OASIS SOLUTIONS PTY LTD via Water & Sewage
82 : Arkwood (Gloucester) Pty. Limited via Water & Sewage
83 : Arnold Electrical and Data Installations Pty Ltd via Water & Sewage
84 : ASME Welding services PL T/A ASME Projects via Water & Sewage
85 : ASME WELDING SERVICES PTY LTD via Water & Sewage
86 : Asphalt Concepts Pty Ltd via Water & Sewage
87 : Asset Life Alliance via Water & Sewage
88 : ATC Williams Pty Ltd via Water & Sewage
89 : Atlantis Plumbing and Drainage via Water & Sewage
90 : Atlas CEA via Water & Sewage
91 : AUSPRESS SYSTEMS PTY LTD via Water & Sewage
92 : Aussie Hydro-Vac Services Pty Ltd via Water & Sewage
93 : AUSTEK PTY LTD via Water & Sewage
94 : AUSTRALIA WIDE LINING PTY LTD via Water & Sewage
95 : AUSTRALIAN CHEMICALS PTY LTD via Water & Sewage
96 : Australian Coating Solutions Pty Ltd via Water & Sewage
97 : AUSTRALIAN WATER MACHINES PTY LTD via Water & Sewage
98 : Australian Water Storage Group via Water & Sewage

99 : Austspray Environmental Weed Control Pty Ltd via Water & Sewage
100 : Automation Group via Water & Sewage
101 : Automation Group Pty Ltd via Water & Sewage
102 : Automation IT Pty Ltd via Water & Sewage
103 : Auzcon Pty Ltd via Water & Sewage
104 : Auzscot Constructions via Water & Sewage
105 : AVFI via Water & Sewage
106 : AVFI PTY LTD via Water & Sewage
107 : AVFI PTY LTD via Water & Sewage
108 : AVK Flow Control via Water & Sewage
109 : AVK FLOW CONTROL PTY LTD via Water & Sewage
110 : B.M.D. CONSTRUCTIONS PTY. LIMITED via Water & Sewage
111 : BARTO'S CONSTRUCTION PTY LTD via Water & Sewage
112 : BASF AUSTRALIA LTD. via Water & Sewage
113 : BC PROJECT INDUSTRIES PTY LTD via Water & Sewage
114 : BCT Water & Infrastructure Solutions via Water & Sewage
115 : BDR Projects Pty Limited via Water & Sewage
116 : BEAVIS & BARTELS PLUMBING PTY LTD via Water & Sewage
117 : Beel Solutions via Water & Sewage
118 : Bellrise Investments Pty Ltd via Water & Sewage
119 : Bellrise Investments Pty. Ltd. via Water & Sewage
120 : BELLRISE INVESTMENTS PTY. LTD. via Water & Sewage
121 : Bellwether via Water & Sewage
122 : Bellwether via Water & Sewage
123 : Bennett and Bennett via Water & Sewage
124 : BG&E via Water & Sewage
125 : Bigmate via Water & Sewage
126 : Bio-Gen Solutions via Water & Sewage
127 : Bioworx Pty Ltd via Water & Sewage
128 : BJT EQUIPMENT PTY LTD via Water & Sewage
129 : Bligh Tanner Pty Ltd via Water & Sewage
130 : blomfield environmental via Water & Sewage
131 : Blue water Contracting via Water & Sewage
132 : Blue Wave Projects via Water & Sewage
133 : Bluey Technologies Pty Ltd via Water & Sewage
134 : BMD via Water & Sewage
135 : BMD Constructions Pty Limited via Water & Sewage
136 : BMD Constructions Pty Limited via Water & Sewage
137 : BMD Urban Pty Ltd via Water & Sewage
138 : BMD URBAN PTY LTD via Water & Sewage
139 : BMT COMMERCIAL AUSTRALIA PTY LTD via Water & Sewage
140 : BOILERMAKERS AUSTRALIA.COM PTY LTD via Water & Sewage
141 : BOLWARRA ENTERPRISES ta Wongabel Quarries Concrete via Water & Sewage
142 : BONACCI INFRASTRUCTURE PTY LTD via Water & Sewage
143 : Border Civil Pty Ltd via Water & Sewage
144 : BRAID INDUSTRIES PTY LTD via Water & Sewage
145 : Brandon and Associates Pty Ltd via Water & Sewage
146 : Brimar via Water & Sewage
147 : Briody Plumbing Pty Ltd via Water & Sewage
148 : Brown Electrical via Water & Sewage
149 : BULL via Water & Sewage

150 : BULLIVANTS PTY LIMITED via Water & Sewage
151 : Burchills Engineering Solutions via Water & Sewage
152 : Burke Industries Pty Ltd via Water & Sewage
153 : BUSH2BEACH Plumbing & Water Treatment Services via Water & Sewage
154 : BUSHMANS GROUP PTY LIMITED via Water & Sewage
155 : Calibre Professional Services Pty Ltd via Water & Sewage
156 : Calix Limited via Water & Sewage
157 : Capricorn Plumbing & Building Supplies via Water & Sewage
158 : Caps Australia Pty Ltd via Water & Sewage
159 : Capstone Collective via Water & Sewage
160 : CARDNO (QLD) PTY LTD via Water & Sewage
161 : Cardno QLD Pty Ltd via Water & Sewage
162 : CASTLEBAR CONSTRUCTION & CIVIL PTY LTD via Water & Sewage
163 : CC P & C Pty Ltd via Water & Sewage
164 : CCA WINSLOW via Water & Sewage
165 : CDM Smith via Water & Sewage
166 : Celtic Construction & Utility Services via Water & Sewage
167 : CEQ via Water & Sewage
168 : CEQ AUSTRALIA via Water & Sewage
169 : Challenger Valves & Actuators via Water & Sewage
170 : CHALLENGER VALVES & ACTUATORS via Water & Sewage
171 : Cheapa 4 U Crane Hire Pty Ltd via Water & Sewage
172 : CHESHIRE CONTRACTORS PTY LTD via Water & Sewage
173 : CHRIS BUCKLEY PLUMBING via Water & Sewage
174 : Chris Dempsey Cranes via Water & Sewage
175 : Civil Mining & Construction Pty Ltd via Water & Sewage
176 : Civil Pipe Supplies via Water & Sewage
177 : CIVIL PROJECT SUPPORT SERVICES PTY LTD via Water & Sewage
178 : CIVILPIPES via Water & Sewage
179 : CIVILPLUS CONSTRUCTIONS PTY LTD via Water & Sewage
180 : CJETS CIVIL AND MECHANICAL via Water & Sewage
181 : Clayton's Plumbing via Water & Sewage
182 : CLEANAWAY EQUIPMENT SERVICES PTY LTD via Water & Sewage
183 : Cleanaway Operations Pty Ltd via Water & Sewage
184 : CLEANAWAY WASTE MANAGEMENT LIMITED via Water & Sewage
185 : CLEAR IDEA via Water & Sewage
186 : Clegg Town Planning via Water & Sewage
187 : Cleveland Bay Chemical Company via Water & Sewage
188 : Closedane Pty Ltd t/a JM Switchboards via Water & Sewage
189 : Clover Pipelines Pty Ltd via Water & Sewage
190 : CMP Corp Pty Ltd via Water & Sewage
191 : Coffeys EMS Pty Ltd via Water & Sewage
192 : COLEMAN DRAINAGE via Water & Sewage
193 : Colin Jackson Water Services via Water & Sewage
194 : Colin Moes & Associates via Water & Sewage
195 : COLLECTIVE CONTRACTING PTY LTD via Water & Sewage
196 : Comdain Infrastructure via Water & Sewage
197 : COMDAIN INFRASTRUCTURE PTY LTD via Water & Sewage
198 : Comlek Group Pty Ltd via Water & Sewage
199 : COMPLETE PIPELINE SERVICE via Water & Sewage
200 : COMPLEX CIVIL INFRASTRUCTURE SERVICES PTY LTD via Water & Sewage

201 : Concept Environmental Services via Water & Sewage
202 : CONCEPT ENVIRONMENTAL SERVICES PTY LTD via Water & Sewage
203 : Conhur Pty Ltd via Water & Sewage
204 : CONHUR PTY LTD via Water & Sewage
205 : Conspectus via Water & Sewage
206 : Conspectus (QLD) Pty Ltd via Water & Sewage
207 : Conspectus (Qld) Pty Ltd via Water & Sewage
208 : Construction Sciences Pty Ltd via Water & Sewage
209 : ConsultCivil Pty Ltd via Water & Sewage
210 : CONSULTJR STRATEGIC ENGINEERING SERVICES PTY LTD via Water & Sewage
211 : Consys Consulting Engineering via Water & Sewage
212 : Continental Water Systems Pty Ltd via Water & Sewage
213 : CONTRACT ELECTRICAL (QLD) PTY. LTD. via Water & Sewage
214 : Control Logic via Water & Sewage
215 : Control Logic Pty Ltd via Water & Sewage
216 : COOLOOLA PUMP & IRRIGATION PTY. LTD. via Water & Sewage
217 : Country-Wide Water Pty Ltd via Water & Sewage
218 : Covey Associates Pty. Ltd. via Water & Sewage
219 : CPM Advisory & Project Management via Water & Sewage
220 : CRC Electrical & Refrigeration via Water & Sewage
221 : Create Security Pty Ltd via Water & Sewage
222 : CREST CIVIL & STRUCTURES PTY LTD via Water & Sewage
223 : Crest Plumbing Supplies Pty Ltd via Water & Sewage
224 : CRS (Geomatics) Pty Ltd via Water & Sewage
225 : CS G.A.S. PTY. LTD. via Water & Sewage
226 : CTRC via Water & Sewage
227 : CURRY PROJECT MANAGEMENT PTY LTD via Water & Sewage
228 : CV SERVICES PTY LTD via Water & Sewage
229 : CVSG ELECTRICAL CONSTRUCTION PTY LIMITED via Water & Sewage
230 : CWD Group via Water & Sewage
231 : D and K Kay Plumbing via Water & Sewage
232 : D&J'S CIVIL CONSTRUCTION PTY LTD via Water & Sewage
233 : D&K lawson plumbing via Water & Sewage
234 : Damos Qld via Water & Sewage
235 : Dando Civil Solutions via Water & Sewage
236 : Dando Civil Solutions Pty Ltd via Water & Sewage
237 : DANFOSS (AUSTRALIA) PROPRIETARY LIMITED via Water & Sewage
238 : DATA RIGHT PTY LTD via Water & Sewage
239 : Dawsons Engineering (N.Q) Pty Ltd via Water & Sewage
240 : Dawsons Engineering (N.Q) Pty Ltd via Water & Sewage
241 : DCG via Water & Sewage
242 : DCG via Water & Sewage
243 : DCG Company Pty Ltd via Water & Sewage
244 : DE.MEM-AKWA PTY LTD via Water & Sewage
245 : De.mem-Akwa Pty Ltd via Water & Sewage
246 : DE.MEM-AKWA PTY LTD via Water & Sewage
247 : DEMACS CONSTRUCTIONS AUST PTY. LTD. via Water & Sewage
248 : Development Construction Pty Ltd (Devcon) via Water & Sewage
249 : DGH ENGINEERING PTY LTD via Water & Sewage
250 : DHI Water and Environment Pty Ltd via Water & Sewage
251 : DIRECT PERSONNEL SERVICES PTY LTD via Water & Sewage

252 : DJK Electrical Services Pty Ltd via Water & Sewage
253 : DMT GmbH & Co. KG via Water & Sewage
254 : Dormway via Water & Sewage
255 : Dowdens Group via Water & Sewage
256 : Dowdens Group Pty Ltd via Water & Sewage
257 : Dowdens Group Pty Ltd via Water & Sewage
258 : Dowdens Pumping & Water Treatment via Water & Sewage
259 : Dowdens Pumping & Water Treatment via Water & Sewage (has responded)
260 : Dowdens Pumping and Water Treatment via Water & Sewage
261 : Dowdens Pumping and Water Treatment via Water & Sewage
262 : Down2earth Signage and Installation Pty Ltd via Water & Sewage
263 : Downer via Water & Sewage
264 : DOWNER PIPETECH PTY LIMITED via Water & Sewage
265 : DOWNER PIPETECH PTY LTD via Water & Sewage
266 : Downer PipeTech Pty Ltd via Water & Sewage
267 : Dozer Enterprises P/L ATF The Pavitt Family Trust via Water & Sewage
268 : DPM Water Pty Ltd via Water & Sewage
269 : DRIVE SOLUTIONS NQ PTY LTD via Water & Sewage
270 : Duratec Australia via Water & Sewage
271 : DYFA PTY LTD via Water & Sewage
272 : Dynamic Hydro Excavations Pty Ltd via Water & Sewage
273 : Dynapumps QLD via Water & Sewage
274 : E2DESIGNLAB via Water & Sewage
275 : East West Dive & Salvage via Water & Sewage
276 : EBRO-ARMATUREN via Water & Sewage
277 : Ecosol Pty Ltd via Water & Sewage
278 : EDgineering via Water & Sewage
279 : EDMS Australia via Water & Sewage
280 : EJ via Water & Sewage
281 : ELECTRICAL CONTROL INSTRUMENTATION GROUP via Water & Sewage
282 : Electro Motives via Water & Sewage
283 : Elite HDD Pty Ltd via Water & Sewage
284 : Elite Piping & Civil Pty Ltd via Water & Sewage
285 : Elster Metering Pty Ltd via Water & Sewage
286 : EMACS ELECTRICAL & MECHANICAL REPAIRS via Water & Sewage
287 : Emergency Trade Services via Water & Sewage
288 : ENDRESS & HAUSER AUSTRALIA PTY LIMITED via Water & Sewage
289 : Endress + Hauser via Water & Sewage
290 : Endress+Hauser via Water & Sewage
291 : Engeny Water Management via Water & Sewage
292 : Engineering and Pipe Welding via Water & Sewage
293 : Engineering Applications Pty Ltd via Water & Sewage
294 : Enprocon (QLD) Pty Ltd via Water & Sewage
295 : Ensbey Electrical via Water & Sewage
296 : ENVIRA HOLDINGS PTY LTD via Water & Sewage
297 : Enviro One Services and Installation via Water & Sewage
298 : ENVIRO ONE SERVICES AND INSTALLATIONS PTY LTD via Water & Sewage
299 : Enviroconcepts via Water & Sewage
300 : Enviroconcepts International via Water & Sewage
301 : Enviropacific via Water & Sewage
302 : Enviropacific Services Pty Ltd via Water & Sewage

303 : Envirosmart Industrial Pty Ltd via Water & Sewage
304 : Envrionmental Data Services via Water & Sewage
305 : Enwaste Environmental Services via Water & Sewage
306 : EpiMax via Water & Sewage
307 : Epoca Constructions Pty Ltd via Water & Sewage
308 : ESG SERVICES PTY LTD via Water & Sewage
309 : Essential Water and Energy Services via Water & Sewage
310 : ETS via Water & Sewage
311 : Evergreen Wastewater via Water & Sewage
312 : Everhard Industries Pty Ltd (Geebung Qld) via Water & Sewage
313 : Everything Water Australia P/L via Water & Sewage
314 : Evo Energy Technologies via Water & Sewage
315 : Evoqua Water Technologies via Water & Sewage
316 : Evoqua Water Technologies via Water & Sewage
317 : Evoqua Water Technologies via Water & Sewage
318 : Excavators On Site via Water & Sewage
319 : F.K. GARDNER & SONS PTY. LTD. via Water & Sewage
320 : FABRIC SOLUTIONS AUSTRALIA PTY LTD via Water & Sewage
321 : Farmbot via Water & Sewage
322 : FD Engineering via Water & Sewage
323 : Fewster Brothers Contracting Pty Ltd via Water & Sewage
324 : FIRE RESCUE SAFETY AUSTRALIA PTY LTD via Water & Sewage
325 : Firstcall plumbing via Water & Sewage
326 : Fitt Resources via Water & Sewage
327 : FITT RESOURCES PTY LIMITED via Water & Sewage
328 : FloatPac Solar via Water & Sewage
329 : FLOWPRO PTY LTD via Water & Sewage
330 : Flowserve Pump Division via Water & Sewage
331 : FLUID Project Group via Water & Sewage
332 : FORCE TECH PTY. LTD. via Water & Sewage
333 : FormDirect via Water & Sewage
334 : Fox Environmental Systems via Water & Sewage
335 : Freyssinet Australia via Water & Sewage
336 : FREYSSINET AUSTRALIA PTY LTD via Water & Sewage
337 : Fulton Hogan Construction Pty Ltd via Water & Sewage
338 : Fusion Piping Pty Ltd via Water & Sewage
339 : FUSION PLASTICS PTY LTD via Water & Sewage
340 : Future-Plus Environmental via Water & Sewage
341 : FUTURE-PROOF SOLUTIONS PTY LTD via Water & Sewage
342 : G and H Plant Hire Pty Ltd via Water & Sewage
343 : GANDEN Pty Ltd via Water & Sewage
344 : GARDNER DENVER INDUSTRIES PTY LIMITED via Water & Sewage
345 : Gavin Groves Plumbing via Water & Sewage
346 : GCE Contractors Pty Ltd via Water & Sewage
347 : GCE CONTRACTORS PTY. LTD. via Water & Sewage
348 : GEA NU-CON PTY LIMITED via Water & Sewage
349 : Genesis Engineering (NQ) Pty Ltd via Water & Sewage
350 : Geofabrics Australasia Pty Ltd via Water & Sewage
351 : GEOFF WARD PLUMBING & GAS via Water & Sewage
352 : George Bourne & Associates via Water & Sewage
353 : GEOVERT GROUND ENGINEERING PTY LTD via Water & Sewage

354 : GHD via Water & Sewage
355 : GHD Digital via Water & Sewage
356 : GHD Pty Ltd via Water & Sewage
357 : Gleeson's Waste Water Services via Water & Sewage
358 : Glincoat via Water & Sewage
359 : GLOBAL MANUFACTURING GROUP via Water & Sewage
360 : Global Waste Services via Water & Sewage
361 : GNM Group (Qld) Pty Ltd via Water & Sewage
362 : GNM Group (Qld) Pty Ltd via Water & Sewage
363 : GOLDING CONTRACTORS PTY LTD via Water & Sewage
364 : Goldward Excavations via Water & Sewage
365 : Gough Plastics via Water & Sewage
366 : Grenof via Water & Sewage
367 : Grenof Pty Ltd via Water & Sewage
368 : Grenof Pty Ltd via Water & Sewage
369 : Grenof Water Technologies Pty Ltd via Water & Sewage
370 : GRUNDFOS PUMPS PTY. LTD. via Water & Sewage
371 : GUIDERA O'CONNOR PTY LTD via Water & Sewage
372 : GUIDERA O'CONNOR PTY LTD via Water & Sewage
373 : GULF CIVIL PTY LTD via Water & Sewage
374 : Gympie Septic Pump Outs via Water & Sewage
375 : H.L.C. ENTERPRISES PTY LTD via Water & Sewage
376 : H2Flow Water Services via Water & Sewage
377 : Hach Australia via Water & Sewage
378 : Hague Plumbing Civil and Gas via Water & Sewage
379 : Hamilton via Water & Sewage
380 : HAMPIDJAN AUSTRALIA via Water & Sewage
381 : Harpley Plumbing Services via Water & Sewage
382 : Hartecs Group via Water & Sewage
383 : Hatch Pty Ltd via Water & Sewage
384 : Hatfield Electrical Pty Ltd via Water & Sewage
385 : HAWKINS TRANSPORT (QLD) PTY LTD via Water & Sewage
386 : HDD Services via Water & Sewage
387 : Heaton Plant & Pipeline via Water & Sewage
388 : Heaton Plant and Pipeline via Water & Sewage
389 : heaton plant and pipeline via Water & Sewage
390 : Heavy Equipment Hire Pty Ltd via Water & Sewage
391 : Height Dynamics ATF The Height Dynamics Unit Trust via Water & Sewage
392 : HH CIVIL PTY LTD via Water & Sewage
393 : HH CIVIL PTY LTD via Water & Sewage
394 : HH CIVIL PTY LTD via Water & Sewage
395 : HIDROSTAL AUSTRALIA PTY LTD via Water & Sewage
396 : Hills Limited via Water & Sewage
397 : Hinterland Water Supplies via Water & Sewage
398 : HMA Flow & Industrial Pty Ltd via Water & Sewage
399 : HMA Flow and Industrial Pty Ltd via Water & Sewage
400 : Hornick Constructions Pty Ltd via Water & Sewage
401 : HTD Kerbmarkers via Water & Sewage
402 : HTQ CIVIL PIPE MINING via Water & Sewage
403 : Hudson's Specialist Maintence Services via Water & Sewage
404 : HUESKER AUSTRALIA PTY LTD via Water & Sewage

405 : HUGHES CONTRACTING GROUP PTY LTD via Water & Sewage
406 : Humes via Water & Sewage
407 : HUNTER ALLIANCE via Water & Sewage
408 : HUNTER ALLIANCE via Water & Sewage
409 : HUTCHINSON BUILDERS via Water & Sewage
410 : HVAC Australia Pty Ltd via Water & Sewage
411 : Hyatt Plumbing via Water & Sewage
412 : Hygrade Water Australia via Water & Sewage
413 : Hygrade Water Australia Limited Partnership via Water & Sewage
414 : Hygrade Water Australia Limited Partnership via Water & Sewage
415 : Hygrade Water Australia Limited Partnership via Water & Sewage
416 : Hygrade Water Infrastructure via Water & Sewage
417 : Iceblast CQ via Water & Sewage
418 : IDENTIFIED PROTECTIVE COATING SERVICES PTY LTD via Water & Sewage
419 : IMPACT BLUE PTY LTD via Water & Sewage
420 : Incospec P/L via Water & Sewage
421 : INDUSTRIAL CONTROLS AUSTRALIA PTY LTD via Water & Sewage
422 : INDUSTRIAL CONTROLS AUSTRALIA PTY LTD via Water & Sewage
423 : Infranew via Water & Sewage
424 : INFRASOL GROUP PTY LIMITED via Water & Sewage
425 : Infrastructure Rehabilitation Services Pty Ltd via Water & Sewage
426 : Inspections X-Ray and Testing via Water & Sewage
427 : Interflow Pty Limited via Water & Sewage
428 : IPLEX PIPELINES via Water & Sewage
429 : Iplex Pipelines via Water & Sewage
430 : Iplex Pipelines via Water & Sewage
431 : Iplex Pipelines Australia Pty Limited via Water & Sewage
432 : Iplex Pipelines Australia Pty Ltd via Water & Sewage
433 : Iplex Pipelines Australia Pty Ltd via Water & Sewage
434 : Iris Integration Pty Ltd via Water & Sewage
435 : ISENRING ELECTRICS PTY. LTD. via Water & Sewage
436 : Iwaki Pumps Australia via Water & Sewage
437 : IWAKI PUMPS AUSTRALIA PTY LTD via Water & Sewage
438 : J & P Richardson Industries Pty ltd via Water & Sewage
439 : J & P Richardson Industries Pty Ltd via Water & Sewage
440 : J. HUTCHINSON PTY. LTD. via Water & Sewage
441 : J. HUTCHINSON PTY. LTD. via Water & Sewage
442 : J.T MURRIHY & S.J MURRIHY via Water & Sewage
443 : JAC Civil Pty Ltd via Water & Sewage
444 : Jackson Semler Pty Ltd via Water & Sewage
445 : Jamie William Franks via Water & Sewage
446 : Jason Cummings Electrical Service via Water & Sewage
447 : JDF Plumbing & Drainage via Water & Sewage
448 : JDP Applications via Water & Sewage
449 : Jeffries Project Services via Water & Sewage
450 : JFM Civil Contracting Pty Ltd via Water & Sewage
451 : JFP Urban Consultants Pty Ltd via Water & Sewage
452 : JG Environmental Pty Ltd via Water & Sewage
453 : Jimboomba Industrial Pty Ltd via Water & Sewage
454 : JLN Electrical via Water & Sewage
455 : JM PLUMBING & CIVIL via Water & Sewage

456 : JMH Plumbing & Drainage via Water & Sewage
457 : JMS Group Australia via Water & Sewage
458 : John Holland Pty Ltd via Water & Sewage
459 : JOHN R KEITH CENTRAL QLD PTY LTD via Water & Sewage
460 : John's Plumbing Service via Water & Sewage
461 : Jones Nicholson QLD via Water & Sewage
462 : JP PIPING SYSTEMS PTY LTD via Water & Sewage
463 : K & J Adeville Pumping Supplies Pty Ltd via Water & Sewage
464 : K & R PLUMBING SUPPLIES via Water & Sewage
465 : KB Pipelines via Water & Sewage
466 : KCB AUSTRALIA PTY LTD via Water & Sewage
467 : Kehoe Myers Consulting Engineers Pty Ltd via Water & Sewage
468 : Keita Services Pty Ltd via Water & Sewage
469 : KELAIR PUMPS AUSTRALIA PTY LTD via Water & Sewage
470 : KELLOGG BROWN & ROOT PTY LTD via Water & Sewage
471 : Kellogg Brown & Root Pty Ltd via Water & Sewage
472 : Kelly's Australia via Water & Sewage
473 : KHONMAC PTY LTD via Water & Sewage
474 : Kingspan Water & Energy Pty Ltd via Water & Sewage
475 : Kirbro Contracting pty ltd via Water & Sewage
476 : KITO PWB via Water & Sewage
477 : Knobel Engineers via Water & Sewage
478 : Konnect Fastening Systems via Water & Sewage
479 : KontraTech Pty Ltd via Water & Sewage
480 : Koppens Developments Pty Ltd via Water & Sewage
481 : KPG Industries via Water & Sewage
482 : KPNCC via Water & Sewage
483 : Krohne Australia Pty Ltd via Water & Sewage
484 : KROHNE AUSTRALIA PTY. LIMITED via Water & Sewage
485 : KSB AUSTRALIA PTY LTD via Water & Sewage
486 : KSB Australia Pty Ltd via Water & Sewage
487 : KSB AUSTRALIA PTY LTD via Water & Sewage
488 : KSB Australia Pty Ltd via Water & Sewage
489 : KSB Pumps Australia via Water & Sewage
490 : KVAC ENVIRONMENTAL SERVICES PTY LTD via Water & Sewage
491 : KW ELECTRIC PTY LTD via Water & Sewage (has responded)
492 : L & S Rosenberg Plumbing & Drainage via Water & Sewage
493 : Lally Plumbing and Gas via Water & Sewage
494 : Lambert Locations Pty Ltd via Water & Sewage
495 : LANDPARTNERS PTY LTD via Water & Sewage
496 : Landscapers plus Brisbane via Water & Sewage
497 : LDI Constructions (Qld) Pty Ltd via Water & Sewage
498 : Lee's Environmental via Water & Sewage
499 : Lee's Environmental via Water & Sewage
500 : Liquitech (QLD) Pty Ltd via Water & Sewage
501 : Liquitek Pty Ltd via Water & Sewage
502 : LISTER IRRIGATION via Water & Sewage
503 : LMP Project Services via Water & Sewage
504 : Locate And Detection Specialists via Water & Sewage
505 : LOGICAMMS AUSTRALIA PTY LTD via Water & Sewage
506 : Lonergan Project Services Pty Ltd via Water & Sewage

507 : LP Pipe & Civil via Water & Sewage
508 : LPGC PTY LTD via Water & Sewage
509 : M&K Pipelines Queensland Pty Ltd via Water & Sewage
510 : M. & J. ARTHUR PTY. LTD. via Water & Sewage
511 : M2P ENGINEERING PTY LTD via Water & Sewage
512 : MAK Industrial Water Solutions via Water & Sewage
513 : MAK INDUSTRIAL WATER SOLUTIONS PTY LTD via Water & Sewage
514 : MAK Water via Water & Sewage
515 : MARCO PLUMBING SOLUTIONS PTY LTD. via Water & Sewage
516 : MARCON AGENCIES PTY LTD via Water & Sewage
517 : Marine Civil Contractors via Water & Sewage
518 : Mass Products (previously known as Mass Products Pty Ltd) via Water & Sewage
519 : Mass Products Pty Ltd via Water & Sewage
520 : Mass Products Pty Ltd via Water & Sewage
521 : MATEC PACIFIC PTY LTD via Water & Sewage
522 : Maxcon Industries via Water & Sewage
523 : MAXFIELD'S WASTEWATER PTY LTD via Water & Sewage
524 : MAXIBOR AUSTRALIA PTY LIMITED via Water & Sewage
525 : McBerns Pty Ltd via Water & Sewage
526 : McCosker Contracting Pty Ltd via Water & Sewage
527 : MCELLIGOTTS (QLD) PTY LTD via Water & Sewage
528 : MCELLIGOTTS (QLD) PTY LTD via Water & Sewage
529 : McFadyen PIpeline Constructions Pty Ltd via Water & Sewage
530 : McFaul & Co Engineers Pty Ltd via Water & Sewage
531 : McKenna Group Contractors Pty Ltd via Water & Sewage
532 : MEINHARDT AUSTRALIA PTY LTD via Water & Sewage
533 : Mendi Constructions Pty ltd via Water & Sewage
534 : Metasphere via Water & Sewage
535 : MFE via Water & Sewage
536 : MFE Pty Ltd via Water & Sewage
537 : MHO Infrastructure via Water & Sewage
538 : MINE CON PLUMBING PTY LTD via Water & Sewage
539 : MIPAC PTY LTD via Water & Sewage
540 : MITCHELL WATER AUSTRALIA PTY LTD via Water & Sewage
541 : Moec Pty Ltd via Water & Sewage
542 : MOLAN PHILLIPS PTY LTD via Water & Sewage
543 : Moloney & Sons Engineering via Water & Sewage
544 : Moloney & Sons Engineering via Water & Sewage
545 : Monadelphous Engineering Pty Ltd via Water & Sewage
546 : Moody Civil & Pipe PTY LTD via Water & Sewage
547 : MORA Consulting Pty Ltd via Water & Sewage
548 : MORRIS WATER PTY LTD via Water & Sewage
549 : MORTON PLUMBING PTY LTD via Water & Sewage
550 : MPA Engineering via Water & Sewage
551 : MPC Kientic via Water & Sewage
552 : MPC Kinetic via Water & Sewage
553 : Munster via Water & Sewage
554 : Munster via Water & Sewage
555 : Munster Mechanical Pty Ltd via Water & Sewage
556 : Munster Mechanical Pty Ltd via Water & Sewage
557 : N.J.THOMPSON via Water & Sewage

558 : NA via Water & Sewage
559 : Naric Civil via Water & Sewage
560 : NARIMU RESOURCES via Water & Sewage
561 : National Concrete Solutions via Water & Sewage
562 : NATIONAL PUMP & ENERGY PTY LTD via Water & Sewage
563 : NATIONAL PUMP & ENERGY PTY LTD via Water & Sewage
564 : National pump and Energy via Water & Sewage
565 : NCP Contracting Pty Ltd via Water & Sewage
566 : NCS via Water & Sewage
567 : NEM GROUP PTY LTD via Water & Sewage
568 : NETZSCH Australia Pty Ltd via Water & Sewage
569 : Newlands Civil Construction via Water & Sewage
570 : Newlands Civil Construction Pty Ltd via Water & Sewage
571 : Newlands Civil Construction Pty Ltd via Water & Sewage
572 : Newsham Steel via Water & Sewage
573 : Next Generation Electrix via Water & Sewage
574 : NIXON PLUMBING PTY LTD via Water & Sewage
575 : NJW ELECTRICAL PTY LTD / COASTAL EARTHWORX via Water & Sewage
576 : North Queensland Hardfacing Pty Ltd via Water & Sewage
577 : Northern Civil Services via Water & Sewage
578 : Northern Civil Services Pty Ltd via Water & Sewage
579 : northern water via Water & Sewage
580 : NorthGroup Consulting via Water & Sewage
581 : NOVAR Group Pty Ltd via Water & Sewage
582 : NQ Water Services Pty Ltd via Water & Sewage
583 : NRG Electrical (Qld) pty ltd via Water & Sewage
584 : Nth Qld Pump & Sealing Solutions via Water & Sewage
585 : NTS GROUP via Water & Sewage
586 : NTS Group Pty Ltd via Water & Sewage
587 : NTS GROUP PTY LTD via Water & Sewage
588 : Nu-Tank via Water & Sewage
589 : Nuflow Central Queensland via Water & Sewage
590 : Nuflow Technolgies 2000 via Water & Sewage
591 : Nuflow Technologies via Water & Sewage
592 : Nuleaf via Water & Sewage
593 : NuSpec Consulting via Water & Sewage
594 : Nutrien Water via Water & Sewage
595 : O'Brien Plumbing Bundaberg via Water & Sewage
596 : O'LEARY INFRASTRUCTURE PTY LTD via Water & Sewage
597 : O'Leary Infrastructure Pty Ltd via Water & Sewage
598 : Oakridge Services Pty Ltd via Water & Sewage
599 : Obadare Group via Water & Sewage
600 : Oceania Water Filters via Water & Sewage
601 : ODD ROLFSEN via Water & Sewage
602 : Offaly Civil Pty. Ltd. via Water & Sewage
603 : OM CIVIL PTY LTD via Water & Sewage
604 : Omron Corporation via Water & Sewage
605 : Opus International Consultants (Australia) Pty Ltd via Water & Sewage
606 : Orion Project Consulting Pty Ltd via Water & Sewage
607 : OSKA Consulting Group via Water & Sewage
608 : OWENS MINI DIGGER via Water & Sewage

609 : P H E PTY. LTD. via Water & Sewage
610 : P.T. ENGINEERING PTY. LIMITED via Water & Sewage
611 : PACH GROUP PTY LTD via Water & Sewage
612 : PACIFIC CONSTRUCTION GROUP via Water & Sewage
613 : Pacific Construction Group Pty Ltd via Water & Sewage
614 : Parasyn via Water & Sewage
615 : Parchem Construction Supplies via Water & Sewage
616 : PAstech via Water & Sewage
617 : PATRIOT ENVIRONMENTAL MANAGEMENT via Water & Sewage
618 : Patriot Tankers Pty Ltd via Water & Sewage
619 : PCP Solutions Pty Ltd via Water & Sewage
620 : PCSA via Water & Sewage
621 : Pensar Building via Water & Sewage
622 : Pensar Building Pty Ltd via Water & Sewage
623 : Pensar Civil Pty Ltd via Water & Sewage
624 : Pensar Structures Pty Ltd via Water & Sewage
625 : PENSAR UTILITIES PTY LIMITED via Water & Sewage
626 : Pensar Water Pty Ltd via Water & Sewage
627 : Pentair Water Australia Pty Ltd via Water & Sewage
628 : PERFECT PRESSURE PLUMBING & GAS PTY LTD via Water & Sewage
629 : Performance Project Services P/L via Water & Sewage
630 : Pezzimenti Tunnelbore via Water & Sewage
631 : PHILIPSEN PLUMBING & GAS SERVICES PTY LTD via Water & Sewage
632 : PHILMAC PTY LTD via Water & Sewage
633 : PIONEERING CONSULTANCY PTY LTD via Water & Sewage
634 : Pipe Hawk Utility Management via Water & Sewage
635 : Pipe Management Australia via Water & Sewage
636 : PIPE MANAGEMENT AUSTRALIA PTY LTD via Water & Sewage
637 : Pipeline Drillers Group PTY Ltd via Water & Sewage
638 : PIPES TO PAVEMENTS via Water & Sewage
639 : Pitt & Sherry (Operations) Pty Ltd via Water & Sewage
640 : PLATINUM AQUATICS via Water & Sewage
641 : Please eliza goup via Water & Sewage
642 : PNG Group Pty Ltd via Water & Sewage
643 : Power Civil via Water & Sewage
644 : Power Pumping via Water & Sewage
645 : POWER PUMPING PTY LTD via Water & Sewage
646 : PPG Industries via Water & Sewage
647 : Practical Engineering Australia Pty Ltd via Water & Sewage
648 : PRACTICAL ENGINEERING INVESTMENTS PTY LTD via Water & Sewage
649 : Precast Civil Industries - Toowoomba Tanks via Water & Sewage
650 : PRECAST CIVIL INDUSTRIES PTY LTD via Water & Sewage
651 : Premise Australia Pty Ltd via Water & Sewage
652 : Preurban Qld Pty Ltd via Water & Sewage
653 : PRIME COMPOSITES AUSTRALIA PTY LTD via Water & Sewage
654 : PRO EDGE CIVIL PTY LTD via Water & Sewage
655 : Process Safety and Automation Engineering Pty Ltd via Water & Sewage
656 : Process Systems via Water & Sewage
657 : PROCESS SYSTEMS PTY LTD via Water & Sewage
658 : Products For Industry via Water & Sewage
659 : PROFESSIONAL PUMP SERVICES & IRRIGATIO N via Water & Sewage

660 : Professional Pump Services & Irrigation via Water & Sewage
661 : Professional Pump Services & Irrigation via Water & Sewage
662 : Professional Pump Services & Irrigation via Water & Sewage
663 : PROFESSIONAL PUMP SERVICES & IRRIGATION via Water & Sewage
664 : Professional Pump[Services via Water & Sewage
665 : Project Delivery Managers Pty Ltd via Water & Sewage
666 : Promethean Projects Pty Ltd via Water & Sewage
667 : ProMinent Fluid Controls via Water & Sewage
668 : ProMinent Fluid Controls Pty Ltd via Water & Sewage
669 : Propump via Water & Sewage
670 : Proterra Group Pty Ltd via Water & Sewage
671 : Pructon via Water & Sewage
672 : PSA Engineering via Water & Sewage
673 : PSM Consult Pty Limited via Water & Sewage
674 : Pumping Irrigation & Machinery Services via Water & Sewage
675 : PUMPS N SOLAR via Water & Sewage
676 : PUMPS UNITED PTY LTD via Water & Sewage
677 : PVE Civil Solutions Pty Ltd via Water & Sewage
678 : QC FLOORS / METAL GRIP COATINGS via Water & Sewage
679 : QLD Civil Engineering via Water & Sewage
680 : QLD CIVIL ENGINEERING PTY LTD via Water & Sewage
681 : QSP TIMBERS & QLD SURVEY PEGS via Water & Sewage
682 : QUEENSLAND HYDRAULICS PTY LTD via Water & Sewage
683 : Queensland Lining Co. via Water & Sewage
684 : Queensland University of Technology via Water & Sewage
685 : Queensland Water Directorate via Water & Sewage
686 : Queensland Water Directorate via Water & Sewage
687 : QUEENSLAND WATER SERVICES PTY LTD via Water & Sewage
688 : R & T Pumps via Water & Sewage
689 : Rabco Plant Hire Pty Ltd via Water & Sewage
690 : Rabco Plant Hire Pty Ltd via Water & Sewage
691 : RAYNER XCAVATIONS via Water & Sewage
692 : Re-Pump Australia via Water & Sewage
693 : Re-Pump Australia Pty Ltd via Water & Sewage
694 : Re-Pump Australia Pty Ltd via Water & Sewage
695 : Re-Pump Australia Pty Ltd via Water & Sewage
696 : Re-Pump Australia Pty ltd via Water & Sewage
697 : Red Ant Group via Water & Sewage
698 : REDLINE WATER INFRASTRUCTURE PTY LTD via Water & Sewage
699 : Reece Group Pty Ltd via Water & Sewage
700 : Reece PTY LTD via Water & Sewage
701 : REECE PTY LTD via Water & Sewage
702 : RELIANCE WORLDWIDE CORPORATION LIMITED via Water & Sewage
703 : Relining Solutions via Water & Sewage
704 : REMONDIS AQUA AUSTRALIA PTY LIMITED via Water & Sewage
705 : REMONDIS Aqua Australia Pty Ltd via Water & Sewage
706 : REMONDIS Australia- Swanbank Landfill via Water & Sewage
707 : Remote Water Treatment Services Pty Ltd via Water & Sewage
708 : Renew Solutions Pty Ltd via Water & Sewage
709 : Resource Constructions via Water & Sewage
710 : Rhino Linings Australasia Pty Ltd via Water & Sewage

711 : RIO INSPECTION SERVICES via Water & Sewage
712 : River Sands Pty Ltd via Water & Sewage
713 : RMA Engineers via Water & Sewage
714 : Roadpak Industries PTY LTD via Water & Sewage
715 : Rob Carr Pty Ltd via Water & Sewage
716 : ROBLAWMAX RECRUITMENT PTY LTD via Water & Sewage
717 : Rockhampton Regional Council via Water & Sewage
718 : Rocla via Water & Sewage
719 : rocla via Water & Sewage
720 : Rocla via Water & Sewage
721 : Rocla Pipeline Products via Water & Sewage
722 : Rokk Industries Pty Ltd via Water & Sewage
723 : ROMA HOME IMPROVEMENT CENTRE via Water & Sewage
724 : Rossi Gearmotors via Water & Sewage
725 : Roth Plumbing via Water & Sewage
726 : Roto Pumps Ltd via Water & Sewage
727 : Rotork Australia Pty via Water & Sewage
728 : Royce Water Technologies via Water & Sewage
729 : RPS AUSTRALIA EAST PTY LTD via Water & Sewage
730 : RTM Engineering PTY LTD via Water & Sewage
731 : Rykar Pty Ltd T/as K & S Waste Water Services via Water & Sewage
732 : Rylsey Enterprises Pty Ltd T/A Celtic Construction via Water & Sewage
733 : S.K Plumbing and Civil via Water & Sewage
734 : saintelec australia via Water & Sewage
735 : Samford Water Carriers via Water & Sewage
736 : SAMIOS PLUMBING SUPPLIES CAIRNS via Water & Sewage
737 : SAMIOS PLUMBING SUPPLIES TOOWOOMBA via Water & Sewage
738 : Satintouch via Water & Sewage
739 : Schneider Electric via Water & Sewage
740 : SCHNEIDER ELECTRIC AUST PTY LIMITED via Water & Sewage
741 : Seepex Australia Pty. Ltd. via Water & Sewage
742 : SEQ Systems & Solutions Pty Ltd via Water & Sewage
743 : SESL AUSTRALIA via Water & Sewage
744 : SEW EURODRIVE PTY LTD via Water & Sewage
745 : SGQ PTY LTD via Water & Sewage
746 : SGQ Pty Ltd via Water & Sewage
747 : Shadforths Civil Pty Ltd t/a Shadforth via Water & Sewage
748 : Sheppard Earthmoving via Water & Sewage
749 : SHORE HIRE PTY LIMITED via Water & Sewage
750 : SILOS BINS AND TANK ENGINEERING PTY LTD via Water & Sewage
751 : Simmonds & Bristow Pty Ltd via Water & Sewage (has responded)
752 : SJ Electric via Water & Sewage
753 : SLADE INDUSTRIES MAINTENANCE PTY LTD via Water & Sewage
754 : SLR Consulting Australia Pty Ltd via Water & Sewage
755 : Smart Lock Group via Water & Sewage
756 : SMEC Australia Pty Ltd via Water & Sewage
757 : Snoopys water delivery via Water & Sewage
758 : SNR Morgan PTY LTD via Water & Sewage
759 : Solari Energy/Solari Water via Water & Sewage
760 : Sort It Water Treatment Services Pty Ltd via Water & Sewage
761 : South Pacific Steam Pipe P/L via Water & Sewage

762 : Southern Cross Directional Drilling via Water & Sewage
763 : Southern Cross Reservoir Services Australia via Water & Sewage
764 : Specialized Civil Pty Ltd via Water & Sewage
765 : Spiecapag Australia Pty Ltd via Water & Sewage
766 : SPIECAPAG AUSTRALIA PTY. LIMITED via Water & Sewage
767 : Spirac Pty Ltd via Water & Sewage
768 : SPIRAX SARCO PTY LTD via Water & Sewage
769 : SPLITS AND BUTT POLY WELDING via Water & Sewage
770 : Springs earthmoving and drainage via Water & Sewage
771 : src engineering pty ltd via Water & Sewage
772 : SS Projects via Water & Sewage
773 : Stainless Steel Drainage & Civil via Water & Sewage
774 : Stantec via Water & Sewage
775 : Stantec Australia Pty Ltd via Water & Sewage
776 : Stauff Corporation via Water & Sewage
777 : Steel Mains via Water & Sewage
778 : Stirloch Constructions via Water & Sewage
779 : STIRLOCH CONSTRUCTIONS (QLD) PTY. LTD. via Water & Sewage
780 : STIRLOCH CONSTRUCTIONS PTY LTD via Water & Sewage
781 : Stirloch Constructions Pty Ltd via Water & Sewage
782 : Stopher Pty Ltd via Water & Sewage
783 : STRATHDICKIE ENGINEERING P/L via Water & Sewage
784 : SUEZ RECYCLING & RECOVERY PTY LTD via Water & Sewage
785 : Suffcon via Water & Sewage
786 : Suffcon via Water & Sewage
787 : SUGRUE CONTRACTORS PTY LTD via Water & Sewage
788 : Sulzer Australia Pty Ltd via Water & Sewage
789 : SULZER AUSTRALIA PTY LTD via Water & Sewage
790 : SUMMERS BUILD via Water & Sewage
791 : SUN ENGINEERING (QLD) PTY. LTD. via Water & Sewage
792 : Suncoast Waste Water Management via Water & Sewage
793 : Suncoast waste Water Management via Water & Sewage
794 : Suncoast Waste Water Management via Water & Sewage
795 : Superior Plumbing & Civil via Water & Sewage
796 : Symal Group via Water & Sewage
797 : Symbio Laborotories via Water & Sewage
798 : Synergy via Water & Sewage
799 : Synergy Pipelines & Plumbing via Water & Sewage
800 : Synergy Resource Management Pty Ltd via Water & Sewage
801 : Synergy Resource Management Pty Ltd via Water & Sewage
802 : Synergy Resource Management Pty Ltd via Water & Sewage
803 : Synergy Resource Management Pty Ltd via Water & Sewage
804 : T&R West Plumbing Service via Water & Sewage
805 : T2 Electrical & Data Pty Ltd via Water & Sewage
806 : Talcon group Pty Ltd via Water & Sewage
807 : TALLAI PROJECT GROUP PTY LTD via Water & Sewage
808 : TALLAI PROJECT GROUP PTY LTD via Water & Sewage
809 : TAS MINI MOTORS via Water & Sewage
810 : Taylex Industries Pty Ltd via Water & Sewage
811 : TECHNICAL SERVICES AUSTRALIA PTY LTD via Water & Sewage
812 : Techno Water Designs via Water & Sewage

813 : Teneo via Water & Sewage
814 : TEW Solutions via Water & Sewage
815 : TFG GROUP PTY LTD via Water & Sewage
816 : TGI AUSTRALIA PTY LTD via Water & Sewage
817 : THE AUSTRANS GROUP (QLD) PTY LTD via Water & Sewage
818 : The Bored Company Pty Ltd via Water & Sewage
819 : THE BUSINESS CONSULTANCY UNIT PTY LTD via Water & Sewage
820 : The Compressor Guys Pty Ltd via Water & Sewage
821 : The Pump House via Water & Sewage
822 : THE RICHARD VINCENT FAMILY TRUST via Water & Sewage
823 : The Trustee for Amate Unit Trust via Water & Sewage
824 : The trustee for Briggs Family Trust via Water & Sewage
825 : The trustee for Griffin Family Trust via Water & Sewage
826 : THE TRUSTEE FOR GRIFFITH ROBINSON FAMILY TRUST via Water & Sewage
827 : The Trustee for PIPELINING TRUST via Water & Sewage
828 : The Trustee for The ATM Tanks Group Trading Trust via Water & Sewage
829 : The trustee for The D'Silva Family Trust via Water & Sewage
830 : The Water and Carbon Group Pty Ltd via Water & Sewage
831 : The Water Boffins via Water & Sewage
832 : Thermo Fisher Scientific via Water & Sewage
833 : Think Water Pty ltd via Water & Sewage
834 : THINK WATER VIRGINIA via Water & Sewage
835 : Thwaite Building Solutions Pty ltd via Water & Sewage
836 : Tolbra Earthmovers & Haulage Pty Ltd via Water & Sewage
837 : Tonkin Consulting via Water & Sewage
838 : Tony Porter Fabrications via Water & Sewage
839 : Toowoomba & Surat Basin Enterprise via Water & Sewage
840 : Toowoomba Clearwater via Water & Sewage
841 : Toowoomba Concrete Tanks Pty Ltd via Water & Sewage
842 : Toowoomba Regional Council via Water & Sewage
843 : Total Eden via Water & Sewage
844 : Total Eden via Water & Sewage
845 : Total Eden via Water & Sewage
846 : Total Eden via Water & Sewage
847 : TOTAL EDEN PTY LIMITED via Water & Sewage
848 : Total Eden Pty Ltd via Water & Sewage
849 : Towers Packaging & Chemical Supplies P/L via Water & Sewage
850 : Townsville City Council via Water & Sewage
851 : Townsville City Council via Water & Sewage
852 : TRADELINK PLUMBING SUPPLIES via Water & Sewage
853 : TRADELINK PTY LIMITED via Water & Sewage
854 : Treadwell via Water & Sewage
855 : TRILITY via Water & Sewage
856 : TRIMLYON CONSTRUCTIONS PTY LTD via Water & Sewage
857 : Trinity Engineering and Consulting via Water & Sewage
858 : Tristar Water Solutions Pty Ltd via Water & Sewage
859 : Trivantage via Water & Sewage
860 : Trojan Engineering & Project Management Australia via Water & Sewage
861 : Tucks Industrial Packings & Seals via Water & Sewage
862 : TUNNEL VISION SERVICES PTY LTD via Water & Sewage
863 : Turf Irrigation Services via Water & Sewage

864 : Turuga Industries via Water & Sewage
865 : TVE Pty Ltd via Water & Sewage
866 : UDEC Pty Ltd via Water & Sewage
867 : ULTIMATE EQUIPMENT HIRE via Water & Sewage
868 : UNGANCO PTY LTD via Water & Sewage
869 : Universal Civil Contracting via Water & Sewage
870 : Universal Cranes Sunshine Coast via Water & Sewage
871 : VAC TRUCK RENTALS PTY LTD via Water & Sewage
872 : Valspar via Water & Sewage
873 : VALVECO via Water & Sewage
874 : VAN DAMME PROJECTS PTY LTD via Water & Sewage
875 : VASSALLO CONSTRUCTIONS PTY. LTD. via Water & Sewage
876 : Veolia Environmental Services (Australia) Pty Ltd via Water & Sewage
877 : VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD via Water & Sewage
878 : Veolia Network Services via Water & Sewage
879 : Veolia Network Services via Water & Sewage
880 : VEOLIA WATER AUSTRALIA PTY LTD via Water & Sewage
881 : Veolia Water Technologies via Water & Sewage
882 : Vermeer via Water & Sewage
883 : Viadux Pty Ltd via Water & Sewage
884 : VIADUX PTY LTD via Water & Sewage
885 : VIADUX PTY LTD via Water & Sewage
886 : Viadux pty ltd via Water & Sewage
887 : Viadux pty ltd via Water & Sewage
888 : Viadux Pty Ltd - Burwood, VIC via Water & Sewage
889 : Viadux Pty Ltd - Burwood, VIC via Water & Sewage
890 : Vickers Aluminium Pty Ltd via Water & Sewage
891 : Vinidex Pty Limited via Water & Sewage
892 : VINIDEX PTY LIMITED via Water & Sewage
893 : Vinidex Pty Ltd via Water & Sewage
894 : Vinidex Pty Ltd via Water & Sewage
895 : Vinidex Pty. Ltd. via Water & Sewage
896 : Viper Water Solutions via Water & Sewage
897 : VOR ENVIRONMENTAL AUSTRALIA PTY LTD via Water & Sewage
898 : Vortex Group of Companies via Water & Sewage
899 : Vortex Group of Companies via Water & Sewage
900 : VORTEX GROUP OF COMPANIES PTY LTD via Water & Sewage
901 : W.A. CROMARTY & COMPANY PROPRIETARY LIMITED via Water & Sewage
902 : Waco Kwikform via Water & Sewage
903 : Wasco Australia Pty Ltd via Water & Sewage
904 : WASTE WATER WORKS via Water & Sewage
905 : WASTE WATER WORKS via Water & Sewage
906 : Water Infrastructure Services via Water & Sewage
907 : Water Process Design via Water & Sewage
908 : Water Smart Qld Pty Ltd via Water & Sewage
909 : Water Treatment Services via Water & Sewage
910 : WATER TREATMENT SERVICES (AUST) PTY. LTD. via Water & Sewage
911 : WATEROZ PTY. LTD. via Water & Sewage
912 : Watertec Engineering P/L via Water & Sewage
913 : WATERTEC ENGINEERING PTY LTD via Water & Sewage
914 : WAVEFIELD PLUMBING PTY LTD via Water & Sewage

915 : Webforge QLD via Water & Sewage
916 : Webster Plumbing Services via Water & Sewage
917 : Welcon Technologies Pty Ltd via Water & Sewage
918 : Weldlok via Water & Sewage
919 : Whelan Electrical Services Pty Ltd via Water & Sewage
920 : Whitsunday Drainage Contractors PTY LTD via Water & Sewage
921 : WILKINSON SHAW & ASSOCIATES PTY LTD via Water & Sewage
922 : Wilo Australia Pty Ltd via Water & Sewage
923 : WILO Australia Pty Ltd via Water & Sewage
924 : Wisely Services via Water & Sewage
925 : Witthoft Engineering Pty Ltd via Water & Sewage
926 : Witthoft Engineering Pty Ltd via Water & Sewage
927 : WIZARD DRILLING via Water & Sewage
928 : Wolff Power via Water & Sewage
929 : WOOD AUSTRALIA PTY LTD via Water & Sewage
930 : Woodys Hard Landscape & Building via Water & Sewage
931 : Wrights Electrical Services via Water & Sewage
932 : Wulguru Group via Water & Sewage
933 : WULGURU STEEL PTY LTD via Water & Sewage
934 : XENCO Services via Water & Sewage
935 : Xport Plumbing via Water & Sewage
936 : Xylem via Water & Sewage
937 : Xylem via Water & Sewage
938 : Xylem Water Solutions via Water & Sewage
939 : Xylem Water Solutions via Water & Sewage
940 : Xylem Water Solutions via Water & Sewage
941 : Xylem Water Solutions Australia Limited via Water & Sewage
942 : Xylem Water Solutions Australia Limited via Water & Sewage
943 : XYLEM WATER SOLUTIONS AUSTRALIA LIMITED via Water & Sewage
944 : XYLEM WATER SOLUTIONS AUSTRALIA LIMITED via Water & Sewage
945 : Xylem Water Solutions Australia Limited via Water & Sewage
946 : Xylem Water Solutions Australia Ltd via Water & Sewage
947 : Xypex Australia via Water & Sewage
948 : Xypex Australia via Water & Sewage
949 : Yindi Group Pty Ltd via Water & Sewage
950 : Yurika Metering via Water & Sewage
951 : Zemek Environmental Pty Ltd via Water & Sewage
952 : Zinfra Pty Ltd via Water & Sewage

Information requested by others

QUESTION (from Anthony Greer : tenders@aqualyng.com | +610733311777) on 16/Feb/21 12:03 PM : Could I get clarification on the following:
Retention and Insurance Levels seem inconsistent with type of work being requested. Construction is not envisaged only, operational manuals, minor works to investigate and rectify or alter items 10-17 listed in Works Schedule existing setup to improve the delivery of the water service from the plant. Please confirm that the level of contract works insurance Clause 11 Annexure Part A Item 10 is to be "Contract Sum + 20%"? Please confirm that both a "Bank Guarantee" and "Retention" is required for this minor works contract?

Please confirm that the tender is for operational improvements items 1 to 18 as listed under Works by the Contractor in the rft document supplied?

ANSWER (Public) on 16/Feb/21 03:05 PM : 1. Retention and Insurance Levels seem inconsistent with type of work being requested.
Alternate insurance values may be considered but must be identified in Part 6 Response Schedules item (p).

2. Construction is not envisaged only, operational manuals, minor works to investigate and rectify or alter items 10-17 listed in Works Schedule existing setup to improve the delivery of the water service from the plant.
Construction is not the major component of the works. The works are divided into 3 components:
1) Operations procedures (items 1-9), to provide the service provider with a simple yet comprehensive manual for the operators to understand the operating parameters of the system and manage the system appropriately.
2) System Improvements, (items 10-17) these works include the rectification of issues identified with the system. construction is not considered the major content of these items, however new components may be required for these works.
3) System maintenance (item 18) a major component of the treatment plant, the RO membrane appears to be operating at a suboptimal level, works are requested to address this problem.

3. Please confirm that the level of contract works insurance Clause 11 Annexure Part A Item 10 is to be "Contract Sum + 20%"?
Confirmed

4. Please confirm that both a "Bank Guarantee" and "Retention" is required for this minor works contract?
A bank guarantee or retention money of 5% of the contract sum shall be provided.

5. Please confirm that the tender is for operational improvements items 1 to 18 as listed under Works by the Contractor in the rft document supplied?
The scope of works for the tender is items 1-18 provided in Annexure Part C – scope of works under - Works by the Contractor.

QUESTION (from Wayne Osborne : wayne.osborne@dowdens.com.au | +61 07 38287000) on 01/Mar/21 10:42 AM : • Is QSC able to provide the following for consideration;
o Copy (native) of the As Constructed PLC code
o Copy of the As Constructed Functional Design Specification
o Details of the media type and volumes used in the media filters (i.e. datasheet / media loading diagram)
o Details of the RO membranes most recently installed in the WTP (i.e. datasheet / commissioning checksheet)
o Can additional water samples from each bore and from the raw water tank be collected and analysed inclusive of the following additional water quality parameters;
? Barium
? Strontium
? Bromide

ANSWER (Public) on 10/Mar/21 04:31 PM : - Qulipie Shire council could not locate a copy of the as Constructed PLC code
- Qulipie Shire council could not locate a copy of the as Constructed Functional Design Specification
- Qulipie Shire council could not locate details of media type and volumes used in the media filters
- Details of the RO membranes most recently installed - Hydronautics (nito group) 8" Membrane Element ESPA2-LD
- Qulipie Shire Council do not have source water quality data for Barium, Strontium or Bromide. If the successful tender provides a water testing program and suitable laboratory to undertake the testing, Council can undertake the sampling and pay for laboratory analysis.

Updates made to this request

16/Mar/21 12:12 PM (139 supplier staff notified of these changes) : Tender Verification

The RFT document Page 4 states the tender closing time is the 26th of February 2021. The actual tender closing date is the 19th of March 2021 at 5:00pm as stated in the Vendor Panel request.

Response from:

Response ID: VPR404276
Created Date: Friday Fri/Mar/21 03:21 PM
Posted Date: Friday Fri/Mar/21 04:42 PM
Response reference: None provided
Response via: Water & Sewage

Business:	**Simmonds & Bristow Pty Ltd**
Validated Business Name:	SIMMONDS AND BRISTOW PTY LTD
ABN	**33 010 252 418**
Location:	Unit 2, 40 Reginald Street Rocklea 4106, Queensland, Australia
Contact:	*Contact Name:* David Bristow *Position:* Managing Director *Main Phone:* +61734343800 *Mobile Phone:* +61419786710 *Email:* sales@simmondsbristow.com.au
Web Site:	http://www.simmondsbristow.com.au
Description:	Simmonds & Bristow are integrated water specialists helping regional, remote and small communities across Australia and the South Pacific make good clean water.
Docs attached by the list admin to this supplier:	None...

Selection Status:

Your decision	Undecided

Your personal notes:

None added

Your attachments to this response

None provided

Suppliers response:

Dear Peter,

We are pleased to present this proposal for the operation and maintenance documentation and upgrade of the Eromanga Water Treatment Plant (WTP).
This proposal has been prepared based on the Scope of Works provided and knowledge and site context gained through the site inspection by our Chief Process Engineer Matthew Reid on 24th February 2021. Experience gained from this visit, coupled with over 50 years of specialist regional and remote practice, will ensure that this project will be delivered

successfully, and most importantly, safely. Simmonds & Bristow is currently delivering a similar solution to Barcaldine Regional Council. Rick Rolfe, Chief Engineer, is our direct client should you wish to speak to him.

We trust that we have satisfactorily met the project and scope requirements. Our Team's value to this project will become evident as you review our methodology and overall offer.

Yours Sincerely,
SIMMONDS & BRISTOW PTY LTD

Supplier provided pricing

Price EXCLUDING Tax:	$ 99,609.13 AUD
Tax component:	$ 9,960.91 AUD
TOTAL PRICE:	$ 109,570.04 AUD
These prices are:	Fixed
Comments:	Refer to the attached response

Invoicing Details

If successful, the supplier will invoice with the following details

Business Name:	SIMMONDS AND BRISTOW PTY LTD
Business Number:	33 010 252 418 (ABN)

Additional Supplier Comments:

Please see the attached Return Package, Simmonds & Bristow's proposal

Suppliers Attachments

The supplier has attached 1 document to this response. You can find it in this zip file under '/Responses/Simmonds_&_Bristow_P/VPR404276/Response Docs/'

Response from:

Response ID: VPR406097
Created Date: Thursday Thu/Feb/21 02:35 PM
Posted Date: Thursday Thu/Feb/21 02:55 PM
Response reference: Quilpie Shire Council Eromanga Water Treatment Plant
Response via: Water & Sewage

Business:	**Aqualyng ICES**
Validated Business Name:	AQUALYNG ICES PTY LTD
ABN	**99 086 243 772**
Location:	3/11 Palmer Place Murarrie 4172, Queensland, Australia
Contact:	*Contact Name:* Anthony Greer *Position:* Administration Officer *Main Phone:* +610733311777 *Mobile Phone:* None Provided *Email:* tenders@aqualyng.com
Web Site:	https://www.aqualyngices.com.au/
Description:	Aqualyng ICES specialises in water treatment solutions and services to deliver improvements to plant productivity and profitability through operational efficiency, reduction in operations costs and downtime. Aqualyng ICES is a privately-owned global service provider of water treatment and environmental solutions to the Mining, Oil & Gas, Power, Healthcare, Food and Beverage and General Manufacturing sectors. Aqualyng ICES provides: Operation & Maintenance Services Consulting Services Capital Projects & Development Plant Rental Services WTP Parts & Consumables
Docs attached by the list admin to this supplier:	None...

Selection Status:

Your decision	Undecided

Your personal notes:

None added

Your attachments to this response

None provided

Suppliers response:

Aqualyng ICES has provided its response to Quipie Shire Council's request in attachments provided. Aqualyng ICES Pty Ltd (Aqualyng) has provided a plan aligned with the tender requirement (369034) to provide training, documentation, investigation, and support to ensure the Eromanga plant operates stably and correctly, producing water within the requirements of the Australian Drinking Water Guidelines, and other relevant local government requirements.
Aqualyng will provide a new chlorine and pH measurement unit connected to the existing communications system. This is the DEPLOX 5 used widely by councils around Australia.
In addition, Aqualyng will provide a calcium hypochlorite dosing system, able to provide a chlorine supply stable for up to 24 months. This reduces risk of chlorine decomposition, reduces manual handling risks, and doesn’t contain caustic. This material is used widely in Australia and around the globe (customers include Sydney Water, Charters Towers Regional Council, etc).
Aqualyng sees the need for operator training and support for the QSC/Eromanga team. Aqualyng will provide a training video for the plant, facilitating easy access to information, and able to be used simply.
The report and action plan provided by Aqualyng will include membrane condition investigation and recommendations. A review of chemistry used (antiscalant), control, and seal integrity is all included.
Aqualyng will provide replacement dosing pumps with alarm feed back. These pumps however are self priming and will be installed on the chlorination rig to be provided.
The hooking up, programming, and improvements in communication to the QSC relies on the access to the existing PLC on site. This is critical and must be provided. In addition, Aqualyng require the provision of all documentation (non transactional) for the plant in word format (drawings in CAD) to permit updating. New procedures will be provided and inserted into the existing documentation.
Aqualyng will provide ongoing support and can assist council with any other water projects going forward.

Supplier provided pricing

Price EXCLUDING Tax:	$ 69,107.14 AUD
Tax component:	$ 6,910.71 AUD
TOTAL PRICE:	$ 76,017.85 AUD
These prices are:	Fixed
Comments:	Refer to return package for details of assumptions and considerations made in determining this price.

Invoicing Details

If successful, the supplier will invoice with the following details

Business Name:	AQUALYNG ICES PTY LTD
Business Number:	99 086 243 772 (ABN)

Suppliers Attachments

The supplier has attached 2 documents to this response. You can find them in this zip file under '/Responses/Aqualyng_ICES/VPR406097/Response Docs/'

Response from:

Response ID: VPR413127
Created Date: Friday Fri/Mar/21 02:32 PM
Posted Date: Friday Fri/Mar/21 02:38 PM
Response reference: None provided
Response via: Water & Sewage

Business:	**Dowdens Pumping & Water Treatment**
Validated Business Name:	Dowdens Group Pty Ltd
ABN	**87 154 375 685**
Location:	24/140 Wecker Road Mansfield 4122, Queensland, Australia
Contact:	*Contact Name:* Wayne Osborne *Position:* Branch Manager *Main Phone:* +61 07 38287000 *Mobile Phone:* 0427165030 *Email:* wayne.osborne@dowdens.com.au
Web Site:	http://www.dowdens.com.au
Description:	Supplier & services for all major makes and models of water pumps, pipework, valving, water treatment, sewerage pumps and plants, water treatment plants, de-watering pumps.
Docs attached by the list admin to this supplier:	None...

Selection Status:

Your decision	Undecided

Your personal notes:

None added

Your attachments to this response

None provided

Suppliers response:

Please refer to the Tender Response Schedule and Technical Proposal.

Supplier provided pricing

Price EXCLUDING Tax:	$ 150,900.00 AUD
Tax component:	$ 15,090.00 AUD

TOTAL PRICE:	$ 165,990.00 AUD
These prices are:	Estimated
Comments:	Please refer to Tender Response Schedule

Invoicing Details

If successful, the supplier will invoice with the following details

Business Name:	Dowdens Group Pty Ltd
Business Number:	87 154 375 685 (ABN)

Suppliers Attachments

The supplier has attached 3 documents to this response. You can find them in this zip file under '/Responses/Dowdens_Pumping_&_Wa/VPR413127/Response Docs/'

Response from:

Response ID: VPR413133
Created Date: Friday Fri/Mar/21 02:44 PM
Posted Date: Friday Fri/Mar/21 02:48 PM
Response reference: None provided
Response via: Water & Sewage

Business:	**KW ELECTRIC PTY LTD**	
ABN	**83 624 617 938**	
Location:	2 / 17 Commerce Cct Yatala 4207, Queensland, Australia	
Contact:	*Contact Name:*	Ian Kennedy
	Position:	Manager
	Main Phone:	+61 458363014
	Mobile Phone:	None Provided
	Email:	ian@kwelectric.com.au
Web Site:	https://www.kwelectric.com.au	
Description:	Electrical Contractors	
Docs attached by the list admin to this supplier:	None...	
Compliance Details:		

Selection Status:

Your decision	Undecided

Your personal notes:

None added

Your attachments to this response

None provided

Suppliers response:

Response documents attached

Supplier provided pricing

Price EXCLUDING Tax:	None provided
Tax component:	None provided
TOTAL PRICE:	None provided.
Comments:	Not provided.

Invoicing Details

If successful, the supplier will invoice with the following details

Business Name:	KW ELECTRIC PTY LTD
Business Number:	83 624 617 938 (ABN)

Suppliers Attachments

The supplier has attached 11 documents to this response. You can find them in this zip file under '/Responses/KW_ELECTRIC_PTY_LTD/VPR413133/Response Docs/'

Email – Tender Verification Response

From: Richard Owen <richardo@simmondsbristow.com.au>
Sent: Wednesday, 31 March 2021 10:15
To: William Green
Subject: P2102-003 T Quilpie SC Eromanga WTP Upgrade Eromanga WTP tender verification Response

Hi William, we have reviewed and our responses below.

Item 14 Ensure that the chlorine tank low level alarm exists and functions and does shut the plant once activated.

- Given the remote location of Eromanga and a lack of specialist technical staff, the shut down of the WTP without simple corrective actions could be prohibitive for QSC where water supply could be lost for a considerable amount of time.
- Can the tenderer clarify that provisions can be made for council to maintain water supply in the event of a low low level alarm activation.
- For instance could an alarm notification be programmed without a plant shut down? Or in the event that there is a dosage system failure could a manual dosage override be implemented similar to the system that is in place now.

Response: The plant control system should and could be programmed to ensure that a chlorine low low alarm has a hierarchy of control such as chlorine LLA shuts the plant off to safe guard the treated water, alerts the operator and others to attend and replenish chlorine stock for dosing. There should then be an alarm over-ride that allows the plant to be restarted without chlorine dosing, but only under the authority of an authorised officer (alternate Password). The authorised officer being delegated to make the decision following public health boil water alert being issued. This way clear water can still be made, but public informed that water in the supply requires boiling before drinking. The plant control logic could also be programmed to keep treating following a chlorine LLA if the reservoir/s are below minimum level to maintain supply and the alarm signals the chlorine LLA and the requirement to issue a boil water alert to the public. Notifications to Qld Health of the boil water alert would occur as required presently, through the normal communication protocol. IF a UV system was included in the process train, the plant could still produce clean safe drinking water and allow more time to remedy the chlorine LLA, allowing a reducing chlorine residual in the reticulation network to develop. This would necessitate additional network testing for E.Coli which could be undertaken on site using EColilert testing system. If water quality becomes unsafe boil water alerts could be issued at that time, rather than immediately. These considerations are best worked out in consultation with Council and community representatives as appropriate.

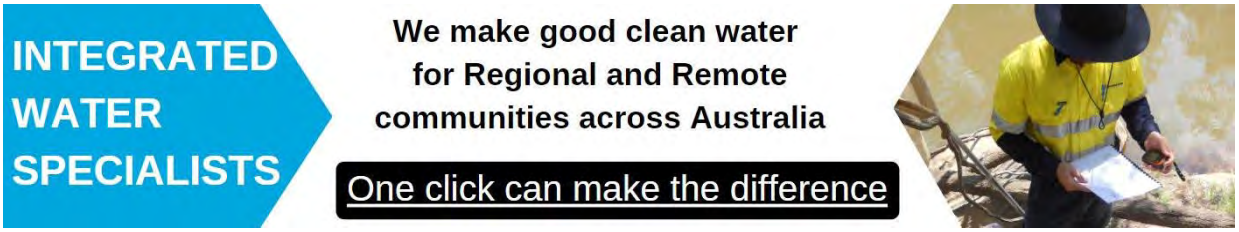
Item 17 Develop a system for the storage of sodium hypochlorite that results in shorter holding times.

- The tender document has not requested that other disinfection products be considered such as calcium hypochlorite, is it the tenderers opinion that a different disinfection system should be considered? Would the consideration of alternate systems and potential installation of a non-sodium hypochlorite system include additional costs?

Response: different disinfection systems can be considered. We are aware that Barcaldine Regional Council has moved to calcium hypo dosing in preference to liquid sodium hypo. A number of indigenous council have moved from sodium hypo to gaseous chlorine. The impact of heat during summer on the quality of sodium hypo stocks and managing the gassing of sodium hypochlorite are two significant considerations that have recommended changing to gaseous or calcium based chlorine for disinfection. We are happy to include consideration of say two alternate disinfection systems – Gas Chlorine and Calcium Hypo as alternates to Sodium Hypo – for no additional fee as we have reviewed these options for clients previously and the base considerations are well understood. The consideration are principally commercial, safety and logistical rather than concern for disinfection efficacy. Consideration of impact of treated water alkalinity, hardness, carbonate balance, pH and LSI on disinfection systems will be included if consideration of change of the chlorine disinfection system is included. Other disinfections systems can be practical, but likely more complex

I trust this response is adequate. Should you require more infoamtion please conatc me

Richard Owen
Marketing & Sales Manager



Simmonds & Bristow Pty Ltd
The Regional and Remote Water Specialist
HERE FOR YOU 50 YEARS SINCE 19

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Unit 2A, 40 Reginald Street, Rocklea, QLD, 4106
P.O. Box 849, Archerfield, QLD, 4108
T: 1800 620 690
Int: +61 7 3434 3800
F: +61 7 3434 3899
www.simmondsbristow.com.au

From: William Green [mailto:WGreen@gbaengineers.com.au]
Sent: Tuesday, 30 March 2021 4:03 PM
To: Sales
Subject: Eromanga WTP tender verification

Att: Matthew Reid

In response to your tender for the Eromanga WTP plant can you provide verification on the following items.

Item 14 Ensure that the chlorine tank low level alarm exists and functions and does shut the plant once activated.

- Given the remote location of Eromanga and a lack of specialist technical staff, the shut down of the WTP without simple corrective actions could be prohibitive for QSC where water supply could be lost for a considerable amount of time.
- Can the tenderer clarify that provisions can be made for council to maintain water supply in the event of a low low level alarm activation.
- For instance could an alarm notification be programmed without a plant shut down? Or in the event that there is a dosage system failure could a manual dosage override be implemented similar to the system that is in place now.

Item 17 Develop a system for the storage of sodium hypochlorite that results in shorter holding times.

- The tender document has not requested that other disinfection products be considered such as calcium hypochlorite, is it the tenderers opinion that a different disinfection system should be considered? Would the consideration of alternate systems and potential installation of a non-sodium hypochlorite system include additional costs?

Regards

William Green | Environmental Scientist
M 0474 148 882 | D 07 4651 5142

George Bourne & Associates Consulting Engineers
T 07 4651 5177 F 07 3220 6791
73 Elm Street | PO Box 169 | Barcaldine Qld 4725
www.gbaengineers.com.au
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Submissions Received

Aqualyng ICES

PROPOSAL

Quilpie Shire Council

Eromanga Water Treatment Plant - Upgrades

25/02/2021

Table 1: Proposal Information

Proposal Information	
ABN	99 086 243 772
Author	Mark Collen
Contact Details	Mark.collen@aqualyng.com / 0436 614 157
Client	Quilpie Shire Council
Recipients	-

Table 2: Revision History Table

Document Number [2019516-C45]					
Rev	Date	Description	Prepared By	Checked By	Approved By
1	25/02/2021	Primary Document	ER	MCOL	FK

Table of Contents

List of Tables

List of Figures

1 EXECUTIVE SUMMARY

Quilpie Shire Council (QSC) provide processed drinking water to approximately 600 residents. The QSC only treats the water feeding the Eromanga township using reverse osmosis, then UV and chlorine.

Aqualyng ICES Pty Ltd (Aqualyng) has provided a plan aligned with the tender requirement (369034) to provide training, documentation, investigation, and support to ensure the Eromanga plant operates stably and correctly, producing water within the requirements of the Australian Drinking Water Guidelines, and other relevant local government requirements.

Aqualyng will provide a new chlorine and pH measurement unit connected to the existing communications system. This is the DEPLOX 5 used widely by councils around Australia.

In addition, Aqualyng will provide a calcium hypochlorite dosing system, able to provide a chlorine supply stable for up to 24 months. This reduces risk of chlorine decomposition, reduces manual handling risks, and doesn't contain caustic. This material is used widely in Australia and around the globe (customers include Sydney Water, Charters Towers Regional Council, etc).

Aqualyng sees the need for operator training and support for the QSC/Eromanga team. Aqualyng will provide a training video for the plant, facilitating easy access to information, and able to be used simply.

The report and action plant provided by Aqualyng will include membrane condition investigation and recommendations. A review of chemistry used (antiscalant), control, and seal integrity is all included.

Aqualyng will provide replacement dosing pumps with alarm feed back. These pumps however are self priming and will be installed on the chlorination rig to be provided.

The hooking up, programming, and improvements in communication to the QSC relies on the access to the existing PLC on site. This is critical and must be provided. In addition, Aqualyng require the provision of all documentation (non transactional) for the plant in word format (drawings in CAD) to permit updating. New procedures will be provided and inserted into the existing documentation.

Aqualyng will provide ongoing support and can assist council with any other water projects going forward.

2 INTRODUCTION TO AQUALYNG ICES

Aqualyng ICES specialises in water treatment solutions and services to deliver improvements to plant productivity and profitability through operational efficiency, reduction in operations costs and downtime.

Aqualyng ICES is a privately-owned global service provider of water treatment and environmental solutions to the Mining, Oil & Gas, Power, Healthcare, Food and Beverage and General Manufacturing sectors. Our focus is to recognise the requirements of our customers and provide solutions that exceed their expectations for:

- Safety
- Functionality
- Quality
- Reliability & Usability
- Cost (lifecycle)
- On time delivery

2.1 History

The company was formed in 1999 and prides itself on selecting highly trained and motivated staff to offer fit for purpose solutions for our clients. We offer national coverage from our offices in Brisbane, Townsville and Perth.

2.2 Health & Safety

Our commitment to health, safety, environment and community responsibilities are integral to the way we do business and essential in providing a safe and healthy working environment.

We are dedicated to identifying and managing HSE&C risks arising from our work activities and managing them to prevent work-related injury and ill health. We aspire to produce only positive aspects in the community and environment in which we operate.

Quality

We are dedicated to achieving consistent outstanding product and service performance that conforms to our customer's requirements at a competitive overall cost, having regard to safety, functionality, reliability, durability and usability.

Our personnel are committed to the quality of our products and services as well as maintaining our ongoing certification of our Management System to the requirements of ISO 9001:2015.

2.3 Capital Projects & Development

- EPC
- Build Own Operate Options
- Plant Upgrades
- Plant Refurbishment

2.4 Operation & Maintenance Services

- Contract Services
- Remote Monitoring
- Membrane & Filter Replacement
- Water Treatment Asset Management
- Environmental Compliance Monitoring

2.5 Plant Rental Services

- UF / RO / EDI
- Waste Water Reuse/Recovery
- Dosing Skids

2.6 Consulting Services

- Environmental
- Process Chemistry
- Plant Audits/Troubleshooting
- Membrane Autopsies
- Training

2.7 WTP Parts & Consumables

- Bespoke Filters
- Specialty and Commodity Chemical Manufacture
- Replacement WTP Mechanical
- Components
- WTP Equipment
- Laboratory Supplies

2.8 Healthcare Systems

Aqualyng provides a range of solutions for Healthcare. These include:

- Potable water sterilisation systems including WARM water legionella control units
- CSSD solutions for AS4187 (2014) Table 7.2 compliance- this includes thermal sterilisation systems, RO plants, silica management solutions.
- Legionella prevention services including point of use filters.
- Consulting and advisory services
- Cooling towers management, chemicals, and control units
- Boiler water management and treatment.

3 RESPONSE SCHEUDLE

The Tenderer should include in its Tender all information which the Tenderer wishes the Principal to take into account in assessing its Tender. The Principal may, but has no obligation to, consider any information not included in the Tender, notwithstanding that such other information may be within the Principal's knowledge, or may have been previously submitted to the Principal by the Tenderer (including, if relevant, information submitted by the Tenderer in any preceding steps in the Procurement Process).

3.1 Tender Schedule

Contact Details for the purposes of tender assessment as below:

Name of Contact:	Mark Collen
Telephone No. (BH):	0436 614 157
Telephone No. (AH):	0436 614 157
Mobile No:	0436 614 157
Facsimile No:	-
Email:	mark.collen@aqualyng.com
ABN or ACN:	99 086 243 772

3.2 Reference

Provide a statement of facts in detail as to the Tenderer's previous experience and achievements in performing similar or comparable work and its resources and ability to carry out the works.

3.2.1 Charters Towers Chlorination Plant Design

Introduction

Aqualyng successfully tendered for the supply of a rechlorination plant at Charters Towers regional council. This plant boosts chlorine levels in 15 Million litres of held water present on Towers Hill, Charters Towers.

Other services provided included training, support, maintenance and online monitoring.

The system uses Calcium Hypochlorite (solid) prepared into a solution for dosing using a dissolver system. This presents unique benefits of being 70% available chlorine compared to liquid chlorine at 10%, reduces hazards of handling (non-caustic based), and reduces transport costs because of increased concentration.

Photos of system

Containerised plant.

The system is installed in a fully power ventilated container, Chemical are separated and stored in a separate air extraction zone.

All pipe work, control valves, etc, installed by Aqualyng.

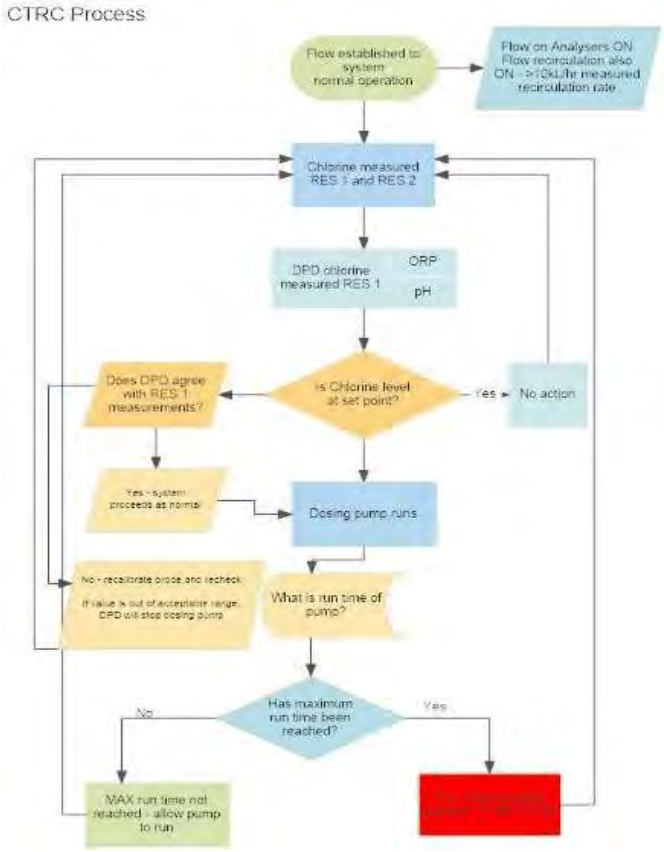
Analyser and Information Communication Systems

Analyser systems monitor free chlorine, temperature, conductivity, ORP, flow, circulation rates, product usages etc. Note control HMI is available as per HMI screen, online.

All information communicated to WEB and securely accessible. To approved personnel.

System Treatment Flow

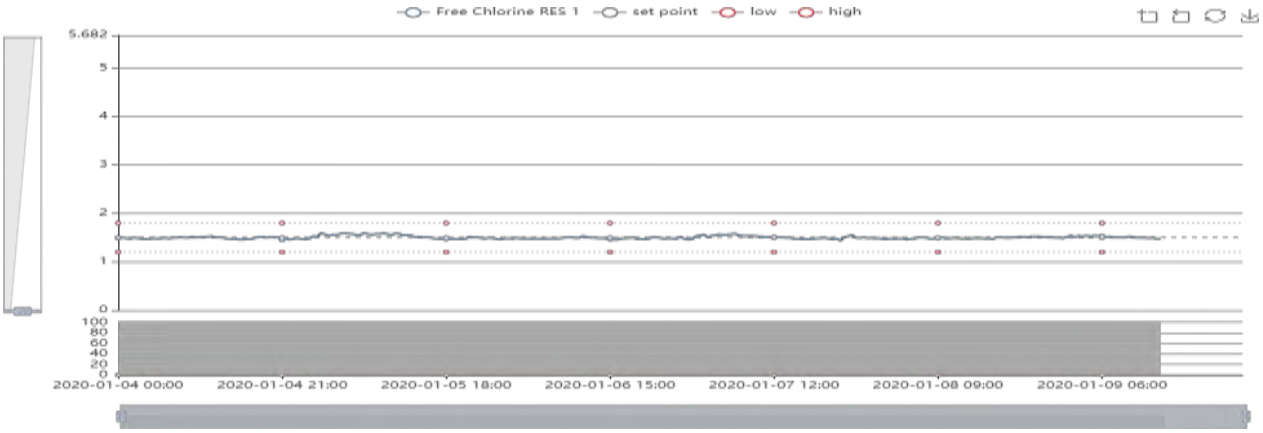
The flow chart below outlines the system function.



Free chlorine measurement – actual data

Instruments measure free chlorine using 4 measurement systems. This included direct online DPD, ORP (oxidation reduction potential), and two Evoqua Free chlorine (deplox 5) units.

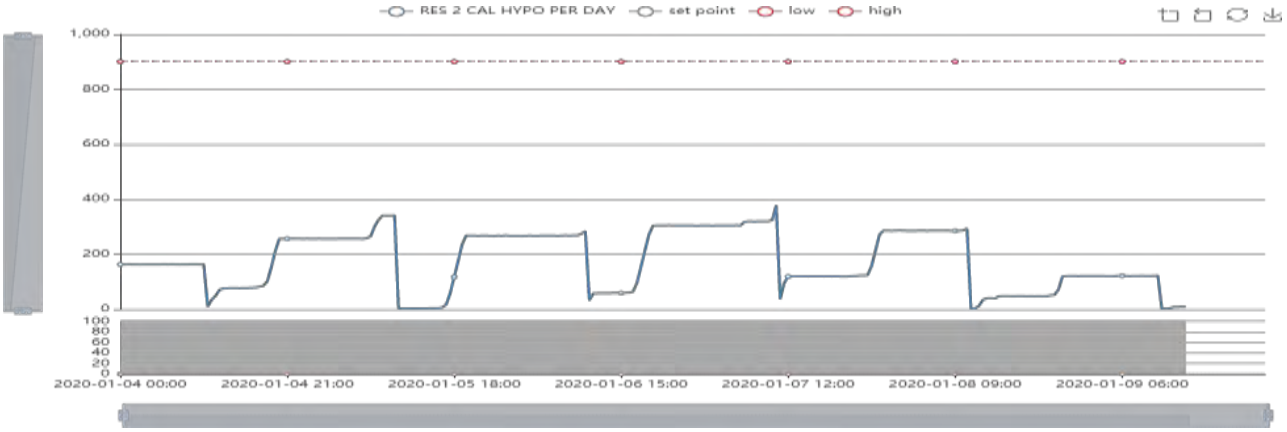
Reservoir 1: Free Chlorine. Set point 1.5ppm.



Free chlorine measurement on potable system.

Product dosing – actual data

The system measured product usage, and records volumes daily.



System features

- Water marked pipe work and equipment
- Free chlorine 1.5-3ppm at outlet of plant with aim of 1-1.5ppm at Distal point.
- Communications and tracking
- >3 levels of safety on chlorine control
- Measurement of tank levels
- Reporting to BMS (connection to our unit by others)

3.2.2 Glencore Murrin Murrin Nickel, Minara, Western Australia

Relationship / Contract Held: July 2014 - Ongoing

Scope of Services Provided:

Aqualyng have serviced and supported the Glencore site for several years, the plant consists of 6 RO trains each designed to supply 100m3/h and 5 mixed bed resin filled demineralisers supplying the mine site, power station and process plant.

Aqualyng service the plant to ensure optimum operation, this involves RO chemical cleans to the RO trains and repairs to the plant, Aqualyng also provide technical support to the process engineers if required and the supply of membranes and resin for the water treatment plant.

We also monitor and trend the plant data so that we can support the engineering team onsite by making recommendations for plant adjustment, repair or further investigation when we see the trends deviate from the norm.

Note: Please see Report examples in Appendix B

3.2.3 Ingham's Casino – Reverse Osmosis Plant and Associated Equipment

Client	Core Water Management
Duration	ongoing
Location	Casino, New South Wales

Key services

- Supply of a Reverse Osmosis unit with a CIP system
- Supply of a Chlorination plant monitoring and dosing system for potable water tank conditioning
- Support and service of the Plant

Client benefits:

RO product water is used as the potable water supply for the birds on site reducing salinity of drinking water. Bird mortality rates have significantly decreased since the installation of the RO plant.

Scope of work

Aqualyng supplied a Reverse Osmosis unit with a CIP system. It was installed and commissioned on site in January of 2020. The Reverse Osmosis plant was designed to remove the high levels of salinity in the bore water. Due to the requirement of potable drinking water standard water, a Calcite filter has been installed after the Reverse Osmosis plant to condition the RO permeate to bring it back to a drinking water grade. The RO unit is provided in a 20 ft shipping container.

The chemistry monitoring controllers were replaced with Nextep units for better control of the chlorination of the potable water to remove biological fouling of the potable water

The unit includes:

- 2.6m3/hr Bespoke Reverse Osmosis unit containerised.
- Antiscalant dosing pump and associated equipment.
- 2 x pH. and ORP Nextep controllers plus probes for Poultry feed water.

Aqualyng is providing a quarterly ongoing service of the unit. The service includes plant maintenance and cleaning of the membranes, tuning of plant, and ongoing training of site personnel.

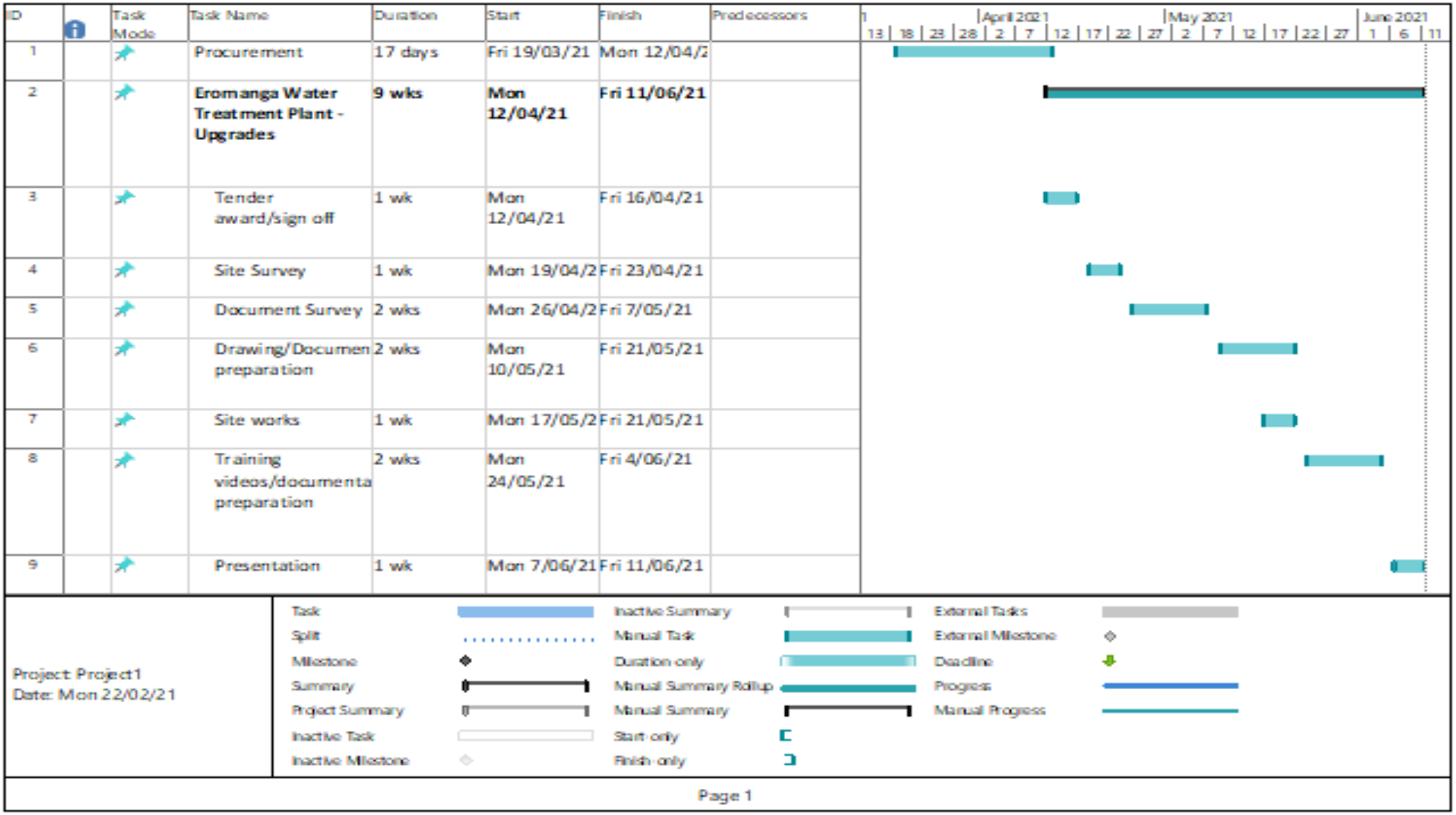
3.2.4 References

Table 3: Project References

Project	Contract Period	Contract Value (approx.)	Location
Caofeidan 50,000M3/Day SWRO Desalination Plant - BOOT	2013-ongoing	BOOT	China
Nike/TLCorporation – EPC Water Treatment & Wastewater Treatment and Reclaim System for Manufacturing Facility	Current EPC	$12 Million	Vietnam
Stanbroke Beef (Abattoir) – 3.2 ML/day fully automated WTP from bore water supply. Ongoing full support contract.	2019 – 2026	$1.5 Million	QLD
Rio Tinto YMPS Power Station: O&M Field support contract; consultancy & supply of chemicals & consumables	>10Years ongoing	varies	WA
Diamantina Power Station – production of process water from bore water and other surface waters	2014-ongoing	> $500K p/a	QLD
Millmerran Power Station – EPC (2017) production of process waters, drinking water. O&M demin WT, boiler/ turbine steam cycle chemistry.	2007-ongoing	> $500K p/a	QLD
Uranquinty Power Station – EPC, O&M of demin water treatment facility	Ongoing	varies	NSW
Newmont Boddington Mine O&M Field support contract; consultancy & supply of chemicals & consumables	>10Years ongoing	> $500K p/a	WA
Glencore Murin Mine site: O&M Field support contract; consultancy & supply of chemicals & consumables	>10Years ongoing	> $500K p/a	WA
Glencore Mining Mount Isa – Full time support of filtration plant and cooling water systems (EPC scopes previously)	>10years ongoing	varies	QLD
BHP/Clough Calcium Hypochlorite dosing system	2020- Present	<$250K	WA
QEII Hospital 22kl/h Drinking Water unit (containerised) Training, support, maintenance, online monitoring	2019	<$250K	QLD
United Petroleum Dalby Bio Refinery Specialists Water Chemistry Consultancy	2020	$150k	QLD
Charter Towers Reginal Council Water Treatment Unit (Containerised plant c/w solar power system)	2019	$400K	QLD
ICON Cancer Hospital – Provision of Water Treatment Plant, O&M field support contract; consultancy & supply of chemicals & consumables	2019-Present	<$250K	WA

3.3 Gantt Chart

Provide a construction programme showing the dates by which or the times within which the various stages or parts of the works are to be completed or executed. The program should be in a Gantt Chart type format and preferably electronically generated.



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		Procurement	17 days	Fri 19/03/21	Mon 12/04/2	
2		**Eromanga Water Treatment Plant - Upgrades**	**9 wks**	**Mon 12/04/21**	**Fri 11/06/21**	
3		Tender award/sign off	1 wk	Mon 12/04/21	Fri 16/04/21	
4		Site Survey	1 wk	Mon 19/04/2	Fri 23/04/21	
5		Document Survey	2 wks	Mon 26/04/2	Fri 7/05/21	
6		Drawing/Documen preparation	2 wks	Mon 10/05/21	Fri 21/05/21	
7		Site works	1 wk	Mon 17/05/2	Fri 21/05/21	
8		Training videos/documenta preparation	2 wks	Mon 24/05/21	Fri 4/06/21	
9		Presentation	1 wk	Mon 7/06/21	Fri 11/06/21	

Figure 1: Program

COMMERCIAL-IN-CONFIDENCE

3.4 Cashflow

Provide an estimated monthly cash flow schedule.

Table 4: Cashflow

Description	Amount
Milestone 1 – Deposit 30%	$20,732.14
Milestone 2 – Component Delivery 60%	$41,464.28
Milestone 3 – Completion 10%	$6,910.72

3.5 Subcontractors

Provide details of proposed subcontractors.

Table 5: Subcontractor List

Supplier	Component
Industrial Software	PLC Programming

3.6 Suppliers

Provide details of proposed suppliers.

Table 6: Supplier List

Supplier	Component
Prominent	Dosing Pumps
Sigura	MC-5 chlorination system
Evoqua	Deplox 5

3.7 Personnel

Provide details of key personnel.

1 Biography – Mark Collen

Mark Collen holds an Honours degree in Industrial chemistry from University of Technology Sydney.

He is a highly skilled industrial chemist with 20+ years industry experience having worked for tier one water treatment companies such as Nalco and Veolia Water.

Mark is also an accomplished Project Manager working on major projects including Nestle Process water plant (1.2MLD), Dalby Bio Refinery Ltd Ultra filtration process water plant, Teys Biloela RO plants. Of late, the focus on legionella management in potable systems came to the forefront which Mark was involved in providing ongoing solutions to Wesley Hospital following the legionella-based fatality.

The potable water (rechlorination and filtration) treatment plants Mark was involved in were:

- Townsville Hospital and Health Service (7 plants)
- Mackay Hospital and Health Service (7 plants)
- Other potable treatment plants around Brisbane and surroundings areas (5)
- QEII Hospital treatment plant

Mark heads Aqualyng ICES's drinking water and healthcare divisions. He has designed and implemented holistic water treatment systems that combine multiple solutions to decrease legionella risk of facilities.

Mark shall be supporting project design activities and provide support through commissioning and operations.

2 Biography – Marcus Cordingley

Marcus Cordingley holds a Bachelor of Science (Australian Environmental Studies) from Griffith University and a Graduate Diploma of Education.

He has worked with several industry leading companies on a wide variety of water treatment applications over the last 20 years.

The broad experience Marcus has gained provides him with a strong aptitude to understand and provide holistic solutions to complex water treatment challenges.

He has worked in several positions in Aqualyng ICES including Operations Manager and understands the complexity of the business very well, he currently holds the position of Technical Manager.

Marcus shall have overall technical responsibility for the design of the facility including technology, membrane and chemical selection through extensive software modelling combined with his vast subject matter knowledge and experience. Marcus shall be assigned Project Manager.

3 Biography - Jamie Loughran

Jamie Loughran holds a Bachelor of Business (Logistics and Operations Management) and BSc (Chemistry) from the University of Southern Queensland. He has worked in the water industry for 10+ years.

As an Industrial Chemist he has advanced knowledge of water treatment and asset protection involving water treatment plants (Ultra-Filtration, Reverse Osmosis, Media Filtration, Clarification and Demineralisation processes), Cooling Towers and Boiler/Steam Turbines.

He is also an experienced laboratory analyst with high levels of problem solving, relating laboratory results with field issues.

Jamie is also an experienced Power Station Chemist with 5+ years of working with power station boilers, water treatment plants, condensers and steam turbines at sites such as Millmerran Power Station, Kogan Power Station, Diamantina Power Station and various Cogen Stations.

He is also an accomplished Project Manager working on major projects including a 3MLD UF/RO plant at an abattoir, Potable water producing RO plant at Ingham's and Demineralised water treatment plant.

Jamie's current role as the QLD Operations Supervisor involves undertaking design, installation, commissioning, maintenance and inspection of water treatment plants across multiple sites, power stations, and hospitals. This involves liaising with clients and reviewing the trends and data to ensure optimal operation of the water treatment plants and processes, report writing on the condition of the plant and making recommendations for improvement, fault finding, investigation into plant failure, calibration and verification of instrumentation, scheduling service visits, and quotation of spares and consumables.

Although not involved directly on the frontline of this project Jaimie, as part of the Aqualyng national supervisory and management team, is involved with the review and approval process of the various project management plans and along with his team provides further depth of resource overall.

4 Biography – Esther Reimann

Esther Reiman holds an advanced Diploma in Business and Accounting with an initial career as a qualified Physics Laboratory Scientist (R&D sector).

Esther has gained extensive experience in both Project Coordination and Administration with recent projects including Blackall containerised WTP, BHP/Clough Treatment system and Mainfreight's dimethoate removal from wastewater project. All projects involved significant coordination and administrative scopes with adherence to a complex schedule of deliverables and demanding time frames.

Esther shall support the Project Manager of this project with all documentation and management tasks.

3.8 Technical Details

Provide dot point details of the proposed work methods to be adopted for the major items of work. Details should include type & number of construction plant &/or equipment to be used.

3.8.1 Nature and scope of the Project

Quilpie shire council have installed a drinking water treatment plant to process mildly saline water from local bores (2) both supplying water from the great artesian basin.

The water treatment plant (WTP) combines the technology of media filtration, reverse osmosis membranes, UV, and chlorine feed.

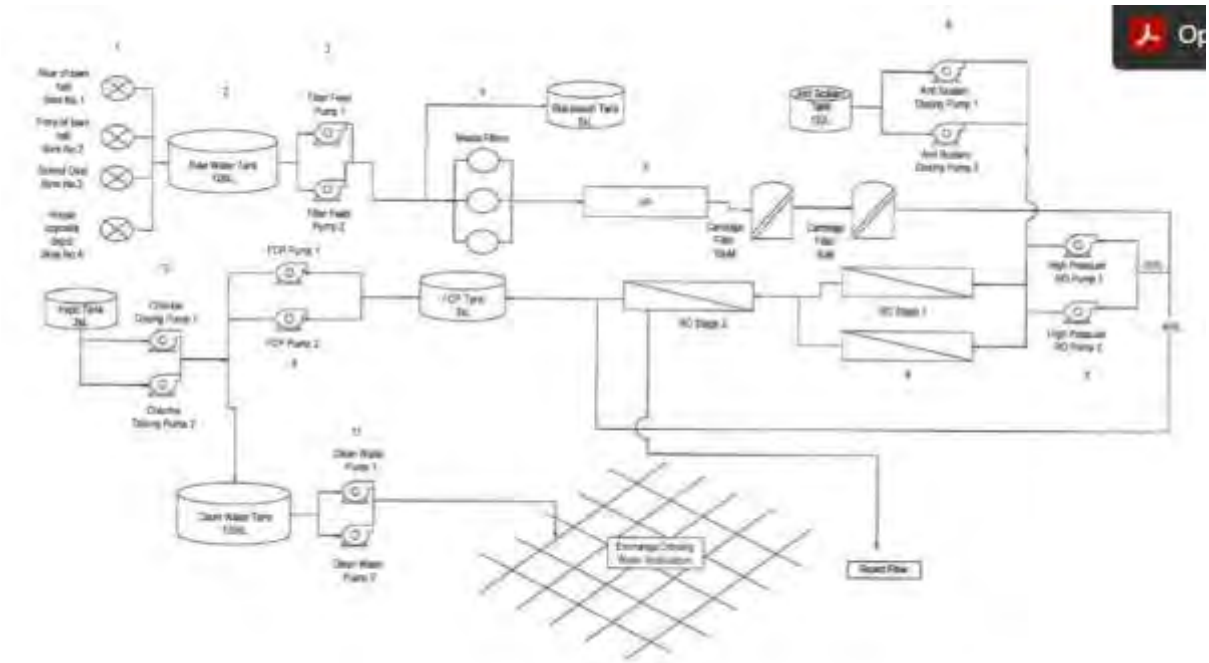


Figure 2: extracted from QSC Water Quality Plan

The QSC has launched the tender (ID 369034) to procure specialist assistance in improving operator knowledge in plant operation, rectification of critical issues (chlorine feed and control, membrane integrity check, etc), and assistance with ensuring data communication capability to the council.

Aqualyng performs similar services on a regular basis to councils including Charters Towers (rechlorination and main reservoir mixing system – see point 3.2.1 for details), Blackall Hospital drinking water feed system (full plant treating great artersian basin water), Julia ck Hospital (full plant treating great artesian basin water), South 32 RO plant (bore water processing), and more.

Our personnel's experience in drinking water plant supply, design, diagnostics, exceeds 100 years.

Concerns

- Relending of RO reject back into towns water supply is a concern – this would be better sorted using remineralisation dosing using calcium chloride or a calcite filter. This will be provided in the report back to QSC.

Table 3-1 Quilpie Reticulated Water

Quilpie Water Supply		Start Date	25/03/2009		End Date:	14/05/2019					
Characteristic	Units	No. of Samples	Summary of Results					Guideline Value			
			Maximum Value	Average Value	Minimum Value	Std Dev	95th Percentile	Health	Exceedances	Aesthetic	Exceedances
Conductivity	uS/cm	29	975.0	907.31	854.00	38.32	972.00				
pH		35	9.3	8.49	8.30	0.16	8.60			≥6.5 & ≤ 8.5	15
Total Hardness	mg/L as $CaCO_3$	29	10.0	6.39	4.20	1.48	9.60				
Temporary Hardness	mg/L as $CaCo_3$	29	10.0	6.39	4.20	1.48	9.60			200	0
Alkalinity	mg/L $CaCo_3$	29	369.0	329.17	307.00	19.04	368.20				
Residual Alkalinity	meq/L	29	7.2	6.44	6.00	0.37	7.16				
Silica	mg/L	29	44.0	42.83	41.00	0.79	44.00			80	0
Total Dissolved Ions	mg/L	58	778.0	698.79	662.00	35.36	769.40				
Total Dissolved Solids	mg/L	29	600.0	545.28	520.00	24.15	592.20			600	0
True Colour	Hazen	18	5.0	1.50	1.00	1.12	4.15			15	0
Turbidity	NTU	32	1.0	0.30	0.25	0.18	0.59			5	0
Sodium	mg/L	29	230.0	207.48	195.00	10.14	230.00			180	29
Potassium	mg/L	29	2.7	2.34	2.20	0.10	2.50				
Calcium	mg/L	29	4.1	2.51	1.70	0.59	3.78				
Magnesium	mg/L	18	0.3	0.03	0.00	0.07	0.13				
Hydrogen	mg/L	29	0.0	0.00	0.00	0.00	0.00				
Bicarbonate	mg/L	29	435.0	386.10	356.00	22.76	431.00				
Carbonate	mg/L	29	13.0	7.46	4.30	2.26	12.00				
Hydroxide	mg/L	29	0.1	0.05	0.00	0.05	0.10				
Chloride	mg/L	29	95.0	83.97	80.00	3.59	89.60			250	0
Fluoride	mg/L	35	1.9	1.70	1.50	0.09	1.80	1.5	33		
Nitrate	mg/L	16	0.5	0.50	0.50	0.00	0.50	50	0		
Sulphate	mg/L	33	9.0	7.89	6.00	0.90	9.00	500	0	250	0
Iron	mg/L	32	0.03	0.01	0.01	0.01	0.03			0.3	0
Manganese	mg/L	16	0.01	0.009	0.000	0.002	0.010	0.5	0	0.1	0
Zinc	mg/L	22	0.53	0.055	0.003	0.141	0.448			3	0
Aluminium	mg/L	29	0.09	0.051	0.039	0.009	0.062			0.2	0
Boron	mg/L	37	0.63	0.485	0.060	0.087	0.602	4	0		
Copper	mg/L	20	0.49	0.072	0.009	0.125	0.405	2	0	1	0

Figure 3: Quilpie Reticulated Water

- The report mentions plant conductivity breaching the 350uS/cm limit (internal plant limitation?). The ADWG aesthetic limit is 500uS/cm, input conductivity is 900uS/cm approx. as per above. Assuming there is no re-blending (% mixture is not specified) then the RO should be producing (at 99% rejection when membranes are new) water with conductivity 9uS/cm (1% of salt remains). If the membranes are worn/aged, 5% of salts typically seep through – 45uS/cm would be the typical value. Hitting 350uS/cm says a serious issue is present. This could well be within the re-blending control or alike.
- Inlet iron from the bore feed is highly likely. Aqualyng have found pre-chlorination converts soluble iron to particulate iron which allows the multimedia units to filter out the iron – failure to remove the iron results in iron depositing on the membrane surface, leading to premature failure. Aqualyng would seek to investigate this. Note: iron deposition not inhibited by antiscalant to any significant level.
- The tender does not specify RPEQ (registered professional engineering QLD) sign off on design. It is recommended Aqualyng provide such a sign off to provide assurance to end users and TSRC. This comes are an additional fee.
- The plant includes a UV. UV systems are designed to kill pathogens based on a "dose rate" controlled by flow and lamp length. As the assessment of the Quilpie and Eromanga Water Supply systems July 2018" report summarises, a lamp intensitometer isn't present. Also there appears to be no flow control. This will require further investigation.

3.8.2 Methodology

Aqualyng proposes to progress the project as per below. Assuming Aqualyng is awarded tender, the process but summarised below

1 Submit plan to QSC

2 Visit site – conduct preliminary survey, measurements, observations, interviews with stakeholders (plumbing, maintenance team, etc)

3 Download software code from plant for modification

4 Install modem for updating program

5 Provide drawings for changes, chlorine monitoring unit install including any process changes for HMI system

6 Install calcium hypochlorite (chlorination) unit, move CIP tank

7 Provide all documentation and film training video

8 Present plant, documentation, and video including training session

9 Any other issues.

The Aqualyng approach will be to apply the approved scope of works as per tender (369034) and provide further comments on other related issues. With approval, other issues would also be remedied or handed to QSC for action.

Aqualyng technical team will look to attend site twice - first time for site survey and information collection, then second for review, implementation, and analysis.

Installation of calcium hypochlorite (chlorine) unit, and movement of CIP tank will be by Aqualyng plumbing specialist.

Aqualyng envisages plant shutdown for conducting membrane integrity and flow testing. This would be for membrane integrity assessment, where the membrane casing is probed for salt leakage. This method allows determination of whether salt leakage is from seal leakage or membrane damage/age/failure. Plant off time should not exceed 6 hours.

3.8.3 Response to Scope of works

Table 7: Scope of works

Scope Component	Comments
Prepare and operations manual	Manual prepared using existing documentation available for installed components. QSC to provide (if possible) word version of existing manual for modification.
Design, install and commission system improvements	
Item 10 – moving CIP tank to outside location. Raised platform.	Includes drawings and galvanised platform if required. Plumbing works included.
Item 11 – installing manual backwash function into PLC unit – displays as button on HMI	Requires code to be downloadable and editable using accessible software. Approval form QSC to modify another company's software is required.
Item 12 – ADWG based conductivity selection (approx. 500uS/cm) would typically be accepted.	Review of blending of reject is required. Aqualyng will recommend a re-mineralisation step instead of re-blending – this removes the risk of putting contaminants back into the finished water. Calcite filtration or use of calcium chloride will be recommended.
Modification of SCADA to include adjustable conductivity setpoint	As above. This will require access to PLC code.
Item 14 – tank level alarms to be installed in conjunction with new calcium hypochlorite dosing system. Alarms will link into the PLC	This assumes available inputs on PLC readily configurable.
Establish true duty standby chlorine dosing with alarm activation and plant shutdown on pump failure.	Aqualyng is proposing to supply two replacement dosing pumps (for details see appendix F). These units will be able to output alarms but are self priming peristaltic units. These work best with the calcium hypochlorite system.
Installation of an online chlorine residual analyser and PLC controlled feed back to control chlorine dosing	Aqualyng will provide a DEPLOX 5 unit linked to the PLC. Again, this assumes spare input channels on existing PLC and ability to modify onboard PLC code. The deplox unit is standard for most councils and proven to be fit for purpose. Unit will also include self cleaning probe, and pH monitoring.
Develop a system for the storage of chlorine	Aqualyng is to provide a calcium hypochlorite system which has a shelf life of 24 months (sodium hypochlorite is 2 months).
Investigate causes of elevated conductivity in permeate	Further work will be conducted
Site visit 11 months post project completion	Ongoing support to the QSC will be provided including the site visit. Support using online monitoring and training are all to be provided on an agreed basis. The training video to be provided with this package will enable training of new personnel, revision to existing personnel.

3.8.4 Dosing pumps to be provided (included in costing).

The pumps below are ideal for dosing the calcium hypochlorite. The cost for the pumps is included in the tender.

The dosing pumps currently on the plant are Prominent Delta which have low functionality. They do not have cavitation detection. They will also likely suffer ongoing gasing challenges due to type and configuration. They will also likely not be true duty standby.

Aqualyng will configure the pumps below to operate duty standby via PLC control. This will require a program change to include a timer (this can be altered by the front screen).

3.8.5 Chlorination system

The system below is the MC-5 Calcium Hypochlorite preparation system. The unit will include alarms communication. See PFD.

This is the similar system what is used at Charters Towers Regional Council, Port Douglas RC, Brisbane Children's Hospital drinking water system, amongst many others.

- The plant specification did not include a UV. Higher life form bacteria such as

The unit pictured above is the DEPLOX 5 (units to RHS) linked to the site PLC. Note the unit displays pH, free chlorine etc.

This unit is installed at Charters Towers Regional Council.

Note Aqualyng programmers provided plant controls to agreed specification. The screen provides for easy set point changes and plant activation.

3.8.6 PFD for typical chlorination system integration

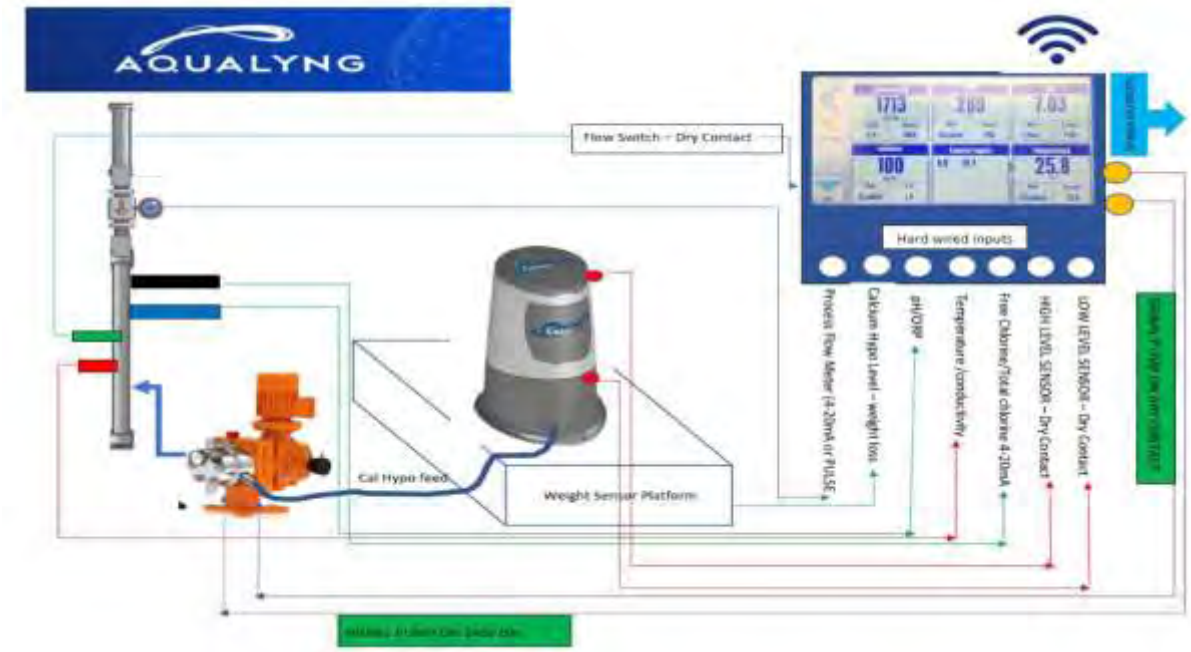
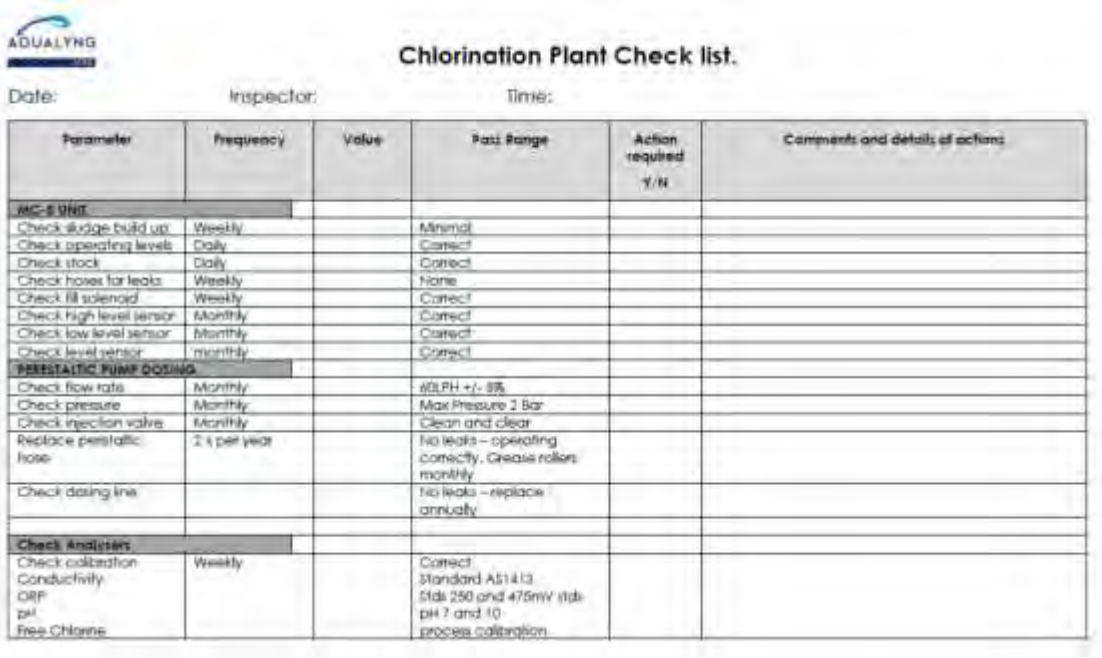


Figure 4: Chlorination System

3.8.7 Implementation of a plant Check list.

Aqualyng will provide training on looking after the plant. Included in this will be a check list to enable easy recording of checks. Example below.



Chlorination Plant Check list.

Date: Inspector: Time:

Parameter	Frequency	Value	Pass Range	Action required Y/N	Comments and details of action:
MC-5 UNIT					
Check sludge build up	Weekly		Minimal		
Check operating levels	Daily		Correct		
Check stock	Daily		Correct		
Check hoses for leaks	Weekly		None		
Check fill solenoid	Weekly		Correct		
Check high level sensor	Monthly		Correct		
Check low level sensor	Monthly		Correct		
Check level sensor	monthly		Correct		
PERISTALTIC PUMP DOSING					
Check flow rate	Monthly		60LPH +/- 5%		
Check pressure	Monthly		Max Pressure 2 Bar		
Check injection valve	Monthly		Clean and clear		
Replace peristaltic hose	2 x per year		No leaks – operating correctly. Grease rollers monthly		
Check dosing line			No leaks – replace annually		
Check Analysers					
Check calibration Conductivity ORP pH Free Chlorine	Weekly		Correct Standard AS1413 Std: 250 and 475mV (Std: pH 7 and 10 process calibration		

Figure 5: Chlorination Plant Checklist

3.9 Alternative Materials

Provide a list of alternative materials and/or equipment and their details, if alternatives are nominated.

- Calcium Hypo chlorite system MC-5 – Datasheet attached in Appendix F

3.10 Site works

Area of Site required for the works, in particular if larger than what is provided for in the Contract.

- Plant area to move CIP Tank

3.11 Quality Assurance Accreditation

Status of Quality Assurance System/Accreditation.

- ISO9001_2015 2020
- ISO45001_2018 2020

3.12 Insurances

3.12.1 Public liability cover

- Policy Number: BN-CAS-19-410367-A

3.12.2 Professional Indemnity COC

- Policy number: MI-BN-SPC-07-123857-PI

3.12.3 Workcover status.

- Policy number: WHA990316204

3.13 Assumptions

Provide a list of assumptions made in the tender.

- Simple access to site
- Rapid availability of documents as required
- Access to PLC code readily available and modification of code able to be conducted using standards means.
- Age of PLC does not preclude access to standard ethernet cable, mobile access to allow off site programming is present
- Access to permeate sampling points
- Access to personnel for training, all within normal hours (8am-4pm)
- CIP tank of 200L easy to move no crane required
- Wiring to CIP tank is minimal
- Local Electrician to do electrical work assume 3 hours on site

3.14 Qualifications

Provide a list of any qualifications of the tender offer.

- Please see details in the Biography of key personnel.

3.15 Other Information

Other information the tenderer may consider relevant to the tender.

- Total combined experience of Aqualyng is around 200 years.

4 TENDER FORM

Name of person, firm or company tendering	AQUALYNG ICES Pty Ltd
Address	Unit 3, 11 Palmer Place, Murarrie QLD 4172

Hereby tender(s) to perform the work for:

Description of works	Eromanga Water Treatment Plant - Upgrades

In accordance with the following Documents:

"The Tender Document – Eromanga Water Treatment Plant – Upgrades"

For the Lump Sum of	
Total being (excluding GST):	$69,107.14
Dated this	25th day of February 2021

.....

Signature of Tenderer

This is a Lump Sum Contract.

The Superintendent shall be notified immediately of any discrepancies in quantities or omissions discovered in the Schedule of Work.

The Schedule of Work is to be used as the basis for the assessment of Progress Claims during the Contract. Clause 2.1(a) of the Minor works contract conditions applies to this Lump Sum Contract.

Notes: All rates are to be exclusive of GST.

Table 8: Pricing breakdown

Item	Description of work	Unit	Qty	Rate	Amount
1	Establishment/ Insurances	Each	1	$3,464.29	$3,464.29
2	Prepare an Operation Manual (Category 1 items 1 to 9)	Each	1	$3,571.43	$3,571.43
3	Design, Install and Commission System Improvements (Category 2 items 10 to 17)				
3.1	Item 10 (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	Each	1	$5,714.29	$5,714.29
3.2	Item 11 Ensure that it is possibleto trigger a manual backwash. If not, modify the PLC to allow this.	Each	1	$857.14	$857.14
3.3	Item 12 Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	Each	1	$1,428.57	$1,428.57
3.4	Item 13 Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	Each	1	$857.14	$857.14
3.5	Item 14 Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated.	Each	1	$285.71	$285.71
3.6	Item 15 Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	Each	1	$7,857.14	$7,857.14
3.7	Item 16 Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	Each	1	$12,857.14	$12,857.14
3.8	Item 17 Develop a system forthe storage of sodium hypochlorite that results in shorter holding times.	Each	1	$17,857.14	$17,857.14
4	Investigate cause of elevated RO membrane EC and provide recommendation (Category 3)	Each	1	$8,142.86	$8,142.86
5	Undertake a site inspection and system assessment 11 months after the date for practical completion	Each	1	$5,857.14	$5,857.14
6	General Cleanup / Disestablishment	Each	1	$357.14	$357.14

Subtotal	$69,107.14
GST (10%)	$6,910.71
TOTAL	$76,017.86

Tenderer:	Aqualyng ICES		
Contact:	Mark Collen		
Address:	Unit 3, 11 Palmer Place		
Telephone:	0436 614 157	Fax:	
Signature:		Date:	25/02/2021
Email:	willa.vorster@aqualyng.com		

4.1 DAYWORKS RATES

These rates are to be held firm for the duration of the Contract. Plant Hire Rates are to include the operator.

Table 9: Daywork Rates

Labour Description	Rate Normal	Time & half	Double time
Consultant	$175	N/A	N/A
Plumber	$125	$185	$215
Electrician	$135	$195	$225
Technician	$120	$180	$210

Table 10: Other Rates

Plant description	Rate
Option 1: using Aqua-Report remote monitoring system	$5,500

Aqualyng can provide on request the "Eagle View" support network to assist the personnel on call, using remote link.

Note: system like above is proposed. The Eagle View unit would ideally be hard mounted to plant to avoid misplacement or unrequired movement.

Tenderer: Aqualyng ICES
Contact: Mark Collen
Address: Unit 3, 11 Palmer Place
Telephone: 0436 614 157 Fax:
Signature: Date: 25/02/2021
Email: willa.vorster@aqualyng.com

5 VALIDITY

Our quotation is valid for 60 days from Tender closing date.

Appendix A ORIGINAL RESPONSE DOCUMENT

Return Package

Quilpie Shire CouncilEromanga

Water Treatment Plant - Upgrades

Contract No. 200274:

Document Control

Date	Description	Author
04/02/2021	Released for Tender	Stuart Bourne

GBA Project/Doc ID no. 200274 / 373253

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, pleasecontact George Bourne and Associates.

Phone 07 4651 5177
Email admin@gbaengineers.com.au

TABLE OF CONTENTS

PART 6 – RESPONSE SCHEDULES

RESPONSE SCHEDULES

The Tenderer should include in its Tender all information which the Tenderer wishes the Principal to take intoaccount in assessing its Tender. The Principal may, but has no obligation to, consider any information not included in the Tender, notwithstanding that such other information may be within the Principal's knowledge,or may have been previously submitted to the Principal by the Tenderer (including, if relevant, information submitted by the Tenderer in any preceding steps in the Procurement Process).

TENDER SCHEDULE

a) Contact Details for the purposes of tender assessment as below:

Name of Contact:	Mark Collen
Telephone No. (BH):	0436 614 157
Telephone No. (AH):	0436 614 157
Mobile No:	0436 614 157
Facsimile No:	-
Email:	mark.collen@aqualyng.com

b) ABN or ACN: 99 086 243 772

c) Provide a statement of facts in detail as to the Tenderer's previous experience and achievements in performing similar or comparable work and its resources and ability to carry out the works.

1. Charters Towers Chlorination Plant Design

Introduction

Aqualyng successfully tendered for the supply of a rechlorination plant at Charters Towers regional council. This plant boosts chlorine levels in 15 Million litres of held water present on Towers Hill, Charters Towers.

Other services provided included training, support, maintenance and online monitoring.

The system uses Calcium Hypochlorite (solid) prepared into a solution for dosing using a dissolver system. This presents unique benefits of being 70% available chlorine compared to liquid chlorine at 10%, reduces hazards of handling (non-caustic based), and reduces transport costs because of increased concentration.

Photos of system

Containerised plant.

The system is installed in a fully power ventilated container, Chemical are separated and stored in a separate air extraction zone.

All pipe work, control valves, etc, installed by Aqualyng.

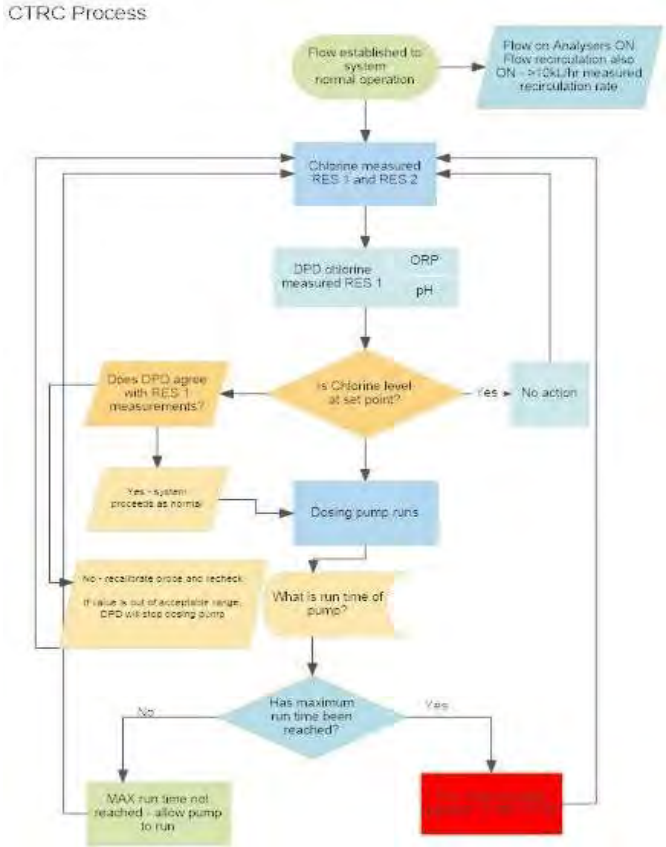
Analyser and Information Communication Systems

Analyser systems monitor free chlorine, temperature, conductivity, ORP, flow, circulation rates, product usages etc. Note control HMI is available as per HMI screen, online.
All information communicated to WEB and securely accessible. To approved personnel.

System Treatment Flow

The flow chart below outlines the system function.

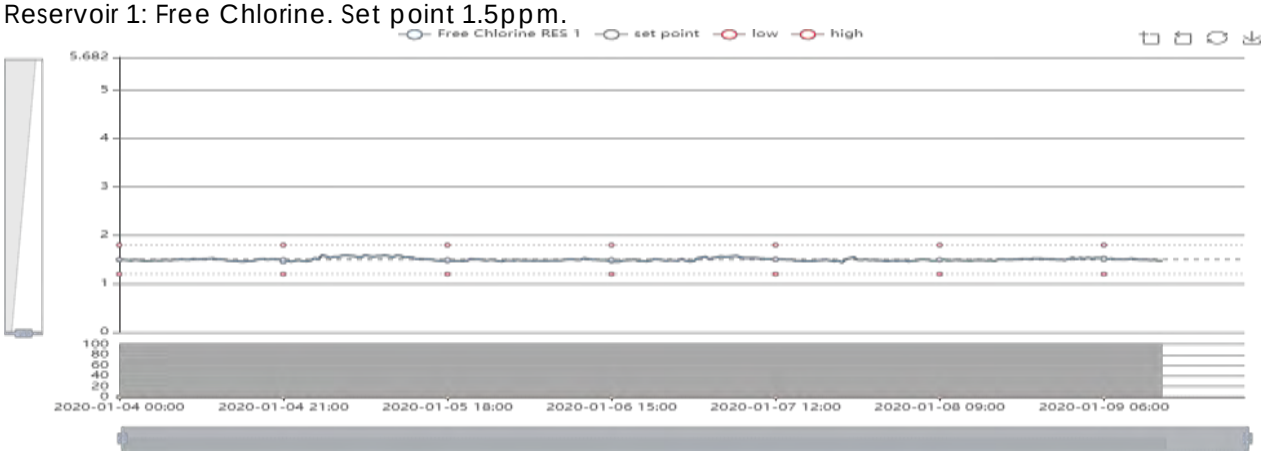
CTRC Process



Free chlorine measurement – actual data

Instruments measure free chlorine using 4 measurement systems. This included direct online DPD, ORP (oxidation reduction potential), and two Evoqua Free chlorine (deplox 5) units.

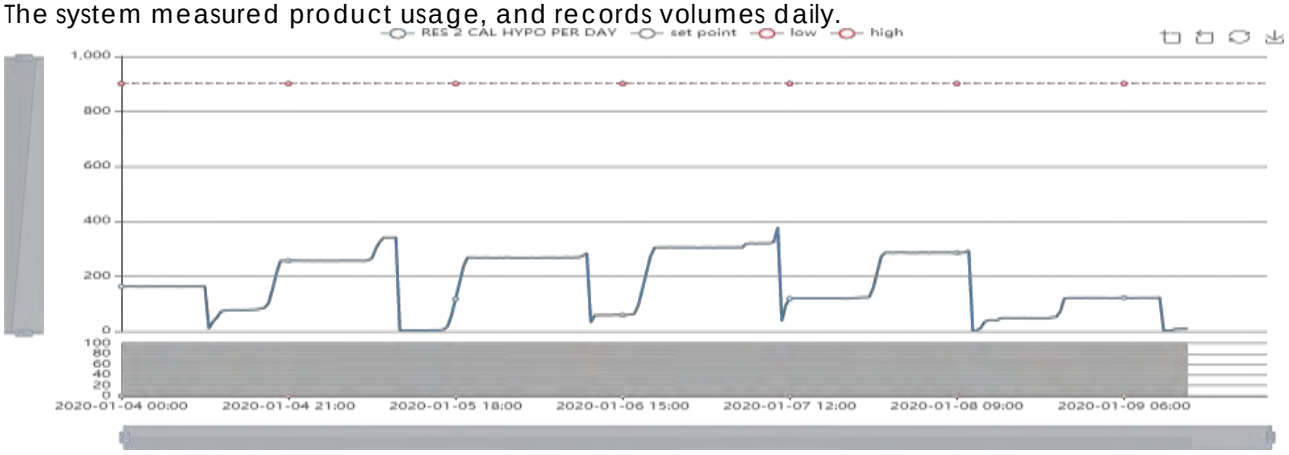
Reservoir 1: Free Chlorine. Set point 1.5ppm.



Free chlorine measurement on potable system.

Product dosing – actual data

The system measured product usage, and records volumes daily.



System features

- Water marked pipe work and equipment
- Free chlorine 1.5-3ppm at outlet of plant with aim of 1-1.5ppm at Distal point.
- Communications and tracking
- >3 levels of safety on chlorine control
- Measurement of tank levels
- Reporting to BMS (connection to our unit by others)

2. Glencore Murrin Murrin Nickel, Minara, Western Australia
   Relationship / Contract Held: July 2014 - Ongoing
   Scope of Services Provided:
   Aqualyng have serviced and supported the Glencore site for several years, the plant consists of 6 RO trains each designed to supply 100m3/h and 5 mixed bed resin filled demineralisers supplying the mine site, power station and process plant.
   Aqualyng service the plant to ensure optimum operation, this involves RO chemical cleans to the RO trains and repairs to the plant, Aqualyng also provide technical support to the process engineers if required and the supply of membranes and resin for the water treatment plant.
   We also monitor and trend the plant data so that we can support the engineering team onsite by making recommendations for plant adjustment, repair or further investigation when we see the trends deviate from the norm.
   Note: Please see Report examples in Proposal document Appendix B

3. **Ingham's Casino –** Reverse Osmosis Plant and Associated Equipment

Client Core Water Management
Duration ongoing
Location Casino, New South Wales
Key services

- Supply of a Reverse Osmosis unit with a CIP system
- Supply of a Chlorination plant monitoring and dosing system for potable water tank conditioning
- Support and service of the Plant

Client benefits:
RO product water is used as the potable water supply for the birds on site reducing salinity of drinking water. Bird mortality rates have significantly decreased since the installation of the RO plant.
Scope of work
Aqualyng supplied a Reverse Osmosis unit with a CIP system. It was installed and commissioned on site in January of 2020. The Reverse Osmosis plant was designed to remove the high levels of salinity in the bore water. Due to the requirement of potable drinking water standard water, a Calcite filter has been installed after the Reverse Osmosis plant to condition the RO permeate to bring it back to a drinking water grade. The RO unit is provided in a 20 ft shipping container.
The chemistry monitoring controllers were replaced with Nextep units for better control of the chlorination of the potable water to remove biological fouling of the potable water
The unit includes:

- 2.6m3/hr Bespoke Reverse Osmosis unit containerised.
- Antiscalant dosing pump and associated equipment.
- 2 x pH. and ORP Nextep controllers plus probes for Poultry feed water.

Aqualyng is providing a quarterly ongoing service of the unit. The service includes plant maintenance and cleaning of the membranes, tuning of plant, and ongoing training of site personnel.

Project	Contract Period	Contract Value (approx.)	Location
Caofeidan 50,000M3/Day SWRO Desalination Plant - BOOT	2013- ongoing	BOOT	China
Nike/TLCorporation – EPC Water Treatment & Wastewater Treatment and Reclaim System for Manufacturing Facility	Current EPC	$12 Million	Vietnam
Stanbroke Beef (Abattoir) – 3.2 ML/day fully automated WTP from bore water supply. Ongoing full support contract.	2019 – 2026	$1.5 Million	QLD
Rio Tinto YMPS Power Station: O&M Field support contract; consultancy & supply of chemicals & consumables	>10Years ongoing	varies	WA
Diamantina Power Station – production of process water from bore water and other surface waters	2014-ongoing	> $500K p/a	QLD
Millmerran Power Station – EPC (2017) production of process waters, drinking water. O&M demin WT, boiler/ turbine steam cycle chemistry.	2007-ongoing	> $500K p/a	QLD
Uranquinty Power Station – EPC, O&M of demin water treatment facility	Ongoing	varies	NSW
Newmont Boddington Mine O&M Field support contract; consultancy & supply of chemicals & consumables	>10Years ongoing	> $500K p/a	WA
Glencore Murin Mine site: O&M Field support contract; consultancy & supply of chemicals & consumables	>10Years ongoing	> $500K p/a	WA
Glencore Mining Mount Isa – Full time support of filtration plant and cooling water systems (EPC scopes previously)	>10years ongoing	varies	QLD
BHP/Clough Calcium Hypochlorite dosing system	2020- Present	<$250K	WA
QEII Hospital 22kl/h Drinking Water unit (containerised) Training, support, maintenance, online monitoring	2019	<$250K	QLD
United Petroleum Dalby Bio Refinery Specialists Water Chemistry Consultancy	2020	$150k	QLD
Charter Towers Reginal Council Water Treatment Unit (Containerised plant c/w solar power system)	2019	$400K	QLD
ICON Cancer Hospital – Provision of Water Treatment Plant, O&M field support contract; consultancy & supply of chemicals & consumables	2019-Present	<$250K	WA

Please see further details in the Proposal Appendix B

d) Provide a construction programme showing the dates by which or the times within which the various stages or parts of the works are to be completed or executed. The program should be in a Gantt Charttype format and preferably electronically generated.

e) Provide an estimated monthly cash flow schedule.

Description	Amount
Milestone 1 – Deposit 30%	$20,732.14
Milestone 2 – Component Delivery 60%	$41,464.28
Milestone 3 – Completion 10%	$6,910.72

f) Provide details of proposed subcontractors.

Supplier	Component
Industrial Software	PLC Programming

g) Provide details of proposed suppliers.

Supplier	Component
Prominent	Dosing Pumps
Sigura	MC-5 chlorination system
Evoqua	Deplox 5

h) Provide details of key personnel.

1. Biography – Mark Collen

Mark Collen holds an Honours degree in Industrial chemistry from University of Technology Sydney.

He is a highly skilled industrial chemist with 20+ years industry experience having worked for tier one water treatment companies such as Nalco and Veolia Water.

Mark is also an accomplished Project Manager working on major projects including Nestle Process water plant (1.2MLD), Dalby Bio Refinery Ltd Ultra filtration process water plant, Teys Biloela RO plants. Of late, the focus on legionella management in potable systems came to the forefront which Mark was involved in providing ongoing solutions to Wesley Hospital following the legionella-based fatality.

The potable water (rechlorination and filtration) treatment plants Mark was involved in were:

- Townsville Hospital and Health Service (7 plants)
- Mackay Hospital and Health Service (7 plants)
- Other potable treatment plants around Brisbane and surroundings areas (5)
- QEII Hospital treatment plant

Mark heads Aqualyng ICES's drinking water and healthcare divisions. He has designed and implemented holistic water treatment systems that combine multiple solutions to decrease legionella risk of facilities.

Mark shall be supporting project design activities and provide support through commissioning and operations.

2. Biography – Marcus Cordingley

Marcus Cordingley holds a Bachelor of Science (Australian Environmental Studies) from Griffith University and a Graduate Diploma of Education.

He has worked with several industry leading companies on a wide variety of water treatment applications over the last 20 years.

The broad experience Marcus has gained provides him with a strong aptitude to understand and provide holistic solutions to complex water treatment challenges.

He has worked in several positions in Aqualyng ICES including Operations Manager and understands the complexity of the business very well, he currently holds the position of Technical Manager.

Marcus shall have overall technical responsibility for the design of the facility including technology, membrane and chemical selection through extensive software modelling combined with his vast subject matter knowledge and experience. Marcus shall be assigned Project Manager.

3. Biography - Jamie Loughran

Jamie Loughran holds a Bachelor of Business (Logistics and Operations Management) and BSc (Chemistry) from the University of Southern Queensland. He has worked in the water industry for 10+ years.

As an Industrial Chemist he has advanced knowledge of water treatment and asset protection involving water treatment plants (Ultra-Filtration, Reverse Osmosis, Media Filtration, Clarification and Demineralisation processes), Cooling Towers and Boiler/Steam Turbines.

He is also an experienced laboratory analyst with high levels of problem solving, relating laboratory results with field issues.

Jamie is also an experienced Power Station Chemist with 5+ years of working with power station boilers, water treatment plants, condensers and steam turbines at sites such as Millmerran Power Station, Kogan Power Station, Diamantina Power Station and various Cogen Stations.

He is also an accomplished Project Manager working on major projects including a 3MLD UF/RO plant at an abattoir, Potable water producing RO plant at Ingham's and Demineralised water treatment plant.

Jamie's current role as the QLD Operations Supervisor involves undertaking design,

installation, commissioning, maintenance and inspection of water treatment plants across multiple sites, power stations, and hospitals. This involves liaising with clients and reviewing the trends and data to ensure optimal operation of the water treatment plants and processes, report writing on the condition of the plant and making recommendations for improvement, fault finding, investigation into plant failure, calibration and verification of instrumentation, scheduling service visits, and quotation of spares and consumables.
Although not involved directly on the frontline of this project Jaimie, as part of the Aqualyng national supervisory and management team, is involved with the review and approval process of the various project management plans and along with his team provides further depth of resource overall.

4. Biography – Esther Reimann
Esther Reiman holds an advanced Diploma in Business and Accounting with an initial career as a qualified Physics Laboratory Scientist (R&D sector).
Esther has gained extensive experience in both Project Coordination and Administration with recent projects including Blackall containerised WTP, BHP/Clough Treatment system and Mainfreight's dimethoate removal from wastewater project. All projects involved significant coordination and administrative scopes with adherence to a complex schedule of deliverables and demanding time frames.
Esther shall support the Project Manager of this project with all documentation and management tasks.

i) Provide dot point details of the proposed work methods to be adopted for the major items of work.Details should include type & number of construction plant &/or equipment to be used.

<u>Nature and scope of the Project</u>
Quilpie shire council have installed a drinking water treatment plant to process mildly saline water from local bores (2) both supplying water from the great artesian basin.
The water treatment plant (WTP) combines the technology of media filtration, reverse osmosis membranes, UV, and chlorine feed.

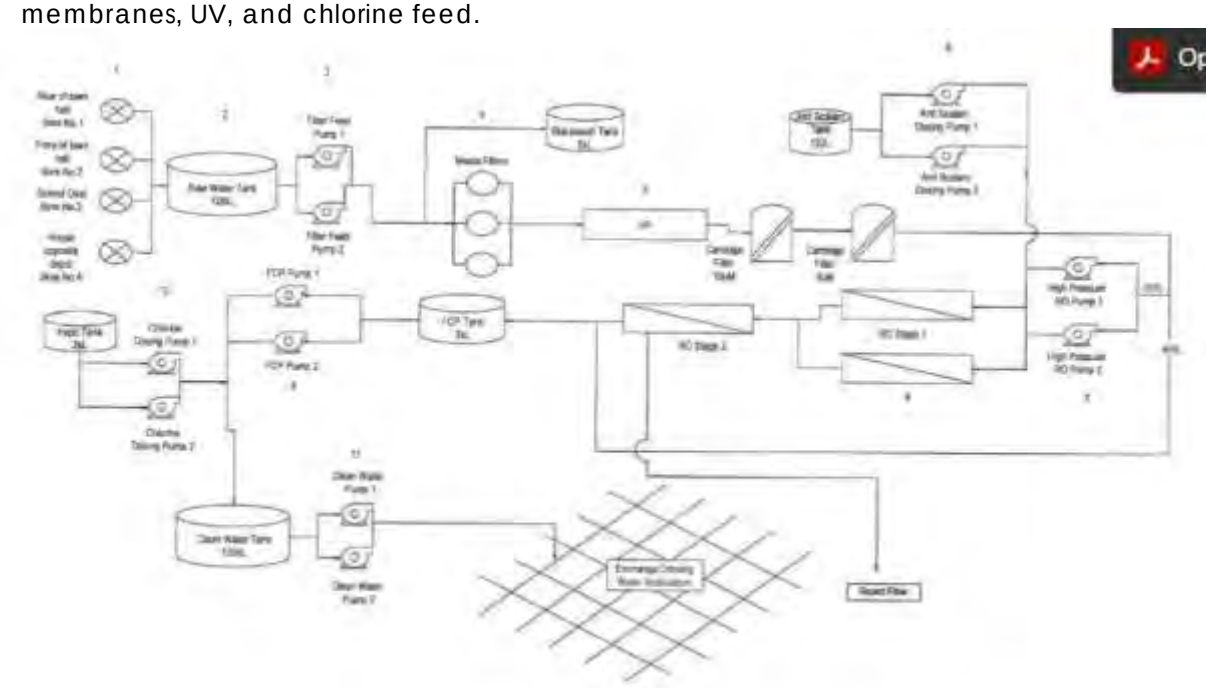


Diagram 1.1: extracted from QSC Water Quality Plan
The QSC has launched the tender (ID 369034) to procure specialist assistance in improving operator knowledge in plant operation, rectification of critical issues (chlorine feed and

control, membrane integrity check, etc), and assistance with ensuring data communication capability to the council.
Aqualyng performs similar services on a regular basis to councils including Charters Towers (rechlorination and main reservoir mixing system – see appendix for case study), Blackall Hospital drinking water feed system (full plant treating great artersian basin water), Julia ck Hospital (full plant treating great artesian basin water), South 32 RO plant (bore water processing), and more.
Our personnel's experience in drinking water plant supply, design, diagnostics, exceeds 100 years.

Concerns

- Relending of RO reject back into towns water supply is a concern – this would be better sorted using remineralisation dosing using calcium chloride or a calcite filter. This will be provided in the report back to QSC.

Table 3-1 Quilpie Reticulated Water

Quilpie Water Supply		Start Date	25/03/2009		End Date:	14/05/2019					
Characteristic	Units	No. of Samples	Summary of Results					Guideline Value			
			Maximum Value	Average Value	Minimum Value	Std Dev	95th Percentile	Health	Exceedances	Aesthetic	Exceedances
Conductivity	uS/cm	29	975.0	907.31	854.00	38.32	972.00				
pH		29	9.5	8.49	8.30	0.16	8.60			6.5 ≤ x ≤ 8.5	21
Total Hardness	mg/L as CaCO3	29	10.0	6.38	4.20	1.48	9.60				
Temporary Hardness	mg/L as CaCO3	29	10.0	6.38	4.20	1.48	9.60			200	0
Alkalinity	mg/L CaCO3	29	389.0	329.17	307.00	19.04	368.20				
Residual Alkalinity	meq/L	29	7.2	6.44	6.00	0.37	7.16				
Silica	mg/L	29	44.0	42.83	41.00	0.79	44.00			80	0
Total Dissolved Ions	mg/L	58	778.0	698.79	662.00	35.36	769.40				
Total Dissolved Solids	mg/L	29	600.0	545.28	520.00	24.15	582.20			600	0
True Colour	Hazen	18	5.0	1.50	1.00	1.12	4.15			15	0
Turbidity	NTU	32	1.0	0.30	0.25	0.18	0.59			5	0
Sodium	mg/L	29	240.0	207.69	195.00	10.14	230.00			180	29
Potassium	mg/L	29	2.7	2.34	2.20	0.10	2.50				
Calcium	mg/L	29	4.1	2.51	1.70	0.59	3.78				
Magnesium	mg/L	18	0.3	0.03	0.00	0.07	0.13				
Hydrogen	mg/L	29	0.0	0.00	0.00	0.00	0.00				
Bicarbonate	mg/L	29	425.0	386.10	356.00	22.76	431.00				
Carbonate	mg/L	29	13.0	7.46	4.30	2.26	12.00				
Hydroxide	mg/L	29	0.1	0.05	0.05	0.05	0.10				
Chloride	mg/L	29	95.0	83.97	80.00	3.59	89.60			250	0
Fluoride	mg/L	35	1.0	1.00	1.00	0.00	1.00	1.5	33		
Nitrate	mg/L	16	0.5	0.50	0.50	0.00	0.50	50	0		
Sulphate	mg/L	33	9.0	7.89	6.00	0.50	9.00	500	0	250	0
Iron	mg/L	32	0.03	0.01	0.01	0.01	0.03			0.3	0
Manganese	mg/L	16	0.01	0.009	0.000	0.002	0.010	0.5	0	0.1	0
Zinc	mg/L	22	0.53	0.055	0.002	0.141	0.448			3	0
Aluminium	mg/L	29	0.09	0.051	0.039	0.009	0.063			0.2	0
Boron	mg/L	37	0.63	0.485	0.040	0.087	0.502	4	0		
Copper	mg/L	20	0.49	0.072	0.009	0.125	0.405	2	0	1	0

- The report mentions plant conductivity breaching the 350uS/cm limit (internal plant limitation?). The ADWG aesthetic limit is 500uS/cm. input conductivity is 900uS/cm approx. as per above. Assuming there is no reblending (% mixture is not specified) then the RO should be producing (at 99% rejection when membranes are new) water with conductivity 9uS/cm (1% of salt remains). If the membranes are worn/aged, 5% of salts typically seep through – 45uS/cm would be the typical value. Hitting 350uS/cm says a serious issue is present. This could well be within the re-blending control or alike.
- Inlet iron from the bore feed is highly likely. Aqualyng have found pre-chlorination converts soluble iron to particulate iron which allows the multimedia units to filter out the iron – failure to remove the iron results in iron depositing on the membrane surface, leading to premature failure. Aqualyng would seek to investigate this. Note: iron deposition not inhibited by antiscalant to any significant level.
- The tender does not specify RPEQ (registered professional engineering QLD) sign off on design. It is recommended Aqualyng provide such a sign off to provide assurance to end users and TSRC. This comes are an additional fee but is included in the tender.
- The plant includes a UV. UV systems are designed to kill pathogens based on a "dose rate" controlled by flow and lamp length. As the assessment of the Quilpie and Eromanga Water Supply systems July 2018" report summarises, a lamp intensitometer isn't present. Also there appears to be no flow control. This will require further investigation.

Methodology

Aqualyng proposes to progress the project as per below. Assuming Aqualyng is awarded tender, the process (provided in project plant in appendix) but summarised below

1. Submit plan to QSC
2. Visit site – conduct preliminary survey, measurements, observations, interviews with stakeholders (plumbing, maintenance team, etc)
3. Download software code from plant for modification
4. Install modem for updating program
5. Provide drawings for changes, chlorine monitoring unit install including any process changes for HMI system
6. Install calcium hypochlorite (chlorination) unit, move CIP tank
7. Provide all documentation and film training video
8. Present plant, documentation, and video including training session
9. Any other issues.

The Aqualyng approach will be to apply the approved scope of works as per tender (369034), and provide further comments on other related issues. With approval, other issues would also be remedied or handed to QSC for action.
Aqualyng technical team will look to attend site twice - first time for site survey and information collection, then second for review, implementation, and analysis.
Installation of calcium hypochlorite (chlorine) unit, and movement of CIP tank will be by Aqualyng plumbing specialist.
Aqualyng envisages plant shutdown for conducting membrane integrity and flow testing. This would be for membrane integrity assessment, where the membrane casing is probed for salt leakage. This method allows determination of whether salt leakage is from seal leakage or membrane damage/age/failure. Plant off time should not exceed 6 hours.

Response to Scope of works

Scope Component	Comments
Prepare and operations manual	Manual prepared using existing documentation available for installed components. QSC to provide (if possible) word version of existing manual for modification.
Design, install and commission system improvements	
Item 10 – moving CIP tank to outside location. Raised platform.	Includes drawings and galvanised platform if required. Plumbing works included.
Item 11 – installing manual backwash function into PLC unit – displays as button on HMI	Requires code to be downloadable and editable using accessible software. Approval form QSC to modify another company's software is required.
Item 12 – ADWG based conductivity selection (approx. 500uS/cm) would typically be accepted.	Review of blending of reject is required. Aqualyng will recommend a re-mineralistion step instead of re-blending – this removes the risk of putting contaminants back into the finished water. Calcite filtration or use of calcium chloride will be recommended.
Modification of SCADA to include adjustable conductivity setpoint	As above. This will require access to PLC code.
Item 14 – tank level alarms to be installed in conjunction with new calcium hypochlorite dosing system. Alarms will link into the PLC	This assumes available inputs on PLC readily configurable.
Establish true duty standby chlorine dosing with alarm activation and plant shutdown on pump failure.	Aqualyng is proposing to supply two replacement dosing dosing pumps (for details see appendix). These units will be able to output alarms but are self priming peristaltic units. These work best with the calcium hypochlorite system.
Installation of an online chlorine residual analyser and PLC controlled feed back to control chlorine dosing	Aqualyng will provide a DEPLOX 5 unit linked to the PLC. Again this assumes spare input channels on existing PLC and ability to modify onboard PLC code. The deplox unit is standard for most councils and proven to be fit for purpose. Unit will also include self cleaning probe, and pH monitoring.

Scope Component	Comments
Develop a system for the storage of chlorine	Aqualyng is to provide a calcium hypochlorite system which has a shelf life of 24 months (sodium hypochlorite is 2 months).
Investigate causes of elevated conductivity in permeate	Further work will be conducted
Site visit 11 months post project completion	Ongoing support to the QSC will be provided including the site visit. Support using online monitoring and training are all to be provided on an agreed basis. The training video to be provided with this package will enable training of new personnel, revision to existing personnel.

Dosing pumps to be provided (included in costing.

The pumps below are ideal for dosing the calcium hypochlorite. The cost for the pumps is included in the tender.

The dosing pumps currently on the plant are Prominent Delta which have low functionality. They do not have cavitation detection. They will also likely suffer ongoing gasing challenges due to type and configuration. They will also likely not be true duty standby.

Aqualyng will configure the pumps below to operate duty standby via PLC control. This will require a program change to include a timer (this can be altered by the front screen).

Chlorination system

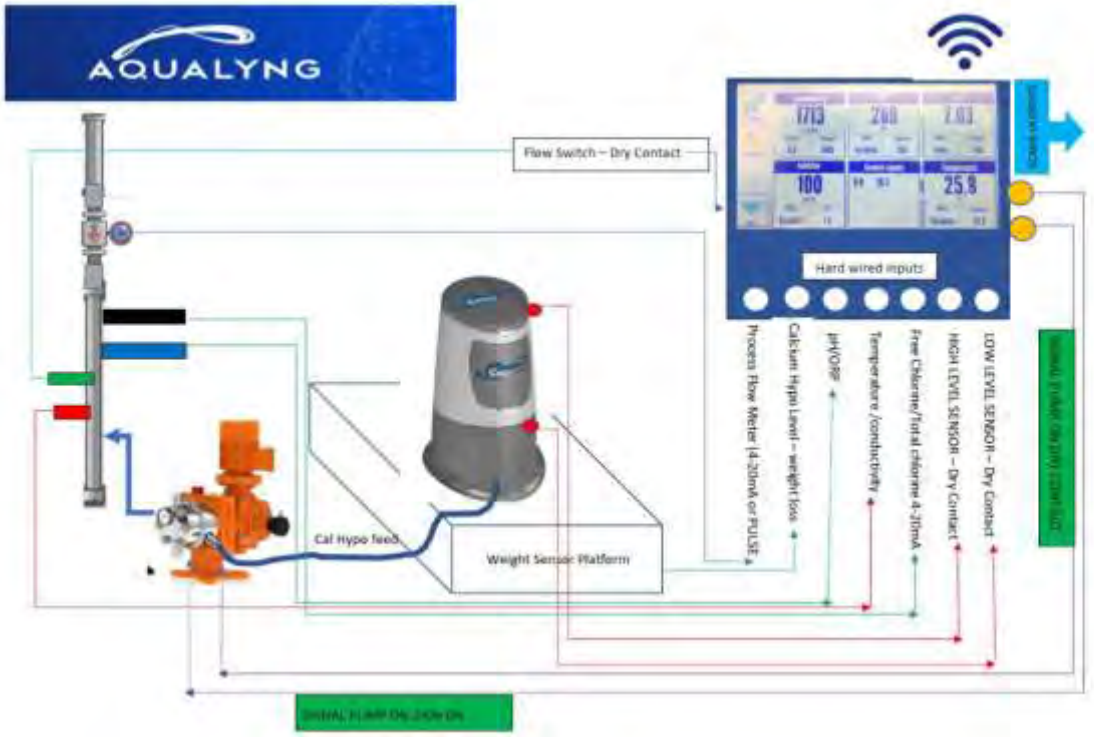
The system below is the MC-5 Calcium Hypochlorite preparation system. The unit will include alarms communication. See PFD.

This is the similar system what is used at Charters Towers Regional Council, Port Douglas RC, Brisbane Children's Hospital drinking water system, amongst many others.

- The plant specification did not include a UV. Higher life form bacteria such as

The unit pictured above is the DEPLOX 5 (units to RHS) linked to the site PLC. Note the unit displays pH, free chlorine etc.
This unit is installed at Charters Towers Regional Council.
Note Aqualyng programmers provided plant controls to agreed specification. The screen provides for easy set point changes and plant activation.

PFD for typical chlorination system integration



Implementation of a plant Check list.

Aqualyng will provide training on looking after the plant. Included in this will be a check list to enable easy recording of checks. Example below.

AQUALYNG

Chlorination Plant Check list.

Date: Inspector: Time:

Parameter	Frequency	Value	Pass Range	Action required Y/N	Comments and details of actions
MC-S UNIT					
Check sludge build up	Weekly		Minimal		
Check operating levels	Daily		Correct		
Check stock	Daily		Correct		
Check hoses for leaks	Weekly		None		
Check fill solenoid	Weekly		Correct		
Check high level sensor	Monthly		Correct		
Check low level sensor	Monthly		Correct		
Check level sensor	monthly		Correct		
PERISTALTIC PUMP DOSING					
Check flow rate	Monthly		60LPH +/- 5%		
Check pressure	Monthly		Max Pressure 2 Bar		
Check injection valve	Monthly		Clean and clear		
Replace peristaltic hose	2 x per year		No leaks – operating correctly. Grease rollers monthly		
Check dosing line			No leaks – replace annually		
Check Analysers					
Check calibration Conductivity ORP pH Free Chlorine	Weekly		Correct Standard AS1413 Std 250 and 475mV (std) pH 7 and 10 process calibration		

j) Provide a list of alternative materials and/or equipment and their details, if alternatives are nominated.

Calicium Hypo chlorite system MC-5 – Datasheet attached in Proposal Document Appendix G

k) Area of Site required for the works, in particular if larger than what is provided for in the Contract.

Plant area to move CIP Tank

l) Status of Quality Assurance System/Accreditation.

ISO9001_2015 2020

ISO45001_2018 2020

m) Public liability cover Policy No.

BN-CAS-19-410367-A

n)Workcover status.

Policy number: WHA990316204

o)Provide a list of assumptions made in the tender.

- Simple access to site
- rapid availability of documents as required
- Access to PLC code readly available and modification of code able to be conducted using standards means.
- Age of PLC does not preclued access to standard ethanet cable, mobile access to allow off site programming is present
- access to permeate sampling points
- access to personel for training, all within normal hours (8am-4pm)
- CIP tank of 200L easy to move no crane required
- wiring to CIP tank is minimal
- local electriction to to electrical work assume 3 hours on site

p) Provide a list of any qualifications of the tender offer.
Please see details in the Biography of key personnel.

q) Other information the tenderer may consider relevant to the tender.
Total combined experience of Aqualyng is aound 200 years.

TENDER FORM

Name of person, firm orcompany tendering
USE
BLOCK LETTERS AQUALYNG ICES

Address Unit 3, 11 Palmer Place, Murarrie QLD 4172
.....

Hereby tender(s) to perform the work for:

Description of works Eromanga Water Treatment Plant - Upgrades

In accordance with the following Documents:

"The Tender Document – Eromanga Water Treatment Plant **– Upgrades"**

For the Lump Sum of

Total being (excluding GST):

$69,107.14.....
...

Dated this 25th day of February 2021

.....
.....
Signature of Tenderer

This is a Lump Sum Contract.

The Superintendent shall be notified immediately of any discrepancies in quantities or omissions discovered inthe Schedule of Work.

The Schedule of Work is to be used as the basis for the assessment of Progress Claims during the Contract.Clause 2.1(a) of the Minor works contract conditions applies to this Lump Sum Contract.

Notes: All rates are to be exclusive of GST.

Item	Description of work	Unit	Qty	Rate	Amount
1	Establishment/ Insurances	Each	1	$3,464.29	$3,464.29
2	Prepare an Operation Manual(Category 1 items 1 to 9)	Each	1	$3,571.43	$3,571.43
3	Design, Install and Commission System Improvements (Category 2 items 10 to 17)				
3.1	Item 10 (Provisional) Consider moving the CIP tank at the end of the WTP building outside thebuilding to provide easier access to the RO membranes.	Each	1	$5,714.29	$5,714.29
3.2	Item 11 Ensure that it is possibleto trigger a manual backwash. Ifnot, modify the PLC to allow this.	Each	1	$857.14	$857.14
3.3	Item12 Determine the acceptable EC of the final waterto consumers and modify the PLC EC shutdown setpoint accordingly.	Each	1	$1,428.57	$1,428.57
3.4	Item 13 Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	Each	1	$857.14	$857.14
3.5	Item 14 Ensure that the chlorinetank low low level alarm exists and functions and does shut theplant once activated.	Each	1	$285.71	$285.71
3.6	Item 15 Establish true duty standby chlorine dosing withalarm activation and plant shutdown on dosing pump failure.	Each	1	$7,857.14	$7,857.14
3.7	Item 16 Install an online chlorine residual analyser andPLC controlled feedback chlorine set point dosing.	Each	1	$12,857.14	$12,857.14
3.8	Item 17 Develop a system forthe storage of sodium hypochlorite that results in shorter holding times.	Each	1	$17,857.14	$17,857.14

Item	Description of work	Unit	Qty	Rate	Amount
4	Investigate cause of elevated RO membrane EC and provide recommendation (Category 3)	Each	1	$8,142.86	$8,142.86
5	Undertake a site inspection andsystem assessment 11 months after the date for practical completion	Each	1	$5,857.14	$5,857.14
6	General Cleanup / Disestablishment	Each	1	$357.14	$357.14
				Subtotal	$69,107.14
				GST (10%)	$6,910.71
				TOTAL	$76,017.86

Tenderer: Aqualyng ICES
Contact: Mark Collen
Address: Unit 3, 11 Palmer Place
Telephone: 0436 614 157 Fax: -
Signature: Date: 25/02/2021
Email: willa.vorster@aqualyng.com

DAYWORKS RATES

These rates are to be held firm for the duration of the Contract. Plant Hire Rates are to include the operator.

Labour Description	Rate		
	Normal	Time & half	Double time
Consultant	$175	N/A	N/A
Plumber	$125	$185	$215
Electrician	$135	$195	$225
Technician	$120	$180	$210

Plant description	Rate
Option 1: using Aqua-Report remote monitoring system	$5,500

Aqualyng can provide on request the "Eagle View" support network to assist the personnel on call, using remote link.

Note: system like above is proposed. The Eagle View unit would ideally be hard mounted to plant to avoid misplacement or unrequired movement.

Tenderer: Aqualyng ICES

Contact: Mark Collen

Address: Unit 3, 11 Palmer Place

Telephone: 0436 614 157 Fax: -

Signature: Date: 25/02/2021

Email: Willa.vorster@aqualyng.com

Appendix B CASE STUDIES

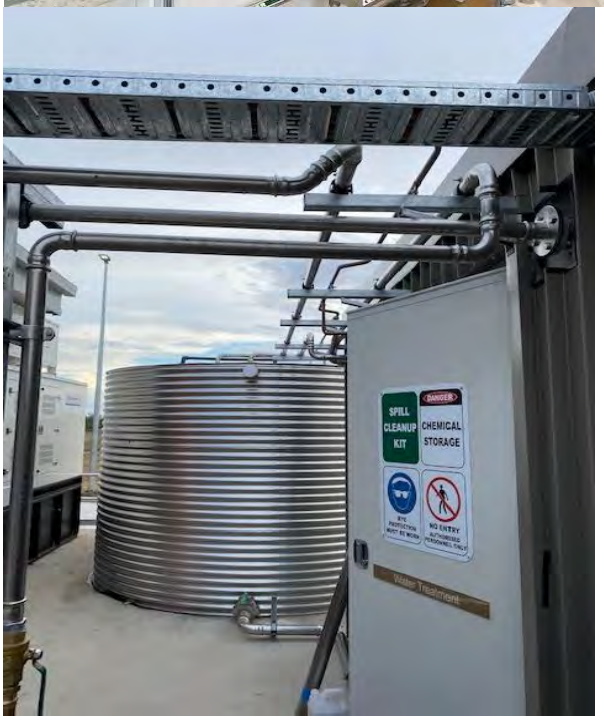
St Hilliers – Blackall Hospital

CLIENT	St Hilliers – QLD Health (Central West Hospital and Health Service)
DURATION	17 months (including 12 month of service contract)
LOCATION	Blackall Hospital - Redevelopment Shamrock St Blackall QLD 4472
KEY SERVICES	◆ Supply of the NEXTEP PWTP- Advanced ◆ 316SS onsite 22.5kL storage tank ◆ 12 months servicing ◆ Remote monitoring including emergency response ◆ Professional consulting services
CLIENT BENEFITS	Aqualyng is providing clean, safe water, increasing patient comfort, and decreasing legionella and bacterial risk.
SCOPE OF WORK	System Features ◆ Ability to deliver cooled water for drinking. Inlet water temperature from main 60-80C. cooled to 24-27c. ◆ Measurement of online corrosion ◆ Measurement of chlorine in returning ring main. ◆ pH control using CO2 injection. ◆ Carbon filtration removes VOC and sulphurous compounds that cause taste and odour in the water. ◆ Delivery volume at 10,000Lph and 4 bar maximum capacity, ◆ Free chlorine 1.5-3ppm at outlet of plant with aim of 1-1.5ppm at Distal point. ◆ Communications and tracking ◆ >3 levels of safety on chlorine control Measurement of tank level ◆ Reporting to Hospital BMS (connection to our unit by others) ◆ Holding volume on site of 22.5kL finished water

St Hilliers – Blackall Hospital

CLIENT CONTACT	Alan O'Kennedy

PHOTOS



St Hilliers – Blackall Hospital

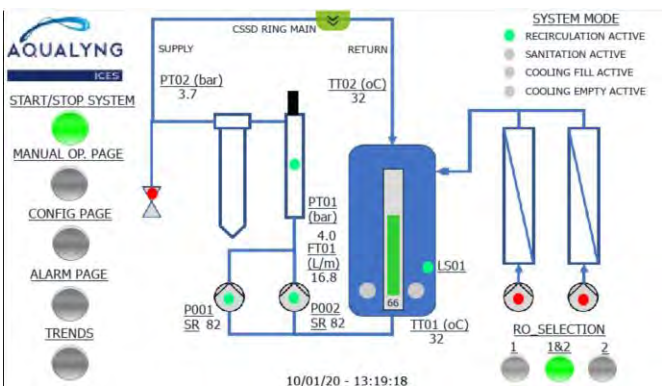
Queensland Children Hospital – Drinking Water treatment

CLIENT	Queensland Children Hospital
DURATION	ongoing
LOCATION	Brisbane
KEY SERVICES	◆ Supply and installation of Calcium Hypochlorite dosing system and Chemistry Monitoring and Dosing Controller ◆ Service of system including current distal point monitors
CLIENT BENEFITS	The unit presents the best options for minimisation of risk to patients by stable reliable operation, minimises manual handling of chemicals, and minimises cost of operation via removal of the need for electro-chlorination system operation.
SCOPE OF WORK	Aqualyng recommended the supply, installation and operation of the Calcium Hypochlorite dosing system for the QCH. The unit included ◆ MC4-150, Calcium Hypochlorite dissolver system ◆ Thermo Scientific Orion XP analyser for free and total chlorine measurement ◆ NEXTEP pH, ORP, communications. Includes access to Aqua reporter WEB -2. Including redundancy free chlorine probe and corrosion monitoring. Control of Grundfos DDA dosing pumps Aqualyng is providing a full fortnightly service to Queensland Children Hospital. This service includes ◆ Maintenance of the MC4-150 dissolver ◆ Clean probes, calibrate probes, clean screen on controllers (water side). Refill DPD analyser where required ◆ Refill chemical - refresh stocks ◆ Check pump systems, check for leaks, check pressures ◆ Calibrate distal point monitors

Queensland Children Hospital – Drinking Water treatment

CLIENT CONTACT	Available on Request

St Vincent Holy Spirit Hospital (Northside) CSSD System



CLIENT	St Vincent Holy Spirit Hospital (Northside)
COMMENCEMENT	February 2020
LOCATION	Queensland
KEY SERVICES	◆ Supply of plant ◆ Sterilisation, setup, and commissioning of plant.
CLIENT BENEFITS	Control of bacteria and endotoxins in the CSSD loop in a hospital or other surgical facility is critical. The presence of bacteria can put the sterility of surgical instruments, and endoscopic equipment at risk. This in turn puts patient's health also at risk. The presence of Bacteria, measured as part of the Total Viable count or TVC, is specified in AS4187 (2014) Table 7.2/7.4 Aqualyng provided the thermal sanitisation with RO plant permeate that accomplished compliance with As4187:2014 (May 2019 update). Compliance with the standard was achieved and is being maintained.
SCOPE OF WORK	Aqualyng supplied commissioned and supported the customer to ensure compliance to the standard was achieved. The thermal sanitisation included advanced control with remote monitoring, flow and pressure communications, online diagnostics and performance tracking. Aqualyng continues to provide support to the customer including consumables, service, process upgrades, and consultancy services.
CLIENT CONTACT	Available on request

CASE STUDY

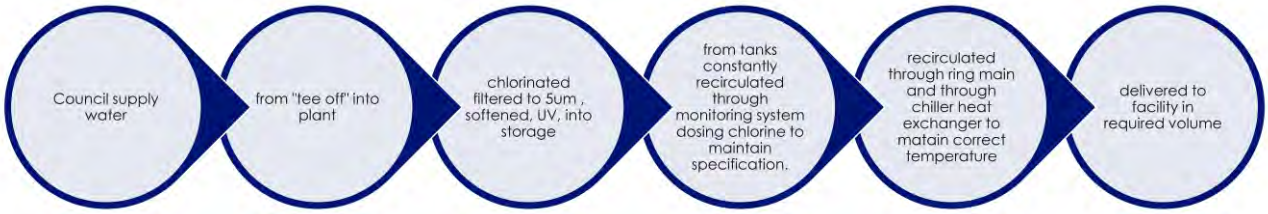
QEII Chlorination Plant Design

Aqualyng ICES provided a plant compliant to Australian Drinking Water Guidelines (2014) at the commencement. Following the treatment, compliance with enHealth guidelines and Public Health Act (2016 – legionella management) was achieved.

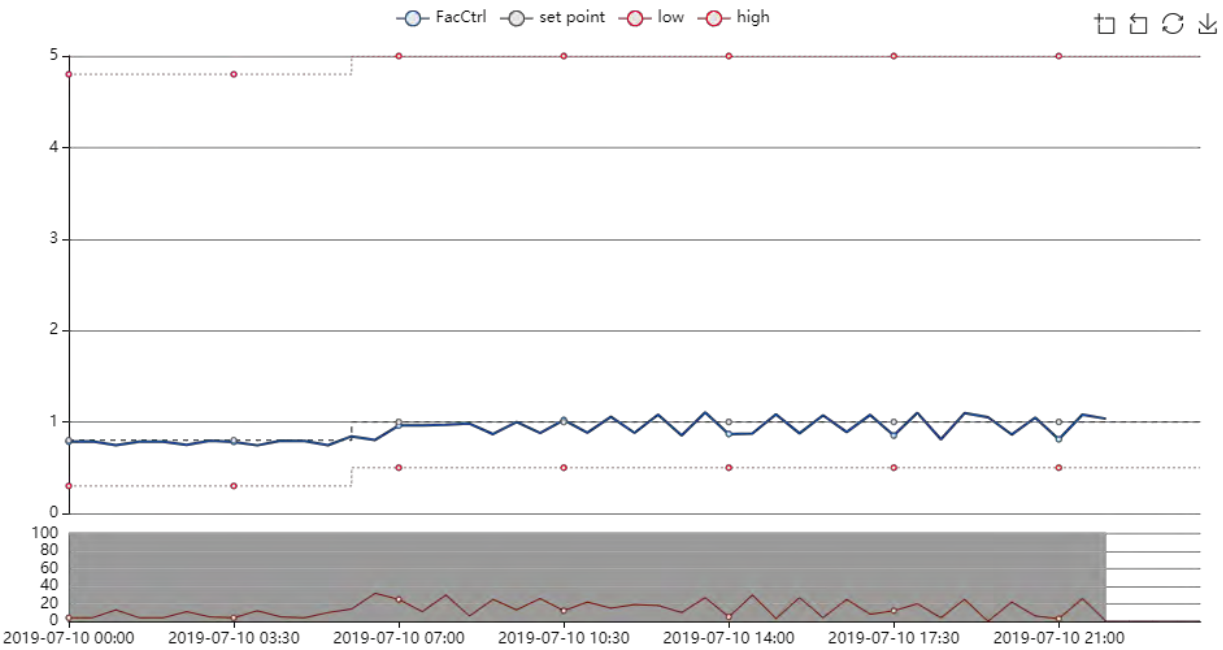
Other services provided included training, support, maintenance and online monitoring.

SYSTEM TREATMENT FLOW

The flow chart below outlines the system function.

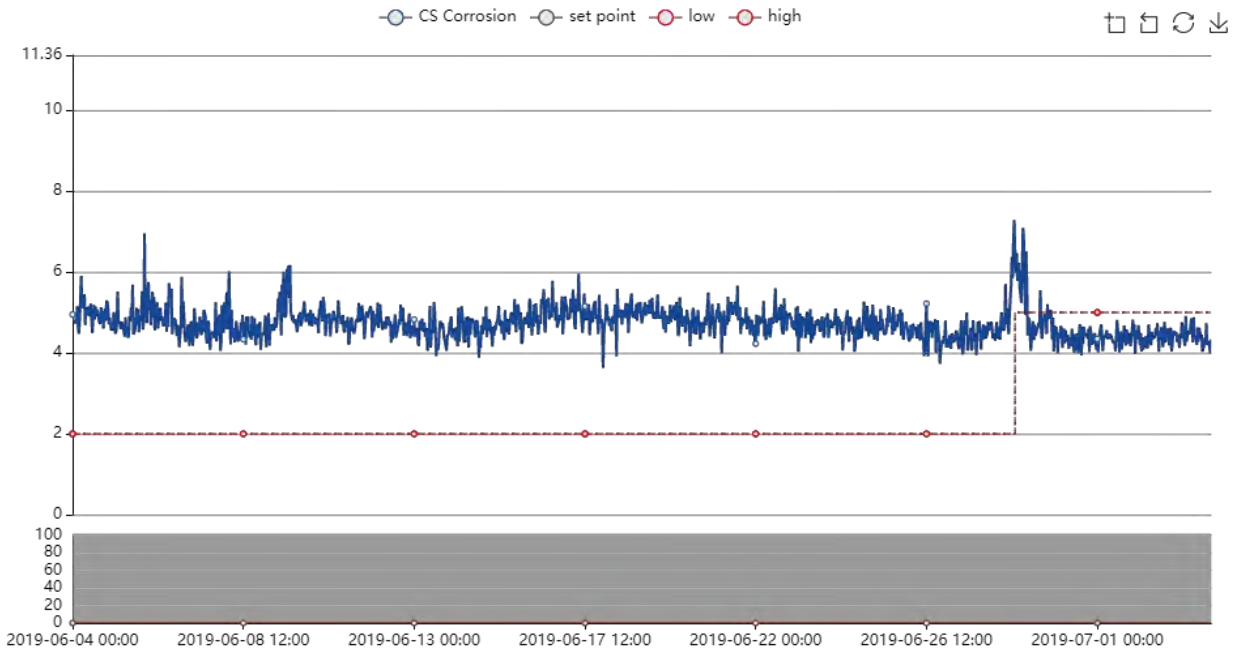


FREE CHLORINE MEASUREMENT – ACTUAL DATA



Free chlorine measurement on potable system.

CORROSION MEASUREMENT – ACTUAL DATA



Measurement of corrosion in treated potable water.

SYSTEM FEATURES

- Water marked pipe work and equipment
- Free chlorine 1.5-3ppm at outlet of plant with aim of 1-1.5ppm at Distal point.
- Communications and tracking
- >5 levels of safety on chlorine control
- Corrosion and turbidity monitoring
- Automatic changeover to towns water should plant stop
- Measurement of tank levels
- Reporting to Hospital BMS (connection to our unit by others)

The plant is designed to provide 25kL per hour 22 hours per day. The 2 hours lost allows for regeneration of pre filters and brining of softener.

Pressure delivery of 8.4-8.5 Bar is available and can be set as required.

PLANT HYDRAULICS DESIGN

The NEXTEP PWTP provides compliant water with chemical properties as outlined below.

Chemical and Hydraulic Provision of the NEXTEP PWTP.

Component	Specification (plant exit)	Comment
Chemical Properties	1-3ppm	Specifications based on Australia Drinking water guidelines and WHO Guidelines.
Free Chlorine	7-8.5	
pH	Monitor only	
conductivity	27-30 Degrees Celsius	
Temperature	<2mpy Copper	
Corrosion rate	<1ppm	
Iron	<60ppm	
Hardness	<10cfu/ml	
Legionella (at plant exit)	<500cfu/ml	
Bacteria (at plant exit)		

Appendix C REPORT EXAMPLE

REPORT

Boddington Gold Mine

Ultra-Filtration/Reverse Osmosis Water Pre-treatment Trial

Revision: A

9/08/2019

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1 Executive Summary

Aqualyng ICES were engaged by Newmont Boddington Gold Mine to investigate a solution for the pre-treatment of water for the Ultra-Filtration and Reverse Osmosis Plant at the site and develop and cost a solution to improve component life of the MF/RO plant. Below is a summary of the findings of this study. Aqualyng ICES constructed a pilot plant consisting of clarification, DMI65 catalytic filtration media and activated carbon for the trial. Coagulant and sodium hypochlorite chemical dosing were included for the operation of the equipment.

As a result, it was found that:

1. A treatment system using Catalytic Filtration Media removed 74% of Iron, 99% of manganese and 77% of turbidity from the MF/RO feedwater.
2. The reduction in iron, manganese and turbidity from the incoming MF/RO feedwater will improve performance of both MF and RO by reducing particulate material to MF and dissolved iron/manganese fouling on RO plant.
3. Based on Aqualyng ICES experience at other locations, it is expected that the reduction of iron, manganese and turbidity from the MF feedwater will more than double the expected life of the MF and RO membranes currently in use.

Recommendations, based on these findings are to

1. Install a pre-treatment plant at the Boddington Gold Mine Water Treatment Plant for the purpose of iron, manganese and turbidity removal.
2. The plant include the equipment for coagulant dosing prior to catalytic filtration media to assist in turbidity and iron removal.
3. Suitably sized catalytic filtration media vessel(s) be installed with sodium hypochlorite dosing prior to the existing Micro Filtration supply tank to pretreat the water. Sodium hypochlorite dosing be provided to dose the catalytic filtration media with sufficient chemical to enable the removal.
4. The new pretreatment plant be installed to operate automatically and independently of the existing water treatment plant.
5. The plant be installed in the area adjacent to the existing water treatment plant on the south-east corner of the plant. This location allows easy access to sufficient space and the water treatment plant supply pipe, as well as access for construction and maintenance.
6. Carbon filtration post catalytic filtration media is not necessary as any residual chlorine will be of benefit for biological control prior to the micro-filtration plant.

2 Introduction

Newmont Boddington Gold Mine Water Treatment Plant (WTP) utilises two Micro Filtration (MF)/Reverse Osmosis (RO) plants for the treatment of bore water for use in cooling tower and other process applications on site. Nominal water production capacity of the MF plants is 110 kL/hr and 70 kL/hr total RO permeate production.

Aqualyng ICES performed a previous study (Aqualyng ICES, 2017), modelling the feedwater for treatment, and found that for all proposed blends of source water, iron and manganese were likely to precipitate from solution and would cause problems for the MF and RO plants.

The history of the WTP at Newmont Boddington Gold Mine has shown that there is a need for frequent cleans and there is a shortened membrane life on site. Observations were made in June 2019 during a MF membrane changeout at site and it was evident that a large amount of fine sediment/silt was forming inside the MF membrane housings. MF and RO membranes life expectancy has been shown to be significantly reduced when compared to industry norms of five years for MF modules and 3-5 years for RO modules.

Aqualyng ICES were engaged by Newmont Boddington Gold Mine to investigate a solution for the pre-treatment of water for the Ultra-Filtration and Reverse Osmosis Plant at the site and develop and cost a solution to improve component life of the MF/RO plant.

3 Aims and Methods

The aim of this report is to present the findings of a pilot scale trial performed by Aqualyng ICES utilising coagulation, precipitation and filtration with catalytic filtration media to improve the water quality feed to the existing Newmont Boddington Gold Mine WTP.

Plant Design and Setup

The flow diagram of the system used is displayed in Figure 1 below.

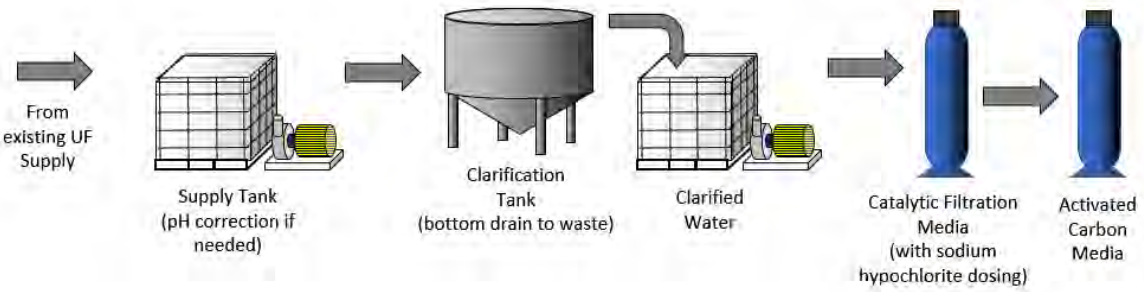

Figure 1: Pilot Trial Process Illustration

For the purpose of the trial, the following equipment was purchased and/or sourced and installed at site.

- Manual control valve to fill Supply Tank from existing WTP feed tank Supply tank function performed by Intermediate Bulk Container (IBC).
- Flow control/chemical dosing manifold with variable area flow meters for injection of chemical and flow control.
- Clarification: 200L Cone Bottom Tank Squat with base. Tank was sized to achieve water upflow velocity of 1000 mm/hr at design flow rate.
- Clarified water tank function performed by IBC.
- Flow control/chemical dosing manifold with variable area flow meters for injection of chemical and flow control.

- Sodium hypochlorite injection, adjusted to maintain a chlorine residual level of at least 0.1 – 0.3 mg/L (ppm) in the product water
- 8"x44" filter vessel with 10 kg 1-2 mm sand and 45 kg DMI65 catalytic filtration media.
- 8"x44" filter vessel with 12.5 kg 12x40 Coal Carbon, Acid Washed.
- Pump duties performed by "pool" type centrifugal pumps with return water back to feed tank to allow flow control.

The purposes of the individual components are as follows:

SUPPLY TANK

- Collection of water from MF plant supply line.
- Level manually controlled by operator with butterfly valve.
- Transfer pump out of Supply Tank pumps through dosing manifold. This manifold performed many purposes including:
    - Monitoring and adjustment of flow to next part of process.
    - Bypass of excess flow back to Supply Tank
    - Agitation of tank to prevent settling of solid material
    - Chemical dosing point for coagulant.

CLARIFICATION TANK

- The clarification tank enabled clarification of incoming water through the addition of coagulant.
- The outlet water from the clarifier passed through a manifold inside the tank to promote even flow distribution in the tank.
- Target flow rate for this system was 240L/hr adjustable at the supply tank manifold.
- Jar tests on various coagulants were performed. The most promising coagulant was trialled in the pilot plant.
- A manual sludge release valve on the base of the clarifier was installed for removal of accumulated sludge as required.
- Clarified water overflowed into the clarified water tank.
- The operating water level of the clarifier was adjustable.

CATALYTIC FILTRATION MEDIA (CFM)

- Flow to the CFM was controlled via a second dosing manifold after the clarified water tank.
- The filtration media trialled was DMI65 catalytic filtration media, effective for removal of iron, manganese and other heavy metals from the water stream.
- The CFM was recharged with a constant supply of sodium hypochlorite in the supply line. Correct dosage was maintained to provide a minimum level of between 0.1 and 0.3 ppm free chlorine in the product water to ensure continued activation.
- Product water pH was monitored to observe any change in pH that may occur.
- The filter was periodically backwashed at 25 Lpm. Time and frequency of backwash was adjusted based on observations during the trial.
- The CFM vessel was flushed and activated using sodium hypochlorite as per manufacturers instructions.

ACTIVATED CARBON

- Activated carbon was added to the trial originally for the removal of chlorine from the water flow.
- The activated carbon vessel could be run or bypassed as required for the trial.
- The activated carbon was flushed as per manufacturer recommendations.

SCENARIOS FOR TESTING

The following scenarios were tested during the trial:

1. Reduce iron and turbidity using filtration only.
2. Reduce iron and turbidity using clarification
3. Reduce iron and turbidity using clarification and filtration

Each scenario was run for 3 – 4 hours and followed by media backwash (if media used).

Scenario 1. Reduce iron and turbidity using filtration only

- Raw water bypassed the clarifier into clarified water tank.
- Chlorine dosing set up to obtain minimum of 0.1 and 0.3 ppm free chlorine in filtration vessel product water at 4 lpm through system.
- On a half hourly basis tests for the following were performed.

Table 1: Field Testing – Filtration Only

Location	Test(s)
Raw Water (from existing UF inlet)	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU)
Clarified Water	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU)
CFM Vessel outlet	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU) • Free chlorine (mg/L) (if carbon filter in use, bypass carbon for free chlorine test).
Carbon Vessel outlet	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU) • Free chlorine (mg/L) (if carbon filter in use, bypass carbon for free chlorine test).

- Above trials were repeated for various flow rates (4, 6 and 8 Lpm)
- Sample were taken before and after carbon vessel to simulate without/with carbon respectively, to determine what affect the addition of the carbon vessel had on results.

Scenario 2. Reduce iron and turbidity using clarification

- Undertake jar testing trials to select suitable coagulant and dose rate.
- Source coagulant(s) and use LMI coagulant dosing pump (and dilution if necessary) to dose to concentration calculated from jar testing.
- Set up process so that raw water goes to clarifier, clarified water tank and filtration.
- Set up coagulant dose rate as per jar testing in flow rate of 4 Lpm.
- On a half hourly basis the following tests were performed:

Table 2: Field Testing – Clarification

Location	Test(s)
Raw Water (from existing UF inlet)	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU)
Clarified Water	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU)

- Above trials were repeated for various flow rates (4, 6 and 8 Lpm)

Scenario 3. Reduce iron and turbidity using clarification and filtration

- Dose rates for coagulant and sodium hypochlorite from Scenarios 1 and 2 used for this scenario.
- Set up system to run through clarification and filtration (catalytic filtration media and carbon)
- On a half hourly basis the following tests were performed:

Table 3: Field Testing – Clarification and Filtration

Location	Test(s)
Raw Water (from existing UF inlet)	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU)
Clarified Water	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU)
Filter outlet	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU) • Free chlorine (mg/L) (if carbon filter in use, bypass carbon for free chlorine test).
Carbon Vessel outlet	• pH • Conductivity (µS/cm) • Iron concentration (mg/L) • Turbidity (NTU) • Free chlorine (mg/L) (if carbon filter in use, bypass carbon for free chlorine test).

- Above trials were repeated for various flow rates (4, 6 and 8 Lpm)
- Samples were taken before and after carbon vessel to simulate without/with carbon respectively, to determine what affect the carbon vessel alone had on results.

Some scenarios were run concurrently where plant setup and available sample points allowed.

External Testing

For the following scenarios samples were taken and tested at an external laboratory. The purpose of this testing was to determine effectiveness of trials on water components not easily tested on-site.

- Clarifier only 8 Lpm – Raw Water and Product Water at end of trial
- Clarifier and filtration (without carbon) 4 Lpm Raw Water, Clarifier Outlet and Product Water at end of trial.
- Clarifier and filtration (without carbon) 8 Lpm Raw Water, Clarifier Outlet and Product Water at end of trial.
- Clarifier and filtration (carbon) 4 Lpm Raw Water, Clarifier Outlet and Product Water at end of trial.
- Clarifier and filtration (carbon) 8 Lpm Raw Water, Clarifier Outlet and Product Water at end of trial.

External testing included:

- Major anions and cations
- Total Iron and manganese
- Silica
- Fluoride
- Conductivity
- Suspended solids
- Turbidity

4 Results

The field-testing results summary and laboratory raw data are displayed in Appendix A and B respectively.

COAGULATION TRIAL

Jar testing of water with various commercially available inorganic and organic coagulants failed to produce any promising results. Evidence was shown in jar testing of formation of precipitate during the trial using 200 ppm of a polydadmac product. When trialled in the plant at the optimum dose, a small improvement in iron reduction was achieved at the tested flow rates, though product water turbidity generally deteriorated.

As a control, the results of water flowing through the clarifier alone, without any coagulant addition were assessed for comparison. When compared with the control, the dosage of a coagulant showed no benefit to iron and turbidity reduction post clarifier. There was no evidence of settled material deposited within the clarifier vessel.

The results are shown in the table below and are a summary of 8 samples for each treatment.

Table 4: Iron and turbidity reduction using coagulation

	No Coagulant			Coagulant Addition		
	4 LPM	6 LPM	8 LPM	4 LPM	6 LPM%	8 LPM
Clarification Iron Reduction %	11.2%	-8.5%	14.5%	17.9%	10.2%	0.7%
Clarification Turbidity Reduction %	12.2%	-9.6%	14.3%	-57.8%	-11.4%	-8.4%

REDUCTION IN IRON AND TURBIDITY USING CATALYTIC FILTRATION MEDIA ONLY

The combined results of iron and turbidity reduction is shown in the table below. The data displayed includes the data with and without coagulant addition. The data displayed is a summary of 8 samples for each treatment.

Table 5: Iron and Turbidity Reduction - CFM Only

	No Coagulant			Coagulant Addition		
	4 LPM	6 LPM	8 LPM	4 LPM	6 LPM	8 LPM
Clarification Iron Reduction %	11.2%	-8.5%	14.5%	17.9%	10.2%	0.7%
Clarification Turbidity Reduction %	12.2%	-9.6%	14.3%	-57.8%	-11.4%	-8.4%
DMI65 Iron Reduction %	73.6%	42.1%	57.2%	74.6%	47.7%	38.1%
DMI65 Turbidity Reduction %	76.7%	56.4%	65.9%	67.5%	35.9%	30.4%
DMI65 & Carbon Iron Reduction %	76.6%	54.7%	61.8%	92.8%	58.4%	48.4%
DMI65 & Carbon Turbidity Reduction %	80.9%	59.1%	69.0%	80.8%	51.8%	43.4%

These results also show that the addition of coagulant in general had minimal effect on overall turbidity reduction. The exception to this is at 4 LPM where the iron reduction was improved when using coagulant, this was not achieved consistently with other flow rates.

The best results for iron and turbidity reduction without coagulant addition were achieved at the design flow rate of 4 LPM with a 73.6% reduction in turbidity and 74.6% reduction in iron.

The addition of carbon treatment after the CFM vessel improved iron and turbidity most markedly at higher flow rates suggesting that the carryover of particulate material from the CFM vessel was filtered by the carbon vessel. At design flow rates (4 LPM), there was no significant increase in performance with the carbon treatment.

EXTERNAL TESTING

External testing of the water was undertaken for the 4 LPM and 8 LPM treatments by Australian Laboratory Services (ALS). The results of external testing are shown in Appendix B. A summary table is displayed below for the reduction of the various tests for various treatments.

Table 6: Summary reduction of various treatments

Treatment	Flow Rate	Turbidity	Silicon as SiO2	Sulfate as SO4 -	Mn	Iron
CFM Only	4 LPM	60%	0%	-4%	>99%	53%
CFM + Carbon	4 LPM	67%	-5%	-3%	97%	61%
CFM only	8 LPM	54%	15%	-1%	>99%	55%
CFM + Carbon	8 LPM	58%	13%	-2%	99%	53%
Coagulant 200 ppm + Clarification	4 LPM	-55%	3%	-23%	12%	26%
Coagulant 200 ppm + Clarification + CFM	4 LPM	82%	0%	-31%	72%	91%
Coagulant 200 ppm + Clarification + CFM + Carbon	8 LPM	86%	-4%	-25%	76%	91%
Coagulant 200 ppm + Clarification	8 LPM	-17%	0%	-15%	1%	-6%
Coagulant 200 ppm + Clarification + CFM	8 LPM	35%	-1%	-19%	62%	39%
Coagulant 200 ppm + Clarification + CFM + Carbon	8 LPM	52%	0%	-18%	64%	50%

According to the external lab results, the best iron and turbidity reduction result was achieved after the addition of coagulant suggesting that coagulant addition may be of benefit. This was not consistently observed with the field trials.

It is also noted that the silica concentration was also reduced by up to 15% but only when coagulant was not used. Manganese reduction was also highest when coagulant was not used with almost complete removal from the treated sample.

5 Discussion of Results

The above results demonstrate the effectiveness of the treatment of the Boddington MF/RO feedwater with catalytic filtration media DMI65 has significant benefits to the quality of the water. The quality of the feedwater would be assisted by removal of up to 77% of turbidity and 74% of iron using CFM alone. The CFM treatment also removes up to 15% of silica and >99% of manganese in some flow conditions.

External testing of the water shows that the addition of a coagulant to the water stream can assist with removal of up to 82% turbidity and 91% of iron from the water stream when combined with CFM, though it inhibits the removal of silica and manganese. The mechanism for this removal is the formation of fine floc of coagulated material which was removed by filtration media. The data shows that clarification does not provide consistent benefit to water quality, however the addition of a coagulant prior to filtration media (i.e. without a clarifier vessel) may improve overall water quality.

The addition of carbon post CFM treatment can assist with removal of turbidity and iron though this is evident mainly at higher flow rates. The reason for this is possibly that the physical filtration efficiency of the CFM is not as effective at flow rates beyond design and the carbon acts as a filter post treatment removing material passed by the CFM vessel.

6 Conclusions and Recommendations

Conclusions are presented below:

1. A treatment system using Catalytic Filtration Media can remove up to 74% of Iron, 99% of manganese and 77% of turbidity from the MF/RO feedwater.
2. The reduction in iron, manganese and turbidity from the incoming MF/RO feedwater will improve performance of both MF and RO by reducing particulate material to MF and dissolved iron/manganese fouling on RO plant.
3. Based on Aqualyng ICES experience at other locations, it is expected that the reduction of iron, manganese and turbidity from the MF feedwater will more than double the expected life of the MF and RO membranes currently in use.

Recommendations, based on these conclusions are to

1. Install a pre-treatment plant at the Boddington Gold Mine Water Treatment Plant for the purpose of iron, manganese and turbidity removal. A budget estimate for the recommended plant is attached to this report.
2. The plant includes the equipment and dose points for coagulant dosing prior to catalytic filtration media to assist in turbidity and iron removal.
3. Suitably sized catalytic filtration media vessel(s) be installed prior to the existing Micro Filtration supply tank to pretreat the water.
4. The new pretreatment plant be installed in the area adjacent to the existing water treatment plant on the south-east corner of the plant. This location allows easy access to sufficient space and the water treatment plant supply pipe.
5. Carbon filtration post catalytic filtration media is not necessary as any residual chlorine will be of benefit for biological control prior to the micro-filtration plant.

7 References

Aqualyng ICES 2017, *Boddington Blending Report BD001-1710-01-DX*.

Disclaimer

Appendix A: Raw Data from Field Testing During Trial.

Boddington Pre-Treatment Pilot Plant Results

Day		25/06/2019							
Conditions		Filtration Only @ 4LPM							
Time		1100	1200	1300	1330	1400	1430	1500	1530
Raw Water	ph	8.06	8.22	8	8.16	8.19	8.27	8.33	8.37
	Conductivity (uS/cm)	8995	8990	8885	8895	8895	8900	8905	8920
	Iron (mg/L)	0.48	0.42	0.5	0.43	0.44	0.42	0.38	0.43
	Turbidity (NTU)	8.87	9.52	8.8	9.35	8.84	8.77	8.99	9.85
Clarified Water	ph	8.28	8.26	8.27	8.27	8.27	8.27	8.28	8.3
	Conductivity (uS/cm)	9683	9505	9410	9365	9306	9250	9210	9175
	Iron (mg/L)	0.35	0.39	0.39	0.39	0.38	0.4	0.41	0.36
	Turbidity (NTU)	7.86	7.55	7.74	7.86	8.42	7.98	8.14	8.41
Filter #1 Outlet (DMI65)	ph	8.08	8.01	7.98	8.02	8.08	8.04	8.06	8.06
	Conductivity (uS/cm)	9735	9605	9520	9390	9340	9270	9230	9195
	Iron (mg/L)	0.08	0.06	0.03	0.1	0.13	0.18	0.17	0.16
	Turbidity (NTU)	1.95	1.14	1.05	1.71	2.41	2.86	2.87	3
	Free Chlorine (ppm)	0.29	0.36	0.89	0.67	0.66	0.55	0.29	0.26
Filter #2 Outlet (Carbon)	ph	8.89	8.85	8.88	8.69	8.56	8.56	8.57	8.58
	Conductivity (uS/cm)	9720	9610	9530	9455	9345	9285	9235	9205
	Iron (mg/L)	0.08	0.05	0.03	0.08	0.11	0.14	0.16	0.15
	Turbidity (NTU)	1.49	0.9	0.81	1.04	1.94	2.47	2.61	2.64
	Free Chlorine (ppm)	0.02	0.05	0.07	0.05	0.02	0.03	0.03	0.02
	Clarification Iron Reduction %	27.08	7.14	22.00	9.30	13.64	4.76	-7.89	16.28
	Average	11.24							
	Clarification Turbidity Reduction %	11.39	20.69	12.05	15.94	4.75	9.01	9.45	14.62
	Average	12.24							
	DMI65 Only Iron Reduction %	83.33	85.71	94.00	76.74	70.45	57.14	55.26	62.79
	Average	73.57							
	DMI65 Only Turbidity Reduction %	78.02	88.03	88.07	81.71	72.74	67.39	68.08	69.54
	Average	76.70							
	DMI65 & Carbon Iron Reduction %	83.33	88.10	94.00	81.40	75.00	66.67	57.89	65.12
	Average	76.64							
	DMI65 & Carbon Turbidity Reduction %	83.20	90.55	90.80	88.88	78.05	71.84	70.97	73.20
	Average	80.93							

= Dud Iron sachets, sample didn't mix and/or went a cloudy white instead of light orange results averaged from previous results

Boddington Pre-Treatment Pilot Plant Results

Day		26/06/2019							
Conditions		Filtration Only @ 6LPM							
Time		1130	1200	1230	1300	1330	1400	1430	1500
Raw Water	ph	7.85	7.96	8.09	8.21	8.29	7.96	8.04	8.17
	Conductivity (uS/cm)	9750	9760	9755	9765	9775	10480	10490	10490
	Iron (mg/L)	0.28	0.26	0.45	0.24	0.24	0.22	0.21	0.21
	Turbidity (NTU)	6.61	6.34	6.26	5.98	6.35	5.49	5.34	5.44
Clarified Water	ph	8	8.05	8.13	8.18	8.14	8.22	8.22	8.23
	Conductivity (uS/cm)	9660	9600	9590	9605	9630	9685	9800	9930
	Iron (mg/L)	0.27	0.28	0.33	0.28	0.28	0.24	0.26	0.26
	Turbidity (NTU)	6.71	6.99	6.74	6.61	6.39	6.5	6.28	6.01
Filter #1 Outlet (DMI65)	ph	8	8	8.02	8.05	8.06	8.07	8.09	8.11
	Conductivity (uS/cm)	9660	9620	9600	9610	9630	9665	9780	9920
	Iron (mg/L)	0.27	0.13	0.16	0.13	0.12	0.12	0.12	0.12
	Turbidity (NTU)	2.58	2.6	2.76	2.63	2.56	2.5	2.49	2.61
	Free Chlorine (ppm)	0.08	0.3	0.16	0.71	0.16	0.04	0.3	0.1
Filter #2 Outlet (Carbon)	ph	8.45	8.4	8.46	8.43	8.38	8.34	8.3	8.34
	Conductivity (uS/cm)	9655	9630	9600	9615	9625	9660	9765	9900
	Iron (mg/L)	0.09	0.09	0.13	0.09	0.12	0.12	0.12	0.12
	Turbidity (NTU)	2.49	2.53	2.61	2.44	2.4	2.34	2.38	2.28
	Free Chlorine (ppm)	0.02	0.08	0.04	0.03	0	0	0.02	0.02
	Clarification Iron Reduction %	3.57	-7.69	26.67	-16.67	-16.67	-9.09	-23.81	-23.81
	Average	-8.54							
	Clarification Turbidity Reduction %	-1.51	-10.25	-7.67	-10.54	-0.63	-18.40	-17.60	-10.48
	Average	-9.63							
	DMI65 Only Iron Reduction %	3.57	50.00	64.44	45.83	50.00	45.45	42.86	42.86
	Average	42.15							
	DMI65 Only Turbidity Reduction %	60.97	58.99	55.91	56.02	59.69	54.46	53.37	52.02
	Average	56.43							
	DMI65 & Carbon Iron Reduction %	67.86	65.38	71.11	62.50	50.00	45.45	42.86	42.86
	Average	54.66							
	DMI65 & Carbon Turbidity Reduction %	62.33	60.09	58.31	59.20	62.20	57.38	55.43	58.09
	Average	59.13							

= Dud Iron sachets, sample didn't mix and/or went a cloudy white instead of light orange results averaged from previous results

Boddington Pre-Treatment Pilot Plant Results

Day		27/06/2019							
Conditions		Filtration Only @ 8LPM							
Time		1130	1200	1230	1330	1400	1430	1500	1530
Raw Water	ph	8.02	7.98	8.05	7.97	8.06	7.99	8.05	8.14
	Conductivity (uS/cm)	9590	9500	9500	9290	9300	9220	9230	9205
	Iron (mg/L)	0.34	0.67	0.34	0.48	0.18	0.29	0.29	0.29
	Turbidity (NTU)	9.99	9.99	9.99	9.99	9.46	9.75	9.99	8.93
Clarified Water	ph	8.14	8.12	8.07	8.18	8.19	8.19	8.19	8.19
	Conductivity (uS/cm)	10260	10140	9960	9760	9640	9555	9470	9400
	Iron (mg/L)	0.23	0.14	0.28	0.24	0.3	0.31	0.31	0.24
	Turbidity (NTU)	6.92	6.8	7.88	9.33	9.12	9.08	8.81	8.77
Filter #1 Outlet (DMI65)	ph	8.12	8.11	8.13	8.17	8.16	8.15	8.15	8.15
	Conductivity (uS/cm)	10280	10160	9995	9770	9645	9660	9475	9410
	Iron (mg/L)	0.12	0.12	0.13	0.11	0.15	0.14	0.17	0.11
	Turbidity (NTU)	3.08	2.7	2.94	3.37	3.61	3.49	3.89	3.47
	Free Chlorine (ppm)	1.15	0.21	0.14	0.13	0.25	0.08	0.11	0.15
Filter #2 Outlet (Carbon)	ph	8.43	8.51	8.54	8.44	8.32	8.29	8.26	8.24
	Conductivity (uS/cm)	10280	10180	10000	9775	9655	9570	9480	9415
	Iron (mg/L)	0.1	0.11	0.12	0.13	0.12	0.13	0.14	0.11
	Turbidity (NTU)	2.69	2.53	2.81	3.19	3.17	3.27	3.25	3.22
	Free Chlorine (ppm)	0.03	0	0.02	0.02	0	0	0	0
	Clarification Iron Reduction %	32.35	79.10	17.65	50.00	-66.67	-6.90	-6.90	17.24
	Average	14.49							
	Clarification Turbidity Reduction %	30.73	31.93	21.12	6.61	3.59	6.87	11.81	1.79
	Average	14.31							
	DMI65 Only Iron Reduction %	64.71	82.09	61.76	77.08	16.67	51.72	41.38	62.07
	Average	57.19							
	DMI65 Only Turbidity Reduction %	69.17	72.97	70.57	66.27	61.84	64.21	61.06	61.14
	Average	65.90							
	DMI65 & Carbon Iron Reduction %	70.59	83.58	64.71	72.92	33.33	55.17	51.72	62.07
	Average	61.76							
	DMI65 & Carbon Turbidity Reduction %	73.07	74.67	71.87	68.07	66.49	66.46	67.47	63.94
	Average	69.01							

Boddington Pre-Treatment Pilot Plant Results

Day		23/07/2019							
Conditions		Flocculant (200PPM) & Filtration @ 4LPM							
Time		1130	1200	1230	1330	1400	1430	1500	1530
Raw Water	ph	8.22	8.04	8.02	8.1	8.01	8.06	8.1	8.13
	Conductivity (uS/cm)	9385	9320	9310	9320	9315	9325	9330	9335
	Iron (mg/L)	0.15	0.32	0.4	0.15	0.16	0.17	0.16	0.15
	Turbidity (NTU)	4.43	3.92	3.69	3.38	3.28	3.1	2.99	3.09
Clarified Water	ph	8.43	8.44	8.43	8.35	8.31	8.26	8.16	8.24
	Conductivity (uS/cm)	9290	9295	9285	9295	9305	9315	9320	9330
	Iron (mg/L)	0.12	0.29	0.3	0.14	0.1	0.15	0.14	0.12
	Turbidity (NTU)	6.8	6.29	5.71	5.37	5.23	5.11	5.05	4.37
Filter #1 Outlet (DMI65)	ph	8.27	8.31	8.34	8.33	8.35	8.33	8.28	8.27
	Conductivity (uS/cm)	9295	9305	9295	9375	9310	9315	9490	9335
	Iron (mg/L)	0.01	0	0.04	0.12	0.05	0.04	0.03	0.05
	Turbidity (NTU)	0.96	0.74	1.06	1.23	1.25	1.24	1.07	1.26
	Free Chlorine (ppm)	0	0.13	0.14	0.28	0.04	0.09	0.4	0.04
Filter #2 Outlet (Carbon)	ph	8.28	8.27	8.3	8.33	8.39	8.37	8.37	8.42
	Conductivity (uS/cm)	9295	9300	9300	9435	9340	9325	9460	9435
	Iron (mg/L)	0	0.01	0.02	0	0.02	0.03	0.02	0.01
	Turbidity (NTU)	0.61	0.65	0.59	0.59	0.77	0.72	0.62	0.68
	Free Chlorine (ppm)	0	0.04	0.01	0.03	0	0.02	0.03	0.03
	Clarification Iron Reduction %	20.00	9.38	25.00	6.67	37.50	11.76	12.50	20.00
	Average	17.85							
	Clarification Turbidity Reduction %	-53.50	-60.46	-54.74	-58.88	-59.45	-64.84	-68.90	-41.42
	Average	-57.77							
	DMI65 Only Iron Reduction %	93.33	100.00	90.00	20.00	68.75	76.47	81.25	66.67
	Average	74.56							
	DMI65 Only Turbidity Reduction %	78.33	81.12	71.27	63.61	61.89	60.00	64.21	59.22
	Average	67.46							
	DMI65 & Carbon Iron Reduction %	100.00	96.88	95.00	100.00	87.50	82.35	87.50	93.33
	Average	92.82							
	DMI65 & Carbon Turbidity Reduction %	86.23	83.42	84.01	82.54	76.52	76.77	79.26	77.99
	Average	80.85							

Boddington Pre-Treatment Pilot Plant Results

Day		24/07/2019							
Conditions		Flocculant (200PPM) & Filtration @ 6LPM							
Time		830	900	930	1000	1030	1100	1130	1200
Raw Water	ph	8.05	8.01	8.07	8	7.96	8.01	7.94	7.97
	Conductivity (uS/cm)	8300	8295	8300	8270	8250	8240	8190	8185
	Iron (mg/L)	0.15	0.15	0.17	0.15	0.15	0.16	0.15	0.14
	Turbidity (NTU)	3.7	3.81	3.66	4.21	4.07	3.9	4	3.98
Clarified Water	ph	8.11	8.1	8.1	8.08	8.06	8.07	8.05	8.06
	Conductivity (uS/cm)	8960	8980	8950	8870	8750	8675	8600	8525
	Iron (mg/L)	0.15	0.13	0.13	0.14	0.14	0.12	0.14	0.15
	Turbidity (NTU)	4.4	4.43	4.1	4.47	4.47	4.48	4.25	4.24
Filter #1 Outlet (DMI65)	ph	8.18	8.15	8.13	8.1	8.08	8.07	8.03	7.92
	Conductivity (uS/cm)	8970	8980	8955	8880	8965	8915	8855	8785
	Iron (mg/L)	0.08	0.08	0.08	0.09	0.08	0.09	0.07	0.08
	Turbidity (NTU)	2.28	2.29	2.42	2.89	2.78	2.66	2.46	2.33
	Free Chlorine (ppm)	0.1	0	0.15	0.12	0	0.14	0.43	0.6
Filter #2 Outlet (Carbon)	ph	8.33	8.29	8.26	8.22	8.18	8.18	8.37	8.37
	Conductivity (uS/cm)	8985	8980	8955	8890	8770	8860	8865	8795
	Iron (mg/L)	0.06	0.06	0.06	0.07	0	0.05	0.08	0.07
	Turbidity (NTU)	1.5	1.67	1.81	2.25	2.27	2.14	1.72	1.77
	Free Chlorine (ppm)	0	0	0	0	0	0.08	0.02	0.12
	Clarification Iron Reduction %	0.00	13.33	23.53	6.67	6.67	25.00	6.67	-7.14
	Average	10.23							
	Clarification Turbidity Reduction %	-18.92	-16.27	-12.02	-6.18	-9.83	-14.87	-6.25	-6.53
	Average	-11.36							
	DMI65 Only Iron Reduction %	46.67	46.67	52.94	40.00	46.67	43.75	53.33	42.86
	Average	47.70							
	DMI65 Only Turbidity Reduction %	38.38	39.90	33.88	31.35	31.70	31.79	38.50	41.46
	Average	35.87							
	DMI65 & Carbon Iron Reduction %	60.00	60.00	64.71	53.33	100.00	68.75	46.67	50.00
	Average	58.35							
	DMI65 & Carbon Turbidity Reduction %	59.46	56.17	50.55	46.56	44.23	45.13	57.00	55.53
	Average	51.83							

= Dud Iron sachets, sample didn't mix and/or went a cloudy white instead of light orange results averaged from previous results

Boddington Pre-Treatment Pilot Plant Results

Day		24/07/2019							
Conditions		Flocculant (200PPM) & Filtration @ 8LPM							
Time		1300	1330	1400	1430	1500	1530	1600	1630
Raw Water	ph	7.98	7.99	8.02	8.1	7.98	8	8.01	8
	Conductivity (uS/cm)	8210	8215	8220	8230	8110	8120	8155	8165
	Iron (mg/L)	0.17	0.15	0.16	0.15	0.15	0.15	0.16	0.16
	Turbidity (NTU)	3.71	3.39	3.74	3.67	4.47	3.72	3.66	3.77
Clarified Water	ph	7.97	7.98	8	8.03	8.04	8.06	8.08	8.07
	Conductivity (uS/cm)	8240	8240	8250	8250	8250	8235	8215	8200
	Iron (mg/L)	0.16	0.16	0.15	0.16	0.14	0.15	0.16	0.16
	Turbidity (NTU)	4.17	4.18	4.07	4.09	4.01	4.12	3.95	3.89
Filter #1 Outlet (DMI65)	ph	7.96	7.9	7.96	7.97	7.9	7.99	7.98	7.91
	Conductivity (uS/cm)	8295	8430	8245	8245	8425	8240	8395	8400
	Iron (mg/L)	0.07	0.08	0.11	0.1	0.1	0.12	0.1	0.09
	Turbidity (NTU)	2.1	2.38	2.9	2.9	2.42	2.81	2.59	2.76
	Free Chlorine (ppm)	0.31	0.45	0.02	0.06	0.29	0.01	0.29	0.71
Filter #2 Outlet (Carbon)	ph	8.19	8.09	8.11	8.08	8.14	8.13	8.09	8.21
	Conductivity (uS/cm)	8410	8425	8250	8250	8420	8240	8375	8390
	Iron (mg/L)	0.05	0.06	0.07	0.1	0.09	0.1	0.08	0.09
	Turbidity (NTU)	1.33	1.94	2.36	2.6	1.99	2.31	2.25	2.17
	Free Chlorine (ppm)	0.08	0.09	0	0	0.1	0	0.11	0.13
	Clarification Iron Reduction %	5.88	-6.67	6.25	-6.67	6.67	0.00	0.00	0.00
	Average	0.68							
	Clarification Turbidity Reduction %	-12.40	-23.30	-8.82	-11.44	10.29	-10.75	-7.92	-3.18
	Average	-8.44							
	DMI65 Only Iron Reduction %	58.82	46.67	31.25	33.33	33.33	20.00	37.50	43.75
	Average	38.08							
	DMI65 Only Turbidity Reduction %	43.40	29.79	22.46	20.98	45.86	24.46	29.23	26.79
	Average	30.37							
	DMI65 & Carbon Iron Reduction %	70.59	60.00	56.25	33.33	40.00	33.33	50.00	43.75
	Average	48.41							
	DMI65 & Carbon Turbidity Reduction %	64.15	42.77	36.90	29.16	55.48	37.90	38.52	42.44
	Average	43.42							

Boddington Pre-Treatment Pilot Plant Results

Day		25/07/2019							
Conditions		Flocculant (100PPM) & Filtration @ 8LPM							
Time		830	900	930	1000	1015	1030	1045	1100
Raw Water	ph	8.08	8.03	8	8.02	7.99	8	8.02	8.06
	Conductivity (uS/cm)	8220	8220	8260	8290	8290	8285	8280	8280
	Iron (mg/L)	0.15	0.12	0.13	0.17	-	-	-	-
	Turbidity (NTU)	3.66	3.83	3.66	3.68	3.69	3.45	3.46	3.36
Clarified Water	ph	8.02	8.02	8.02	8.01	8	7.99	7.99	7.99
	Conductivity (uS/cm)	8205	8210	8210	8220	8220	8225	8225	8230
	Iron (mg/L)	0.13	0.1	0.15	-	-	-	-	-
	Turbidity (NTU)	4.12	4.22	4.04	4.13	3.74	3.92	3.99	4.22
Filter #1 Outlet (DMI65)	ph	7.99	7.88	7.88	7.98	7.86	7.88	7.98	7.96
	Conductivity (uS/cm)	8330	8380	8380	8220	8410	8425	8235	8365
	Iron (mg/L)	0.04	0.02	0.08	-	-	-	-	-
	Turbidity (NTU)	2.2	2.4	2.12	2.42	1.99	1.98	2.43	2.17
	Free Chlorine (ppm)	0.42	0.22	0.22	0	0.79	1	0.49	0.93
Filter #2 Outlet (Carbon)	ph	8.04	8.11	8.19	8.11	8.07	8.14	8.2	8.1
	Conductivity (uS/cm)	8205	8370	8375	8215	8400	8420	8335	8235
	Iron (mg/L)	0.03	0.02	0.06	0.07	-	-	-	-
	Turbidity (NTU)	2.06	1.6	1.51	1.96	1.42	1.53	1.6	1.77
	Free Chlorine (ppm)	0	0.06	0.06	0	0.11	0.13	0.08	0
	Clarification Iron Reduction %	13.33	16.67	-15.38	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	Average	4.87							
	Clarification Turbidity Reduction %	-12.57	-10.18	-10.38	-12.23	-1.36	-13.62	-15.32	-25.60
	Average	-12.66							
	DMI65 Only Iron Reduction %	73.33	83.33	38.46	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	Average	65.04							
	DMI65 Only Turbidity Reduction %	39.89	37.34	42.08	34.24	46.07	42.61	29.77	35.42
	Average	38.43							
	DMI65 & Carbon Iron Reduction %	80.00	83.33	53.85	58.82	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	Average	69.00							
	DMI65 & Carbon Turbidity Reduction %	43.72	58.22	58.74	46.74	61.52	55.65	53.76	47.32
	Average	53.21							

Boddington Pre-Treatment Pilot Plant Results

Day		25/07/2019							
Conditions		Flocculant (50PPM) & Filtration @ 8LPM							
Time		1200	1210	1220	1230	1240	1250	1300	1310
Raw Water	ph	8.01	8.03	8.03	8.04	8.06	8.07	8.1	8.13
	Conductivity (uS/cm)	8590	8590	8595	8600	8600	8605	8600	8610
	Iron (mg/L)	-	-	-	-	-	-	-	-
	Turbidity (NTU)	3.85	3.4	3.15	3.17	3.22	3.72	3.24	3.13
Clarified Water	ph	8.01	8	8.01	8.01	8.02	8.02	8.03	8.04
	Conductivity (uS/cm)	8240	8250	8260	8265	8275	8290	8300	8310
	Iron (mg/L)	-	-	-	-	-	-	-	-
	Turbidity (NTU)	3.84	4.16	3.95	3.75	4.06	3.95	3.94	4.12
Filter #1 Outlet (DMI65)	ph	7.93	7.91	7.86	7.88	7.89	7.85	7.89	7.89
	Conductivity (uS/cm)	8240	8390	8410	8295	8400	8430	8355	8305
	Iron (mg/L)	-	-	-	-	-	-	-	-
	Turbidity (NTU)	2.6	2.52	2.37	2.21	1.99	1.95	2.1	2.31
	Free Chlorine (ppm)	0.07	0.49	0.62	0.93	0.49	0.51	0.55	0.12
Filter #2 Outlet (Carbon)	ph	7.99	8.02	8.03	8.05	8.02	8.02	8.03	8
	Conductivity (uS/cm)	8240	8380	8400	8410	8375	8420	8400	8305
	Iron (mg/L)	-	-	-	-	-	-	-	-
	Turbidity (NTU)	1.94	1.63	1.55	1.49	1.52	1.32	1.34	1.77
	Free Chlorine (ppm)	0	0.06	0.09	0.12	0.06	0.08	0.08	0.04
	Clarification Iron Reduction %	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	Average	#VALUE!							
	Clarification Turbidity Reduction %	0.26	-22.35	-25.40	-18.30	-26.09	-6.18	-21.60	-31.63
	Average	-18.91							
	DMI65 Only Iron Reduction %	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	Average	#VALUE!							
	DMI65 Only Turbidity Reduction %	32.47	25.88	24.76	30.28	38.20	47.58	35.19	26.20
	Average	32.57							
	DMI65 & Carbon Iron Reduction %	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	Average	#VALUE!							
	DMI65 & Carbon Turbidity Reduction %	49.61	52.06	50.79	53.00	52.80	64.52	58.64	43.45
	Average	53.11							

Appendix B: Laboratory Results for External Testing During Trial.

Matrix:	WATER		Sample Type:		REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Workgroup:	EP1907419		ALS Sample Number:		EP1906355001	EP1906355002	EP1906355003	EP1906355004	EP1906355005	EP1907419001	EP1907419002	EP1907419003	EP1907419004	EP1907419005	EP1907419006	EP1907419007	EP1907419008
Project name/number:	BODDINGTON PRE-TREATMENT		Sample Date:		25/06/2019	25/06/2019	25/06/2019	27/06/2019	27/06/2019	23/07/2019	23/07/2019	23/07/2019	23/07/2019	24/07/2019	24/07/2019	24/07/2019	24/07/2019
			Client sample ID (1st):		Raw Water at 4LPM	DMI65 only at 4LPM	DMI65 and Carbon at 4LPM	DMI65 only at 8LPM	DMI65 and Carbon at 8LPM	Raw Water at 4LPM	Coagulant dosed at 200ppm and Clarification at 4LPM	Coagulant dosed at 200ppm, Clarification and DMI65 at 4LPM	Coagulant dosed at 200ppm, Clarification, DMI 65 and Carbon at 4LPM	Raw Water at 8LPM	Coagulant dosed at 200ppm and Clarification at 8LPM	Coagulant dosed at 200ppm, Clarification and DMI65 at 8LPM	Coagulant dosed at 200ppm, Clarification, DMI 65 and Carbon at 8LPM
			Client sample ID (2nd):														
			Depth Type:														
			Depth (m):														
			Site:														
			Purchase Order:														
Analyte grouping/Analyte	CAS Number	Unit	Limit of reporting														
EA010P: Conductivity by PC Titrator																	
Electrical Conductivity @ 25°C		µS/cm	1		**9010**	**9230**	**9340**	**9610**	**9740**	**8890**	**9440**	**9770**	**9770**	**8330**	**8340**	**8560**	**8580**
EA025: Total Suspended Solids dried at 104 ± 2°C																	
Suspended Solids (SS)		mg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
EA045: Turbidity																	
Turbidity		NTU	0.1		**5.7**	**2.3**	**1.9**	**2.6**	**2.4**	**2.2**	**3.4**	**0.4**	**0.3**	**2.3**	**2.7**	**1.5**	**1.1**
Turbidity						60%	67%	54%	58%		-55%	82%	86%		-17%	35%	52%
ED037P: Alkalinity by PC Titrator																	
Turbidity	DMO-210-001	mg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1		**95**	**98**	**116**	**80**	**106**	**78**	**86**	**90**	**78**	**102**	**101**	**101**	**108**
Total Alkalinity as CaCO3		mg/L	1		**95**	**98**	**116**	**80**	**106**	**78**	**86**	**90**	**78**	**102**	**101**	**101**	**108**
						-3%	-22%	16%	-12%		-10%	-15%	0%		1%	1%	-6%
ED040F: Dissolved Major Anions																	
Silicon as SiO2	14464-46-1	mg/L	0.1		**22.3**	**22.2**	**23.5**	**19.0**	**19.3**	**12.8**	**12.4**	**12.8**	**13.3**	**19.4**	**19.4**	**19.5**	**19.4**
Silicon as SiO2						0%	-5%	15%	13%		3%	0%	-4%		0%	-1%	0%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA																	
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1		**267**	**278**	**275**	**271**	**273**	**224**	**276**	**294**	**280**	**242**	**279**	**289**	**286**
Sulfate as SO4 - Turbidimetric						-4%	-3%	-1%	-2%		-23%	-31%	-25%		-15%	-19%	-18%
ED045G: Chloride by Discrete Analyser																	
Chloride	16887-00-6	mg/L	1		**2620**	**2780**	**2800**	**2900**	**2850**	**3310**	**3200**	**3400**	**3290**	**2510**	**2830**	**2940**	**2730**
						-6%	-7%	-11%	-9%		3%	-3%	1%		-13%	-17%	-9%
ED093F: Dissolved Major Cations																	
Calcium	7440-70-2	mg/L	1		**177**	**183**	**181**	**173**	**173**	**132**	**138**	**137**	**137**	**160**	**158**	**158**	**159**
Magnesium	7439-95-4	mg/L	1		**308**	**320**	**316**	**331**	**334**	**330**	**320**	**319**	**322**	**269**	**272**	**270**	**271**
Sodium	7440-23-5	mg/L	1		**1290**	**1340**	**1330**	**1370**	**1380**	**1520**	**1420**	**1470**	**1490**	**1200**	**1190**	**1250**	**1260**
Potassium	7440-09-7	mg/L	1		**24**	**24**	**24**	**24**	**24**	**20**	**20**	**20**	**21**	**24**	**24**	**24**	**24**
EG020T: Total Metals by ICP-MS																	
Manganese	7439-96-5	mg/L	0.001		**0.315**	**0.001**	**0.008**	**0.001**	**0.004**	**0.158**	**0.139**	**0.044**	**0.038**	**0.249**	**0.247**	**0.094**	**0.090**
Manganese						100%	97%	100%	99%		12%	72%	76%		1%	62%	64%
Iron	7439-89-6	mg/L	0.05		**0.38**	**0.18**	**0.15**	**0.17**	**0.18**	**0.27**	**0.20**	0.025	0.025	**0.18**	**0.19**	**0.11**	**0.09**
Iron						53%	61%	55%	53%		26%	91%	91%		-6%	39%	50%
EK040P: Fluoride by PC Titrator																	
Fluoride	16984-48-8	mg/L	0.1		**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
EN055: Ionic Balance																	
Total Anions		meq/L	0.01		**81.4**	**86.2**	**87.0**	**89.0**	**88.2**	**99.6**	**97.7**	**104**	**100**	**77.9**	**87.6**	**91.0**	**85.1**
Total Cations		meq/L	0.01		**90.9**	**94.4**	**93.5**	**96.1**	**96.8**	**100**	**95.5**	**97.5**	**98.7**	**82.9**	**82.6**	**85.1**	**85.6**
Ionic Balance		%	0.01		**5.54**	**4.54**	**3.59**	**3.80**	**4.63**	**0.39**	**1.15**	**3.12**	**0.76**	**3.14**	**2.94**	**3.34**	**0.31**

Treatment	CFM Only	CFM + Carbon	CFM only	CFM + Carbon	Coagulant 200 ppm + Clarification	Coagulant 200 ppm + Clarification + CFM	Coagulant 200 ppm + Clarification + CFM + Carbon	Coagulant 200 ppm + Clarification	Coagulant 200 ppm + Clarification + CFM	Coagulant 200 ppm + Clarification + CFM + Carbon
Flow Rate	4 LPM	4 LPM	8 LPM	8 LPM	4 LPM	4 LPM	8 LPM	8 LPM	8 LPM	8 LPM
Turbidity	60%	67%	54%	58%	-55%	82%	86%	-17%	35%	52%
Silicon as SiO2	0%	-5%	15%	13%	3%	0%	-4%	0%	-1%	0%
Sulfate as SO4 - Turbidimetric	-4%	-3%	-1%	-2%	-23%	-31%	-25%	-15%	-19%	-18%
Manganese	>99%	97%	>99%	99%	12%	72%	76%	1%	62%	64%
Iron	53%	61%	55%	53%	26%	91%	91%	-6%	39%	50%

Treatment	CFM Only	CFM + Carbon
Flow Rate	4 LPM	4 LPM
Turbidity	60%	67%
Silicon as SiO2	0%	-5%
Sulfate as SO4 - Turbidimetric	-4%	-3%
Manganese	>99%	97%
Iron	53%	61%
Treatment	CFM only	CFM + Carbon
Flow Rate	8 LPM	8 LPM
Turbidity	54%	58%
Silicon as SiO2	15%	13%
Sulfate as SO4 - Turbidimetric	-1%	-2%
Manganese	>99%	99%
Iron	55%	53%

Treatment	Flow Rate	Turbidity	Silicon as SiO2	Sulfate as SO4 - Tu	Manganese	Iron
CFM Only	4 LPM	60%	0%	-4%	>99%	53%
CFM + Carbon	4 LPM	67%	-5%	-3%	97%	61%
CFM only	8 LPM	54%	15%	-1%	>99%	55%
CFM + Carbon	8 LPM	58%	13%	-2%	99%	53%
Coagulant 200 ppm + Clarification	4 LPM	-55%	3%	-23%	12%	26%
Coagulant 200 ppm + Clarification + CFM	4 LPM	82%	0%	-31%	72%	91%
Coagulant 200 ppm + Clarification + CFM + Carbon	8 LPM	86%	-4%	-25%	76%	91%
Coagulant 200 ppm + Clarification	8 LPM	-17%	0%	-15%	1%	-6%
Coagulant 200 ppm + Clarification + CFM	8 LPM	35%	-1%	-19%	62%	39%
Coagulant 200 ppm + Clarification + CFM + Carbon	8 LPM	52%	0%	-18%	64%	50%

Treatment	Coagulant 200 ppm + Clarification	Coagulant 200 ppm + Clarification + CFM
Flow Rate	4 LPM	4 LPM
Turbidity	-55%	82%
Silicon as SiO2	3%	0%
Sulfate as SO4 - Turbidimetric	-23%	-31%
Manganese	12%	72%
Iron	26%	91%
Treatment	Coagulant 200 ppm + Clarification + CFM + Carbon	Coagulant 200 ppm + Clarification
Flow Rate	8 LPM	8 LPM
Turbidity	86%	-17%
Silicon as SiO2	-4%	0%
Sulfate as SO4 - Turbidimetric	-25%	-15%
Manganese	76%	1%
Iron	91%	-6%
Treatment	Coagulant 200 ppm + Clarification + CFM	Coagulant 200 ppm + Clarification + CFM + Carbon
Flow Rate	8 LPM	8 LPM
Turbidity	35%	52%
Silicon as SiO2	-1%	0%
Sulfate as SO4 - Turbidimetric	-19%	-18%
Manganese	62%	64%
Iron	39%	50%

AQUALYNG ICES

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Murrin Murrin Reverse Osmosis Train F Investigation March 2019

4 March 2019

Prepared By: Marcus Cordingley
Prepared For: Brett Marsh

DOCUMENT NUMBER AQL_MurrinTrainFRO1903					
Rev	Date	Description	Prepared by	Checked by	Approved by
0	4/03/18	Original - for discussion	MC	JL	HT

Background

Aqualyng ICES visited the Murrin Murrin site on Wednesday 27 February 2019 to investigate the cause of issues associated with RO Train F in the utilities section of the site.

Train F RO plant at Murrin Murrin, like all RO plants on site is a two stage RO in a 13:7 arrangement. Each 200mm RO pressure vessel contains 6 DOW Filmtec XFR 30-400 elements. Train F is the newest of the RO plants at Murrin Murrin, but is a copy of the design of the other RO trains with minimal changes.

A RO plant clean was undertaken by Aqualyng ICES on Train F Stage 1 only on 31 January 2019 to address differential pressure and possible scaling issues. Stage 2 elements were not cleaned during this visit.

From 6 February 2019, the plant had been demonstrating reduced performance as indicated by:

- Stage 1 and Stage 2 permeate conductivity/salt passage increase.
- Stage 2 permeability increase
- Differential pressure (DP) within acceptable limits. A rising DP on stage 1 of Train F was corrected during the January visit with a bio-clean.

Aims and Methods

The aims of the investigation were to determine the likely cause(s) of the decline in RO Train F performance. The methods used were:

- Examination of plant historic data. Historic data for the plant is available from 22 August 2017.
- Inspection of the plant on site
- Removal of endcaps and element inspection Stage 1 and Stage 2
- Measurement of RO vessel performance including vessel profiling. (Probing of individual elements was not available due to plant design).
- Discussions with staff at site about plant operation and maintenance.

Results

Train F Plant Historic Data

Train F RO plant is the most recent addition to the Murrin water treatment plant, with data dating back to August 2017. All other plants (trains A-E) date back to 2010. The current membranes were installed in November 2017 and have had a service life of approximately 16 months.

Readings taken at the time of review site visit (27 February 2019) were:

Reject Flow	45 kL/hr	**Permeate Total**	113 kL/hr
Stage 1 Permeate	74 kL/hr	**Stage 2 Permeate**	39 kL/hr
Stage 1 flow/vessel	5.69 kL/hr	**Stage 2 flow/ vessel**	5.5 kL/hr

Train F permeability data is presented graphically below in Figure 1:

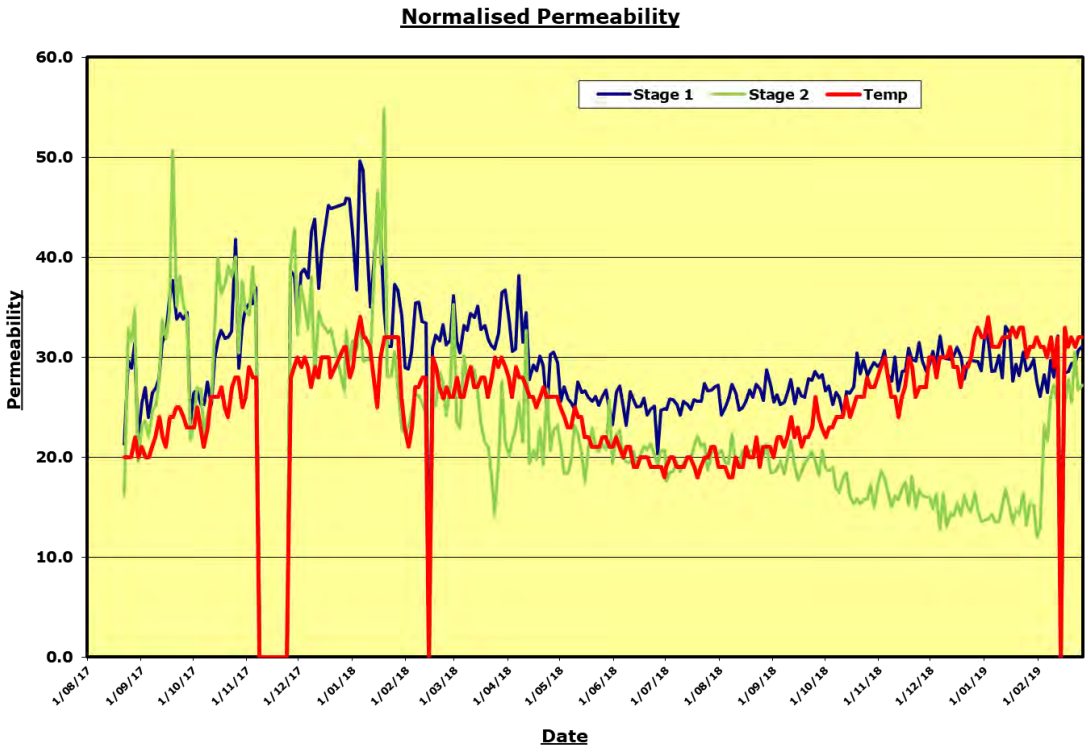
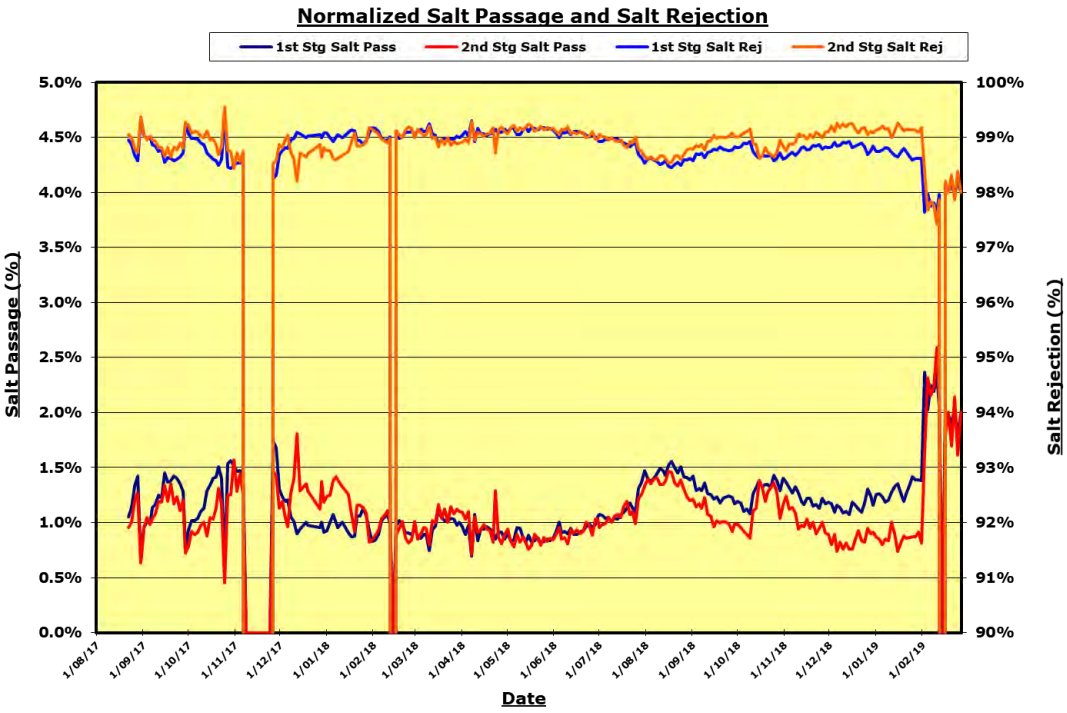


Figure 1: Train F Permeability History

Figure 1 shows a rapid increase in Stage 2 permeability in early February.

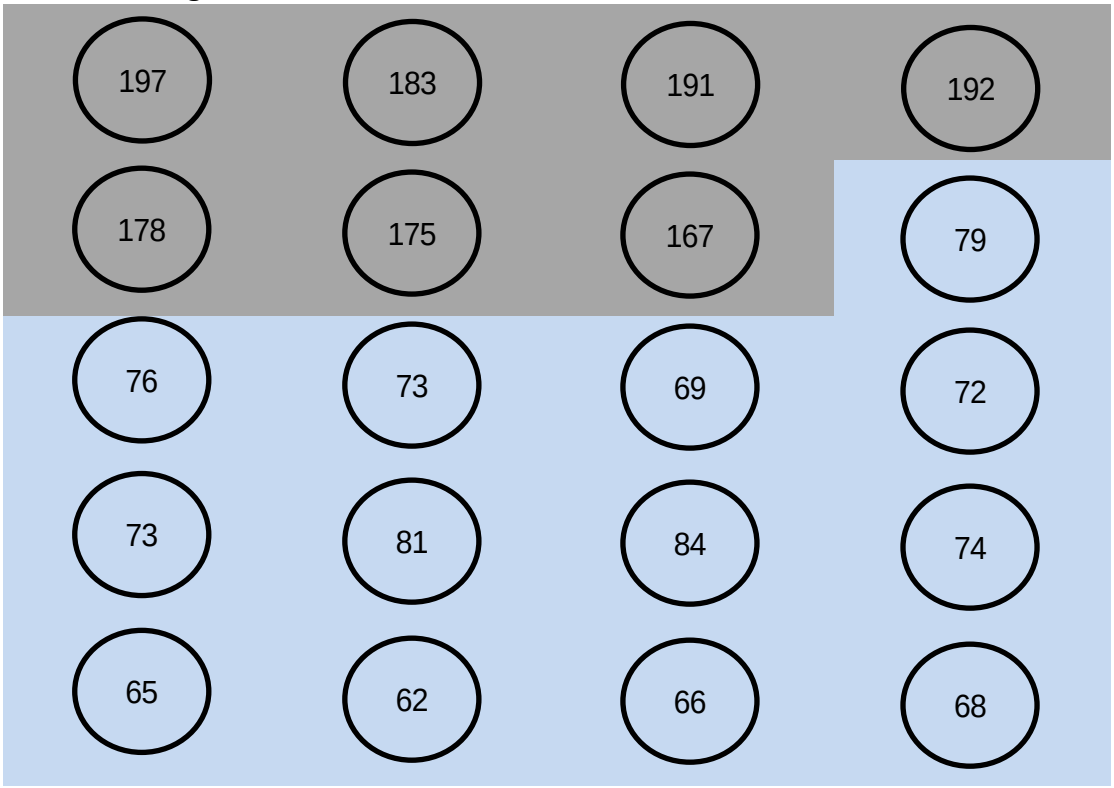
The Stage 2 permeability increase corresponds with a decrease in salt rejection (Figure 2).



RO Vessel Conductivity Profilling

The permeate quality of each RO housing was tested on site. The combined vessel conductivity results in µS/cm are shown below.

Train F Profiling

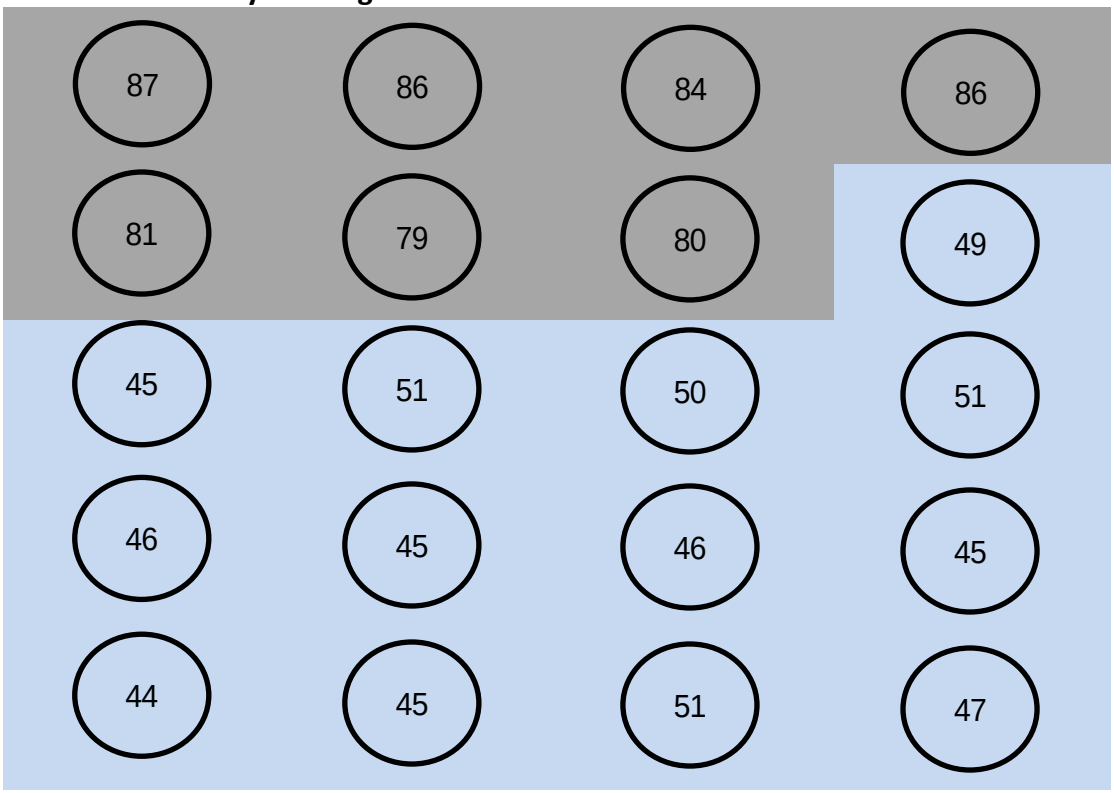


Blue vessels are Stage 1 and grey vessels are Stage 2. Vessel profile shows relatively consistent permeate conductivity across the housings with no individual vessel displaying evidence of o-ring failure or membrane or other failure.

It is possible that an improved performance from Stage 1 after the clean would account for higher flux in Stage 2, but this would not account for the reduced salt rejection.

Train A was also operating at the time of the visit and profiling was performed on this train.

Train A Conductivity Profiling



RO Train A Profiling Results

End Cap Removal and Element Inspection

The end caps were removed from train F vessels to inspect for evidence of mechanical damage or solids accumulation. End caps were removed from a representative vessel in Stage 1 and a vessel in Stage 2. No evidence of element damage was observed. There was some accumulation of material on the feed end of stage 1 (see photo) but the accumulation was not excessive and was consistent with the low DP across the stage.

There was no evidence of accumulated material in the feed end of the stage 2 vessel.

RO Cleaning

The cleaning history for train F is shown in the table below.

Date	Stage 1	Stage 2
November 2017	New membranes	New Membranes
February 2018	Bio-clean	Bio-clean
April 2018	Bio-clean	-
May 2018	Acid Clean	Acid Clean
October 2018	Bio-clean	Bio-clean
January 2019	Bio-clean and acid clean	-
Total	4 Bio-clean, 2 Acid clean	2 Bioclean, 1 Acid Clean

The process for determining cleaning is currently for Murrin staff to receive a recommendation from Aqualyng staff, based on the plant data. The recommendations are approved/modified and cleans undertaken. There may be a considerable delay between the recommendation and the actual clean. It is likely that this delay is contributing to additional fouling of the RO membranes.

Stage 1 and 2 acid cleans are performed on average 1-2 times per year. Cleaning schedules prior to 2017 were approximately twice this frequency. Longer acid clean intervals combined with a delay between recommendations and undertaking of the clean, allows the formation of scale to accumulate and possibly damage the membrane surface.

An accumulation of Silica scale on the second stage (and first stage) can cause damage to the membrane surface causing an increase in permeate conductivity and membrane permeability.

RO Antiscalant

At the time of the site visit, RO train F was running and its results were compared with Train A. A draw down test was performed on Train F antiscalant dosing pump and it calculated to an antiscalant concentration of 4.6 ppm of product in feed. Train A had a higher dose rate of 6.1 ppm. As Aqualyng is not familiar with the nature of the antiscalant used, we cannot comment if this difference in dose rate is significant.

Permeate Line Vacuum

It was noted during the visit that the permeate tubes on Train F were experiencing vacuum after shutdown. Comments from site mentioned that this was a problem with all RO trains on site. This effect is caused by osmotic pressure and indicates insufficient flushing of RO membranes during shutdown, and can lead to membrane damage and increased scale fouling.

Discussion of Results

There is no single likely cause of the issues in reduced performance of the Murrin RO plant. Below are the observations based on the results shown above.

- Physical damage to membrane elements due to physical damage (e.g. pipe hammer, leaking o-rings, cracked RO element casing) is unlikely due to consistent results across the RO vessels. Physical damage such as this would be evident in one (or a few) RO vessels suddenly producing poor quality water, but not all.
- Damage to RO elements due to chlorine or silt would produce the results observed but is unlikely due to absence of chlorine in the system and the lack of similar effect on the other RO trains. If chlorine was added to the system for an unauthorised purpose e.g. cleaning a reuseable cartridge filter on Train F only, this would produce similar results. There is no evidence to suggest this.
- Sudden permeability changes such as seen in Stage 2 RO on Train F, may be caused by flow meter instrument error. If this is the cause, it is likely that the Train F combined flow permeate flow meter would be at fault.
- Silica scaling of the Second Stage RO membranes and (to a lesser extent) First Stage RO membranes may produce the combined effect of low salt rejection and higher permeability due to damage caused by silica crystals formed on the membranes perforating the membrane surface.
- General scaling (e.g. hardness) of the second stage RO membranes and First Stage RO membranes may produce the effect of low salt rejection due to concentration polarisation. The effects of concentration polarisation are less evident with silica scale.
- Train F antiscalant dose rate was approximately 30% lower than Train A operating at the same time. Consistently low antiscalant dose rate for Train F may allow the gradual accumulation of silica and other scale, though Aqualyng cannot comment on the suitable dose rate for the antiscalant product.
- The osmotic pressure formed across the membranes after shutdown can cause damage to the RO membranes. This problem can be improved through introduction of an automated reject flush valve opened during plant shutdown and/or introducing permeate to the feed during plant shutdown.
- Operator error cannot be ruled out as a cause. Manually closing e.g. a reject flow control valve or failing to reopen after maintenance work could cause the effects demonstrated by Stage 2 of the plant.
- It is unlikely that the effects observed are due to the RO cleans performed during the previous week. Most noticeable effects are in the second stage which wasn't cleaned and became evident several days after the first stage clean.

Recommendations/Conclusions

Below are the recommendations for continuing the diagnosis and resolution of the RO membrane issues on the Murrin Train F RO.

1. Undertake comprehensive clean on Train F plant to remove foulants. It is recommended that both bio-cleans and acid cleans be performed on both stages. Whilst the plant DP does not suggest excessive bio-fouling, a bio-clean will remove any organic/bio-foulants which may impede the access of the acid to any scale present.
2. Review Train F RO antiscalant concentration required with the antiscalant supplier and adjust dosing pump to achieve desired dose rate.
3. Swap out Train F combined permeate flow meter with that from another plant to rule out error in the flow meter readings. If this meter is "reading high," this will artificially increase permeability reading for the second stage.
4. Review cleaning schedules so that they include both preventative as well as reactive cleans in response to plant performance and trend data. The current schedules mean that there is a significant delay between recommendations and the recommended clean occurring. Due to the exponential nature of foulant accumulation, the current timetable may cause irreversible membrane fouling.
5. To prevent permeate-side RO vacuum formation, improve plant shutdown flushing by introduction or increase the capacity of an automated reject flush valve. This valve would open during shutdown allowing lower conductivity feed water to flush the RO membranes. Flushing the RO plant with permeate during shutdown would achieve the same/better result.
6. Install ports at the end of all RO plants to allow insertion of 8mm tube for detailed profiling of individual RO elements in the RO vessels. A simple ½" BSP valve would allow easy installation of the necessary gland seal and fittings necessary for this test. This will help with future fault finding. Note existing threads on RO housing fittings are likely to be NPT not BSP. Aqualyng can source the necessary fittings if required.

Appendix D INSURANCES

Certificate of Currency

This Certificate confirms that the undermentioned Policy is effective on the date of issue and in accordance with the details shown:

Class of Insurance	Professional Indemnity Liability
Policy Number	MI-BN-SPC-07-123857-PI
Named Insured	Aqualyng Ices Pty Ltd
Policy Period	From: 08 April 2020 at 4:00pm local standard time To: 08 April 2021 at 4:00pm local standard time
Limit of Liability	$5,000,000
Excess	$200,000
Policy Wording	Liberty AUS OQS PI D&C Contractors Policy Wording (07-13)
Retroactive Date	Unlimited

Authorised by Liberty

LIBERTY MUTUAL INSURANCE COMPANY
A.B.N. 61 086 083 605

Date of Issue 07 April 2020

This Certificate:
- Is issued as a matter of information only and confers no rights upon the holder
- Does not amend, extend or alter the coverage afforded by the Policy listed
- Is only a summary of the cover provided
- Reference must be made to the current policy wording for full details
- Is current at the date of issue only

Suite 1, Level 17
10 Eagle Street
Brisbane QLD 4000

PO Box 7077
Riverside Centre
Brisbane QLD 4001

Telephone: +61 7 3235 8800
Web site: www.libertyspecialtymarkets.com.au

Certificate of Currency

This Certificate:

- Is issued as a matter of information only and confers no rights upon the holder.
- Does not amend, extend or alter the coverage afforded by the Policy(ies) listed.
- Is only a summary of the cover provided.
- Reference must be made to the current Policy wording for full details.
- Is current at the date of issue only.

This certificate confirms that the under mentioned Policy is effective in accordance with the details shown:

POLICY NUMBER	BN-CAS-19-410367-A
INSURED	Aqualyng ICES Pty Ltd
CLASS OF INSURANCE	Primary Liability
POLICY PERIOD	From: 4:00pm on 08/04/2020 local standard time To: 4:00pm on 08/04/2021 local standard time
LIMIT OF INDEMNITY	AUD25,000,000 any one Occurrence in respect of public liability and in the aggregate during the Period of Insurance in respect of Product liability.

LIBERTY MUTUAL INSURANCE COMPANY
A.B.N. 61 086 083 605

For and on behalf of
Liberty Specialty Markets

7 April 2020
Date

Liberty Specialty Markets is a trading name of Liberty Mutual Insurance Company Australia Branch (ABN 61 086 083 605) incorporated in Massachusetts, USA (the liability of members is limited)

Certificate of Currency

1. Statement of coverage

The Accident Insurance Policy covers the full amount of the employer's liability under the *Workers' Compensation and Rehabilitation Act 2003.*

Your workers' compensation insurance policy is due for renewal. Your policy will be current to 30 September 2021

This Certificate is valid from: 01 July 2020 to 30 September 2021

The information provided in this Certificate of Currency is correct as at: 01 July 2020

2. Employer's information

Policy number: WHA990316204

Employer name: Aqualyng Ices Pty Ltd

ABN: 99086243772

ACN / ARBN: 86243772

3. WorkCover industry classification

Scientific Testing & Analysis Services - 692504

For more information, please contact us on 1300 362 128 or visit our website at worksafe.qld.gov.au.

Appendix E QUALITY ACCREDITATION

CERTIFICATE OF APPROVAL

No. 005-98802-Q

This is to certify that the Quality Management System at

Aqualyng ICES

Of

U3/11 Palmer Place, Murarrie QLD 4172

Has been examined by assessors of QMS Certification Services
and found to be conforming to the requirements of:

ISO 9001:2015

Quality Management Systems

In respect of the following activities:

The provision of consulting, monitoring and analysis, servicing, labour, provision of laboratory supplies, chemical blending and supply for water systems and process chemistry. Design, development and rental of water treatment plants and equipment including the storage of equipment and chemical supplies required for the operation and servicing of water treatment plants.

This certificate is valid from 15/07/2020 to 15/07/2023
Original certification date: 06/06/2004
Issue Date: 15/07/2020

Gerry Bonner, CPEng, BEng, FIE Aust, Chairman – QMSCS Pty Ltd

To verify the validity of this certificate please visit www.jas-anz.org/register

Accreditation Number
S1410994MA

CERTIFICATE OF APPROVAL

No. 005-98802-Q

Schedule of Certified Locations

Aqualyng ICES

U3/11 Palmer Place, Murarrie QLD 4172

49 Bolam Street, Garbutt QLD 4814

23a Ruse Street, Osborne Park WA 6017

Accreditation Number S1410994MA

CERTIFICATE OF APPROVAL

No. 005-98802-OHS

This is to certify that the Quality Management System at

Aqualyng ICES

Of

U3/11 Palmer Place, Murarrie QLD 4172

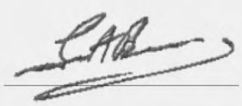
Has been examined by assessors of QMS Certification Services
and found to be conforming to the requirements of:

ISO 45001:2018
Occupational Health & Safety Management Systems

In respect of the following activities:

The provision of consulting, monitoring and analysis, servicing, labour, provision of laboratory supplies, chemical blending and supply for water systems and process chemistry. Design, development and rental of water treatment plants and equipment including the storage of equipment and chemical supplies required for the operation and servicing of water treatment plants.

This certificate is valid from 20/07/2020 to 20/07/2023
Original certification date: 20/07/2020
Issue Date: 20/07/2020



Gerry Bonner, CPEng, BEng, FIE Aust, Chairman – QMSCS Pty Ltd

To verify the validity of this certificate please visit www.jas-anz.org/register

Accreditation Number
S1410994MA

CERTIFICATE OF APPROVAL

No. 005-98802-OHS

Schedule of Certified Locations

Aqualyng ICES

U3/11 Palmer Place, Murarrie QLD 4172

49 Bolam Street, Garbutt QLD 4814

23a Ruse Street, Osborne Park WA 6017

Accreditation Number S1410994MA

Appendix F EXAMPLE MANUAL

Installation and Operation Manual – Blackall Hospital

5 m3/h CONTAINERISED WATER FILTRATION PLANT, CHILLER SUPPLY AND RING MAIN SUPPLY PUMPS

Revision: 1

23/09/2020

Table of Contents

1 System Overview

1.1 EQUIPMENT DESCRIPTION

Containerised water treatment system for Blackall Hospital including:

- Filtration system consisting of media and carbon filtration with UV disinfection.
- Chiller supply pump
- Constant pressure ring main supply pumps with 1um bag filtration
- Sodium hypochlorite dosing

2 Specifications

Construction: Shipping container lined with insulation panel

Frame: Strut mounted to container wall

Valves: SS316 valves water marked

Piping: SS316, IBEX Impress, watermarked
PVC Sch80 chemical dosing lines & sample lines

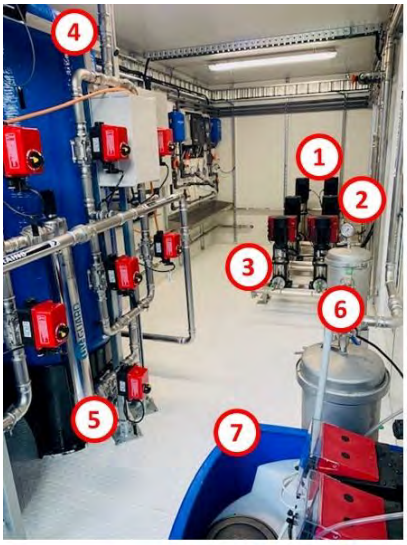
Seals: EPDM Orings & gaskets, PTFE seats on valves

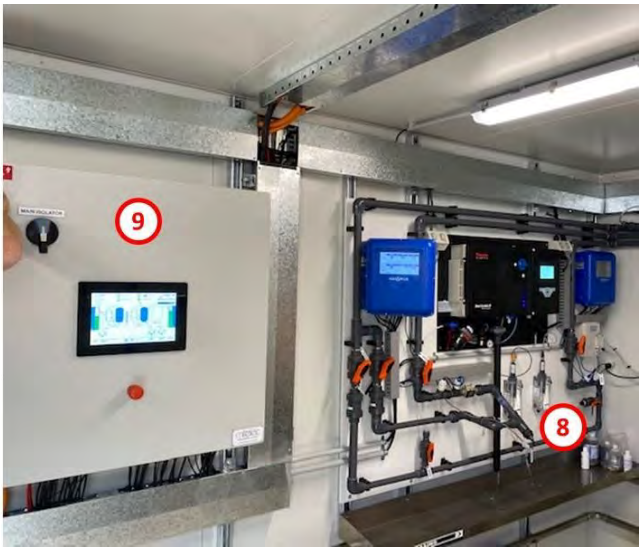
Electrical: 415 VAC, 50 Hz (3 P, N & E)
IP65 MS Cabinet
Allen Bradley Micro 870 PLC and Exor Ex710 HMI

2.1 MAJOR COMPONENTS

ITEMS	Number
FILTER SUPPLY PUMS, GRUNDFOS CRN5-11	96517211
CHILLER SUPPLY PUMPS, GRUNDFOS CRI15-2	96501718
RING MAIN SUPPLY PUMPS, GRUNDFOS CRIE 5-5	99427931
DOSING PUMPS, GRUNDFOS DDA 7.5-16 FCM	97722862
UV STERILISER, UV GUARD S125	
MEDIA FILTER, WAVECYBER PRESSURE VESSEL WITH DRYDEN AFM	
CARBON FILTER, WAVECYBER PRESSURE VESSEL WITH CARBON	

KEY COMPONENTS





1. FILTER FEED PUMPS
2. CHIILLER FEED PUMPS
3. RING MAIN FEED PUMPS
4. MEDIA FILTER (& CARBON FILTER)
5. UV STERILISER
6. BAG FILTERS
7. SODIUM HYPOCHLORITE DOSING PUMPS & STORAGE
8. WET CHEMISTRY SAMPLE SYSTEM
9. MAIN CONTROL PANEL
10. AIR CONDITIONER (NOT SHOWN IN PHOTOS)

3 Recommended Spare Parts

Description	Manufacturer	P/N
GRUNDFOS PUMP SHAFT SEAL, CRN , HQQE	Grundfos	96455087
GRUNDFOS DDA DOSING PUMP WET END	Grundfos	97751539
PRESSURE SENSOR	IFM	PM1704
LEVEL SENSOR	IFM	PS4208
FLOW SENSOR	IFM	SM9100
FILTER VALVE ACTUATORS	VALPES	ER60.90A.G00 (ER PLUS)
UV STERILISER	UV GUARD	QUART THIMBLE, 905X28 UV LAMP, 127W, 18MM DIAM, 4 PIN
BAG FILTER, 1um (BOX 50)	PEARL FILTRATION	
EXOR HMI WITH RUNTIME INSTALED	NAITE	
AB MICRO870 PLC WITH EXPANSION CARDS, WITH LOGIC INSTALLED	NAITE	

4 Operation

The filtration plant is controlled via a touch screen on the main control panel. The system can be run either manually (each pump/valve turned on individually) or automatically based on level in the raw & filtered water tanks. The HMI provides a plant over with pumps, valves and instrument status/values displayed.

4.1 RUNNING SYSTEM AUTOMATICALLY

The filtration system is designed to run periodically based on the filtered water tank level. When the tank level is low the filtered water plant starts operation and stops when a high level is achieved. The chiller and ring main supply pumps run continuously. The chiller pumps are DOL, while the ring main pumps supply water at a constant pressure.

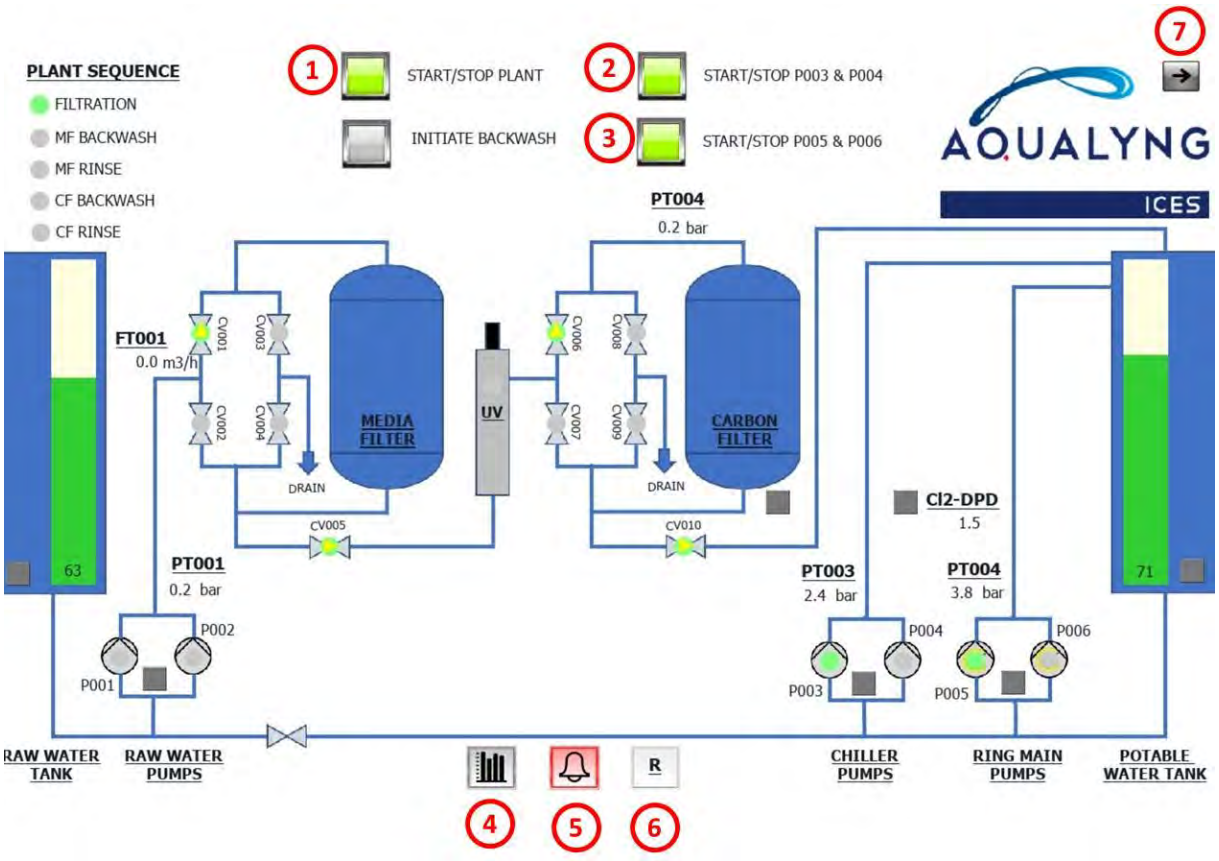
To Run Automatically:

1. Select 'START/STOP PLANT' button (illuminated green when selected), and
2. Select 'START/STOP P003/P004' to run chiller pumps, and
3. Select 'START/STOP P005/P006' to run ring main pumps, and

With these items selected:

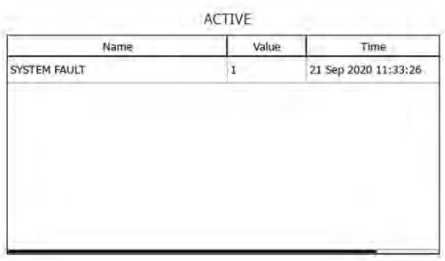
(a) Filtration plant will run automatically based on tank levels in filtrated water tank
(b) P003 or P004 will run continuously
(c) P005 & p006 will run continuously with speed controlled via a PI pressure feedback loop.

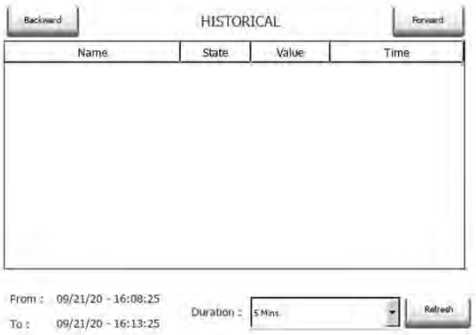
NOTE: Dosing of sodium hypochlorite is controlled via the Aquarius analyser.



4.2 FAULTS/ALARM

Key faults are displayed and recorded on the HMI. When system has a fault, the alarm button (5) on HMI screen is highlight red. Pressing the alarm button will navigate to the alarm page where active and historical faults are displayed.





Fault Description	REASON	ACTION
SYSTEM FAULT	SYSTEM FAULT LATCHES WHEN FAULT OCCURS. IT REMAINS LATCHED UNTIL RESET.	IF NO OTHER ACTIVE FAULTS PRESENT, HIT RESET BUTTON (6) ON MAIN PAGE. ALARM BUTTON WILL NO LONGER BE ILLUMINATED
T001 LOW TANK LEVEL	LOW WATER LEVEL IN RAW WATER TANK. THIS WILL STOP P001 & P002 FROM RUNNING.	FILL RAW WATER TANK TO ALLOW FOR FILTER SUPPLY PUMPS TO OPERATE. CHECK LEVEL TRASNMITTER
T002 LOW TANK LEVEL	LOW WATER LEVEL IN FILTERED WATER TANK. THIS WILL STOP CHILLER AND RING MAIN FEED PUMPS FROM RUNNING	FILL FILTERED WATER TANK. CHECK LEVEL TRANSMITTER
PT001 HIGH PRESSURE FAULT	HIGH PRESSURE TO MEDIA FILTER	CHECK VALVE POSITON/OPERATION BACK WASH FILTERS
PT002 HIGH PRESSURE FAULT	HIGH PRESSRE TO CABON FILTER	CHECK VALVE POSITION/OPERATION. BACKWASH FILTERS

PT003 LOW PRESSURE FAULT	LOW PRESSURE FEEDING CHILLER SYSTEM	CHECK P003 &/OR P004 TO ENUSURE THEY ARE WORKING CORRECTLY CLEAN AND INSPECT CHECK VALVE IMMEDIATELY AFTER P003 & P004
PT004 LOW PRESSURE FAULT	LOW PRESSURE FEEDING RING MAIN	CHECK P005 & P006 TO ENSURE THEY ARE WORKING CORRECTLY CHECK SETPOINTS FOR PRESSURE ENSURE NO SIGNIFICANT WATER LOSSES ARE OCCURING IN THE SYSTEM.
P001 TRIPPED P002 TRIPPED P003 TRIPPED P004 TRIPPED	RELEVANT PUMP OVERLOAD TRIPPED IN MAIN CONTROL PANEL	RESET TRIP
P005 FAULT P006 FAULT	RING MAIN PUMP/S VFD FAULTED	RESET PUMP VFD. REFER TO GRUNDFOS CRIE OPERATION MANUAL
UV FAULT	UV TRIPPED OR LAMP FAILURE	CHECK OPERATION OF UV. RESET CIRCUIT BREAKER IN MAIN CONTROL PANEL. REPLACE UV LAMP OR BALLAST (REFER TO UV GUARD OPERATION MANUAL)
FIT001 SENSOR FAULT LT001 SENSOR FAULT LT002 SENSOR FAULT PT001 SENSOR FAULT PT002 SENSOR FAULT P003 SENSOR FAULT P004 SENSOR FAULT	TRANSMITTER ANALOG SIGNAL OUTSIDE EXPECTED RANGE <3.6Ma	CHECK OPERATION OF SENSOR. REPAIR OR REPLACE.

5 Maintenance schedule

SCOPE OF WORKS	WEEKLY	MONTHLY	YEARLY
CHECK AND REPLACE BAG FILTERS		✓	
RECORD AND TREND NORMALISED PRESSURES & FLOWS		✓	
CHECK OPERATION OF SYSTEM AND REPLACE/REPAIR FAULTY ITMES		✓	
REPLACE SHAFT SEAL IN PRESSURE/TRASANFER PUMPS			✓
REPLACE WET END OF DOSING PUMPS			✓
REPLACE UV LAMP & QUARTX THIMBLE			✓

AQUALYNG ICES

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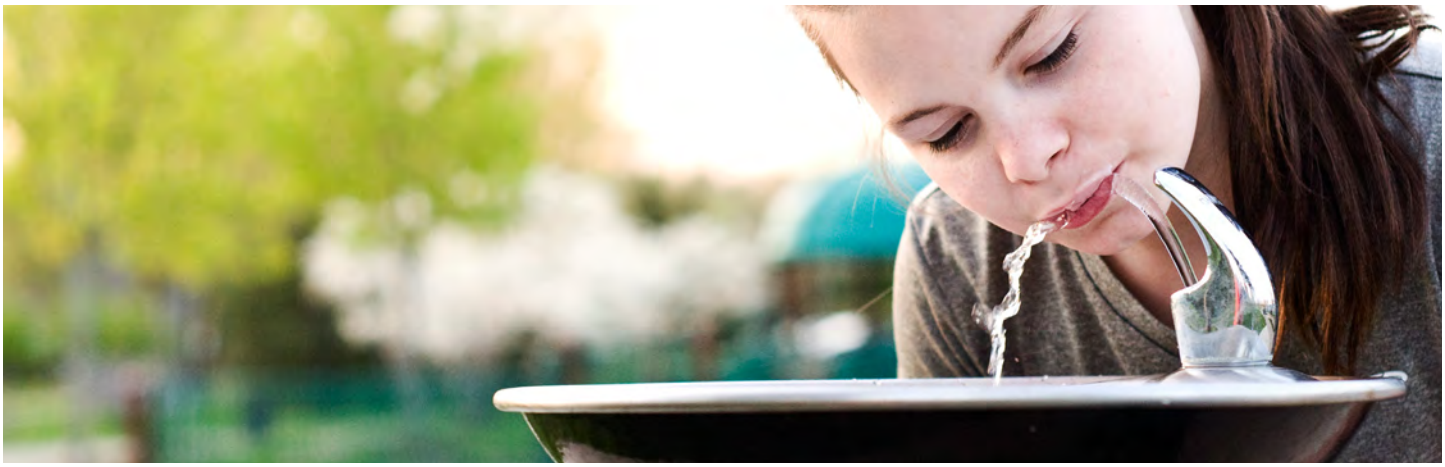
WWW.AQUALYNGICES.COM.AU

Appendix G DATA SHEETS

Constant Chlor® MC5 Feeder

The next generation feeder featuring patented erosion technology

The Constant Chlor® MC5 Feeder system provides reliable chlorine solutions for water treatment plants, waste water plants and water reclamation facilities. The **Constant Chlor**® system consistently delivers liquid available chlorine for disinfection applications that kills bacteria, controls algae and removes organic contaminants. The feeders use EPA registered **Constant Chlor**® Briquettes that work in conjunction with the feeder to produce a fresh concentrated liquid chlorine solution for clean, clear, sanitized water. Treats facilities with up to 10 MGD ranging from a minimum of 5 lbs a day available chlorine to 83 lbs a day available chlorine.

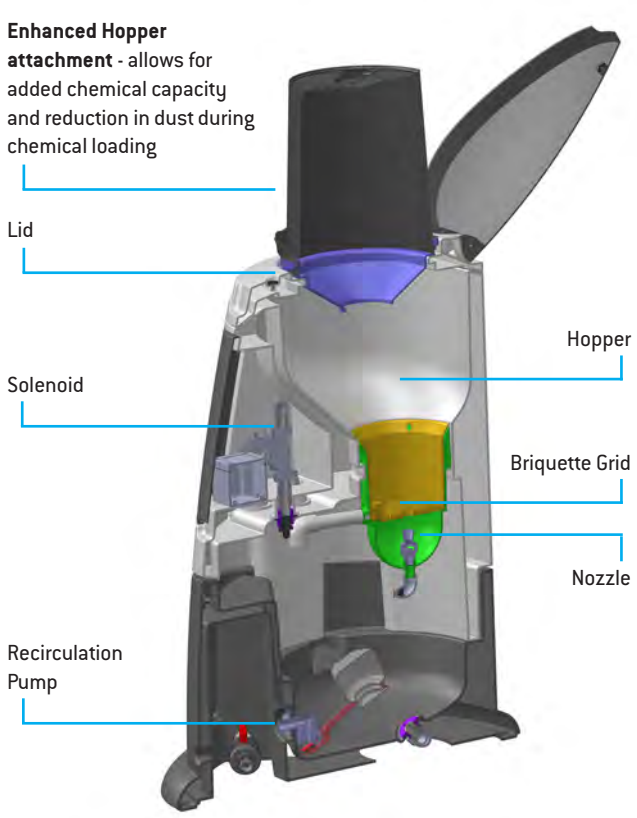


Constant Chlor Features:

- High Strength 65% minumum AvCl
- Reduced shipping and handling costs compared to liquid bleach
- NSF/ANSI 61 Certified for drinking water
- Minimal operator dosage adjustment
- Meets AWWA Standard B300
- Dry, easy to handle product form
- Scale inhibitor for reliable performance
- Feeder designed to minimize maintenance requirements

Feeder Specifications

Pressure Range	35 - 45 PSI	2.42 - 3.11 bar
Dry Chemical Capacity	70 - 120 lbs	31.8 - 54.4 kg
Tank Soultion Volume	10.3 gal	38.6 l
Available Working Solution	4.8 gal	18.2 l
Water Inlet Size	5/8“	15.9 mm
Solution Outlet Size	5/8 “	15.9 mm
Operating Weight	210 lbs	95.25 kg
Shipping Weight	60 lbs	27.2 kg
Solution Mixing	6 gpm a 7 psi	22.7 lpm at 0.48 bar
Feeder Dimensions	25.3“ W x 19.8“ D x 40.9“ H	642.6mm W x 1010.9mm D x 1038.9mm H
Site Requirements:		
Inlet Water		
Electrical	120V / 1ph / 60Hz (15 amp)	120V / 1ph / 60Hz (15 amp)
Operating Temperature	40°F -95°F	4.4°C - 35°C



Chemical Specifications

Active Ingredients	Calcium Hypochlorite	Calcium Hypochlorite
Available Chlorine	68%	68%
Scale Inhibitor	0.4 - 1.0%	0.4 - 1.0%
Weight	7-10 g	7-10 g
Dimensions	1 1/4“ x 3/4“ x 1/2“	33 mm x 19 mm x 13 mm
Chemical Form	Briquette	Briquette
Color:	white	white
Container:	50 lb pail	22.6 kg

Constant Chlor is dedicated to providing innovative water solutions to our customers. We build customer relationships by offering professional, reliable services and customer support, backed by a culture of excellence in research and development.

Constant Chlor® products are available globally.

To learn more about your region call **+1-800-478-5727** or visit **www.constantchlor.com**

DEPOLOX® 400 M ANALYZER FOR POTABLE WATER

WALLACE & TIERNAN® ANALYZERS/CONTROLLERS

The DEPOLOX® 400 M system is an on-line analyzer designed to measure the disinfectant concentration in drinking and other clean water applications.

The new state of the art electronics incorporates a color touch screen the size of today's popular smart phones making the user interface truly intuitive. Communication with the instrument includes a standard Ethernet port which allows access to built-in web visualization of all pertinent information when connected to a local area network. An RS 485 port and four mA outputs are also standard for communication to other plant monitoring and control systems.

All popular disinfectants utilized today can be measured including: free chlorine, total chlorine, chlorine dioxide, ozone and potassium permanganate. Choose from two types of amperometric disinfectant measurements for use with the new electronics: unless water quality dictates otherwise, the well proven, lowest life cycle cost and extremely fast reacting DEPOLOX 5 C bare electrode measurement is the obvious choice; otherwise choose from a number of membrane based amperometric sensors fitted into our precisely flow controlled VariaSens™ C flow cell. A temperature measurement is standard and there is a choice of adding either an additional pH measurement or a fluoride measurement.

The electronics includes smart operation features such as user configured calibration and service reminders. Instructions are provided on how to set up the analyzer to be compliant with calibration check intervals required by regulatory agencies. The new flow cell LED light indication changing color along with user defined alarm text can easily alert personnel to perform a required calibration check.

Benefits

- Intuitive operation as well as easy visualization of all measured parameters via a 4" color touch panel
- LED lit flow cell that can be programmed to change color in case of an alarm or fault condition
- Data logging of measurement values with easy transfer to remote devices
- Smart operation features: user configured intervals for calibration checks and also for the instrument's service intervals
- State of the art communication possibilities via an Ethernet interface (Modbus® TCP) as well as a RS 485 port
- Very fast reaction to a change in disinfectant concentration with the popular DEPOLOX bare electrode measurement

ELECTRONIC MODULE

Touch panel:

4 inch capacitive color touchscreen with backlight

Measurement inputs:

Rugged 3-electrode sensor DEPOLOX® 5 C for free chlorine, ClO_2, O_3, $KMnO_4$ or 1 x VariaSens™ flow cell with a choice of membrane sensors: FC2 - free chlorine, TC3 - total chlorine, OZ7 - ozone, CD7 - chlorine dioxide and sensors 1 x pH or 1 x fluoride & 1 x temperature

Digital inputs:

5 x freely definable

Output contacts:

Max. six freely definable fused alarm contacts/general fault messages
Relay status is depicted on the display;
max. 3.15 A /250 V AC; 0.2 A/220 V DC

Analog outputs:

4 x 0/4 – 20 mA, freely configurable
Load ≤ 1000 Ohm, accuracy < 0.5 % FS
Galv. isolated up to 50 V relative to earth

Interfaces:

Ethernet interface (HTTP protocol/Modbus® TCP protocol); RS 485 to connect to the Wallace & Tiernan® Process Monitoring System (option)

Power supply:

100 – 240 V AC ± 10 %, 50/60 Hz, 48 VA
24 V DC ± 20 % 30 W

Ambient temperature: 0 – 50 °C (32 – 122 °F)

Protection: IP 66

Tests and marks: Conform to CE, CSA

Weight (incl. packaging): 4.5 kg (9.9 lbs)

Dimensions (W x H x D):
320 x 311 x 153 mm (12.6 x 12.2 x 6.0 “)

DEPOLOX 5 C FLOW CELL MODULE

The DEPOLOX 5 C flow cell houses the amperometric bare electrode. Stable measuring signals are achieved with hydrodynamic grit cleaning together with optimized flow around all sensors.

VARIASENS C FLOW CELL MODULE

The VariaSens™ C flow cell houses one disinfectant based amperometric membrane sensor.

Both flow cells include a temperature measurement and can include either an optional pH or a fluoride measurement. The flow cells are available as discharge to a gravity drain or to a pressurized line. The following components are integral to both of the above mentioned flow cells.

Flow control valve:

- Controlled sample water flow: 33 l/h (0.15 US gpm)
- Control range: 0.25 – 3.0 bar (3 – 60 psi at valve inlet)
- Back-pressure: max. 1.5 bar (21.7 psi) for press. model
- Sample water temperature: max. 50 °C (122 °F)

Multi-sensor:

- Monitoring of correct sample water flow
  Switching point: 21 l/h +/- 3; Switching hysteresis: 2 l/h
- Measurement of sample water temperature with sensor Pt 1000 for the temperature compensation of the chlorine and possibly the pH measurement
- Sample water earthing with stainless steel sleeve

Sample water connections:

PVC hose 6 x 3 mm or PE hose 6 x 1 mm hose connector adaptors to 1/2 “ threaded hose connection

Weight (incl. packaging): approx. 2.5 kg (5.5 lbs)

Dimensions (W x H x D):
253 × 375 × 163 mm (9.9 x 14.7 x 6.4 “)

MEASURING RANGES

DEPOLOX 5 sensor: free chlorine, ClO_2, O_3, $KMnO_4$:
0 to 20 mg/l ; min 200 µS/cm
pH: pH 0 to 12 (short time to 14)
pH compensation (free chlorine measurement with DEPOLOX 5 sensor): within the pH range of 5.0 - to 8.0
Fluoride: 0 to 20 mg/l
FC2 membrane sensor; Free chlorine: 0 to 10 mg/l
TC3 membrane sensor; total chlorine: 0.05 to 10 mg/l
CD7 membrane sensor; chlorine dioxide: 0 to 10 mg/l
OZ7 membrane sensor; ozone: 0 to 10 mg/l

evoqua WATER TECHNOLOGIES

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Wallace & Tiernan® Products worldwide

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LENNTECH
WATER TREATMENT SOLUTIONS

DULCO®flex

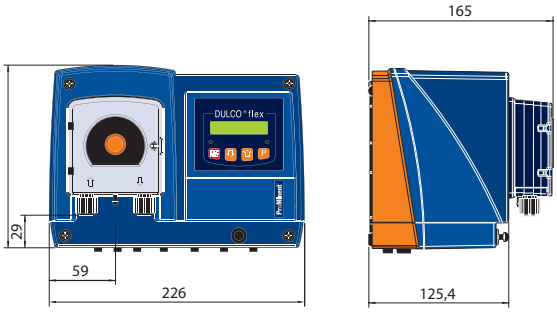
Peristaltic pumps

The best solutions are simple. The optimum pump for typical use in swimming pools, Jacuzzis and spa and wellness facilities.

DF2a for private swimming pools
DF4a for private and public swimming pools, and for general chemical metering.

- Capacity range 0.4–12 l/h, 4–1.5 bar
- Virtually silent operation
- Simple and safe to operate
- Efficient operation through "eco mode" possible
- Service-friendly design
- Spring-mounted rollers for uniform roller pressure and increased service life of the hose

DULCO®flex DF4a



Pump type	Pump capacity bar	l/h	Speed rpm	Suction lift mWS	Priming lift mWS	Connector size a Ø x i Ø mm
DULCO®flex DF2a						
0204	1.5	0.4	5	4	3	6x4/10x4
0208	1.5	0.8	10	4	3	6x4/10x4
0216	1.5	1.6	20	4	3	6x4/10x4
0224	1.5	2.4	30	4	3	6x4/10x4
DULCO®flex DF4a						
04004	4.0	0.4	0–85	4	3	6x4/10x4
04015	4.0	1.5	0–85	4	3	6x4/10x4
03060	2.5	6.0	0–85	4	3	6x4/10x4
02120	2.0	12.0	0–85	4	3	6x4/10x4

LENNTECH
WATER TREATMENT SOLUTIONS
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www.lenntech.com Fax. +31-152-616-289

AQUALYNG ICES

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Dowdens Pumping & Water Treatment

Return Package

Quilpie Shire Council

Eromanga Water Treatment Plant - Upgrades

Contract No. 200274:

Document Control

Date	Description	Author
04/02/2021	Released for Tender	Stuart Bourne

GBA Project/Doc ID no. **200274 / 373253**

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, please contact George Bourne and Associates.

Phone 07 4651 5177
Email admin@gbaengineers.com.au

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PART 6 – RESPONSE SCHEDULES

RESPONSE SCHEDULES

The Tenderer should include in its Tender all information which the Tenderer wishes the Principal to take into account in assessing its Tender. The Principal may, but has no obligation to, consider any information not included in the Tender, notwithstanding that such other information may be within the Principal's knowledge, or may have been previously submitted to the Principal by the Tenderer (including, if relevant, information submitted by the Tenderer in any preceding steps in the Procurement Process).

TENDER SCHEDULE

(a) Contact Details for the purposes of tender assessment as below:

Name of Contact:	Bradley Thomas
Telephone No. (BH):	(07) 3828 7000
Telephone No. (AH):	
Mobile No:	0418 444 925
Facsimile No:	(07) 3828 7055
Email:	bradley.thomas@dowdens.com.au

(b) ABN or ACN: 87 154 375 685 / 154 375 685

(c) Provide a statement of facts in detail as to the Tenderer's previous experience and achievements in performing similar or comparable work and its resources and ability to carry out the works.

- 2017: Dowdens upgraded the wastewater treatment plant (WWTP) at Coppabella, for Aurizon. The upgrade included the installation of new filration / polishing processes and decommissioning of obsolete processes without interupting the operation the overall WWTP process.
- 2017: Dowdens upgraded the chemical dosing systems at the WTP in Clermont, for Isaac Regional Council.
- 2018: Dowdens upgraded the WTP at the Saraji Mine, for BMA. The upgrade included the replacement of an old, underperforming clarifier with an improved equivalent clarifier with minimal disruption to potable water supply to the mine.
- 2019: Dowdens upgraded the PLC for the Boby WTP in Moranbah, for Isaac Regional Council
- 2019: Dowdens designed and constructed a new WTP for the township of Nebo, for the Isaac Regional Council. The WTP is capable of producing 2 ML/d of potable water.

Dowdens has infield project resources located in both Brisbane and Mackay to service the above referenced projects as well as many others that Dowdens has completed in the last 4 years. Our Project resources include; Project Managers, Engineers, Draftspersons, Project Co-oridinators, Electricians, Plumbers, Fitters and T/A's with a wealth of experience working in the Municipal, Mining and Industrial industries throughout Queensland.

(d) Provide a construction programme showing the dates by which or the times within which the various stages or parts of the works are to be completed or executed. The program should be in a Gantt Chart type format and preferably electronically generated.

Please refer to the attached Gantt Chart

(e) Provide an estimated monthly cash flow schedule.

Deposit: 30% to accompany official purchase order
Milestone 1: 30% upon completion of all off-site works and site mobilisation has been scheduled
Milestone 2: 30% upon completion of on-site works
Milestone 3: 10% upon completion of commissioning

(f) Provide details of proposed subcontractors.

Welcon - PLC / HMI code amendments

(g) Provide details of proposed suppliers.

Polymaster - Poly tank
Prominent - Dosing pumps, chemical tank level switches
Vitachem - RO Membranes
IMCD - Antiscalant
Welcon - Control components
Towner Raindrop - uPVC pipe and fittings
Haymans - Electrical components
REX - Flights to / from site
Eromanga Hotel / Motel - Accommodation for Dowdens personnel

(h) Provide details of key personnel.

Project Manager: Paul Timms
Project / Process Engineer: Brad Thomas
Electrician: Mitchell Tomley
Plumber: Blake Brown

(i) Provide dot point details of the proposed work methods to be adopted for the major items of work. Details should include type & number of construction plant &/or equipment to be used.

- Conduct project kick-off meeting on-site with Dowdens and QSC personnel to finalise scope of works and introduce Dowdens project personnel.
- Attempt to recover PLC / HMI codes from existing control panel (if QSC are unable to provide beforehand), take a material take-off approved scope of works.
- Off-site, procure materials required, amend PLC / HMI code, prepare documents, schedule freight and personnel mobilisation.
- Package and ship required materials and tools to site.
- Mobilise to site, Dowdens' infield personnel will DIDO to Eromanga from Brisbane, Dowdens' commissioning engineer will FIFO to Quilpie from Brisbane and Dowdens' Sub-contractor Welcon will FIFO to Quilpie from Brisbane.
- Setup / configure the WTP to run during the night so that upgrade works can be progressed during each day without impacting potable water supply to town. On occasion, the potable reticulation pumps may need to be powered down temporarily to allow our electrician to electrically terminate and new equipment and instrumentation to be installed, as part of the approved upgrade scope of works, in the main control panel.
- Infield plumber will, during the plant shutdowns, complete all mechanical component upgrades as per the approved upgrade scope of works.
- Dowdens' programmer sub-contractor will download and test the amended PLC / HMI code as part of the plant recommissioning process as per the approved upgrade scope of works.

- Dowdens will investigate high permeate conductivity issue and replace components as required.
- Dowdens will recommission the amended processes with a detailed commissioning document detailing tasks completed and performance achieved.
- Conduct detailed operator training on how to operate the WTP and adjust the operating parameters, for when the raw water quality fluctuates, to ensure the target treated water quality is maintained.
- Handover plant to QSC
- Tidy site and demobilise

(j) Provide a list of alternative materials and/or equipment and their details, if alternatives are nominated.

Please refer to the attached technical proposal with broken down scope of works details and proposed optional variations.

(k) Area of Site required for the works, in particular if larger than what is provided for in the Contract.

Area required will depend on options / variations approved by Council.
Nominally an approx. 1m2 area will be required, currently occupied by a chemical storage bund, would be required to house a new CIP tank immediately outside the WTP building.
Any other temporary works, such as laydown and cutting station, will be setup in the available free space on-site and will not impact the access to and operation of the WTP.

(l) Status of Quality Assurance System/Accreditation.

We do not hold formal Accreditation.

(m) Public liability cover Policy No.

XL INSURANCE COMPANY LIMITED VERTEX ABN:36 083 570 441
Policy # AU00004306LI20A
Expiration: 24/09/2021
Amount COvered: $20,000,000.00

(n) Workcover status.

WORK COVER QUEENSLAND
Policy # WAD120899183
Expiration Date: 30/09/2021

(o) Provide a list of assumptions made in the tender.

Please refer to the attached technical proposal.

(p) Provide a list of any qualifications of the tender offer.

- Fees associated with holding Bank Guarantees (2* 2.5% of Contract Value) have been accounted for in our offer.
- Liability Clause 14.2 - Cross Liability clause will not be required as the insurances will not be in the joint names (as per AS4905:2002).
- Dowdens propose to reduce Liquidated Damages to $0 per day with the final milestone payment of 10% claimable only after successful recommissioning of the upgraded WTP processes and conclusion

of the recommended additional Operator Training. Dowdens has a reputation from not walking away from our Clients and always meet our contractual obligations.
- Recommended additional scope of works detailed in the attached technical proposal.

(q) Other information the tenderer may consider relevant to the tender.

Please refer to the attached technical proposal.

TENDER FORM

Name of person, firm or company tendering USE BLOCK LETTERS	DOWDENS GROUP PTY LTD BRADLEY THOMAS .....
Address	UNITS 23 & 24 WECKER ROAD, MANSFIELD QLD 4122 .....
	Hereby tender(s) to perform the work for:
Description of works	**Eromanga Water Treatment Plant - Upgrades**
	In accordance with the following Documents:
	"The Tender Document – **Eromanga Water Treatment Plant – Upgrades"**
	For the Lump Sum of
	Total being (excluding GST):
	$ 150,900.00.....
	Dated this 19.....day of March.....2021

.....

Signature of Tenderer

SCHEDULE OF WORK

This is a Lump Sum Contract.

The Superintendent shall be notified immediately of any discrepancies in quantities or omissions discovered in the Schedule of Work.

The Schedule of Work is to be used as the basis for the assessment of Progress Claims during the Contract. Clause 2.1(a) of the Minor works contract conditions applies to this Lump Sum Contract.

Notes: All rates are to be exclusive of GST.

SCHEDULE OF WORK

ITEM	DESCRIPTION OF WORK	UNIT	QTY	RATE	AMOUNT
1	Establishment/ Insurances	Each	1	$ 27,150	$ 27,150
2	Prepare an Operation Manual (Category 1 items 1 to 9)	Each	1	$ 59,900	$ 59,900
3	Design, Install and Commission System Improvements (Category 2 items 10 to 17)				
3.1	Item 10 (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	Each	1	$ 7,800	$ 7,800
3.2	Item 11 Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.	Each	1	$ 2,490	$ 2,490
3.3	Item12 Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	Each	1	$ 1,980	$ 1,980
3.4	Item 13 Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	Each	1	$ 2,210	$ 2,210
3.5	Item 14 Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated.	Each	1	$ 1,450	$ 1,450
3.6	Item 15 Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	Each	1	$ 9,960	$ 9,960
3.7	Item 16 Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	Each	1	$ 15,960	$ 15,960

ITEM	DESCRIPTION OF WORK	UNIT	QTY	RATE	AMOUNT
3.8	Item 17 Develop a system for the storage of sodium hypochlorite that results in shorter holding times.	Each	1	$ 250	$ 250
4	Investigate cause of elevated RO membrane EC and provide recommendation (Category 3)	Each	1	$ 3,750	$ 3,750
5	Undertake a site inspection and system assessment 11 months after the date for practical completion	Each	1	$ 2,800	$ 2,800
6	General Cleanup / Disestablishment	Each	1	$ 15,200	$ 15,200
				Subtotal	**$ 150,900**
				GST (10%)	**$ 15,090**
				TOTAL	**$ 165,990**

Tenderer: Dowdens Pumping & Water Treatment

Contact: Bradley Thomas

Address: U24/140 Wecker Road, Mansfield, Qld 4122

Telephone: 0418 444 925 Fax: 07 3828 7055

Signature: Date: 19/03/2021

Email: brad.thomas@dowdens.com.au

DAYWORKS RATES

These rates are to be held firm for the duration of the Contract. Plant Hire Rates are to include the operator.

LABOUR DESCRIPTION	RATE		
	NORMAL	TIME & HALF	DOUBLE TIME
Project Manager	$ 120.00	$ 150.00	n/a
Project / Process Engineer	$ 150.00	$ 200.00	n/a
Electrician	$ 120.00	$ 180.00	$ 240.00
Plumber	$ 100.00	$ 150.00	$ 200.00
Programmer	$ 210.00	$ 300.00	n/a

PLANT DESCRIPTION	RATE
n/a	

Tenderer: Dowdens Pumping & Water Treatment

Contact: Bradley Thomas

Address: U24/140 Wecker Road, Mansfield, Qld 4122

Telephone: 0418 444 925 Fax: 07 3282 7055

Signature:  Date: 19/03/2021

Email: brad.thomas@dowdens.com.au

ID	Task Name	Duration	Start	Finish
1	**EROMANGA WTP UPGRADES**	**94.6 days**	**Tue 27/04/21**	**Wed 14/07/21**
2	**AWARD**	0 days	**Tue 27/04/21**	**Tue 27/04/21**
3	**PRELIMINARIES**	**2 days**	**Mon 10/05/21**	**Tue 11/05/21**
4	Project Kick-off / Site Meeting	2 days	Mon 10/05/21	Tue 11/05/21
5	**ENGINEERING**	**33.2 days**	**Wed 12/05/21**	**Tue 8/06/21**
6	**Design**	**3 days**	**Wed 12/05/21**	**Fri 14/05/21**
7	Equipment Specification	3 days	Wed 12/05/21	Fri 14/05/21
8	**Drafting**	**2 days**	**Mon 17/05/21**	**Tue 18/05/21**
9	Update PFD / P&ID	2 days	Mon 17/05/21	Tue 18/05/21
10	**Programming PLC / HMI**	**26 days**	**Tue 18/05/21**	**Tue 8/06/21**
11	Update PLC / HMI Code	26 days	Tue 18/05/21	Tue 8/06/21
12	**PROCUREMENT**	**27 days**	**Thu 27/05/21**	**Fri 18/06/21**
13	All components	27 days	Thu 27/05/21	Fri 18/06/21
14	**DELIVERY TO SITE**	**5 days**	**Mon 21/06/21**	**Fri 25/06/21**
15	All components	5 days	Mon 21/06/21	Fri 25/06/21
16	**SITE MOBILISATION**	**1.7 days**	**Mon 5/07/21**	**Tue 6/07/21**
17	Travel to Site	1.5 days	Mon 5/07/21	Tue 6/07/21
18	Site Familiarisation / Setup	0.5 days	Tue 6/07/21	Tue 6/07/21
19	**INSTALLATION**	**4.4 days**	**Wed 7/07/21**	**Sat 10/07/21**
20	Mechanical Upgrade Works	3 days	Wed 7/07/21	Fri 9/07/21
21	Electrical Upgrade Works	3 days	Wed 7/07/21	Fri 9/07/21
22	PLC / HMI Code Download	1.5 days	Thu 8/07/21	Fri 9/07/21
23	Investigate RO Performance	2 days	Fri 9/07/21	Sat 10/07/21
24	**COMMISSIONING**	**3.9 days**	**Sat 10/07/21**	**Tue 13/07/21**
25	Mechanical Checks	1 day	Sat 10/07/21	Sat 10/07/21
26	Electrical Checks	1 day	Sat 10/07/21	Sat 10/07/21
27	Program Checks	1 day	Sat 10/07/21	Sat 10/07/21
28	Process Checks	1 day	Sun 11/07/21	Sun 11/07/21
29	Operator Training	1.5 days	Mon 12/07/21	Tue 13/07/21
30	**SITE DEMOBILISATION**	**2.2 days**	**Tue 13/07/21**	**Wed 14/07/21**
31	Tidy Site	0.5 days	Tue 13/07/21	Tue 13/07/21
32	Travel to Brisbane	1 day	Wed 14/07/21	Wed 14/07/21
33	**HANDOVER**	0 days	Tue 13/07/21	Tue 13/07/21

Project: Project Delivery Schedu
Date: Fri 19/03/21

Task | Split | Milestone | Summary
Project Summary | Inactive Task | Inactive Milestone | Inactive Summary
Manual Task | Duration-only | Manual Summary Rollup | Manual Summary
Start-only | Finish-only | External Tasks | External Milestone
Deadline | Progress | Manual Progress

DOWDENS

PUMPING & WATER TREATMENT

PROPOSAL

EROMANGA WTP UPGRADES

Q284245

CONTENTS

19th March 2021
Quilpie Shire Council
c/o GBA Engeineers
73 Elm Street
Barcaldine
QLD 4725

Attention: William Green c/o George Bourne & Associates

SUBJECT: Eromanga WTP Upgrades

Dear William,

Dowdens Pumping and Water Treatment is pleased to submit our formal proposal for the Eromanga Water Treatment Plant Upgrades for the Quilpie Shire Council.

Dowdens has modified, upgraded and replaced portions of existing water and wastewater treatment plants for various Municipalities throughout Queensland, most notably the Clermont WTP for the Isaac Regional Council.

Please do not hesitate to contact us to discuss the details of this proposal.

Yours faithfully,

Brad Thomas
Process / Project Engineer - Brisbane
0418 444 925

OVERVIEW

Dowdens can offer complete turnkey packages including the design, manufacture, supply, installation, and commissioning of all equipment required for your infrastructure project.

Our teams experience over the years encompasses a whole spectrum of industries including mining, industrial, agricultural, rural, commercial, government, residential and tourist resorts.

Dowdens' has a skilled and experienced team consisting of infield technicians, engineers and project managers can deliver on projects from concept to design to installation and commissioning to handover, meeting or exceeding our clients' expectations.

SCOPE OF WORKS

Following a visit to the Eromanga WTP on Monday 22/02/2021, Dowdens had the privilege of being able to add context to the recommended improvements to the existing water treatment plant process described in the scope of works document as well as discuss potential additional options for consideration by Council for implementation as part of the overall contract.

For clarity, each of the requested and optional items are listed below including details of proposed scope of supply, materials and any specific assumptions applied.

If Council required any further clarification to this offer, Dowdens welcomes the opportunity to discuss the detail with both GBA Engineers and the Quilpie Shire Council to revise the final scope of works as appropriate to achieve the best value-for-money for Council and ultimately the rate-payers within the Quilpie Shire Council area.

1.0 CATEGORY 1 – OPERATIONS MANUAL

ITEM 1

Scope:

- Dowdens will prepare a detailed procedure to isolate the process, remove the top pipe spool and lateral from the media filter and the recommended practice on replacing media in the pressure filters.

Materials:

- Not applicable

Assumptions:

- Performance of Media Filters, as is, is suitable for the RO and will not be modified by Dowdens
- Replacement of media is not required as part of these works

ITEM 2

Scope:

- Dowdens will prepare a detailed document detailing the monthly preventative maintenance task of observing a filter backwash cycle and how / when to adjust the backwash cycle timing set-points on the HMI.

Materials:

- Not applicable

Assumptions:

- Not applicable

ITEM 3

Scope:

- Dowdens will generate a new page on the HMI to accommodate pre and post media filter pressure trends for ease of display and interpretation by the authorised operator.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.
- Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware.

ITEM 4

Scope:

- Dowdens will prepare a detailed procedure to isolate the process, remove and inspect the UV lamp as well as the recommended practice on replacing all components of the UV unit at the recommended preventative maintenance frequencies.

Materials:

- Not applicable

Assumptions:

- Performance of UV unit, as is, is suitable for the RO and will not be modified by Dowdens
- Replacement of UV lamp, thimble or other components is not required as part of these works

ITEM 5

Scope:

- Dowdens will update the process flow diagram (PFD) and piping and instrumentation diagram (P&ID) to represent the as constructed status of the water treatment process. This will include clear representation of the actual flow through the 2-stage RO pressure vessels.

Materials:

- Not applicable

Assumptions:

- Not applicable

ITEM 6

Scope:

- Dowdens will generate a new page on the HMI to accommodate pre and post RO membrane pressure trends for ease of display and interpretation by the authorised operator.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.
- Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware.

ITEM 7

Scope:

- Dowdens will generate a new page on the HMI to accommodate pre and post RO membrane EC trends for ease of display and interpretation by the authorised operator.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.
- Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware.

ITEM 8

Scope:

- Dowdens will prepare a comprehensive operating / troubleshooting guide to enable any of the Council's authorised personnel to attend site and interrogate and resolve all main process / alarm issues.

Materials:

- Not applicable

Assumptions:

- Document will be based on the Troubleshooting Guide Dowdens prepared for the Nebo WTP in 2019 with the addition of corrective actions for critical faults.
- In the event of major process failure, such as failed RO membranes or pump motor fault, Dowdens assumes the affected equipment or process unit will be isolated and / or by-passed until the issue is investigated by the appropriate personnel / contractor.

ITEM 9

Scope:

- Dowdens will prepare a detailed maintenance program for the entire water treatment process.
- Dowdens will complete 4off quarterly services on the upgraded water treatment process following completion of the contracted works.

Materials:

- Replacement parts, consumables and chemicals have not been included and will quoted / charge as appropriate.

Assumptions:

- Dowdens have made allowances for one of our technicians to travel to / from Eromanga once every 3 months to complete a service on the process and perform the recommended preventative maintenance tasks (i.e. CIP of RO membranes, calibrate instruments, etc.)

2.0 CATEGORY 2 – SYSTEM IMPROVEMENTS

ITEM 10 (PROVISIONAL)

Scope:

- Dowdens will supply install a new, larger, RO CIP tank outside of and immediately adjacent to the water treatment building on the opposite side of the wall to the current RO CIP tank location.
- The new tank will be plumbed into the existing pumps and the existing level pressure transducer will be reinstalled.

Materials:

- 1000L poly tank
- 1 set of valves, pipework

Assumptions:

- Council has no objections to the proposed location of the new tank.

ITEM 11

Scope:

- Dowdens will confirm that the operator-initiated filter backwash function does not currently exist and amend the PLC and HMI code accordingly to incorporate the function for use by the authorised WTP operator.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

ITEM 12

Scope:

- Dowdens will investigate and recommend to Council the maximum treated water EC limit (for plant shutdown) and amend the PLC and HMI code accordingly to incorporate the function for use by the authorised WTP operator.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

ITEM 13

Scope:

- Dowdens will amend the HMI and PLC code to incorporate a new user set-point for the EC limit for plant shutdown described in item 12.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

ITEM 14

Scope:

- Dowdens will investigate the liquid chlorine (sodium hypochlorite) tank low low alarm and confirm that upon activation, the plant will shutdown.

Materials:

- Not applicable

Assumptions:

- Dowdens has made an allowance to make minor amendments to the HMI and PLC code relating to the chlorine tank low low level alarm. If significant amendments are required to make this shutdown function operate as intended, the additional hours (estimated and quoted) will be by variation to the contract.
- Dowdens has made an allowance to supply and install a new chemical level switch suitable for the standard 20L chemical drums which Dowdens recommends Council use moving forward as per item 17.

ITEM 15

Scope:

- Dowdens proposed to install two new chemical dosing pumps capable of remote start / stop complete with alarm / fault relay outputs to achieve the requested duty / standby functionality.
- Dowdens will amend the PLC code to incorporate the additional pump functionality.

Materials:

- Prominent Dosing Pumps
- Cables (remote start, alarm relay)
- Chemical Tank Level Switch

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

ITEM 16

Scope:

- Dowdens will install a pH / Chlorine analyser in the recommended potable water storage tank recirc line (by others) to monitor the residual free chlorine prior to reticulation to the town.
- Dowdens will amend the HMI and PLC code to incorporate the additional analyser functionality of generating alarms for operator information and intervention.

Materials:

- Prominent pH / Residual free chlorine analyser / controller
- pH and residual free chlorine probes

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.
- Dowdens assumes the analyser will be installed on the recommended recirculation line of the new potable water tank to be installed on-site (by others).

ITEM 17

Scope:

- Dowdens propose to supply and install a suitable chemical bund to ensure any spills of chemical do not impact equipment or instrumentation located below.

Materials:

- Chemical drum bund suitable for 20L drums

Assumptions:

- Dowdens assumes item 10 will be adopted which generates additional space to safely install and access the proposed alternative chemical tank storage option.
- Council will accept the use of 20L chemical drums only which can be easily replaced as needed.

3.0 CATEGORY 3 – SYSTEM MAINTENANCE

ITEM 18

Scope:

- Dowdens propose to install 5off process sample points, SS valves with PP tubing, through the water treatment process to allow for independent assessment of the water treatment process using calibrated handheld instruments (by others).
- Dowdens will prepare a detailed RO projection for Council's records and reference by the WTP operator.
- Dowdens will assess the operation of the RO process unit against the prepared RO projection and investigate the potential issues with the selection and installation of the RO membranes and prepare a brief recommendation report for Council's consideration and records.

Materials:

- Chemicals to complete chemical clean of installed RO membranes

Assumptions:

- Dowdens assumes that Council will undertake at least two sets of complete water quality analyses from both bores as well as the raw water buffer tank at the water treatment plant for consideration in the investigation of the high EC issue.
- Dowdens has not included the cost of supplying replacement membranes and RO vessel components if they need to be replaced following the investigation. An indicative cost would be $ 18,900 ex GST.

4.0 CATEGORY 4 – DOWDENS RECOMMENDED OPTIONS

ITEM 19

Scope:

- Dowdens will investigate and correct the reticulation pumps duty rotation functionality.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that the control wiring to and from the reticulation pump-sets is correct and the issue is related to the programming of the VSD's only.

Cost:

$ 1,500 ex GST

ITEM 20

Scope:

- Dowdens will correct spelling and incorrect units of measure on the HMI.

Materials:

- Not applicable

Assumptions:

- Not applicable

Cost:

$ 850 ex GST

ITEM 21

Scope:

- Dowdens will correct existing trends on the HMI to add timescale on x-axis for ease of interpreting trended data.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.
- Dowdens assumes that the existing HMI has sufficient capacity to add more trends without having needing to supply and install any additional electrical hardware.

Cost:

$ 850 ex GST

ITEM 22

Scope:

- Dowdens will add flow totals to the HMI for ease of access to data for the WTP operator.

Materials:

- Not applicable

Assumptions:

- Not applicable

Cost:

$ 1,950 ex GST

ITEM 23

Scope:

- Dowdens will amend the functionality of the existing CIP tank transfer pumps to incorporate a recommended CIP function for the RO unit from the proposed larger CIP tank referenced in item 10.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

Cost:

$ 1,850 ex GST

ITEM 24

Scope:

- Dowdens will amend the functionality of the existing CIP tank transfer pumps to incorporate a recommended permeate flush function for the RO unit from the proposed larger CIP tank referenced in item 10.

Materials:

- Not applicable

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

Cost:

$ 2,500 ex GST

ITEM 25

Scope:

- Dowdens will supply and install a new Citect SCADA HMI to replace the existing unit in the event that it's capacity and capabilities are insufficient to accommodate the above proposed amendments.

Materials:

- Citect SCADA HMI

Assumptions:

- Dowdens assumes that either QSC will be able to provide native files, with notations, for both the HMI and PLC codes or that they are readily downloadable from the main control panel during the project kick-off meeting. If they are not available, the PLC code will need to be rewritten at Council's cost.

Cost:

$ 18,500 ex GST

OTHER

Dowdens have not made any allowances to rectify the current issues with remote access to the existing HMI.

However, whilst on-site, Dowdens will investigate and provide advice to Council for consideration and prepare an offer to supply install part of the solution if appropriate to do so.

5.0 DELIVERY

Subject to negotiation of scope of works and terms of contract, Dowdens expect to be able to complete the proposed scope of works (excluding inclusion of the options) within 100 days from receipt of a formal purchase order and signed contract.

6.0 VALIDITY

Prices quoted are firm based on the scope of works described above and are valid for sixty days from Friday 19th March 2021.

7.0 TERMS OF PAYMENT

The below is Dowdens' proposed project milestone payments;

- 30% deposit to accompany official purchase order
- 30% upon completion of all off-site works and site mobilisation has been scheduled
- 30% upon completion of on-site works
- 10% upon completion of commissioning

8.0 WARRANTY

A full twelve months' manufacturer's warranty is extended on all working parts from date of invoice.

Replacement parts will be supplied by the manufacturer at no cost, but the cost for freight, installation and recommissioning of equipment / parts will be the responsibility of Council.

9.0 TERMS AND CONDITIONS

- All Dowdens' Standard Terms and Conditions of Sale apply.
- Standards and Specifications which deviate from Dowdens' normal scope of supply will need to be re-quoted.
- All terms and conditions to be negotiated prior to signing contract agreement

10.0 CRITICAL SPARES

Dowdens recommends that critical spares are purchased and receipted on-site prior to commissioning.

Dowdens can provide a quote to Council to supply these spares upon request.

KW Electric Pty Ltd

Return Package

Quilpie Shire Council

Eromanga Water Treatment Plant - Upgrades

Contract No. 200274:

Document Control

Date	Description	Author
04/02/2021	Released for Tender	Stuart Bourne

GBA Project/Doc ID no. **200274 / 373253**

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, please contact George Bourne and Associates.

Phone 07 4651 5177
Email admin@gbaengineers.com.au

TABLE OF CONTENTS

PART 6 – RESPONSE SCHEDULES

RESPONSE SCHEDULES

The Tenderer should include in its Tender all information which the Tenderer wishes the Principal to take into account in assessing its Tender. The Principal may, but has no obligation to, consider any information not included in the Tender, notwithstanding that such other information may be within the Principal's knowledge, or may have been previously submitted to the Principal by the Tenderer (including, if relevant, information submitted by the Tenderer in any preceding steps in the Procurement Process).

TENDER SCHEDULE

(a) Contact Details for the purposes of tender assessment as below:

Name of Contact:	Ian Kennedy
Telephone No. (BH):	07 3287 2766
Telephone No. (AH):	
Mobile No:	0458 363 014
Facsimile No:	
Email:	kwe@kwelectric.com.au

(b) ABN or ACN: 83 624 617 938

(c) Provide a statement of facts in detail as to the Tenderer's previous experience and achievements in performing similar or comparable work and its resources and ability to carry out the works.

See attached resumes. We have on the team Nick Cumming who programmed and commissioned the Eromanga Water Treatment Plant when it was installed. Nick has had 10 years at Olympic Dam as a software and instrumentation engineer.
He now writes PLC code for water systems

(d) Provide a construction programme showing the dates by which or the times within which the various stages or parts of the works are to be completed or executed. The program should be in a Gantt Chart type format and preferably electronically generated.

See attached Gantt Chart

(e) Provide an estimated monthly cash flow schedule.

(f) Provide details of proposed subcontractors.

Richard Thew - Process Engineer
Michael Simms - Water Engineer
Nick Cumming - Software and Instrumentation Engineer

(g) Provide details of proposed suppliers.

Depolox D400M - Chlorine analyser

(h) Provide details of key personnel.

Ian Kennedy - Electrical Engineer & Project Manager
Richard Thew - Process Engineer
Michael Simms - Water Engineer
Nick Cumming - Software and Instrumentation Engineer

(i) Provide dot point details of the proposed work methods to be adopted for the major items of work. Details should include type & number of construction plant &/or equipment to be used.

See attached

(j) Provide a list of alternative materials and/or equipment and their details, if alternatives are nominated.

(k) Area of Site required for the works, in particular if larger than what is provided for in the Contract.

(l) Status of Quality Assurance System/Accreditation.

Third Party Accredited:
AS/NZS 4801: Safety
OHSAS 18001: Safety
ISO 14001: Environment
ISO 9001: Quality

(m) Public liability cover Policy No.

141AN00140COM

(n) Workcover status.

WPR180345363

(o) Provide a list of assumptions made in the tender.

See attached

(p) Provide a list of any qualifications of the tender offer.

See above

(q) Other information the tenderer may consider relevant to the tender.

TENDER FORM

Name of person, firm or company tendering USE BLOCK LETTERS	KW ELECTRIC PTY LTD.....
Address	UNIT 2/17 COMMERCE CIRCUIT, YATALA, QLD, 4207.....
	Hereby tender(s) to perform the work for:
Description of works	**Eromanga Water Treatment Plant - Upgrades**
	In accordance with the following Documents:
	"The Tender Document – **Eromanga Water Treatment Plant – Upgrades"**
	For the Lump Sum of
	Total being (excluding GST):
	$92,236.....
	Dated this nineteenth.....day of March.....2021
	..... Signature of Tenderer

SCHEDULE OF WORK

This is a Lump Sum Contract.

The Superintendent shall be notified immediately of any discrepancies in quantities or omissions discovered in the Schedule of Work.

The Schedule of Work is to be used as the basis for the assessment of Progress Claims during the Contract. Clause 2.1(a) of the Minor works contract conditions applies to this Lump Sum Contract.

Notes: All rates are to be exclusive of GST.

SCHEDULE OF WORK

ITEM	DESCRIPTION OF WORK	UNIT	QTY	RATE	AMOUNT
1	Establishment/ Insurances	Each	1		1500
2	Prepare an Operation Manual (Category 1 items 1 to 9)	Each	1		27,800
3	Design, Install and Commission System Improvements (Category 2 items 10 to 17)				
3.1	Item 10 (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	Each	1		13,800
3.2	Item 11 Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.	Each	1		5,850
3.3	Item12 Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	Each	1		5,850
3.4	Item 13 Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	Each	1		2,350
3.5	Item 14 Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated.	Each	1		2,500
3.6	Item 15 Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	Each	1		4,850
3.7	Item 16 Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	Each	1		14,200
3.8		Each	1		3,280

ITEM	DESCRIPTION OF WORK	UNIT	QTY	RATE	AMOUNT
	Item 17 Develop a system for the storage of sodium hypochlorite that results in shorter holding times.				
4	Investigate cause of elevated RO membrane EC and provide recommendation (Category 3)	Each	1		3,200
5	Undertake a site inspection and system assessment 11 months after the date for practical completion	Each	1		4,800
6	General Cleanup / Disestablishment	Each	1		2.256
				Subtotal	**$ 92,236**
				GST (10%)	**$ 9,223.60**
				TOTAL	**$ 101,459.60**

Tenderer: KW Electric Pty Ltd

Contact: Ian Kennedy

Address: Unit 2/17 Commerce Cct, Yatala QLD 4207

Telephone: 0458 363 014 Fax:

Signature: Ian Kennedy Date: 19/03/2021

Email: kwe@kwelectric.com.au

DAYWORKS RATES

These rates are to be held firm for the duration of the Contract. Plant Hire Rates are to include the operator.

LABOUR DESCRIPTION	RATE		
	NORMAL	TIME & HALF	DOUBLE TIME
Electrical Engineer	220		
Process Engineer	220		
Water Engineer	220		
Software Engineer	220		
Electrician	$95	115	135

PLANT DESCRIPTION	RATE

Tenderer: KW Electric Pty Ltd

Contact: Ian Kennedy

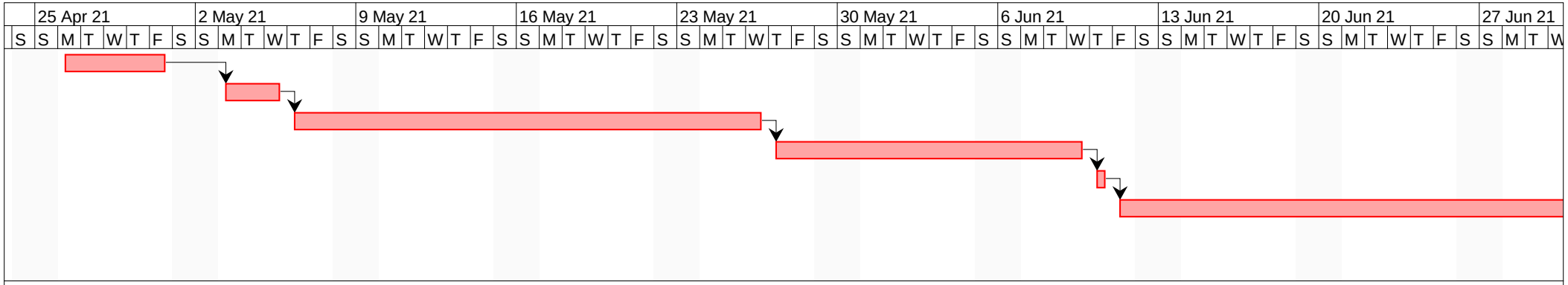
Address: Unit 2/17 Commerce cct Yatala, QLD 4207

Telephone: 0458 363 014 Fax:

Signature: Ian Kennedy Date: 19/03/2021

Email: kwe@kwelectric.com.au

		Name	Duration	Start	Finish	Predecessors	Resource Names	F
1		Prepare HSEQ Plan	5 days?	26/04/21 8:00 AM	30/04/21 5:00 PM			
2		Initial site visit, refer to methodology fo...	3 days	3/05/21 8:00 AM	5/05/21 5:00 PM	1		
3		Provide critique develop PLC code	15 days	6/05/21 8:00 AM	26/05/21 5:00 PM	2		
4		Second site visit, refer to methodology ...	10 days	27/05/21 8:00 AM	9/06/21 5:00 PM	3		
5		Review with QSC on site	1 day	10/06/21 8:00 AM	10/06/21 5:00 PM	4		
6		Submit Draft Operating instructions	15 days	11/06/21 8:00 AM	1/07/21 5:00 PM	5		
7		QSC review	10 days	2/07/21 8:00 AM	15/07/21 5:00 PM	6		
8		Submit Final Documentation	10 days	16/07/21 8:00 AM	29/07/21 5:00 PM	7		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9 May 21
16 May 21
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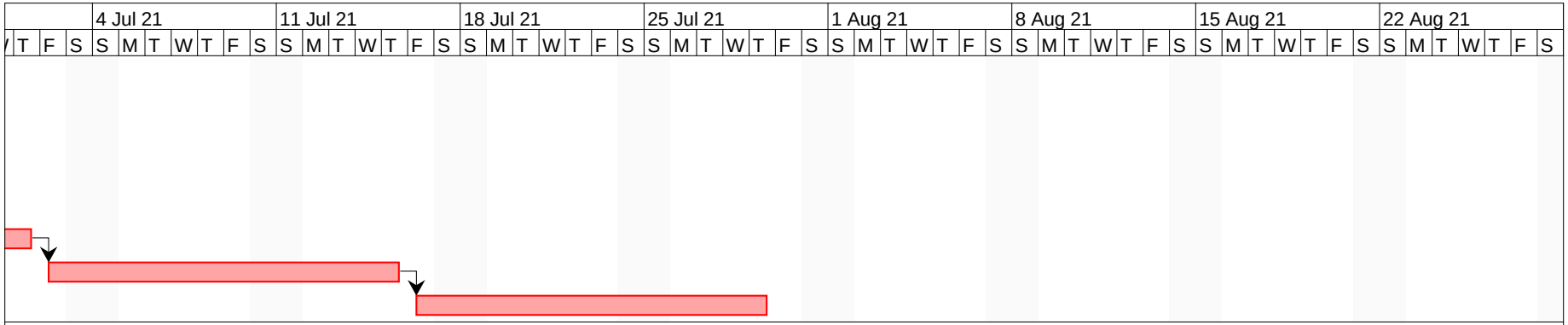
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WHET
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ABN 86 601 077 203

Richard Thew

Qualifications

BE (Hons), Chemical Engineering, University of Queensland, 1983.
BA, Industrial Design, Royal Melbourne Institute of Technology, 1990.
MIChemE, RPEQ, MEIANZ

Summary of Experience

Richard is a chemical engineer with over 30 years' experience in the provision of consulting engineering services to industrial and municipal clients. He has specialist skills in groundwater, surface water and wastewater quality and treatment ranging from ultra-pure applications such as boiler feedwater through to high strength wastewater and hazardous waste treatment. Richard's experience includes audits, due diligence reviews, engineering investigations, development of conceptual solutions, detailed design and documentation, commissioning and on-going operations advice. Project scale ranges from small investigations through to major mining and industrial developments. These services have been provided to: oil and gas production, oil refining, petrochemical, mining, mineral processing, smelting, refining, power generation, steel making, metal fabrication, pharmaceutical and food processing industries.

Over the past twenty years, Richard has primarily worked primarily for industrial and resource sector clients across the water and environment issues that they encounter.

This has included significant, long-term roles in a number of large projects including:

- Koniambo project (Process Lead – Infrastructure) –,
- Luggage Point Advanced Water Treatment Plant (Facility Lead – Pre-Treatment) and
- RTA Gove – Spent Liquor Treatment (Process Lead)

In addition to the roles in multidisciplinary design and delivery teams with these large projects, Richard has continued to undertake smaller scale consulting engagements; investigations, options studies, feasibility studies and concept evaluations.

Water Treatment

Luggage Point Advanced Water Treatment Plant (Western Corridor Reuse Scheme)

While employed at Hatch in 2007, Richard was part of the proposal team, providing review of influent water characteristics and their impact on the design of the Luggage Point Advanced Water Treatment Plant, its capacity and configuration. During project implementation, Richard held the role of Facility Lead for the pre-treatment facilities of the LPAWTP. In this role Richard was responsible for the process design and overall co-ordination of the multidisciplinary team undertaking the detailed design of the pre-treatment facilities. The scope of the pre-treatment facilities included:

- Raw water pump station (RWPS) with 3x50% vertical turbine pumps with VSD to transfer up to 1350 L/s of raw water to the raw water storage. On-line analyser racks

were provided at the RWPS to monitor raw water quality (pH, EC, turbidity, ORP, TOC/NO3, phosphate and ammonia).
- Raw water storage tank (RWST) of 15,800 m3 capacity (57 m x 52 m x 6 m) with 2 x 10 kW submersible mixers.
- Feed water pump station with 3x50% vertical turbine pumps with VSD to transfer up to 675 L/s to each of the subsequent floc-clarifier trains.
- In-line mechanical mixers (5.5 kW) for coagulant (ferric chloride) dispersion over the range of feed flowrates (20% - 100% design flow).
- Two (50%) 10 m (W) x 30 m (L) x 6 m (D) floc-clarifiers for removal of phosphate and poorly settling solids from the raw water.
- Three flocculation chambers with two vertical paddle, low speed flocculators to provide gentle mixing in each flocculation chamber in each floc-clarifier.
- Five rows of inclined plate settlers providing 2300 m^2 of effective sedimentation area per floc-clarifier
- A hose-less travelling sludge collector with duty/standby pair of helical rotor pumps for each floc-clarifier, and
- A common wet well housing 4x33% pumps to which supernatant from the two floc-clarifiers discharges.

Richard prepared and conducted operator training sessions for the pre-treatment facilities as part of the alliance's hand–over to the scheme operator.

Augmentations of Municipal Water Treatment Plants (Zinfra)

As Principal and Director at WHET Consulting, Richard has held the roles of process engineer and design manager for the civil/structural/mechanical/process design of augmentations to the Moura and Biloela Water Treatment plants for Banana Shire Council. These two projects were delivered under D&C contract by Zinfra.

Augmentation of the Moura Water Treatment Plant was conducted over two stages.

The scope of the stage 1 augmentation, completed in 2015, included the provision of new pre-treatment facilities (raw water treatment tank and rapid mix tank) together with new chemical storage, preparation and metering systems for 100 L/s potable water production. The chemical systems included: coagulant, alkali, powdered activated carbon, potassium permanganate, polyelectrolyte and gaseous chlorine.

The stage 2 works included the upgrade of raw water pumping facilities and the installation of a new 50 L/s water treatment train and 1500 m^3 clear water storage at the WTP. The new process train includes two, lamellar plate clarifiers and four multi-media gravity filters. The new process train operates in parallel with the existing water treatment plant, utilising the existing pre-treatment, chemical dosing, backwash and residue management infrastructure. Hydraulic structures were designed to provide flow to the new process train and to split flow between the clarifiers and filters respectively.

For Biloela WTP the chemical preparation and metering systems were upgraded in 2015. This included the installation of a potassium permanganate system at the raw water pump station and powdered activated carbon, coagulant, alkali, polyelectrolyte and gaseous chlorine at the WTP.

Richard has also prepared design of modifications to the anhydrous ammonia facilities at Holts Hill Reservoir. The modifications facilitate bulk delivery and storage of aqueous ammonia in the (previous) anhydrous ammonia batching tank. The modifications were performed for Seqwater under D&C contract by Zinfra.

Richard prepared process engineering deliverables and managed the detailed design of upgraded residuals management facilities at Hinze Dam WTP. The project scope included process, civil, structural, I&C and mechanical engineering deliverables and included assessment and detailed design of an effluent irrigation scheme for disposal of wastewater generated by the facilities. The upgraded facilities were delivered by under D&C contract to Seqwater.

Accommodation Village Water Supply and Treatment - QCLNG

While working at Hatch, Richard was the Process Lead for the development of accommodation villages at Wooleebee (1700 residents) and Ruby-Jo (1100 residents) for the QCLNG project. Richard developed water demand projections over the construction and operational phases of the project and managed investigations by hydrogeological subcontractors to identify groundwater resources for raw water supply to the villages. Water supply for both villages was sourced from borefields constructed in groundwater aquifers at 100 to 200 m BGL. Specifications were prepared for the treatment of groundwater to produce potable water for reticulation through the villages. The presence of methane in the groundwater necessitated the management of potential explosive atmosphere in the head space of the raw water tanks via stripping and ventilation. Oxidation and filtration was provided for soluble iron and manganese removal with RO, pH adjustment and chlorination for production of potable water. Potable and fire water storages were provided to manage demand fluctuations within the villages.

Accommodation Camp – Water Supply and Treatment – Koniambo project

While employed by Hatch, Richard was the Process Lead – Infrastructure for the Koniambo project. This role included responsibility for the conceptualisation, design development and detailed design of all water infrastructure in the EPCM delivery of the project. The project is located in a remote site in the North Province of New Caledonia with construction facilities required to house the construction personnel from the early works team in a 30 person pioneer camp to the accommodation village for peak construction manning of 5000 personnel. As a result of local topography, geology and meteorological patterns the local surface water resources are ephemeral and ground water resources limited to the alluvium of these ephemeral streams. Richard managed investigations into the water supply options for the project, particularly prior to installation of the project's permanent water supply infrastructure, which includes seawater intake, SWRO and deep water outfall. Supply from larger (remote) surface waters was investigated in parallel with modelling to assess reliability of supply from the local alluvium. Staged development of the raw water supply, treatment and reticulation systems was developed to match scheduled construction workforce.

Miscellaneous Water Treatment projects

Evaluation of alternate alkali for pH correction at the water treatment plant servicing the remote community of Aurukun. Specification of equipment for soda ash batching and doing.

Evaluation of alternate alkalis for the water treatment plant servicing Weipa Township [8 ML/d]. Preparation of tender documents for the upgrade of lime handling plant.

Investigation of a demineralised water treatment plant (1 ML/d) used for BFW treatment. Evaluation of upgrade versus replacement of the ion exchange plant with a RO plant. Recommendations included the design of plant modifications to raise plant recovery from 80% to 95%.

Process commissioning and preparation of operation and maintenance manuals for seven (7) water treatment plants in Tasmania, Victoria and New South Wales – Australia. These plants included conventional, DAF and direct filtration plants.

Prepared design report on water treatment options – Emerald District Water Board.

Design investigations for Geelong and District Water Board, Emerald and District Water Board and Westernport Water Board, Australia.

Commissioning of four water treatment plants – Victoria and Tasmania, Australia.

Plant performance evaluation for two rural water treatment plants – Victoria, Australia.

Investigation of stainless steel filter vessel corrosion – Melbourne, Australia.

Investigation of water treatment options, including costings, for BFW, potable and non-potable water supplies for a coal mine and base-load power station development at Oaklands, NSW. Also included development of treatment and disposal options for cooling water and steam blowdown and other wastewater from the proposed development.

Industrial Wastewater Treatment and Reuse

Koniambo Nickel Project

This $7B project by Société Minière du Sud Pacifique and Xstrata Nickel involved the green-field development of 2.3 Mtpa open cut mine, 60 000 tpa ferro-nickel smelter, 340 MW power station, international shipping port and related infrastructure. Richard was initially introduced to the project team while employed by Connell Wagner who was undertaking the pre-feasibility study for the project's captive power station in 2003. After joining Hatch in 2004 Richard was responsible for development of the project's integrated water management plan during early permitting activities initiated between pre-feasibility and bankable feasibility studies. This involvement included quantification of water consumption and estimation of wastewater characterisation (including contaminated storm water), identification of recycling and reuse opportunities, preliminary estimation of wastewater quality, development of wastewater treatment strategy and disposal objectives. He also provided of specialist support for environmental approvals and project permitting which occurred in advance of the commencement of project implementation. During the project's detailed design phase Richard's role was Process Lead – Infrastructure which included development and detailed design of all water, wastewater and sewage treatment infrastructure including seawater desalination, demineralisation, surface and groundwater treatment, sewage and wastewater treatment facilities for both construction-phase activities and the operational phase of the plant.

Some of the challenges which Richard encountered, and was intimately involved in resolution of, included:

- Review of background environmental survey data to assist with the development of the project's environmental design criteria, particularly with reference to construction phase activities and on-going management of surface water releases from the mining activities under the prevailing meteorological conditions;
- Community meetings to support permitting of the project's ocean release;
- Characterisation of water demand and process wastewater generation for the unique ferro-nickel smelting technology and design of appropriate facilities for its treatment.

- Sourcing of freshwater and management of sanitary effluent for the project's construction workforce from the initial 50 person pioneer camp to the peak of 4500 personnel.
- Development of water management facilities for the construction of the mine access road and over-land conveyor both of which traverse steep terrain from ~950m to sea level over their 12 km route.
- Development of calibrated hydrologic models to provide estimates of reliability of supply from multiple surface water sources and for design of off-stream storages for freshwater supply to the mine industrial area.
- Conceptual development and permitting approval of water management facilities for coal and wet ore stockpiles, power station ash, pyro-metallurgical slag and refinery slag emplacements in close proximity to the pristine marine environment.
- Planning of dredging activities for the project's port and 4.5 km outfall.

RTA Gove – Spent Liquor Treatment

In 2010, as a result of historical operational practices compounded by adverse climatic conditions, Gove refinery's residue disposal area was approaching its capacity with potential impact to refinery production. Richard was initially engaged to assist in the development of options for the short-term and on-going treatment and discharge of supernatant liquor held in the residue disposal area to return capacity for additional residue storage. The options which were evaluated included installation of a thermo-mechanical evaporator, in situ sulfuric acid neutralisation, increased through-put via upgrade and optimisation of seawater neutralisation and modifications to the (then non-operational) wastewater neutralisation plant. Richard spent many months on-site during the early scoping-phase of the project and conducted initial bench-top evaluation for selection of an appropriate dewatering technology for augmentation of the neutralisation plant. He managed and was the principal author of the Options Analysis report which identified the preferred strategy; for spent liquor disposal. Subsequently Richard was Process Lead for the detailed design and implementation of the labyrinth optimisation, sludge (hydrotalcite) dredging and neutralisation plant augmentation. In this role Richard managed the production of the project's process deliverables into detailed design and commissioning.

Nystar Port Pirie – Water Management and Wastewater Treatment

For many years Richard has been intimately involved with a number of water, wastewater and aqueous environment projects at Nyrstar's Port Pirie smelter. This involvement commenced in the late 1990's when Richard managed a series of investigations undertaken to characterise wastewater discharges from the integrated smelter, ultimately to provide compliance with increased scrutiny of the smelters aqueous discharges. This initial involvement occurred while Richard was employed by Woodward-Clyde (later Aecom).

Initially a site-wide water balance was prepared accounting for inputs of seawater, potable and demineralised water consumption together with process wastewater, cooling water, storm water, sanitary effluent, steam and evaporative discharges/losses. This investigation provided recommendations to reduce water and steam usage and wastewater generation together with the segregation of process wastewaters from the site's drainage system to reduce pollutant loads discharging to the marine environment.

Richard then managed a series of detailed investigations undertaken to characterise wastewaters from the discrete process sources within the integrated smelter complex; including the sinter plant, precious metals refinery, cadmium plant, slag fuming furnaces,

kiln dust recovery plant, copper plant, zinc leach plant, demineralised WTP, research and assay facilities and the site's laundry. Preliminary designs were prepared for collection and conveyance of these process wastewaters, together with (contaminated) groundwater from a containment system, to the process effluent treatment system (PETS).

Parallel investigations by Richard's team during this time included:

- Characterisation of rainfall run-off and design of modifications to site drainage for containment and collection of contaminated storm water,
- Groundwater contamination investigations,
- Design of contaminated groundwater containment and intersection systems,
- Characterisation of non-contact cooling water usage and its discharge across the smelter,
- Investigations to characterise the presence of selenium in the wastewaters and evaluation of treatment conditions to improve its removal in from aqueous discharges.
- Mass and energy balances of the HRSG boiler and its associated HP, MP and LP steam systems together with their utilisation and condensate recovery across through the smelter, and
- Preliminary design of heat exchanger network to replace live steam usage in the zinc leach plant.

Richard was the principal author of the options analysis report prepared for the process wastewater treatment plant. Bench-top treatability studies were performed on-site to assist the development of the preferred flowsheet. The report included the preliminary design of the treatment plant and provided the cost estimate to which capital budget expenditure was allocated.

In an additional project Richard managed the detailed design of collection, conveyance and treatment of sewage from the smelter's sanitary facilities. This project eliminated 50 separate septic tank installations and provided a treatment system that produced treated effluent for irrigation reuse across the site's revegetation areas. Richard assisted in the negotiations with regulatory authorities for approval of the scheme.

More recently, as principal and Director at WHET Consulting, Richard has conducted regular audits of the performance of the smelter's water and wastewater management systems. This involvement has included:

- Review of water balance, process wastewater loads, PETS performance and marine discharge compliance (2012);
- Preparation of Integrated Water Management Plan for Nyrstar Port Pirie (2014)
- Review of Wastewater Loads (including impact of process transients) on PETS and Marine Discharge Compliance (2015), and
- Water Balance and Wastewater Load Assessment (2016)

Century Mine – Water and Tailings Management

Following his work at the Port Pirie smelter, Richard was engaged to prepare water and pollutant balances of the then recently commissioned portside (Karumba) operations of the

Century Mine in late 2000. At the time Century Mine was owned by Port Pirie smelter's parent company (Pasminco) and Richard was employed by Connell Wagner. The portside facilities separated lead and zinc concentrates from the bulk flow of slurries pumped from the mine which was approximately 350 km away. The concentrates were then dewatered and dried prior to placement in bulk storage buildings from which they were transferred by barge to international shipping. Water recovered from the slurry received physio-chemical treatment and was combined with treated effluent from the site's sanitary facilities prior to reuse for pasture irrigation (dry season) or release to the estuarine environment (wet season). The investigation quantified component balances over each to the unit operations and quantified pollutant fluxes across the range of operational conditions.

During 2001 Richard was engaged to prepare an integrated water management plan of the Century Mine operations with quantification of surface and groundwater inputs, process water usage and losses associated with product transportation (i.e., concentrate slurry transfer), tailings storage and evaporative disposal over the mine's remaining life with a range of climatic and operational scenarios. Dynamic water and salt balance models were prepared of the mine's tailings storage facility to predict the likely range of characteristics of the water retained in the TSF and its associated evaporation dam. This included the effects of oxidation of the tailings, dilution and concentration due to rainfall in the catchment and evaporation from surface of the dams. Also modelled, to quantify the effects on water quality were scenarios in which water was extracted from the evaporation dam for reuse within the Minesite operations. The investigation provided a sound basis for the development of potential water management options including recovery of water from the TSF for reuse in the concentrator, to counter the effects of potential reduced groundwater yields and extreme rainfall events on the operations.

Power Station Water and Ash Management

While employed by Connell Wagner, Richard undertook a series of investigations for CS Energy's Callide Power Station in the period 2000 through 2004.

His initial involvement came through the review of the site's blowdown water treatment plant which was installed with the Callide C units in 2001. This plant uses lime-soda softening, clarification, media filtration and reverse osmosis to treat the blowdown from the site's 1720 MWe installed generating capacity. Permeate is recovered for return to the cooling water circuit. Richard reviewed plant operation and provided operational advice for the facility. He completed investigations to assess performance of each unit operation and prepared a package of remedial works and modifications to the blowdown water treatment plant for CS Energy. The project included detailed investigations to de-bottleneck the water treatment systems including the development of bench-top test-work and plant trials. The remedial works package included provision of a second lime-soda clarifier, upgrades to all chemical metering systems and provision of additional instrumentation to increase the plant's operational stability and reduce operator attendance.

Subsequently Richard prepared a calibrated water balance model for the Callide Power Station to assist with integration of Callide C power plant into the on-going operational envelope of the ash and water management systems at the site.

The dynamic model allowed evaluation of the impact of process and climatic conditions on the volume and quality of water held within the integrated ash/water management systems. For example the impact of: changed operational (power generating) scenarios; modifications to ash management practices (i.e., transition from lean-phase deposition to

dense phase stacking); changes in BDWTP performance and the installation of an ash-water recovery and treatment system to replace (external) water supplies and reduce the ash dam water level. Water quality in the ash dam was evaluated and the risk posed by release of water from the dam evaluated under these influences.

During this period the focus of the modelling changed from preservation of the station's water envelope during drought (when the station was reliant upon water transferred from Lake Awoonga to Callide Dam) to maintenance of operation freeboard and fast-tracked ash dam wall raising after the unseasonal flood event which followed. Ultimately the model has been retained to assist with the on-going licensing of the ash dam.

Through this period Richard also completed a detailed investigation of the water and ash management systems at Millmerran Power Station. The plant uses tertiary treated sewage effluent as raw water supply for its boiler feed water system and air-cooled condensers. This raw water is softened, filtered and demineralised (by RO) to produce treated and demineralised waters, which are reticulated across the site. Initially a water balance was developed for the site from base data collected during a site audit. The water balance illustrated water requirements both under normal operating conditions together and also under abnormal conditions such as unit return to service. This approach resulted in the identification of augmentations to the treatment systems to eliminate plant bottlenecks.

Industrial and Mineral Processing - Surface Water Management

While employed by Hatch Richard prepared a storm water management plan for QAL's refinery operations in Gladstone. The study included dynamic modeling of the storm water management systems to assess system performance under a range of hydrologic conditions. The study identified areas in the drainage system where contamination of storm water and hydraulic limitations necks combined to pose risk to the site's overall performance. Remedial works were scoped and preliminary design undertaken to eliminate these shortfalls.

Also while employed by Hatch Richard was the Water Lead for the ERA Ranger Expansion Project. In this role he supervised integration of the hydrologic water processes (i.e., rainfall and evaporation) into the process liquor balance for the 12 Mtpa heap leach project. A dynamic model was prepared of surface water through the mine and tailings storage facility as low grade ores were reprocessed from the TSF to their ultimate disposal in the mine void via the heap leach pad.

Coal Seam Gas – Associated Water and Brine Management

While employed by Hatch in 2013, Richard managed a review of test work performed by a technology vendor in support of the process design and materials selection for a selective salts recovery facility (SSRF). The SSRF was conceived to service the long-term brine management requirements of two of the CSG projects in the Surat Basin. The objective of the SSRF was to treat 3 000 m^3/d of concentrated brine (23% mixed sodium carbonate/bicarbonate and sodium chloride with a range of other, minor, constituents) generated in the upstream processing of associated water from these CSG fields and produce from the brine, high purity (monohydrate) sodium carbonate and sodium chloride for on-sale to international markets. (Confidential client)

The scope of the review included:

- Analysis of test work results, providing feedback on the adequacy of the piloting conducted by the technology vendor, including a review of solution chemistry and phase diagrams/solubility curves developed by the technology vendor
- Analysis of test work results to provide feedback on the adequacy of the process selected by the technology vendor for a full scale plant
- Review of the materials selection, and the test work conducted on suitable construction materials to provide feedback on the materials selection
- Provision of comments on implications regarding durability and operability of plant based on pilot results to date.
- Identification of significant durability and operability risks apparent from review of the test-work for the first 30 years of operation for the plant.

While employed by Hatch in 2012, Richard managed long-term water balance modelling of surface water infrastructure in Fairview and Roma fields of the GLNG project to assess the impact of climatic influences and associated water yield projections on the capacity of designed water management infrastructure. Modelling included associated water collection and conveyance networks, storages, treatment and amendment facilities, treated/amended water irrigation and river release schemes, brine storages and reinjection facilities. Modelling was updated as water projections were refined over project duration to identify bottlenecks and investigate debottlenecking options.

More recently, as principal and Director at WHET Consulting in 2014, Richard has undertaken a number of other investigations for Santos GLNG including:

- Preparation of an independent review of pilot plant operation conducted for an enhanced evaporation trial at the Scotia production site on behalf of the project proponent. The trial was of the solar enhanced tube system (SETS), a vendor supplied technology that incorporates a shallow evaporation pond, covered with a transparent flexible membrane, with air exchange provided by a fan (forced draft). The review included the development of a numeric model of SETS together with analysis of data collected during the 12 month pilot plant operation. The analysis focused on the influence of the principal independent variable (solar radiation) and controlled variable (air speed). Additional consideration was provided as to the operational mode (batch fill versus continuous recirculation), water composition and the ambient climatic conditions. A vapour-phase mass balance was developed to assess evaporative performance in the absence of alternate measurements from the pilot trial. The review brought rigour to the technology assessment that the vendor had been unable to provide.
- A desk-top study was conducted to evaluate low-tech options potentially suited to assist with the management of CSG water/brine. The objective of the study was to identify technologies that provide enhanced performance relative to ambient evaporative processes and to provide justification to advance selected technologies through to pilot trials. A range of alternate technologies were identified and a base-case established for comparative purposes. Pair-wise, multi-criteria analysis was then performed of each of the alternative options against the base case. Three options were selected for further evaluation on the basis of this study.
- Richard provided an independent review of a pilot trial of WAIV (wind aided intensified evaporation) technology conducted in the Roma field on behalf of the

project proponent. The technology vendor (Orica) had been engaged to undertake the 18-month duration pilot trial and develop a numerical model of the technology. During the review process Richard developed an alternate (simplified) model, which better simulated the performance of the pilot unit and was subsequently adopted by the vendor. A summary report was prepared which presented the results of the pilot plant operation focusing on the key demonstrated results: quantification of pilot unit performance relative to ambient climatic conditions, predictive modeling of the technology, assessment of the impact of operational mode on technology performance and quantification and management of salt drift.

Miscellaneous Industrial and Resource Sector Water Management Projects

Preparation and presentation of primary submission at Commission of Inquiry (Review of Condenser Cooling Options for Kurnell Cogeneration Plant) – Sydney, Australia.

Investigation of source and treatment alternatives for odorous compounds present in wastewaters handled through a Petroleum/Natural Gas Terminal. The investigation included design of laboratory bench scale experiments and full plant trials for chemical oxidation of specific odoriferous compounds in wastewater.

Wastewater characterisation, treatability investigation, process design and commissioning of wastewater treatment facilities for Defense logistics support at Bandiana VIC. The project included an audit of the facilities dangerous goods storage and wastewater treatment facilities that identified a number of non-compliant activities including the discharge of polluted storm water and the contamination of groundwater. Preliminary design of modifications to the wastewater conveyance and storage facilities were prepared to eliminate these issues.

Review and operational advice for control of bulking sludge at wastewater treatment facilities for a fibreboard manufacturing facility, at Oberon. This initial study was followed with a commission for a detailed investigation of wastewater plant performance and conceptual design of upgraded facilities to handle the 1000 kg DS/d of waste biological sludge that the WWTP generated.

Site wide water audit for Bluescope Steel's Western Port flat products plant. The study included the development of water, steam and wastewater balances across the facility together with the quantification of available surface water yield from the available catchments.

Design, specification, review of tenders and commissioning of wastewater treatment facilities for a large food industry (bakery) client in metropolitan Sydney, Australia. This study was followed with a detailed investigation of poorly performing treatment facilities installed at a second facility operated by the client. This review included all aspects of the installed treatment plant including mechanical, electrical (control), and chemical batching and dosing equipment.

Review of wastewater generation, treatment and disposal from three operating dairy facilities with waste loads of up to 40,000 ep (BOD basis) – Western Australia.

Design report on materials handling and safety and detailed design of upgraded batch preparation building; Chemical Industry – Melbourne, Australia.

Water/wastewater balance, at fuel and lube oil refinery – Adelaide, Australia,

Investigation and modeling of water supply options for mine-only option for the Aurukun bauxite mine.

Full plant water and wastewater audit and wastewater minimisation studies – Petroleum Terminal, Melbourne, Australia.

Review of wastewater treatment facilities including documentation of modifications to improve performance and design of odour control facilities for wastewater holding lagoon – Food Industry, Penola, South Australia.

Review and analysis of bench top investigations of phenol oxidation in formation water – Petroleum Industry, Indonesia.

Water and wastewater balance for the Yarraville terminal and grease and lube oils blending plant, Mobil Oil.

Wastewater audit and minimisation study for manufacturer of casting resins, Sydney, Australia.

Design of modifications to contaminated storm water collection and treatment facilities, paint manufacturer – Sydney, Australia.

Design, specification, review of tender and commissioning of wastewater treatment facilities – Pharmaceutical Industry, Sydney, Australia.

Review of treatment of wastewater from metal cleaning, degreasing, plating and painting – Metal Fabrication Industry, Melbourne, Australia.

Investigation and process design strategy for upgraded wastewater treatment plant – Food Industry, Victoria, Australia.

Preparation of Works Approval documentation for acidic pit water treatment and disposal – Local Government, Melbourne, Australia.

Process and hydraulic design, equipment specification and selection for (acidic) coal mine water treatment and disposal – Lithgow, Australia.

Review of wastewater generation, treatment and disposal for a white goods manufacturer – Sydney, Australia.

Soil and Groundwater Remediation – Hazardous Waste Treatment

Richard was employed at Woodward-Clyde (later URS) from 1990 to 2000. During this time he was largely focused on soil and groundwater remediation projects in Australia and the USA (1995-97). These projects include:

Orica Botany (1997-2000)

During the late 1990's, Richard managed a series of investigations in the remedial options for the car park waste encapsulation (CPWE), a schedule waste landfill which had been constructed at ICI/Orica Botany in 1980. The engineered landfill held approximately 45 000 m^3 of soils and ash which had been contaminated through contact with residues from the solvents plant at the Botany complex. The main contaminants were semi-volatile chlorinated organic compounds, principally hexachlorobutadiene, with hexachlorobenzene and octochlorostyrene also present.

Richard managed detailed initial investigations of the CPWE in accordance with the requirements of the HCB Wastewater Management Plan (ANZEEC, Nov 19996). These initially included:

- Inspection, in-situ and ex-situ testing of liner material to evaluate its integrity and on-going performance;
- Sampling of soil-gas vapours and full-depth transects of the encapsulated materials within the CPWE to characterise the encapsulated materials and assess biological activity and potential biochemical transformation of the materials.
- Sampling of groundwater and soil gas emissions in the vicinity of the CPWE to assess migration of contaminants and degradation products.
- Investigation of in-situ bioremediation options for the contaminated soils performed by UNSW's Department of Microbiology.

Richard also investigated options for physio-chemical remediation of materials within the CPWE. Thermal desorption of the contaminants with vapour phase their vapour-phase destruction via thermal oxidation was identified as the preferred treatment strategy. This included evaluation of in-situ thermal desorption technologies such as steam stripping, six-phase soil heating and radio frequency heating. More conventional excavation of the material and thermal desorption via a rotary kiln was identified as a preferred (ultimate) fall-back remediation strategy.

With the base-line studies complete, the integrity of the encapsulation confirmed, bioremediation studies initiated and preliminary evaluation of conventional remediation technologies evaluated the project entered a hiatus. Investigation protocols were established for the on-going monitoring of the CPWE. These would later trigger remediation of these CPWE.

In parallel investigation were progressing into the groundwater contamination and its movement beneath the broader Botany site. In support of these investigations Richard undertook a series of investigations to assess options for contaminated groundwater containment and remediation options across the site including:

- Review of vapour phase treatment for sulphide compounds stripped from groundwater. Treatment options included dispersion, biological oxidation, thermal destruction and carbon adsorption.
- Option development and preliminary design of 300 kL/d pump-and-treat remediation system for ICI/Orica in Botany, Australia. The system was designed to provide containment and treatment of shallow groundwater. The treatment system removed volatile chlorinated hydrocarbons which were present in the groundwater at near saturation concentrations with their vapour-phase destruction via thermal oxidation and elimination of discharge of odorous compounds (sulfides and mercaptans) to the atmosphere. The system design also incorporated processes to account for the high concentrations of dissolved metals and biological activity in the groundwater.
- Preliminary design of a deep groundwater remediation system extraction 800 kL/d of groundwater containing chlorinated hydrocarbons present at near saturation concentrations. Off-gas treatment included catalytic oxidation and acid gas scrubbing.

- Development of a preferred remediation strategy for approximately 1000 m^3 of contaminated sediments deposited in an unlined storm water channel. The sediments were contaminated with mercury and chlorinated semi-volatile compounds. The investigation considered the state and stability of mercury contained in contaminated sediments. The focus of this study was to evaluation the potential for mobilisation (and methylation) of the mercury under conditions required for the remediation of semivolatile compounds also present in the sediments.
- Investigation and pilot trial of permeable reactive barrier for treatment of shallow groundwater.
- Assessment of options for DNAPL recovery.
- In-situ bio-augmentation of contaminated shallow groundwater

Miscellaneous Soil and Groundwater Remediation projects (Australia)

Process and detail design of in situ bioremediation system for clean up of hydrocarbon contaminated soils and groundwater at a large hydrocarbon handling terminal – Sydney, Australia.

Detailed design of vapour extraction system for remediation of a petroleum spill beneath an operating service station – Manila, The Philippines.

Design, installation and commissioning of free phase hydrocarbon (naphtha) recovery system from beneath an operating oil refinery – Caltex Kurnell Refinery.

Design, installation and commissioning of dual phase liquids recovery system for hydrocarbon and solvent contamination from beneath an adhesives manufacturing plant – Padstow, Australia.

Process and detail design of in situ bioremediation system for clean up of hydrocarbon contaminated soils and groundwater at a large hydrocarbon handling terminal – Sydney, Australia.

Detailed design of vapour extraction system for remediation of a petroleum spill beneath an operating service station – Manila, The Philippines.

Design, installation and commissioning of free phase hydrocarbon (naphtha) recovery system from beneath an operating oil refinery – Caltex Kurnell Refinery.

Concept design for wet lands scheme for treatment of leachate and stormwater from a former landfill site. The combined treated wastewaters were treated and discharged to surface waters meeting the relevant ANZECC guidelines.

Design of landfill gas collection and ventilation system for a warehouse and office complex built on a rehabilitated landfill – Melbourne, Australia.

Review of treatment technologies for leachate emanating from three closed landfill sites in Homebush Bay, NSW. The principal contaminants in the leachate which influenced the selection of treatment processes in all three cases was ammonia and salinity of the leachate.

Miscellaneous Soil and Groundwater Remediation projects (USA)

While employed by Woodward-Clyde Consultants in the USA, Richard worked on the design, fabrication, installation, commissioning and operation of soil and groundwater remediation schemes.

Richard prepared the design and documentation of remediation of a former manufactured gas plant site in Pottstown PA. Scope initially included review of on-site treatment options and evaluation of options for hazardous and non-hazardous materials (both contaminated soils and groundwater). This was followed by the preparation of the technical specifications for the site's remediation and the provision of technical assistance through the tendering process and its subsequent implementation.

Field investigations, process-mechanical design of containerised soil remediation system (soil-gas extraction with catalytic oxidation of off-gases) at an operating Rohm and Haas facility, Bristol PA.

Process-mechanical design of a containerised dual-phase, SVE system with vapour phase thermal oxidation and liquid phase sewer discharge. Richard also managed the container fabrication/fit-out, site installation and commissioning this remediation system at the Valeo Thermal Systems manufacturing site in Greensburg IN.

Process-mechanical design of a containerised dual-phase, SVE system with vapour phase catalytic oxidation and liquid phase carbon adsorption. Richard also managed the container fabrication/fit-out, site installation and commissioning this remediation system at Southwest Bell, St Louis, MO

Detailed investigation to determine the cause of failure of a 270 kL/d remediation system treating chlorinated hydrocarbon-contaminated groundwater for Boeing Corporation in Ridley Park PA. Richard identified dissolved metals and poor selection of groundwater pumping equipment as the root cause of fouling in the downstream remediation equipment. He provided recommendations for process changes and equipment augmentation to enhance system performance. Richard also provided of "expert witness testimony" to support cost recovery from the original system designer.

Design of landfill gas collection and destruction system and preparation of comprehensive O&M manuals for all environmental controls at a closed landfill in Pelham Bay, NY. Installed systems included; membrane capping system, landfill gas extraction and destruction, storm water collection and treatment and leachate collection and disposal.

Debottle-necking and commissioning of a soil and groundwater remediation system at a former Ciba-Geigy facility in Cranston RI. System components included multi-well, dual phase extraction, soil gas thermal oxidation.

Review and design of equipment augmentation for up-grade of air-stripping equipment for VOC removal from contaminated groundwater – CCCP, Camden NJ.

Development of interim remedial measures for an operating chemical industry facility, Pennsauken Township, NJ

Odour Investigations and Vapour Phase Treatment

Investigation of odour generation potential for a 4.5 km sewage pressure main. Quantification of sulphide generation, review of alternate methodologies for reduction in sulphide generation, review of alternate methods for treatment and discharge of foul air.

Sewage Treatment and Effluent Irrigation

While employed at Hatch, Richard undertook the development of water and sewerage infrastructure for remote accommodation villages for two large construction projects; QCLNG (2012) and Koniambo project (2006).

Accommodation Village Sewage Treatment and Effluent Disposal (QCLNG)

In his role as Water Lead, Richard prepared conceptualisation and development of water infrastructure for the Ruby-Jo and Woleebee accommodation villages for the QCLNG project. Water demand profiles and integrated water management plans were developed for each of the villages, which ultimately grew to accommodate 1100 and 1700 residents respectively. Richard provided direct assistance with regulatory approvals for the villages, particularly with regard to the negotiation of licence conditions for the STP and their irrigation disposal schemes and managed the detailed design of the water infrastructure. This water infrastructure includes; groundwater supply wells, explosive gas management, water treatment processes, potable water storage and reticulation, fire-fighting supply and reticulation, sewerage reticulation, sewage treatment processes, treated effluent irrigation disposal scheme(s) (including soils assessment and MEDLI modelling) and surface water management facilities for construction and operations phases. The design incorporated staged development of the facilities to follow changes in construction phase workforce and the long-term retention of parts of the camps for the project's operations phase. Richard was engaged to assist with the commissioning and rectification of defects in the vendor supplied STP packages.

Accommodation Village Sewage Treatment and Effluent Disposal (Koniambo)

For the Koniambo project Richard developed the sewage treatment strategy for the five-year construction program. Initial STP facilities for the pioneer camp used primary treatment tanks with recirculated attached-growth rock media filters and disinfection. As the construction workforce increase, ultimately to a 5000 person peak, the strategy provided for staged development of the activated sludge process commencing with a single SBR unit with chemical dosing for phosphorus and disinfection. This was then supplemented with a second bioreactor as the camp size grew. For the peak load period, clarifiers were added and the bioreactors modified from intermittent to continuous operation. Treated effluent reused for a range of construction phase activities, reducing the project's water requirements.

Mackay Effluent Reuse Project

While employed at Connell Wagner, Richard managed the detailed feasibility investigation for the Mackay Effluent Reuse Project. This investigation examined the use of 30 ML/d of treated sewage for irrigation of approximately 4500 ha of sugar cane in the Homebush-Chelona district immediately to the south of Mackay. The study examined the treated effluent quality, soil characteristics, groundwater issues, provided modelling of the irrigation scheme, evaluated sustainability of the scheme, reviewed options for effluent storage and reticulation, provided cost estimates and an economic analysis of alternate systems and also provided feasibility-level risk assessment and review of environmental factors for the project.

Miscellaneous Sewerage and Sewage Treatment projects

Project management of detailed investigations for Tenterfield sewerage augmentation. The investigations have included review of options and option development for the replacement

of the sewage treatment facilities, detailed investigation of the effluent irrigation schemes and augmentation of the sewerage reticulation.

Assessment of odour generation potential and design of odour control facilities for the Heroes Avenue catchment redirection project for Brisbane Water. This project involved the construction of a 4 km pressure main to redirect sewage into the Luggage Point STP together with the collection of wet weather overflows which would otherwise discharge to the Brisbane River.

Review of options for the upgrade of sewage treatment facilities at HMAS Albatross. The STP comprised trickling filter and activated sludge plants with treated effluent discharged to an irrigation area. The review was initiated over concerns regarding the integrity of some of the older structures, particularly the trickling filters, humus tanks and digesters. The review identified modifications to the activated sludge plant to upgrade its capacity and allow the decommissioning of the older plant.

Bintan Island, Singapore – Development of sewage treatment strategy for 200,000 ep resort development.

Castlemaine and District Water Board – Review of trade waste discharges and acceptance standards – Victoria, Australia.

National Parks and Wildlife Service, Perisher Valley Sewage Treatment Works – Review of operation performance and augmentation options for this 8,000 ep plant operating in alpine conditions and discharging to pristine waters – biological nitrogen removal and chemical phosphorus removal.

Jindabyne Sewage Treatment Works (25,000 ep) – design report on augmentation strategy – biological nitrogen removal and chemical phosphorus removal – Australia.

Alpine Resorts Commission – Review of options for upgrading of sewage treatment facilities for Mt Hotham – Australia.

Operational advice and preparation of detailed operations and maintenance manual – Bullocks Flat Sewage Treatment Plant, Australia.

Design of augmentation to treatment facilities at Toogoolawah sewage treatment plant. The upgrade includes the provision of facilities for receipt and pre-treatment of septage together with polishing to enhance performance of the existing lagoon treatment system.

Daily operations advice for three sewage authorities operating seven sewage treatment plants (including four package plants).

Commissioning of two sewage treatment plants.

Career History

2014 onward WHET CONSULTING Pty Ltd, Brisbane. Director / Principal

2005 - 2014 Hatch, Brisbane, Queensland, Australia. Technical Director - Water

2004 - 2005 Environmental Ground, Water and Air Consultants, Brisbane, Queensland, Australia. Executive Chemical Engineer

2000 - 2004 Connell Wagner, Brisbane, Queensland, Australia. Executive Chemical Engineer

1990 - 2000 URS Australia (formerly Woodward-Clyde International), Melbourne/Sydney/ Philadelphia, Principal Chemical Engineer

1989 - 1990 Design Development Group, Melbourne, Victoria, Australia. Designer

1984 - 1988 Gutteridge Haskins and Davey, Melbourne, Victoria, Australia. Chemical Engineer

CEENA Pty Ltd

ABN 51 860 796 218

Engineering and Project Management Consultants

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Michael J Simms **Principal Civil Engineer and Project Manager**
Water Industry Specialist

Qualifications

Bachelor of Engineering (Hons), University of Queensland, 1979

Affiliations

- Member, Institution of Engineers

Professional History

- July 2000 onwards Principal Civil Engineer and Project Manager, CEENA
- July 1996-June 2000 Principal Civil Engineer, Consulting Environmental Engineers
- Oct 1995-June 1996 Sole Practitioner
- 1990-Sept 1995 Director, John Wilson and Partners, Consulting Engineers
- 1985-1990 Senior Engineer, John Wilson and Partners
- 1980-1984 Engineer, John Wilson and Partners

Specific Technical Expertise

- Project management of infrastructure upgrading particularly for the water industry
- Strategic planning for the upgrading of water industry infrastructure
- Planning and detailed design of sewage collection and transport systems
- Planning and detailed design of sewage treatment works including new technology processes
- Detailed design of water treatment plants and water pumping stations
- Hydraulic analysis of water and wastewater pipeline systems
- Process and environmental auditing of water and wastewater treatment facilities
- Water and wastewater infrastructure process control and SCADA system implementation
- HAZOP and Safety in Design/CHAIR Study facilitation
- Contract administration and construction supervision

Whilst predominately working on sewerage infrastructure during his professional career, Michael has worked on the detailed design, or technical review, or construction supervision/review of the following water treatment plants/filtration plants in the last 15 years in the noted roles:

- Dingo and Duaringa WTP Filter Upgrade Projects for Central Highlands Regional Council, Queensland (2019-2021), civil, structural, mechanical and electrical detailed design consultant;
- Hinze Dam WTP Sludge Handing Upgrade for Seqwater (2017), civil, structural and mechanical detailed design sub-consultant to Richard Thew, consultant for Zinfra Pty Ltd;
- Moura WTP Stage 2 Augmentation for Banana Shire Council, Queensland (2016), civil, structural and mechanical detailed design sub-consultant to WSE Queensland Pty Ltd, consultant for Zinfra Pty Ltd;
- Landers Shute WTP for Seqwater (2016), civil, structural and mechanical detailed design consultant for the stormwater and chemical spill management system upgrade to Abergeldie Contractors Pty Ltd;
- Landers Shute WTP for Seqwater (2016), civil, structural and mechanical detailed design consultant for the service water system upgrade to Abergeldie Contractors Pty Ltd;
- Mildura 7th Street WTP for Lower Murray Water, Victoria (2015), Ten Consulting undertook the preliminary design of an upgrading to flow splitting of the raw water feed to this WTP; an 80 ML/d potable water treatment plant. CEENA undertook a detailed hydraulic analysis of the pipework system from the raw water pumping station that abstracts from the River Murray to the filters within the WTP including the proposed new flow splitter;
- Landers Shute WTP for Seqwater (2015), peer review of the process, civil, structural and mechanical detailed design by SMEC for the lime storage and dosing system upgrade for Stirlock Pty Ltd;

- Kerang WTP for Lower Murray Water, Victoria (2013 to 2014), CEENA is a specialist hydraulic assessment sub-consultant to Ten Consulting for the upgrade of the Treated Water Pumping Station;
- Swan Hill WTP for Lower Murray Water, Victoria (2013 to 2014), CEENA was the civil, structural and mechanical design consultant for an automation project;
- Pimpama WWTP and RWTP for Gold Coast City Council, Queensland (2006 to 2009), relevant processes: rapid gravity filtration, ultra-filtration, UV irradiation and chlorination – CoGC's direct representative in the Alliance delivering the project; and
- Mildura West WTP for Lower Murray Water, Victoria (2003 to 2004), new 20 ML/d (ultimately 80 ML/d) plant treatment River Murray Water – Authorities Representative undertaking complete technical review of the WTP's detailed design prepared by ESI Pty Ltd and Cardno (Qld) Pty Ltd.

Detailed Professional Experience – Other Significant Projects [2004 to 2017]

1. **August 2016 to December 2018** SMEC for City of GoldCoast, QLD, Principal's Engineer, Staging Solutions for the Longer Term Recycled Water Release Plan CEENA was a specialist sub-consultant to SMEC for this Principal's Engineer role to increase the hydraulic capacity for the release of excess recycled water through the existing Northern Recycled Water Release System up to 2,500 L/s and for the release of excess recycled water through the existing Southern Recycled Water Release System up to 2,070 L/s. Michael was a technical writer in the SMEC team for this project and undertook most of the preparation of the written description of the scope of the works. The pumping stations include:
   - One pumping station with 3 No 1.2 MW 6.6 kV variable speed drives with an extra 1.2 MW drive in the future; and
   - One pumping station with 3 No 1.3 MW 6.6 kV variable speed drives with an extra 1.3 MW drive in the future.
2. **January 2014 to May 2018** Arcadis (formerly Hyder Consulting) for City of GoldCoast, QLD, Staging Solutions for the Longer Term Recycled Water Release Plan CEENA was a specialist sub-consultant to Hyder Consulting for this study into options to increase the hydraulic capacity for the release of excess recycled water through the existing Northern Recycled Water Release System up to 2,500 L/s to defer the proposed expenditure of $320 million on an ocean release including the preparation of the preliminary design of the selected option. The study was extended by the CoGC to include the preparation of the preliminary design for the upgrade components for the existing Southern Recycled Water Release System. Michael was the lead designer in the Arcadis/Hyder team for this project and undertook most of the preparation of all cost estimates for the work. The pumping stations have included:
   - One pumping station with 4 No 1.2 MW 6.6 kV variable speed drives;
   - One pumping station with 4 No 1.3 MW 6.6 kV variable speed drives;
   - One pumping station with 3 No 460 kW 415 V variable speed drives; and
   - Two identical booster pumping stations with 3 No 250 kW 415 V variable speed drives.
3. **July to December 2016** SMEC for Brady Marine and Civil Pty Ltd for Bundaberg Regional Council, Rubyanna WWTP - detailed design for the D&C contract CEENA is a specialist sub-consultant to SMEC for the preparation of the detailed design for the river discharge facility (river outfall) for an ultimate 90,000 EP sewage treatment plant (PWWF of 1,150 L/s). Michael is the lead hydraulic and civil design engineer in the SMEC team for this project.
4. **February to March 2016** SMEC for Bundaberg Regional Council, Rubyanna WWTP Reference Concept Design CEENA was a specialist sub-consultant to SMEC for the preparation of the concept design for the river discharge facility (river outfall) for an ultimate 90,000 EP sewage treatment plant (PWWF of 1,150 L/s). Michael was the lead hydraulic design engineer in the SMEC team for this project and undertook most of the preparation of all cost estimates for the work.
5. **May 2015 to September 2015** Uptime Services Management Pty Ltd for SunWater, Collinsville Low Lift Pumping Station, Bowen River, Collinsville, QLD Michael led the CEENA team which included Geoff Hamilton of GHCE for the assessment by finite element analysis of the structure reinforcing options required for the installation of a steel submarine door near the base of an almost 50 year old concrete pumping station which is subject to a maximum 20 m water head.
6. **March 2012 to June 2015** ACTEW Corporation Ltd, Canberra, ACT, Lower Molonglo WQCC (a 300,000 EP biological/physical/chemical municipal wastewater treatment plant) Michael provided technical review for the upgrade of the aeration system for the secondary treatment facility.
7. **September 2104** CEE for Pan Pac Forest Products Ltd, Napier, New Zealand Michael undertook the detailed drawing and technical documentation review of a 2000 m DN630 PE ocean outfall extension for Dr Wallis of CEE. The existing 9.5 m deep outfall (at MSL) is being extended offshore to waters 16.5 m deep. The construction method involves a towed and sunk PE pipeline with weight blocks and

steel piles water jetted into place to secure the pipeline. Steel components are protected by hot dip galvanizing and sacrificial zinc anodes.

8. **March to September 2014** Hyder Consulting for Bundaberg Regional Council, Rubyanna WWTP Reference Concept Design CEENA was a specialist sub-consultant to Hyder Consulting for the preparation of the concept design for a Stage 1; 40,000 EP of an ultimate 90,000 EP plant. The concept design included a 70 L/s Class A recycled water treatment plant as part of the overall WWTP. Michael was the lead designer in the Hyder team for this project.
9. **October 2013 to July 2014** Grampians Wimmera Mallee Water Authority, Warracknabeal Sewage Pumping Station Refurbishment CEENA undertook the preparation of the Options Assessment, Project Scope Statement and preliminary design associated with the refurbishment of this very old sewage pumping station. Michael checked/reviewed all work undertaken by CEENA on this refurbishment project which was led by Darren Bennett.
10. **May to September 2013** TEW Solutions for City of Gold Coast, Molendinar Michael prepared the detailed mechanical and civil design on behalf of the D&C contractor for CoGC of the upgrade of water pump station MO2, which features twin 285 kW motor driven booster pumps.
11. **July 2010 to June2013** Gold Coast Water/formerly Allconnex Water, Coombabah Wastewater Treatment Plant Michael was Gold Coast Water's Technical Reviewer for the development of the detailed design, construction and commissioning of the Coombabah WWTP upgrade, a 17 ML/d main flow treatment module on a brownfield site, WAS thickening and anaerobic digestion for 91 ML/d, the whole plant's sludge handling capacity. The project delivery model is a traditional Alliance.
12. **January 2012 to June 2012** ACTEW Corporation Ltd, Canberra, ACT, Lower Molonglo WQCC Michael undertook the technical review for the strategy for the Primary, secondary and tertiary treatment facilities for the future development to 2060 of this wastewater treatment plant.
13. **November 2011 to June 2012** Gold Coast Water/formerly Allconnex Water, Elanora Wastewater Treatment Plant Michael prepared the detailed design and documentation for optimisation works for the recently completed preliminary treatment area. The project delivery model is construct to design.
14. **November 2009 to June 2010** Gold Coast Water, Gold Coast City Council, Coombabah Wastewater Treatment Plant and Stapylton Wastewater Treatment Plant. Michael was the full time GCW Technical Reviewer participating in the development of the preliminary design and the preparation of two TOCs in a WWTP program. The first TOC was for Stage 5 of Coombabah WWTP, a 17 ML/d main flow treatment module on a brownfield site and anaerobic digestion for 91 ML/d, the whole plant's sludge handling capacity. The second TOC was for Stage 1 of Stapylton WWTP, a high performance BNR plant with a 9 ML/d capacity. The project involved the preliminary design of 2.2 km of DN1200 and DN1000 trunk sewers and a lift pumping station into the proposed STP. The project delivery model was a traditional Alliance.
15. **July 2009 to November 2011** Allconnex Water (and formerly Gold Coast Water), Elanora Wastewater Treatment Plant, Odour Modelling. In association with Ian Wallis of Consulting Environmental Engineers, Michael has undertaking an odour study for Elanora WWTP.
16. **June 2009 to December 2009** Gold Coast Water, Elanora Wastewater Treatment Plant. Michael lead the development of the technical specification for the detailed design and construction for a new preliminary treatment area and an associated odour management facility including odour collection covers, ductwork and an odour control facility (OCF). The plant's main flow capacity is 28.75 ML/d, the new PTA will feature 2 No 5 mm aperture band screen and the OCF as the first stage of a four train OCF will treat 10,500 m^3/h. The project delivery model was a design and construct contract.
17. **September 2006 to November 2009** Gold Coast Water, Gold Coast City Council, Pimpama Wastewater Treatment Plant and Recycled Water Treatment Plant Michael was a full time GCW Alliance representative with the role of managing the client's commercial and managerial interests in the $80 M Contract. The WWTP is a 17 ML/d module on a greenfield site, ultimately a 54 ML/d plant. The WWTP is a high performance BNR plant. The RWTP is a 9 ML/d UF/UV process following dual media filtration of WWTP secondary treated wastewater. The project delivery model was a competitive Alliance involving two proponents.
18. **July 2004 to August 2006** Gold Coast Water, Gold Coast City Council, Merrimac Wastewater Treatment Plant. Michael was the full time GCW Alliance representative with the role of managing the client's input to the detailed design, construction and commissioning phases of the main project, a $35 M 22.4 ML/d upgrade to a 57.5 ML/d plant, ultimately an 80 ML/d plant. The plant is a high performance BNR plant with a TN of 5 mg/L and a TP of 2 mg/L. The project delivery model was a competitive Alliance involving two proponents. The main project was followed by an odour management project valued at $20 M to manage odours from the upgraded treatment plant. This work was undertaken by the Alliance as a scope change.

Electrical Project Manager

Electrical Designer
Cert. IV Electrical Trade
Bachelor of Engineering (Electrical)
Registered Professional Engineer Queensland 4082

Memberships: Registered Professional Engineer, Queensland (RPEQ)
Certified Practicing Engineer
Hazardous area Licence

Expertise: Design of medium and high voltage switchgear, motor control equipment, building services, overhead and underground high voltage and 415 V electricity distribution and street lighting.
Plant automation using PLC, supervisory control, telemetry and instrumentation.
Hazardous Area Licence.
Design and equipment documentation.
Construction management, plant commissioning and troubleshooting.

EXPERIENCE:

Oct 2012 to Present	kW electric formally Whiteford Electrical Project Management, electrical construction supervision and switchboard design.
June 2011 to October 2012	Principal Electrical Engineer, Kellogg Brown and Root.(Contract) Detailed design of 540 klm gas pipeline and associated equipment, from coal seam gas fields in the Surat Basin to an LNG plant on Curtis Island. Concept and opportunity designs for power supplies to gas gathering fields.
2008 to 2011	Project Manager, Whiteford Electrical Switchboard design and construction. Electrical contracting installations. Equipment procurement and supervision
2007	John Wilson and Partners Pty Ltd acquired by Worley Parsons Ltd
1997 to 2008	Manager of Electrical & Power Department responsible for all electrical design, documentation and construction inspections undertaken by the practice. Expanded into Power undertaking substation designs for Powerlink and Energex.
1990 - 1997	John Wilson and Partners Pty Ltd, Brisbane Office Electrical Engineer responsible for design and inspection of electrical installations including power, control, instrumentation and automation for multi-disciplinary water supply, sewerage, roadworks. Electricity transmission and distribution projects.

1989	7 months contract in the United Kingdom designing and constructing power and control panels for the Heating and Ventilation Industry
1988	Joined Fraser Osborn Pty Ltd., Townsville, Consulting Engineers and EPCM contractors to the Resources Industry. .
1985-1988	Joined Hamersley Iron Pty Ltd at their Iron Ore Mining Operation, Paraburdoo W.A. as a Graduate Electrical Engineer. Promoted to Specialist Electrical Engineer for the mine with statutory responsibility including mining equipment and power reticulation
1985	Graduated from Queensland Institute of Technology Electrical Engineering Specialising in Power & Control
1983	Overseas travel
1978 - 1982	Licensed Electrical Fitter-Mechanic - S.E.Q.E.B. (now Energex) Trained in all areas of the electricity supply industry and worked as a substation fitter.

PROJECT EXPERIENCE:

- **Mining/Resources Industry**

- Spring Gully Pond Telemetry, Origin Energy APLNG. Instrumentation, solar, batteries, RTUs
- Site support QCLNG Delivery Station, Roma
- Site supervision, electrical reticulation and lighting at Moranbah

- Major gas pipeline for QCLNG. Electrical design of equipment. Review of equipment and contractors

- Construction and Commissioning of two D.C. electric face shovels with static drives and state of the art control. Construction and commissioning of eight 240 tonne diesel electric haul trucks at Paraburdoo.

- Design, procurement, construction and commissioning of a 500,000 tpa C.I.P. gold plant at Ravenswood.

- Detailed Electrical Design and specification of major modifications to the de-sanding process at Nabalco's bauxite plant in Gove.
- Engineering procurement of switchgear for South Walker Creek, Coal mine

- **Water and Wastewater Projects.**

- Design, specifications and inspection of water treatment, pumping and telemetry at Stradbroke Island, Capalaba, Image Flat Landers Shute and Buderim.

- Design, Specification of a Hydro power generation scheme at the Landers Shute WTP and Baroon Pocket Dam.

- Design, specifications and contract administration of water pollution control works to 70,000 persons at Capalaba, Nambour, Suncoast, Burpengary East, Thursday Island, Bribie Island, Cleveland, and Maroochydore.

- Design, specification and contract administration of Foul air removal, Backwash return pumps Fine Screens and the Disinfection Facilities at the Lower Molongolo Water Quality Control Centre.

- Design, specification and contract administration of a floating raw water pump station with high voltage motors at Herring Lagoon on Stradbroke Island.

- Design, specification and contract administration of numerous water and sewerage pump stations.

- Design, specification and contract administration for telemetry-based SCADA systems for Redland Shire Council, Noosa Council, Maroochy Shire Council, Caloundra City Council.

- Waste to Energy composting plant, Yatala.

- Food Organic Waste Organic power plant, Byron Bay

METHOD

1 Prepare and submit the kW electric HSEQ Plan to the QSC Superintendent / Principal's Representative for review and acceptance.

2 Initial site visit by kw electric's Electrical Engineer to:
- Commence the project including discussing the project with the QSC Superintendent / Principal's Representative;
- Gather information including plant operating data and download the PLC & HMI code;
- Inspect the current state of the instruments, PLC IO wiring and electrical controls/wiring;
- Inspect and document (photograph) the potential location(s) for the chlorine residual analyser / controller and associated cable routing; and
- Thoroughly photo document the WTP.

3 Provide a critique (prepared by kW electric's Process Engineer [sub-consultant] in technical memorandum format) of the prior operations reports and the identified remedial actions.

4 Second site visit by kw electric Process Engineer, Software Engineer [sub-consultant] and Electrician to:
- Inspect the site and review the plant's operation;
- Discuss the project objectives and resolve any initial operating issues with the QSC Superintendent / Principal's Representative and the plant operator;
- Check the identified problematic components / controls (note the exclusions from the tender);
- Install and commission the new chlorine analyser;
- Load the revised PLC & HMI code and conduct a site acceptance test;
- Submit the draft simplified operating instructions prepared by kW electric's Process Engineer to the QSC Superintendent / Principal's Representative for comment whilst the team is on site; and
- Review the QSC comments and action all issues.

5 Submit final documentation to the QSC Superintendent / Principal's Representatives.

6 Third site visit 11 months by kW electric's Process Engineer after completion to report (prepared by kW electric's Process Engineer in technical memorandum format) on the plant's revised operating status.

GRS CERTIFICATION

Certificate of Registration

Awarded to

kW Electric Pty Ltd.

(ABN 83624617938)

Member of Master Electricians Australia
2/17 Commerce Circuit, Yatala, QLD 4207, Australia

Operates an Environmental Management System which complies with the requirements of

ISO 14001: 2015

for the following scope:

Design, supply, install and maintain all services associated with Electrical, Data and Communications.

Certificate Number: 47714001610065

Original Issue Date: 16/01/2019

Current Issue Date: 16/01/2019
Expiry Date: 15/01/2022

GRS CERTIFICATION
ISO 14001
ENVIRONMENT

JAS-ANZ
WWW.JAS-ANZ.ORG/REGISTER

Sharmin Mahmud, MBA, PhD
General Manager Risk and Compliance

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

Registered by:
Global Registrar of Systems Pty Ltd. trading as GRS Certification
Head Office: 433 Logan Road, Stones Corner, QLD 4120, Australia
Phone : (+61) 1300 007 477 | Email: certification@grscertification.com | Web: www.grscertification.com

GRS CERTIFICATION

Certificate of Registration

Awarded to

kW Electric Pty Ltd.

(ABN 83624617938)

Member of Master Electricians Australia

2/17 Commerce Circuit, Yatala, QLD 4207, Australia

Operates a Quality Management System which complies with the requirements of

ISO 9001: 2015

for the following scope:

Design, supply, install and maintain all services associated with Electrical, Data and Communications.

Certificate Number: 4779001610065

Original Issue Date: 16/01/2019

Current Issue Date: 16/01/2019

Expiry Date: 15/01/2022

GRS CERTIFICATION ISO 9001 QUALITY

JAS-ANZ

WWW.JAS-ANZ.ORG/REGISTER

Sharmin Mahmud, MBA, PhD
General Manager Risk and Compliance

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Registered by:
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Head Office: 433 Logan Road, Stones Corner, QLD 4120, Australia
Phone : (+61) 1300 007 477 | Email: certification@grscertification.com | Web: www.grscertification.com
Expiry is subject to regular surveillance audits and applied Terms & Conditions of GRS.
This certificate cannot be treated as a legal document and must be returned to GRS upon request.

Certificate of Registration

Awarded to

kW Electric Pty Ltd.

(ABN 83624617938)

Member of Master Electricians Australia

2/17 Commerce Circuit, Yatala, QLD 4207, Australia

Operates a Safety Management System which complies with the requirements of

OHSAS 18001: 2007

for the following scope:

Design, supply, install and maintain all services associated with Electrical, Data and Communications.

Certificate Number: 47718001610065

Original Issue Date: 16/01/2019

Current Issue Date: 16/01/2019

Expiry Date: 15/01/2022

OHSAS 18001
SAFETY

WWW.JAS-ANZ.ORG/REGISTER

Sharmin Mahmud, MBA PhD
General Manager Risk and Compliance

Registered by:
Global Registrar of Systems Pty Ltd. trading as GRS Certification
Head Office: 433 Logan Road, Stones Corner, QLD 4120, Australia
Phone : (+61) 1300 007 477 | Email: certification@grscertification.com | Web: www.grscertification.com

Assumptions and Exclusions

For this tender, kW electric assumes that:

1. All prior documentation for the WTP will be found and provided to kW electric on contract award.
2. The QSC nominated staff or representatives including the operator will be available when kW electric staff or sub-consultants are on site.
3. The WTP instruments are all in working order and calibrated;
4. The PLC and HMI are in working order and the PLC and HMI code can be uploaded;
5. The PLC input and output wiring and the control wiring is sound with no faults or disconnections or work arounds. If there are any faults or disconnections or work arounds, kW electric will document them for Council; and
6. The existing PLC/HMI can trend data.

For this tender, kW electric exclude:

1. Replacing any WTP instruments that are not in working order. This can be undertaken for QSC if required as a variation to the Contract Sum;
2. Calibrating any WTP instruments that are not calibrated; and
3. Rectifying any faults or disconnections or work arounds in the PLC input and output wiring and the control wiring.
4. Any civil works needed to move equipment

Simmons & Bristow Pty Ltd

Simmonds & Bristow Pty Ltd

The Regional and Remote Water Specialist

HERE FOR YOU 50+ YEARS SINCE 1965

19/03/2021

Peter See
Quilpie Shire Council
50 Brolga St, Quilpie QLD 4480

Proposal for Eromanga Water Treatment Plant Upgrades
S&B Reference No.: P2102-003

Dear Peter,

We are pleased to present this proposal for the operation and maintenance documentation and upgrade of the Eromanga Water Treatment Plant (WTP).

This proposal has been prepared based on the Scope of Works provided and knowledge and site context gained through the site inspection by our Chief Process Engineer Matthew Reid on 24th February 2021. Experience gained from this visit, coupled with over 50 years of specialist regional and remote practice, will ensure that this project will be delivered successfully, and most importantly, safely.

Simmonds & Bristow is currently delivering a similar solution to Barcaldine Regional Council. Rick Rolfe, Chief Engineer, is our direct client should you wish to speak to him.

We trust that we have satisfactorily met the project and scope requirements. Our Team's value to this project will become evident as you review our methodology and overall offer.

Yours Sincerely,
SIMMONDS & BRISTOW PTY LTD

_____

Craig Hill

Business Development Manager

NATA WORLD RECOGNISED ACCREDITATION

bsi. ISO 9001 Quality Management FS 520982

Head Office: 40 Reginald Street, Rocklea, QLD 4106
Postal Address: PO Box 849, Archerfield, QLD 4108
1800 620 690 | +61 7 3434 3800 | Fax: +61 7 3434 3899
info@simmondsbristow.com.au | www.simmondsbristow.com.au

RTO 1735 ABN 33 010 252 418

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Return Package

Quilpie Shire Council

Eromanga Water Treatment Plant - Upgrades

Contract No. 200274:

Document Control

Date	Description	Author
04/02/2021	Released for Tender	Stuart Bourne

GBA Project/Doc ID no. **200274 / 373253**

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, please contact George Bourne and Associates.

Phone 07 4651 5177
Email admin@gbaengineers.com.au

TABLE OF CONTENTS

PART 6 – RESPONSE SCHEDULES

RESPONSE SCHEDULES

The Tenderer should include in its Tender all information which the Tenderer wishes the Principal to take into account in assessing its Tender. The Principal may, but has no obligation to, consider any information not included in the Tender, notwithstanding that such other information may be within the Principal's knowledge, or may have been previously submitted to the Principal by the Tenderer (including, if relevant, information submitted by the Tenderer in any preceding steps in the Procurement Process).

TENDER SCHEDULE

(a) Contact Details for the purposes of tender assessment as below:

Name of Contact:	Matthew Reid
Telephone No. (BH):	07 3434 3800
Telephone No. (AH):	1800 620 690
Mobile No:	0417 177 217
Facsimile No:	07 3434 3899
Email:	sales@simmondsbristow.com.au

(b) ABN or ACN: 33 010 252 418

(c) Provide a statement of facts in detail as to the Tenderer's previous experience and achievements in performing similar or comparable work and its resources and ability to carry out the works.

Simmonds & Bristow team have completed the following relevant projects in the last 12 months:

1. PROJECT ONE Alpha & Jericho WTP Electrical and Control Systems Upgrade
Client Name: Barcaldine Regional Council
Contract Value: $100,900.00
Client Contact: Rick Rolfe, Chief Engineer, Barcaldine Regional Council
Email: RickR@barc.qld.gov.au
Ph: +617 4651 5600
Key Personnel: Gary Green, David Bristow
Project Overview:
S&B were initially requested by Barcaldine Regional Council to address the critical electronic control components of the Alpha and Jericho Water Treatment Plants as first recommended in a comprehensive condition assessment carried out by S&B in October 2019.

Project Outcomes:
A substantial amount of electronic control equipment associated with the programmable logic controllers (PLCs) had become legacy equipment, was no longer manufactured and had limited manufacturer support and stock availability.
S&B managed to source some legacy products to provide replacements for the critical components as well as provide and install other replacement parts such as motor contactors, relays and variable speed drives. The project was split up into two service visits, of which, the first was completed in December 2020 and the second is scheduled to be completed April 2021. The first service was carried out to change over as many of the faulty pieces of equipment and to successfully download the PLC and HMI program configurations as well as confirm the additional inputs and outputs required to be supplied and installed in the second visit yet to occur.

Value Add:
- Ability to identify and troubleshoot additional faults not in the original brief.
- Able to carry out some initial programming changes on the fly to improve existing processes.
- Provided cost effective temperature monitoring and logging facilities to ensure that data can be gathered to ascertain if further cooling measures need to be undertaken.

2. PROJECT TWO Heron Island Resort RO WTP Condition Assessment, Renewal Strategy and RO Membrane Replacement
Client Name: Aldesta Heron Island Pty Ltd
Contract Value: $125,000

Client Contact: Aaron Green – Aldesta Maintenance Manager
Email: maintenancesupervisor@heronisland.com
Phone: +61 7 4972 9055
Key Personnel: Matthew Reid, Gary Green, David Bristow

Project Overview:
S&B were initially requested by Aldesta to investigate an environmental incident relating to their STP and through this were asked to investigate issues relating to RO WTP on the island. The islands RO WTP was in a run-down state and only producing 40% of its design capacity and this water was still of a poor quality that resulted in ongoing complaints from their guests and other customers.
The installed membranes were from an overseas manufacturer and had a 4-6 month lead time due to the COVID restrictions. The ESS team were able to quickly assess alternate membrane suppliers for process and logistical compatibility and S&B were able to order and deliver to site within a 6 week time-frame in the lead up to the Christmas period.
With guests returning to the island in greater numbers, and the island barging potable water over to cover the shortfall in production, the pressure was well and truly on S&B to deliver a good outcome for the client and those guests currently holidaying there.
Our team, led by Matthew Reid, were able to overcome significant technical challenges and restore the plant to full name-plate capacity over a 3 day campaign.

Project Outcomes:
We further provided a condition assessment and renewal strategy document, synthesising the technical risks into business risks to Aldesta's operations. It is this mix of technical expertise, understanding of our clients business and risks, and willingness to find practical, simple but elegant solutions to their problems that led to S&B being engaged as their O&M provider going forward into 2021.

Value Add:
• Ability to identify and convey technical risks and issues into the business risk for our client (i.e. inability to make water and risk of evacuating guests from the island).
• Optimising the RO WTP and providing a detailed commissioning report for future reference (regardless of who the current operator will be in the future).
• Providing a sensible and practical renewals strategy for our client to help them navigate through challenging times of financial hardship.

3. PROJECT THREE Couran Cove Resort RO WTP Operation and Maintenance
Client Name: South Stradbroke Caretaking Services Pty Ltd
Contract Value: $260,000 (for 2020 period including projects)
Client Contact: Jonny Kuper & Steve Gibbs
Email: jk@courancove.com.au & steveg@courancove.com.au
Phone: +61 7 5597 9999
Key Personnel: Matthew Reid, Gary Green, David Bristow

Project Overview:
South Stradbroke Caretaking Services owns and operates a tourist eco-resort on South Stradbroke Island for which S&B provides "turn-key" Operation and Maintenance Services. This includes the day to day operation of the Nano-filtration (NFRO) Water Treatment Plant and Sewage Treatment Plant, but extends to the operational and environmental monitoring and reporting, and provision of engineering services including any plant upgrades required.
Over the last 12-18 months some of the improvement projects at Couran Cove have included: Overhauling and Improving the NFRO WTP Control System; STP Effluent Irrigation Area Condition

Report and Upgrade Recommendations; Replacing Sludge Blowers on STP; Replacing Plant & Instrument Air System on NFRO WTP.

Project Outcomes:
Our O&M Team have managed to avoid several potential situations that threatened the ability of our client to provide water and sewage services to their customers and guests. For instance, prior to Christmas 2019 we were able to find alternate parts after a sudden failure of the NFRO WTP membrane interconnections. Through our networks and suppliers we were able to source and priority ship the parts to the island and our O&M Manager personally oversaw the replacement which meant that the resort was able to continue making safe clean water over the Christmas holiday period.

Value Add:
More recently we have been assisting our client with negotiations with the regulator (DES) around their STP effluent irrigation system which is in need of upgrading, but due to the financial difficulties created by the COVID-19 and impact on tourism in Qld, have not been able to be planned and executed as initially thought. We are currently looking into ways in which the irrigation upgrade can be staged so that the capital investment can be more closely aligned to the occupancy i.e. undertake the most urgent upgrade works and a portion of the irrigation area to match current occupancy (with safety factor) and stage the rest of the upgrades as guests return to the resort. The design of this upgrade and negotiations with DES are ongoing but we are committed to guiding our client through this particularly tough period, while respecting the need to protect the environment in this unique part of Queensland.

Other projects in a similar field that have been completed over the previous 12 months include:
• University of Queensland – Gatton Campus – Advice on Laboratory waste treatment and suitability for treatment by existing STP
• Tangalooma Island Resort – Drinking Water Quality Assessment, Monitoring Program and Management Plan
• Aldesta Heron Island Pty Ltd – Heron Island Environmental Protection Order (EPO) Investigation
• Bombardier – QR New Generation Rolling Stock Project, potable water supply system risk assessment
• Parks & Wildlife Services Tasmania – STP process review and environmental compliance assessment and various other advisory projects

(d) Provide a construction programme showing the dates by which or the times within which the various stages or parts of the works are to be completed or executed. The program should be in a Gantt Chart type format and preferably electronically generated.

see Attachment B - Gantt Chart Eromanga WTP Upgrades for more details

(e) Provide an estimated monthly cash flow schedule.

Our schedule (Attachment D) has been prepared based on an initial site inspection to gather the required information and refine the design, after which we will procure the Chlorine Analyser and associated materials for the upgrade (Site Works phase). Our schedule has allowed for 10 days for QSC to gather information we see as required to complete the design and plan for the Site Works and further 10 days to review our proposed SCADA solution and the drafts of the operational documentation. Based on these assumptions we provide an indicative cash flow schedule as follows:
1. First Invoice 30th April 2021 – Initial Site inspection and information gathering – approximately $12,500 (ex GST)
2. Second Invoice 31st May 2021 – Design upgrades and procurement of equipment and materials - $12,500 (ex GST)
3. Third Invoice 30th June 2021 – Progress payment - $15,000 (ex GST)
4. Fourth Invoice 30th July 2021 – Progress payment assuming Site Works completed - $25,000
5. Final Invoice on Practical Completion – Balance of Contract

(f) Provide details of proposed subcontractors.

Our Site Works, Operation and Maintenance team is headed up by Gary Green (see attached profile) who will also provide specialist input to Electrical and Control Systems scope. Gary will be supported by a qualified Operator/Maintainer Technician and will manage the subcontractors:

- SAGE Automation
- Krave Electrical

Subcontractors will be engaged and contracted under a purchase order with conditions, that clearly states the scope of work, and special requirements or standards, delivery times and price. Subcontractors when used on site will be supervised by our staff to ensure their practices comply with Council's requirements, particularly site security/access, fitness to work, safety and environmental controls. l

(g) Provide details of proposed suppliers.

- HACH Australia (instrumentation)
- Local plumbing and electrical suppliers (e.g. Reece Plumbing, Haymans Electrical, etc. as required)

(h) Provide details of key personnel.

Simmonds & Bristow provides proactive and preventative maintenance to ensure continual improvement to the maintenance and treatment systems at the sites we operate and maintain for our clients. Our aim is to reduce maintenance costs, increase asset reliability and extend asset life.

Our O&M services are also supported by highly qualified and experienced water treatment technical specialists in our Engineering and Scientific Services (ESS) unit. The ESS team helps clients get the most out of their water assets. They can assist with new plant design or commissioning, plant refits, environmental assessments and dealing with state environmental regulators. Their services include:
- Start-up and commissioning
- Planning & development support
- Repairs, optimisation and refits
- Design solutions
- Water and wastewater treatment design solutions
- Environmental assessment and analysis
- Sampling, testing and monitoring
- Environmental modelling
- Laboratory liaison.

see Attachment A - Proposal P2102-003_Eromanga WTP Upgradesfor more details-
1. Matthew Reid - Chief Engineer / ESS Manager - Water Engineering & Drinking Water Quality
2. Gary Green - Acting Operations & Maintenance Manager

All key management staff are covered by alternates. Key technical staff are also covered by alternates from the depth of expertise across the organisation. See the Alternatives below:

1. Terrence Allen - Senior Process Engineer - Process Support Water/Wastewater Engineer
2. Fiona Milnes - Environmental Scientist - Water Quality Scientific Support
3. Linda Nyamaswe - Environmental Engineer - Water Quality Scientific and Engineering Support
4. Stephanie Gaurvit - Process Engineer - Process Support Water/Wastewater Engineer
5. Amelie Perrault - Project Coordinator

(i) Provide dot point details of the proposed work methods to be adopted for the major items of work. Details should include type & number of construction plant &/or equipment to be used.

see Attachment A - Proposal P2102-003_Eromanga WTP Upgradesfor more details-

(j) Provide a list of alternative materials and/or equipment and their details, if alternatives are nominated.

N/A

(k) Area of Site required for the works, in particular if larger than what is provided for in the Contract.

The area listed in the scope of work and sited on inspection is sufficient.

(l) Status of Quality Assurance System/Accreditation.

BSI: ISO 9001:2015
Certficiate Number: FS 520982

SAI Global: Acknowledgement of Application
ISO 14001: Environmental
ISO 45001: 2018 Occupational Health and Safety Management Systems

(m) Public liability cover Policy No.

Insurance Company: Chubb Insurance Australia Limited
Policy Number : SGL0002728
Expiry Date: 28 August 2021
Indemnified Amount: AUD 20,000,000

(n) Workcover status.

Policy Number : WAA810766965
Expiry Date: 30 September 2021

(o) Provide a list of assumptions made in the tender.

These prices do not include:
- Design and installation of dedicated Data Historian and proprietary data trending software
- Licence costs involved with the SWIMS system
- Additional meetings other than those indicated in our offer (this proposal)
- Design or safety (e.g. HAZOP) workshops
- We have assumed that if successful we will be able to book accommodation in Eromanga for the duration of the Site Works (well in advance and avoiding peak tourist periods). If this is not possible we will require a variation order for the additional daily travel and expenses (vehicle and fuel) from Quilpie to Eromanga
- This proposal is valid for 30 days, from date of issue.

(p) Provide a list of any qualifications of the tender offer.

PartA - Item8 Contractor's security Partially Compliant
We will not provide a bank gurantee. We offer in substitution either 5% retention for security or a Bank Check in favour of council to the value of 5% of the Contract Sum.

PartA- 14 Delay Damages, rate (subclause 20.6) Non-Compliant
Simmonds & Bristow won't accept the delay damages.

PartA- Arbitration (subclause 27.3) Partially Compliant
Simmonds & Bristow requests that "Arbitration" be replaced with the "Mediation". We feel this is a more practical and sensible resolution method in this circumstance.

PartB-25A(c)(i) costs reasonably necessarily and not prematurely incurred by the Contractor up to the date of termination. Partially Compliant
Simmonds & Bristow don't accept this clause change to:

PartB-25A(c)(i) costs reasonably necessarily and not prematurely incurred by the Contractor up to the date of termination with 25% for profit.
The reason for this change is that if the Principle wishes to terminate the contract, we would include the profit earned and the cost of work to date. It is unreasonable only to pay the cost without the profit.

(q) Other information the tenderer may consider relevant to the tender.

1. Simmonds and Bristow Pty Ltd is a Brisbane-based, private Australian company. We provide an extensive range of scientific & engineering, operation & maintenance and operator training services for the water industry to Business, Industry and Government since 1965.

We currently have approximately 47 staff members, with a network of operation and maintenance staff from Far North Queensland to Perisher Valley (Southern NSW). Simmonds & Bristow are fully certified by national and international accreditations and licenses as below (see Attachment C-Certificates):

• All work is carried out in accordance with ISO9001, third party certified (BSI) quality assurance systems.
• NATA Accreditation ISO17025
• We offer the services of two RPEQ engineering professionals, David Bristow (RPEQ 3810) and Matthew Reid (RPEQ 17636)
• We hold a valid labour hire licence under the labour Hire (QLD) Act (License LHL-02237-P3R5M)
• Registered Training Organisation (RTO Code 1735) since 1995 for the provision of water and sewerage plant & network operator training.

2. Simmonds & Bristow (S&B) is committed to the health and safety of all people at the workplace and to complying with the safety requirements outlined in the tender documents. Our WHSMS documents and policies and the allied processes we have adopted are consistent with the requirements outlined in:
• Work Health and Safety Act 2011 (Qld)
• Work Health and Safety Regulation 2011 (Qld)
• How to Manage Work Health and Safety Risks Code of Practice 2011 (Qld).

TENDER FORM

Name of person, firm or company tendering USE BLOCK LETTERS: SIMMONDS AND BRISTOW .....

Address: 2/40 REGINALD ST, ROCKLEA, QLD, 4106 .....

Hereby tender(s) to perform the work for:

Description of works: **Eromanga Water Treatment Plant - Upgrades**

In accordance with the following Documents:

"The Tender Document – **Eromanga Water Treatment Plant – Upgrades"**

For the Lump Sum of

Total being (excluding GST):

$99,609.13.....

Dated this 19……day of March……2021

.....
Signature of Tenderer

SCHEDULE OF WORK

This is a Lump Sum Contract.

The Superintendent shall be notified immediately of any discrepancies in quantities or omissions discovered in the Schedule of Work.

The Schedule of Work is to be used as the basis for the assessment of Progress Claims during the Contract. Clause 2.1(a) of the Minor works contract conditions applies to this Lump Sum Contract.

Notes: All rates are to be exclusive of GST.

SCHEDULE OF WORK

ITEM	DESCRIPTION OF WORK	UNIT	QTY	RATE	AMOUNT
1	Establishment/ Insurances	Each	1	$17,055.50	$17,055.50
2	Prepare an Operation Manual (Category 1 items 1 to 9)	Each	1	$24,288.00	$24,288.00
3	Design, Install and Commission System Improvements (Category 2 items 10 to 17)				
3.1	Item 10 (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	Each	1	$11,643.50	$11,643.50
3.2	Item 11 Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.	Each	1	$1,364.00	$1,364.00
3.3	Item12 Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	Each	1	$990.00	$990.00
3.4	Item 13 Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	Each	1	$748.00	$748.00
3.5	Item 14 Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated.	Each	1	$682.00	$682.00
3.6	Item 15 Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	Each	1	$1,364.00	$1,364.00
3.7	Item 16 Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	Each	1	$17,188.88	$17,188.88
3.8	Item 17 Develop a system for the storage of sodium hypochlorite that results in shorter holding times.	Each	1	$5,260.75	$5,260.75
4	Investigate cause of elevated RO membrane EC and provide recommendation (Category 3)	Each	1	$3,608.00	$3,608.00

ITEM	DESCRIPTION OF WORK	UNIT	QTY	RATE	AMOUNT
5	Undertake a site inspection and system assessment 11 months after the date for practical completion	Each	1	$9,009.00	$9,009.00
6	General Cleanup / Disestablishment	Each	1	$6,407.50	$6,407.50
				Subtotal	**$ 99,609.13**
				GST (10%)	**$ 9,960.91**
				TOTAL	**$ 109,570.04**

Tenderer: Simmonds & Bristow Pty Ltd

Contact: David Bristow

Address: 2/40 Reginald Street, Rocklea QLD 4106

Telephone: 07 3434 3800 Fax: 07 3434 3899

Signature: Date: 19/03/2021

Email: sales@simmondsbristow.com.au

DAYWORKS RATES

These rates are to be held firm for the duration of the Contract. Plant Hire Rates are to include the operator.

LABOUR DESCRIPTION	RATE		
	NORMAL	TIME & HALF	DOUBLE TIME
Managing Director / Principal Engineer	$400 per hour	To be confirmed	To be confirmed
Chief Professional	$280 per hour	To be confirmed	To be confirmed
Project Manager	$280 per hour	To be confirmed	To be confirmed
Project Manager	$280 per hour	To be confirmed	To be confirmed
Senior Professional	$220 per hour	To be confirmed	To be confirmed
Professional	$160 per hour	To be confirmed	To be confirmed
Administrator	$90 per hour	To be confirmed	To be confirmed

PLANT DESCRIPTION	RATE
Not required	Not required
Not required	Not required
Not required	Not required
Not required	Not required
Not required	Not required
Not required	Not required
Not required	Not required
Not required	Not required
Not required	Not required

Tenderer: Simmonds & Bristow Pty Ltd

Contact: David Bristow

Address: 2/40 Reginald Street, Rocklea QLD 4106

Telephone: 07 3434 3800 Fax: 07 3434 3899

Signature: Date: 19/03/2021

Email: sales@simmondsbristow.com.au

Attachment A - Proposal P2102-003

Eromanga WTP Upgrades

Simmonds & Bristow Pty Ltd

The Regional and Remote Water Specialist

Proposal/Service Agreement

For

Eromanga Water Treatment Plant Upgrades

Quilpie Shire Council

Submitted

19/03/2021

SCOPE OF WORKS

The Eromanga water supply system consists of four sub-artesian bores, raw water storage, media filtration, Ultra-Violet (UV) disinfection, micron pre-filtration, Reverse Osmosis (RO) membranes and breakpoint chlorine disinfection. Quilpie Shire Council (QSC) has identified a range of process upgrades and plant improvements that will improve the facility's operation.

QSC seeks a suitably qualified and experienced water treatment specialist to carry out the upgrades and develop operation and maintenance documentation required to service the treatment plant.

The Scope of Works for the Eromanga Water Treatment Plant (WTP) Upgrade is divided into three (3) categories as outlined in the request for tender.

Category 1: Operations Manual

1. Prepare a procedure for opening of the media filters and the removal and replacement of the media.
2. Establish a formal monthly preventive maintenance task to observe backwash water flow through the site glass and record the time taken for the water to clear.
3. Trend pre and post media filter pressures and display these for easy access and interpretation, and process control changes.
4. Prepare a procedure for the operation and maintenance of the UV disinfection system.
5. Develop a schematic of the flow paths through the RO membrane units.
6. Trend pre and post RO membrane pressures and display for easy access and interpretation and process control changes.
7. Trend pre and post RO membrane EC and display for easy access and interpretation and process control changes, in particular membrane replacement.
8. Produce a comprehensive yet straightforward Operating Manual for the Water Treatment Plant – a maximum of ten pages if possible.
9. Document an ongoing maintenance program for the RO system, including follow up inspection and maintenance after completion of contracted works.

Category 2: System Improvements

10. (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.
11. Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.
12. Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.
13. Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.
14. Ensure that the chlorine tank low level alarm exists and functions and does shut the plant once activated.
15. Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.

16. Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.
17. Develop a system for the storage of sodium hypochlorite that results in shorter holding times.

Category 3: System Maintenance

18. Investigate the elevated post RO membrane EC and provide recommendations. (ie due to failed membranes, or faulty seals, etc.).

Simmonds and Bristow (S&B) have a highly experienced project team combining expertise from our Engineering and Scientific Services (ESS) and Operation and Maintenance (O&M) departments to deliver positive project outcomes for QSC. Our methodology below has been prepared to the requisite Scope of Works and where applicable we have introduced our Team's skills and experience to demonstrate our suitability for this project.

METHODOLOGY

Item 0: Establishment and Insurances

As part of establishment for this project, we propose the following activities:

1. Prepare Project Execution Plan (PEP), update Project Schedule and issue to QSC;
2. Prepare Project Safety Plan (PSP) and work specific Job Safety Procedures (JSAs, SOPs, etc.);
3. An Initiation (kick-off) Meeting (1.5 hours) via video conference with QSC Project Manager to discuss and confirm the project requirements and updated schedule;
4. Mobilisation of our Site Works Team to Eromanga for the Site Works phase of the project;
5. Accommodation, meals and expenses for the Site Works phase; and
6. Up to 4 monthly reports from our Engineering and Site Works Project Managers.

Our Engineering team is headed up by our Chief Process Engineer (RPEQ) Matthew Reid (see profile at Meet Our Team section). Matthew will be supported by Linda Nyamaswe who will be preparing the operational deliverables under Matthew's supervision (and specialist inputs). The Engineering team will be Brisbane based for the duration of the project (no site visit is planned during execution phase).

Our Site Works, Operation and Maintenance team is headed up by Gary Green (see profile at Meet Our Team section) who will also provide specialist input to Electrical and Control Systems scope. Gary will be supported by a qualified Operator/Maintainer Technician and will manage the sub-contractor inputs from one of our control systems specialist providers (SAGE Automation, Krave Electrical).

Item 1: Prepare procedure for opening of the media filters, and the removal and replacement of the media

Our Chief Engineer and drinking water specialist Matthew Reid (RPEQ) will oversee the development of an Operating Procedure that allows for the safe removal and replacement of the media at Eromanga WTP. From our site inspection we note that the media filters are of a type that does not have a removable "control head" and therefore there is a very limited opening within which to work as indicated in Figure 1.

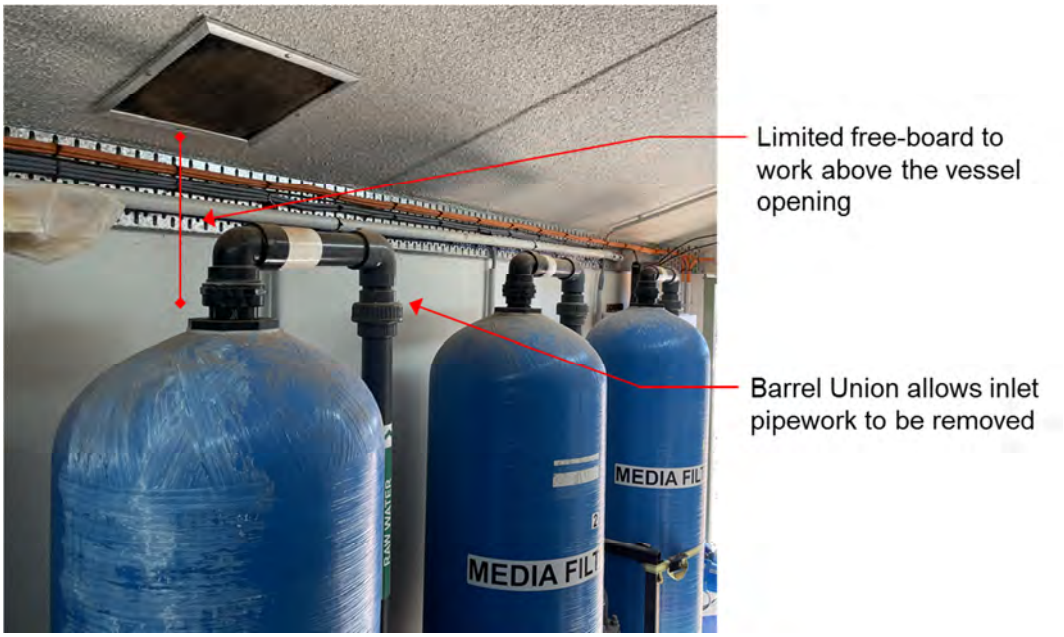


Figure 1: Media filter access

We expect that due to the very small opening at the top of the vessel that media can only be removed by vacuum and as such the procedure is required to ensure that all filter internals (i.e. filtrate collection and backwash manifolds or laterals) are protected from damage while the new media is gentle pumped into the vessel. We will work with QSC to ensure that all Workplace Health and Safety requirements are satisfied as well as QSC's internal requirements around work procedures involving lifting or working at heights (as appropriate).

The final solution will be dependent on these requirements with the main operational decision being the necessity to completely remove the vessels from the building or whether they can be unloaded and reloaded insitu. This will require a risk assessment to be carried out with QSC to ascertain the level of manual handling and other risks to the Operator/Maintainer that QSC are willing to accept.

Our Chief Engineer Matthew Reid has loaded media and resin into pressure vessels on a large scale and therefore has direct relevant experience in protecting both the media and filter internals from damage. He will use his experience which at this early stage may include emptying the media into an open Intermediate Bulk Container (IBC) so that water can be used to pump the slurry into the vessels insitu. The selection (or design) of suitable slurry pump (highly ruggedised given the application) as well as an injection lance that enables safe loading will be central to developing an appropriate solution (assuming removing the entire vessel is ruled out on safety and equipment damage concerns/risks).

Matthew has experience developing standard operating and maintenance procedures (SOPs) for desalination treatment plants for municipal and oil and gas industry clients and is highly confident that he can apply that knowledge to this application in way that is accessible and easy to follow (pictures/diagrams where appropriate and clear step by step procedural instructions).

Item 2: Establish a formal monthly preventive maintenance task to observe backwash water flow through the site glass and record the time taken for the water to clear

The backwash of the media filters should ideally be optimised so as to ensure that the media bed has been fully fluidised, the majority of particles dislodged and ejected with the backwash.

Relatively "clear" backwash water should be visible once this has sufficiently occurred, although the process should not be too long such that it begins to encroach on the plant availability (as the RO is offline while this is happening).

The monthly preventative maintenance task will be set up as "Work Instruction" (WI) that is similar to a standard operating procedure but more compact in appearance and with less pre-requisite information (i.e. procedure background, safety and other pre-requisites). The maintenance WI would be limited to 1-2 pages including space to record observations and backwash set-points.

When we are undertaking Item 11 (ensuring manual backwash can be triggered) we will also ensure that the filter backwash step duration is operator adjustable so that the time taken to water to clear can be updated directly into the PLC settings as part of the monthly maintenance task. The maintenance task should also allow for the removal and cleaning of the sight glass (actually a rotameter) as required.

Item 3: Trend pre and post media filter pressures and display these for easy access and interpretation and process control changes

From our site inspection and discussions with QSC we understand that the solution for trending pre- and post-media filter pressures does not need to be a complex digital solution with associated price tag. We believe this is appropriate for the level of instrumentation tags available as there will not be any economy of scale if the solution requires a dedicated Data Historian (data storage repository), and sophisticated Data Trending Software package The Hydrological report (Assessment of Operation of the Quilpie and Eromanga Drinking Water Supply Systems, 2018) recommends the adoption and use of the Statewide Water Information Management (SWIM) system. This appears to offer easy data entry with powerful trending and reporting capabilities at a cost lower than a data Historian.

In the first instance, we propose to carry out the required updates to the SCADA output to enable the trending to be established on the SWIM system for reporting and remote monitoring purposes, as well as provide a local update to the HMI display for the plant operator to view.

As an additional low-cost solution, we also propose a simple but elegant solution that will "mine" process values (PVs) from the existing SCADA at set intervals and store the data in an MS Excel Spreadsheet that we will pre-populate with trend pages (graphs for visualisation and interpretation).

For example, the SCADA will record the PVs for pre and post pressure readings at the top of each hour (adjustable with the PLC code only) and file these values in an MS Excel file which has been set-up to trend this data. The spreadsheet approach prevents the need for an expensive data logging (e.g. Historian).

We will however build in some features into the MS Excel Trend Pages so that trend analysis can be carried out, including:

- User adjustable (user entry) time periods for trend graphs (i.e. to view weekly or more targeted time period trend data)

- Locked calculations such as differential pressure (Item 3); normalised[1] RO pressures (Item 6), normalised RO Flow, and normalised electrical conductivity or salt passage (Item 7);
- Basic percentile data analysis based on user entered time period (e.g. 80th percentile or average result for the period); and
- Printable (QSC headers and footers) trend graphs with operational and action limits and summary plant performance data tables.

An example of the types of trends that we will be able to develop for QSC from SCADA is below.

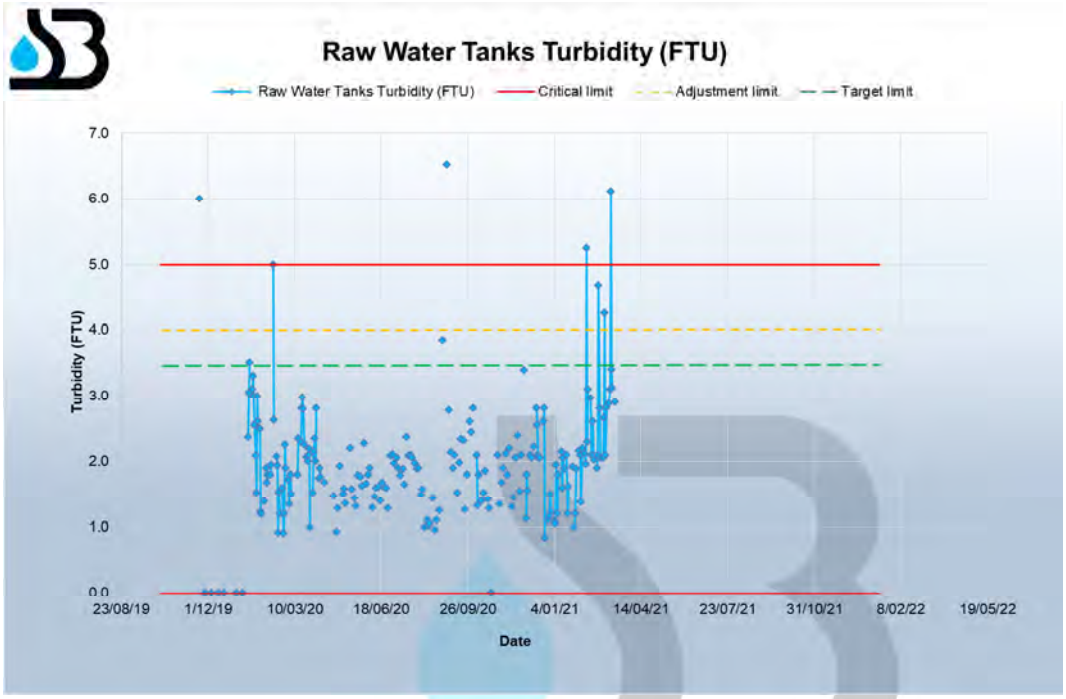


Figure 2: Example trend page

Item 4: Prepare procedure for the operation and maintenance of the UV disinfection system

UV Lamps contain an amalgam which contains a small quantity of mercury (<100mg). Mercury can be cleaned up easily from the following surfaces: wood, linoleum, tile and any similarly smooth surfaces with manageable safety precautions. However, if the spill occurs on carpets, curtains, upholstery or other absorbent surfaces, these contaminated items should be thrown away in a manner that does not introduce risks to the Operator or Maintainer and the persons removing or handling the waste.

As per Item 1, our lead process engineer (RPEQ) and project manager Matthew Reid has extensive experience developing and rolling out operating procedures that are informative, safety focussed, with a good balance of prescriptive steps and visual aids (photos and diagrams).

He has prepared UV centric operation and maintenance procedures for various UV makes and models and is therefore well placed to provide a procedure that adequately addresses and manages the risk to the Operator that UV lamps can present.

[1] RO process pressure, flow and salt passage data must be normalised (applying calculations with temperature) to account for change in viscosity of water as changes temperature changes. Normalised data allows for a more comprehensive operational monitoring and scheduling of membrane cleaning based on performance (e.g. > 10% reduction in normalised RO Feed Flow may trigger CIP).

We assume the UV system requires a single combined procedure with the following sub-sections:

1. UV Lamp Removal, Cleaning and Replacement
2. UV Quartz Thimble Removal, Cleaning and Replacement
3. Mercury Spill Cleanup and Disposal.

An example of the level of SOP detail that can be included on request is shown in the Figure below.

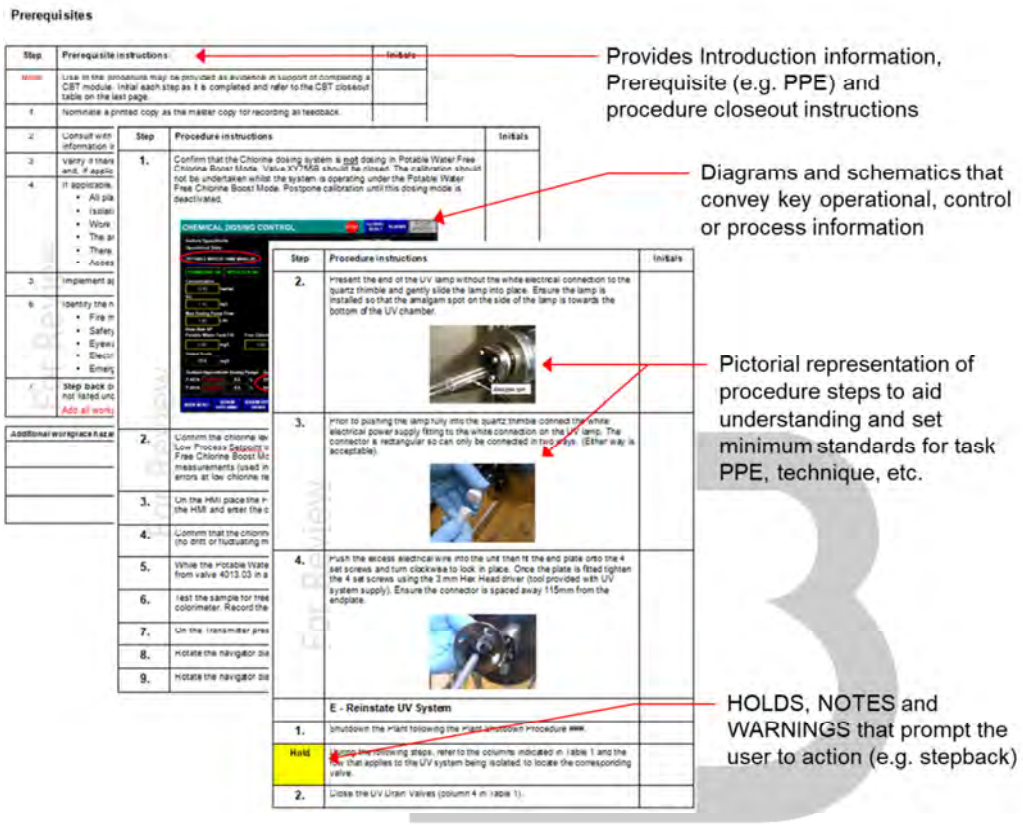


Figure 3: Example Standard Operating Procedure outputs

We are not proposing to send our Engineering team to site to gather the required photographs, and field test (review and update) the procedures, but we are nonetheless confident that our draft procedures and review provided to our Site Works team will be sufficient to produce a high quality procedure that meets all necessary QSC and OH&S requirements.

Item 5: Develop a schematic of the flow paths through the RO membrane units

QSC require a simple and accessible process schematic that will describe the treatment plant process and installation at Eromanga. As part of the this project we propose to develop a proper Process Flow Diagram (PFD) that will contain the bores, tanks and unit processes on a single page and also include a mass balance of the process (hydraulic flows). We will prepare this using our process modelling software AqMB as this will also form part of our investigations at Item 18 (Investigate elevated post RO membrane EC).

This PFD will be suitable to use for O&M and Engineering purposes.

Once the PFD is finalised we will produce a compact and visually appealing process schematic that:

- Displays the major processes, tanks and bores in using standard process symbology
- Shows the major pipework including where pipework enters and exits below ground as well as inside and outside the WTP building; and
- Shows the major instrumentation and control interactions between the bores and WTP; and
- Shows the major safety or process protection related interlocks or shutdown/control functions e.g. treatment plant shut-down based on low low sodium hypochlorite storage level.

Item 6: Trend pre and post RO membrane pressures and display for easy access and interpretation and process control changes

See methodology at Item 3

Item 7: Trend pre and post RO membrane EC and display for easy access and interpretation and process control changes, in particular membrane replacement

See methodology at Item 3

Item 8: Produce a simple yet comprehensive Operating Manual for the Water Treatment Plant – maximum 10 pages if possible

We believe that the most of the key information and background context required for the Standard Operating Procedures and Work Instructions can live within those documents so as to not clutter the Operation and Maintenance Manual (O&M) Manual. The O&M Manual can therefore be more targeted and specific information/background can be referenced as appropriate (e.g. further information can be found at *SOP: UV System Maintenance*).

The O&M Manual therefore needs to be an accurate representation of the plant that describes the operation and maintenance in an accessible manner and references the documents where more detailed descriptions and information can be found. The contents of the O&M Manual are proposed as follows:

- Introduction and general description – 0.5 to 1 page dedicated to introducing the supply system and importance to the town of Eromanga.
- Process description – 1 to 2 pages with an accessible description of the control interaction between the bores and WTP, the basic (high-level) description of the process, and interaction with the treated water storage and potable water reticulation network.
- List of O&M Procedures – 1 page listing all the relevant SOPs and WIs associated with the operation and maintenance.
- Operational monitoring – 0.5 to 1 page describing the various tools available for monitoring the process and water quality (SCADA and trend pages). This section should present basic level operational guidance on what the risks to the process or water quality are if the system goes outside of its "safe operating envelope" and what the corrective actions should be (would not include detailed process engineering requirements or advice, but would provide some guidance as to what needs to be monitored and possible implications to the plant or water quality). The operating envelopes should set out normal and abnormal

operating ranges for key equipment/processes e.g. RO Feed Pressure would be shown with a normal operating envelope (green zone) with upper and lower pressure values (process high and low setpoints), abnormal operating envelope (amber zone) with high (PAHH) and low (PALL) setpoints (usually with a shut-down or inhibition function), and some remark/comment on process or safety implications of the system going outside these envelopes (e.g. prevents RO from operating or shuts down the WTP).

- Maintenance strategy – 1 to 2 pages describing the overall maintenance strategy e.g. equipment redundancy, assets/equipment with preventative maintenance (PM) or corrective (i.e. run-to-fail) maintenance (CM), frequency of inspections and PM/CM tasks and reference to specific maintenance procedures or plans.

This format can be amended to place more or less emphasis on certain areas that QSC sees as more critical to the end user of this document.

Item 9: Document an ongoing maintenance program for the RO system, including follow up inspection and maintenance after completion of contracted works

The information summarised in the O&M Manual will be summarised from a separate Eromanga WTP Maintenance Strategy document that will be produced as part of Item 9. The maintenance strategy will be worked up in consultation with QSC but would typically detail:

- *An inspection tasks list:* i.e. what visual (see) and auditory (listen) inspections are carried out routinely and what corrective actions are required if faults or degradation/deterioration is observed.
- *Functional testing task list:* e.g. annual (or periodic) function testing of key control equipment like actuated valves, duty pump switching, etc.
- *Hard time component replacement schedule:* tasks and schedule for replacement of "fixed-run" type items such as cartridge filters replacement, motor lubricants, and other consumable type plant and equipment.
- *Critical Spares schedule:* a list of critical spares i.e. items that would otherwise cause the plant to be offline for days/weeks if not sourced ahead of possible failures e.g. dosing pumps
- *Other:* any other requirements to manage the integrity or reliability of the asset e.g. integrity inspections of tanks and penetrations, chemical stores, etc.

Item 10: (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes

QSC has been advised previously that the WTP container *"has not been well designed for maintenance access of either the media filters or RO membranes"* (Assessment of Operation of the Quilpie and Eromanga Drinking Water Supply Systems, Hydrological Pty Ltd, 2018). While this is true to an extent, the true impact to QSC as the operator/maintainer of the WTP may be negligible when the maintenance access requirements over the life of the plant are considered.

With regard to accessing the RO membranes, these are heavy and bulky to manually handle (16-18 kg fully wetted) but it must be noted that there are only six (6) membrane elements (three membrane vessels each containing two (2) RO membrane elements each or a total of six (6) RO elements) that would need replacing every 4-7 years (based on raw water quality, design configuration, pre-treatment and management i.e. cleaning regimes adopted).

Considering that there are possibly 3-4 occasions during the life of the plant when access is required, this would typically not justify the cost of moving the CIP system to reduce the effort involved in carefully handling and managing removal (and subsequent replacement) of 6 membrane elements.

If the installation had multiple RO trains and racks that could not be easily accessed then this lack of easy access is obviously compounded over a much larger maintenance task. But for Eromanga WTP we believe that the effort and cost involved in moving the CIP Tank may not be justified against the actual risk of adequate maintenance access.

The general mode of replacing membranes is to load the elements from the raw water Feed side so that they can be pushed up against the thrust cone (or thrust ring) at the RO Concentrate side although this is a convenience measure and not insurmountable (i.e. can be carefully loaded from either end).

At Eromanga WTP the RO is set up as a two (2) stage system with the Stage 1 vessels in parallel (bottom two vessels) and the Stage 2 vessel picking up the RO concentrate from Stage 1 and filtering the flow in the reverse direction as indicated below. The RO concentrate from the Stage 2 vessel then exits the skid through at the top as indicated in Figure 4.

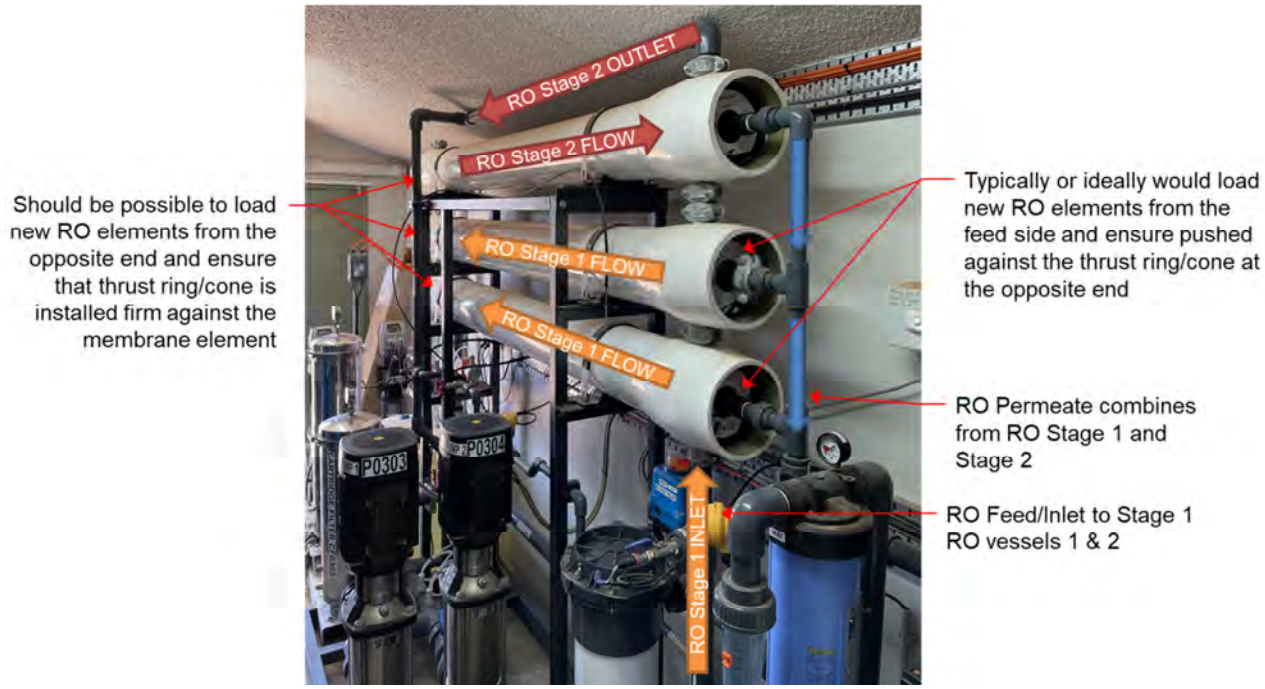


Figure 4: Flow path of Stage 1 and Stage 2 RO

As indicated in Figure 4 the general method for loading RO membranes (elements) is to remove both the feed and concentrate end-caps and pull the elements out by pushing a feeding a rope up the permeate tube (and anchoring at the far end). This is essential for long vessels with more than 5 membranes because it is not physically possible to remove the membrane otherwise. It is also easier to clean and lubricate the inside of the vessel prior to reloading if both end caps are removed.

With only 2 RO membranes/elements per vessel this logistical challenge is far simpler. It should be possible to remove the end caps at both ends (there are dismantling joints/barrel unions on the permeate header pipework) and push (or pull) the membranes to the opposite end of Figure 4. Similarly it is possible to load the new RO elements from the same end and push into place prior to

reinstating the thrust cone/ring at that end. The elements can then be shimmed (install spacers to reduce hydraulic shock of RO start-up and shutdown) from the Feed End as per normal loading procedure.

That said, the logistics of installing the CIP skid on the outside of the container is not complicated and can be easily achieved provided sufficient time is allowed for the uPVC and cPVC glued joints to cure (approximately 24 hours). The installation requirements are indicated in Figure 5.

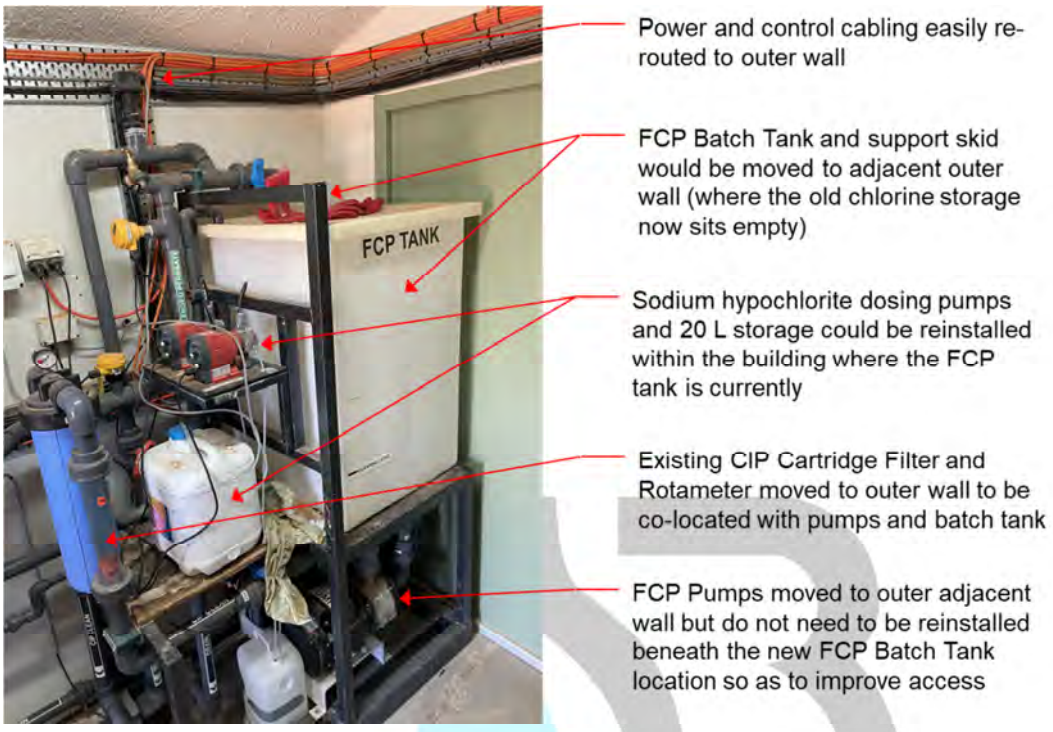


Figure 5: Installation details/requirements for moving CIP Tank and pump set

If the town reservoir cannot accommodate greater than 2 days supply then tankered potable water supply will need to be considered by QSC (included in the overall project cost). If QSC would prefer S&B to manage this we can provide this service as a variation order (VO) or separate proposal as preferred. The cost of providing potable water to Eromanga is otherwise not included as costings (here or for other Items).

Item 11: Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this

We have prepared a project schedule that minimises the involvement of specialist labour, however the use of specialist sub-contractors is unavoidable for S&B. We will engage a PLC Coding and Programming specialist engineer that will join the Site Works Team onsite at the appropriate time.

Prior to undertaking the site PLC and SCADA works we will require access to the PLC code to allow the PLC Engineer sufficient time to assess the PLC code and match this to the required functionality (using the original process description, control philosophy, and/or functional specification). The PLC/SCADA programming will be done prior to our sub-contractor mobilising to site so as to ensure that quality assurance reviews and checks are carried out more efficiently.

Our Team will then update the appropriate document (control philosophy or FD) to provide an "as-commissioned" record of the changes and upgrades to the PLC code to achieve manually triggered backwashes.

We expect that required features e.g. "Manual Backwash", "Pause Backwash", etc. HMI functions (user selectable HMI buttons) will be resolved through a review of the changes with QSC prior to implementation. We have allowed for this review step in our schedule.

Item 12: Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly

We will undertake a desktop review of ADWG, USEPA, WHO, and other drinking water quality references to ascertain what EC (salinity) is generally acceptable to end users of potable water supply schemes. We will also review any qualitative data that QSC may have available (e.g. customer complaints on drinking water quality from the visitor centre) and attempt to match these to WTP process and water quality data in order to determine the influence of local experience.

Item 13: Modify the SCADA to include an operator adjustable EC setpoint on the touch screen

The PLC programming of the EC Operator Adjustable Setpoint will be undertaken in conjunction with (and to the same methodology) of the backwash PLC upgrades described at Item 11.

Item 14: Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated

The PLC programming of the level alarm low low (LALL) will be undertaken in conjunction with (and to the same methodology) of the backwash PLC upgrades described at Item 11.

Functional testing of the LOW LOW shutdown will be undertaken as part of testing and commissioning where we will physically force a signal to the instrument and record that the required plant response (plant shutdown) occurs.

Item 15: Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure

The PLC programming of the chlorine dosing pump duty switch will be undertaken in conjunction with (and to the same methodology) of the backwash PLC upgrades described at Item 11.

Functional testing of chlorine dosing pump duty switching will be undertaken as part of testing and commissioning where we will physically force a signal to the instrument and record that the required plant response (plant shutdown) occurs.

Item 16: Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing

To ensure a representative sample flow across the new residual free chlorine analyser we propose to break-in (tie-in) to the treated water transfer line as indicated in Figure 6 and install new sample line pipework to an agreed location in the WTP building.

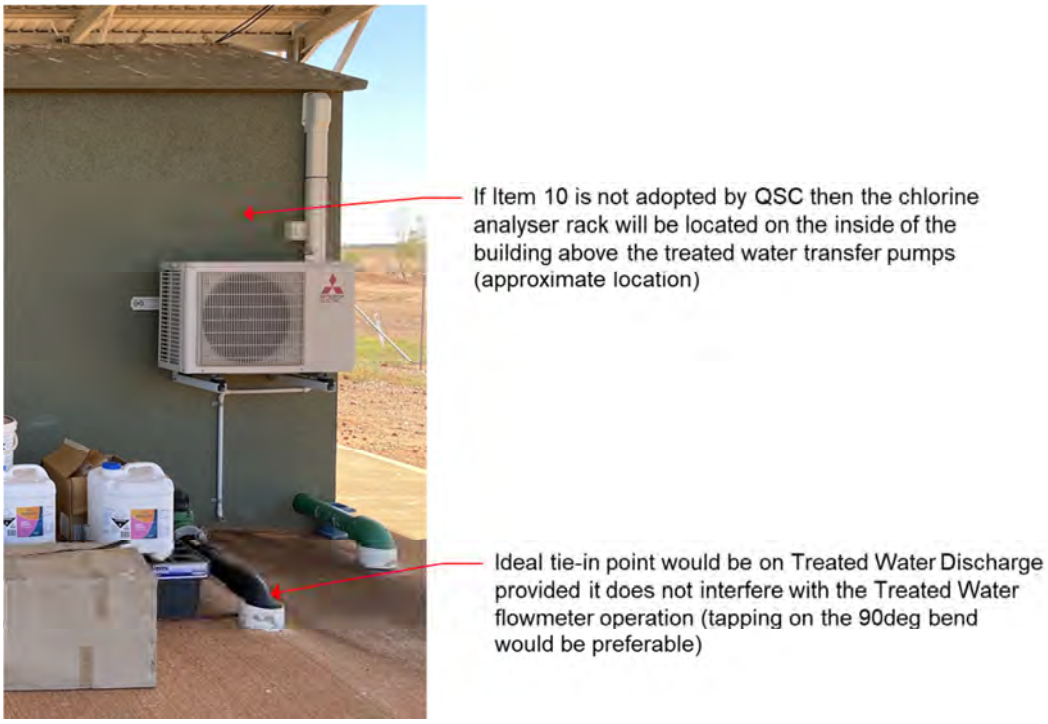


Figure 6: Tie-in point for chlorine analyser sample line

If Item 10 (moving the CIP Tank and pump set) is not adopted by QSC then the only available location for the analyser rack is above the treated water transfer pumps on the inside of the building (protected from weather).

However, if QSC does adopt Item 10 then we propose that the analyser be installed along-side the newly located chlorine storage and dosing area (where the CIP tank is currently).

We are not aware of QSC's preferences and have selected a reliable and reputable supplier for the supply of the analyser, pressure regulator, and associated installation components. The HACH CL17sc (colorimetric method).

QSC has not indicated whether dosing control (e.g. dose rate "trimming" based on instrument feedback) is required from this instrument, however given RO permeate quality is fairly consistent we do not believe this is necessarily required and dose rates will be reasonably constant once set.

If however QSC decide that feedback control is required then we will incorporate a controller and PLC coding under a variation order (VO).

Item 17: Develop a system for the storage of sodium hypochlorite that results in shorter holding times

Through site inspection we believe QSC has already resolved some of the operational issues identified by the consultant, in particular the long suction lines and suction problems this included in the past. The current installation is not however bunded and this would need to be resolved as part of the upgrade project.

The final design of the sodium hypochlorite storage will however depend on whether or not Item 10 (moving the CIP Tank) is adopted by QSC.

If QSC decides to implement Item 10 and move the CIP Tank and pump set to the outer side of the building then we would recommend moving to 20 L drums (carboys) rather than the previously used 60 L drums and installing the Sodium Hypo carboy onto mounted bund as shown in Figure 7.

Figure 7: Bunded decant stand for sodium hypochlorite storage if CIP Tank is moved

The Chlorine Dosing Pumps will be moved on a wall mounted bracket to sit at or just below the now elevated sodium hypochlorite storage so that the suction is always flooded. The chlorine analyser will also be wall mounted in this location.

If however the CIP Tank is retained in its current location then we would suggest retaining the hypo dosing pumps and current location of the 20 L storage as is, and installing a tray style 20 L chemical bund underneath the current location.

Figure 8: Sodium Hypochlorite bunding solution if CIP tank retained in current location

The associated costs with moving the CIP Tank and pump set is captured in our provisional lump for Item 10 (item 3.7 in the returnable schedule) and therefore the costs included in this Item are for supply of the bund (similar in cost) and associated works. This means that the price is fixed regardless of whether the CIP Tank is moved and all associated costs are captured in that provisional sum.

Item 18: Investigate the elevated post RO membrane EC and provide recommendations. (i.e. due to failed membranes, or faulty seals, etc.)

Our Engineering team will review all of the available operating and water quality data that has caused this concern to be raised. It is possible that the cause is due to a cracked inter-connector ports (connection between membrane elements) or rolled o-ring which is quite common on RO Systems that have not been properly "shimmed" at installation (filling up the lateral space between the end cap and the first module with packers).

We will prepare a procedure (work instruction) for our site team to undertake RO vessel conductivity profiling to confirm this is not the case. This involves inserting tubing into the permeate collection pipe (the inner pipe in which permeate collects under near atmospheric pressure, i.e. once the osmotic pressure has been overcome) and extending the tubing along the full length of the permeate pipe and measuring the conductivity at set intervals.

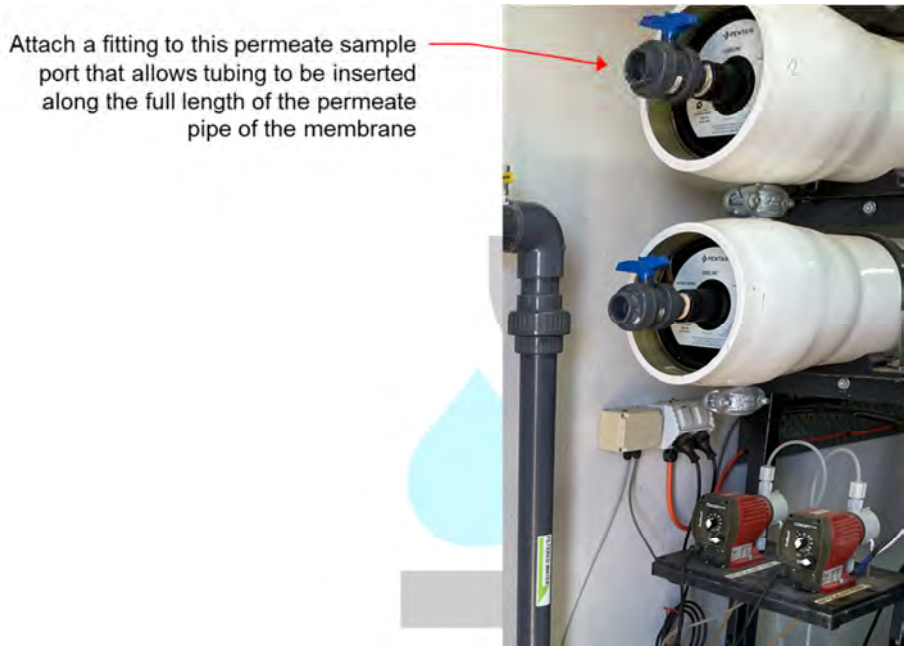


Figure 9: RO Membrane Conductivity Profiling

We have included this profiling exercise as one of the activities to be conducted by our Site Works team under the direction of Chief Process Engineer, Matthew Reid.

We will provide a written report of the analysis and interpretation of the process and water quality data as well as the outcomes of the conductivity profiling described above, including recommendations. If the profiling does indicate an issue then it will be necessary to remove and replace the offending/faulty RO element and/or interconnector(s) and properly shim the vessel on reinstatement.

This activity is not included in our price and would need to be carried out under either a variation order or separate works proposal.

DELIVERABLES

The deliverables for this project are shown against the Scope Items as follows.

Scope of Works ITEM No.	DELIVERABLES LIST
Item 0: Establishment and Insurances	• Project Execution Plan (PEP) • Project Safety Plan (PSP) • Project Inception Meeting agenda and meeting minutes • Monthly Progress Reports
Category 1: Operations Manual	
Item 1: Prepare a procedure for opening of the media filters, and the removal and replacement of the media.	Draft and Final SOP
Item 2: Establish a formal monthly preventive maintenance task to observe backwash water flow through the sight glass and record the time taken for the water to clear.	Draft and Final Work Instruction
Item 3: Trend pre and post media filter pressures and display these for easy access and interpretation and process control changes.	Draft and Final Data Storage and Trend MS Excel Spreadsheet
Item 4: Prepare a procedure for the operation and maintenance of the UV disinfection system.	• Draft and Final SOPs: ▪ UV Lamp Removal, Cleaning & Replacement ▪ UV Quartz Thimble Removal, Cleaning & Replacement ▪ Mercury Spill Cleanup & Disposal
Item 5: Develop a schematic of the flow paths through the RO membrane units.	• Draft and Final Process Flow Diagram (for engineering use) • Draft and Final Process Schematic (for general use)
Item 6: Trend pre and post RO membrane pressures and display for easy access and interpretation and process control changes.	Draft and Final Data Storage and Trend MS Excel Spreadsheet
Item 7: Trend pre and post RO membrane EC and display for easy access and interpretation and process control changes, in particular membrane replacement.	Draft and Final Data Storage and Trend MS Excel Spreadsheet
Item 8: Produce a simple yet comprehensive Operating Manual for the Water Treatment Plant – maximum 10 pages if possible.	Draft and Final Operator Manual
Item 9: Document an ongoing maintenance program for the RO system, including follow up inspection and maintenance after completion of contracted works.	Draft and Final RO WTP Maintenance Strategy (report)
Category 2: Systems Improvements	
Item 10: (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	• Redline markup of existing P&IDs • Final Commissioning Report

Scope of Works ITEM No.	DELIVERABLES LIST
Item 11: Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.	• Red-line markup of PLC Code • Revised and "As-Commissioned" Control Philosophy or Functional Description
Item 12: Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	*Technical Memorandum:* Investigation on acceptable EC of Treated Water for Eromanga WTP
Item 13: Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	• Red-line markup of PLC Code • Revised and "As-Commissioned" Control Philosophy or Functional Description
Item 14: Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated.	• Red-line markup of PLC Code • Revised and "As-Commissioned" Control Philosophy or Functional Description
Item 15: Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	• Red-line markup of PLC Code • Revised and "As-Commissioned" Control Philosophy or Functional Description
Item 16: Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	• Red-line markup of existing P&IDs • Red-line markup of PLC Code • Red-line markup of General Arrangement and Sections (if existing, no new drawings proposed) • Instrument calibration certificate and other supplier documentation (e.g. NSF61 certification) • Revised and "As-Commissioned" Control Philosophy or Functional Description
Item 17: Develop a system for the storage of sodium hypochlorite that results in shorter holding times.	• Redline markup of existing P&IDs • Final Commissioning Report
Category 3: System Maintenance	
Item 18: Investigate the elevated post RO membrane EC and provide recommendations. (ie due to failed membranes, or faulty seals, etc).	*Technical Memorandum:* Investigation of elevated RO Permeate EC for Eromanga WTP

We assume that CAD versions of existing process drawings and arrangements, sections, etc. are available and will provide electronic markups (red-line) to all amended drawings. The updated CAD files will be provided prior to practical completion.

All documents, plans, drawings produced will be issued in soft copy only or in portable document format (PDF).

OUR PROJECT TEAM

We offer a highly experience Engineering team lead in Matthew Reid. Matthew is RPEQ qualified and will either directly carry-out or oversee all process designs and investigations. Matthew's profile is provided below.

Matthew Reid | Project Manager for Category 1 and RPEQ Process Engineer

Qualifications

IChemE – chartered member (MIChemE)

Engineering Council – chartered member (CEng)

Board of Professional Engineers of Queensland – registered professional engineer (RPEQ)

About Matthew

Matthew is an RPEQ Chemical Engineer (RPEQ No. 17636) with 20 years' experience in design, construction, commissioning and operation. He has worked on water projects across the municipal, industrial and petroleum/gas sectors, including conventional water treatment and desalination projects in Australia and South Africa.

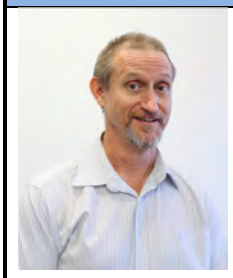
Industry Experience

Matthew is a critical thinker and is adept at identifying process, operational, and water quality risks in drinking water supply schemes and delivering practical solutions that are based on operational, process and water quality risks. Matthew's relevant project experience includes:

- Operational Readiness documentation (i.e. plans, operating procedures, etc.) for the following water assets as part of the Santos GLNG Project
  - 20 MLd Fairview Brackish Water (BWRO) Desalination Plant with Actiflo clarification, breakpoint chlorination, chloramination, pressure multi-media filters (MMF), SAC Ion exchange (IX), 3 stage RO, and calcium chloride remineralisation
  - Dawson River Discharge Scheme
  - 10 MLd Roma Brackish Water (BWRO) Desalination Plant as above
  - 9 MLd membrane deoxygenation plant
  - Roma Managed Aquifer Recharge scheme
  - 3 x Potable Water Treatment Plants (UV and chlorination)
  - 3 x Oily Water Treatment Plants
- Jorf Lasfar Desalination Plant Phase II+ Expansion project: Process design review and specialist input to design, contract documents and commissioning deliverables for 70 ML/d DAFF, UF, 2 pass SWRO, Remineralisation, upgraded to 122 ML/d.
- Springvale Mine Water Treatment Project: Process design review and specialist input to design and commissioning deliverables of 42 ML/d Actiflo, MMF, 4 Stage Brackish Water RO, Brine Crystalliser.
- Heron Island RO WTP condition assessment and RO membrane replacement.

Matthew will be supported in the engineering works by Linda Nyamaswe (CV attached).

Gary Green | Project Manager for Category 2 & 3 and PLC Engineer/Specialist



Qualifications

Bachelor of Electrical and Computer Engineering

COMPTIA A+ Certification in Hardware & Operating Systems

About Gary

Gary brings 10 years of knowledge and practical operational understanding of the S&B team. He is an experienced Engineering Technician with a demonstrated history of working in the environmental services industry, specialising in water and wastewater. As an electrical engineer, Gary provides high-quality service and customer support to enhance client's plants so they operate efficiently and effectively, ensuring full compliance in health and safety, quality and environmental management policies and engineering standards.

His specialty includes management and maintenance of process control/monitoring systems as well as scoping and costing works involved in the installation and ongoing maintenance of plant components, overseeing works carried out and writing condition reports.

Industry Experience

- Alpha WTP and Jericho WTP Electrical and PLC Upgrade Project (Barcaldine Regional Council)
- Couran Cove Irrigation System Design Review and Upgrade Planning

	• Maintenance and Operation supervision of: o Cedar Lake Resort WTP & STP o Couran Cove Resort WTP & STP o Heron Island Resort WTP & STP

Gary will be supported by his Team of Operator/Maintainers (technicians) for the Site Works component as well as having specialist input and review responsibility for many of the engineering and O&M deliverables. Gary will also use his design and operational experience in managing our specialist subcontractor.

TIMELINE – PROJECT SCHEDULE

Refer to the attached schedule.

POSSIBLE COMMENCEMENT DATES

The project can be commenced within 10 days of receiving proposal acceptance and purchase order.

PRICING

Refer to the attached Returnable Schedule for full Pricing against Scope of Works Items.

OUR CLIENTS

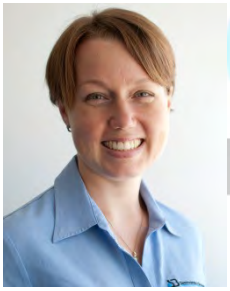
MEET THE TEAM

David Bristow
Principal Engineer / Managing Director
Water & Wastewater Engineering

Matthew Reid
Chief Engineer / ESS Manager
Water Engineering & Drinking Water Quality

Gary Green
Acting Operations & Maintenance Manager

Terrence Allen
Specialist Process Engineer
Water & Wastewater Process Engineering,
Process Modelling & Design



Fiona Milnes
Environmental Scientist
Environmental Science, Compliance
and Environmental Modelling

Stéphanie Gauvrit
Water & Wastewater Engineer

Linda Nyamaswe
Graduate Engineer
Environmental Engineering
and Pollution Control

Robert Beckerton
Field Service Coordinator
Environmental Science

WHY USE SIMMONDS & BRISTOW?

Simmonds & Bristow is an integrated consultancy that helps you ensure good clean water from catchment to cup and back again.

With Simmonds & Bristow, you can stay compliant, stay safe and protect the environment.

We offer:	We have clients in:
• Environmental Science • Process Engineering • Operator Training • Field Services • Operations and Maintenance • Relief Operators • Permanent Operators	• State Government • Local Government • Hospitality • Tourism • Mining • Water Utilities • Manufacturing • Aged Care • Transport • Education

Our clients call on us to help them make sure the water they make or consume meets their health and safety or operational requirements. We also work with clients to ensure they produce water of all kinds, including sewage sourced or industrial process effluent that meets the regulatory requirements of their operational licences.

We also help many developers and other organisations that are planning activities which might impact on the water, air or land in the environment.

Our clients are often independent of metropolitan water and sewage supplies because they are in remote or regional areas or must process their effluent prior to discharging to the environment, irrigation or the sewer.

Environmental Science

Our environmental consultancy comprises qualified and competent environmental scientists, who are experienced in a broad range of environmental services:

- Assistance in communication and liaison with the Department of Environment and Science (DES);
- Development application support;
- Environmental assessments and audits;
- Hazard assessment and risk analysis;
- Modelling and design of stormwater management systems;
- Water and soil monitoring programs;
- Sample collection;
- Results interpretation and compliance reports; and
- Environmental licensing and management plans.

You can rest assured we've got you covered when it comes to compliance and environmental issues. We relieve you to focus on managing and growing your business, instead of on environmental compliance.

Process Engineering

Our experienced engineering consultancy team has successfully designed, commissioned, audited, upgraded and monitored a variety of water and wastewater treatment plants and distribution / collection systems all over Australia and its near neighbours.

Our engineers are competent in all facets of water and wastewater treatment, and can provide troubleshooting advice when you need it most, to prevent problems and save you time and money. They work closely with scientific Team to develop cost effective solutions using the most proven yet up to date technology available.

What's more, our engineers are available to speak with you directly to assist with any technical inquiries you may have.

Expert Witnesses

Our environmental scientists and engineers can provide expert advice to your legal Team and present the facts to support or defend your application. Our dedication to science as the basis for the truth has earned the respect of both councils and developers. We are here to solve environmental problems others have deemed too difficult.

Field Services

Hire an environmental officer to assist you resolve environmental concerns. They will typically have significant experience in sampling and performing field tests on waters and soils. They are thoroughly experienced in on-site investigations and environmental monitoring. Typical works our environmental officers carry out include:

- Environmental sampling
- On Site testing
- Keeping and maintenance of records

Fully Supported Routine Operations & Servicing

Simmonds and Bristow can provide a fully supported operator to comprehensively operate and maintain the client's plant. Operators have full back up support from our scientists and engineers at all times whether this over the phone or on-site as required. If a service vehicle is included in the package, it will be fully kitted out with tools, test gear, PPE and other operational and safety equipment. It is S&B's responsibility to cover all leave requirements, training, WHS and human resources requirements. This service is generally covered by a formal service agreement and is long term - a number of years.

Relief Plant Operator

This is where Simmonds and Bristow provide relief plant operators to cover for the client's permanent staff being on leave, away at training, or awaiting replacement. The relief operator can also be deployed to provide the client with a back-up operator during major events or maintenance programs. Each Relief Operator will possess a combination of qualifications, experience, and skills that meet or exceed the requirements of the client's brief. The assignments are generally short term (1 week to 2 months), are not covered by a service agreement, do not have full back-up support and do not include a service vehicle or equipment.

Simmonds & Bristow is a registered labour hire provider under the Labour Hire Licensing Act 2017 (QLD) (License LHL-02237-P3R5M) and we are pleased to be able to provide you with the support that you need.

Registered Training Organisation (RTO)

Simmonds & Bristow has been providing training to the Water and Wastewater Industry for almost 30 years. As a Registered Training Organisation (National Provider Code:1735) delivering nationally recognised training in the new National Water Industry Training Package, we are able to provide the following qualification outcomes:

- Certificate II in Water Industry Operations (NWP20119);
- Certificate III in Water Industry Operations (NWP30219);
- Certificate IV in Water Industry Operations (NWP40515);
- Certificate IV in Water Industry Treatment (NWP40615); and
- Diploma of Water Industry Operations (NWP50118).

NATIONALLY RECOGNISED TRAINING

Please note: enrolments will only be accepted into superseded qualifications on the basis that the learner commits to full course completion prior to the mandatory teach out period ending or agrees to transition to the current qualification prior to the mandatory teach out period ending.
Plus Short Courses and workshops in:

- Water and Wastewater Treatment Plant Operation;
- Environmental Sampling;
- Swimming Pool Operations;
- Using and evaluating laboratory results;
- Acid sulphate soils; and
- Soil classification.

Our newly developed course material is delivered by industry-based professionals, who bring both technical expertise and practical experience to the learning environment. Our flexible competency based approach means we are able to deliver training that suits your needs - i.e. in-house, on-site, vurtuallyand by correspondence or using our e-learning platform.

A diverse range of elective units are available to meet our learners vocational requirements.

We are able to provide our learners, through industry-focused training, very significant **benefits** to their workplace including:

- The optimisation of current processes and development of tools to solve operational problems;
- Reduction of operating costs;
- Reduction of infringements relating to environmental, safety and/or public health obligations;
- Increased observation skills, recognition of and protection of critical assets;
- Development of workforce flexibility through multi-skilling;
- Increased life expectancy of capital assets through improved maintenance routines; and
- Greater workplace satisfaction, through understanding how task roles and activities support the outcome.

Our training of your personnel to specific competency levels ensures organisations comply with two important statutory obligations, namely:

1. Prevent environmental harm; and
2. Be pro-active and exercise due diligence.

CUSTOMER SERVICE

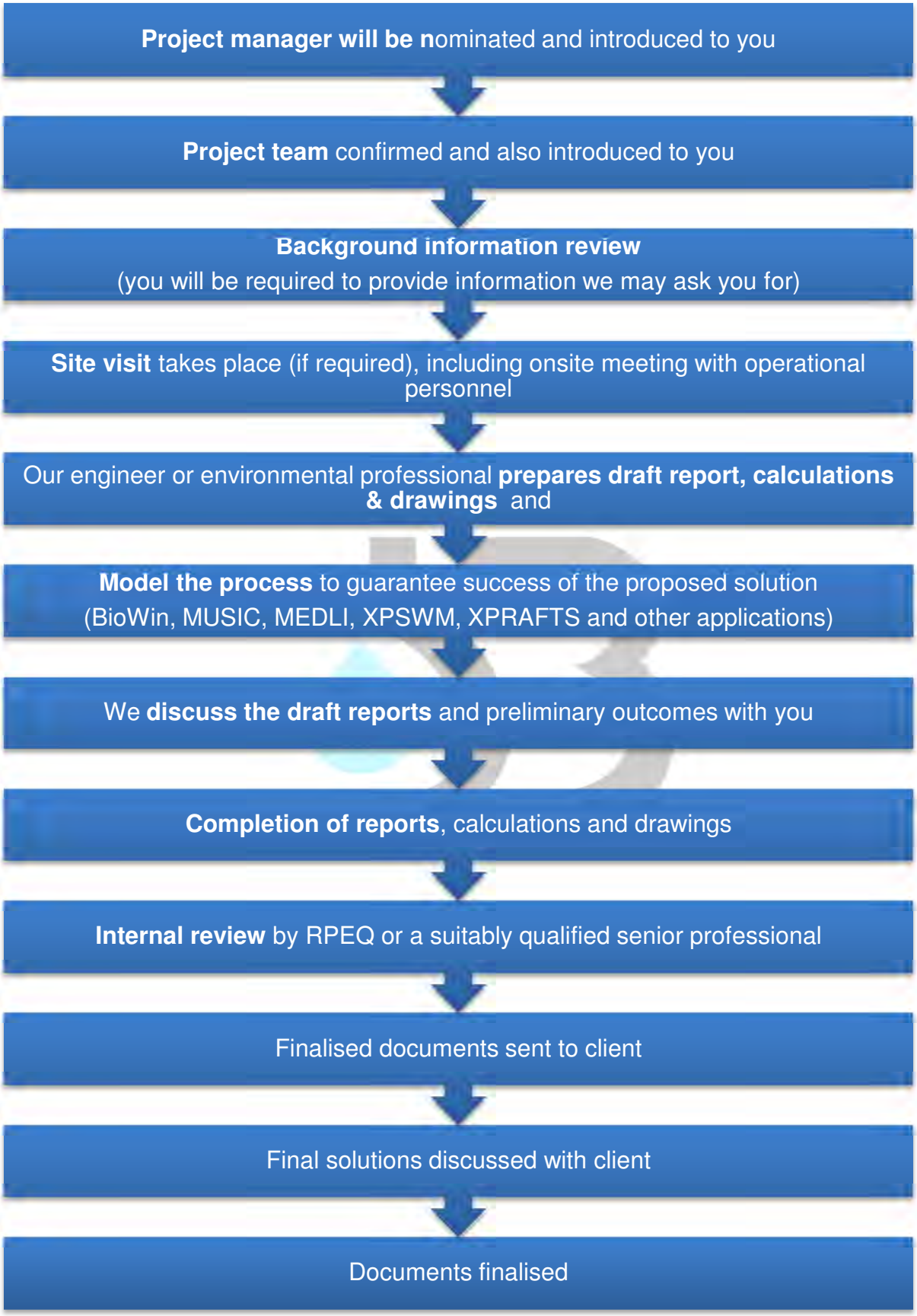
When you choose Simmonds & Bristow, we will assign a single client manager to you, to look after your company and its requirements. You will avoid wasting precious time being transferred from person to person, trying to find someone who knows about the work we do for you.

QUALITY ASSURANCE

Simmonds & Bristow Pty Ltd is a NATA accredited, quality assured organisation and holds third party certification to Quality Assurance Standard AS/NZS ISO 9001-2015 & ISO17025.

Simmonds & Bristow is Registered Training Organisation (RTO1735) and all training will be delivered and accessed in accordance with our registration obligations.

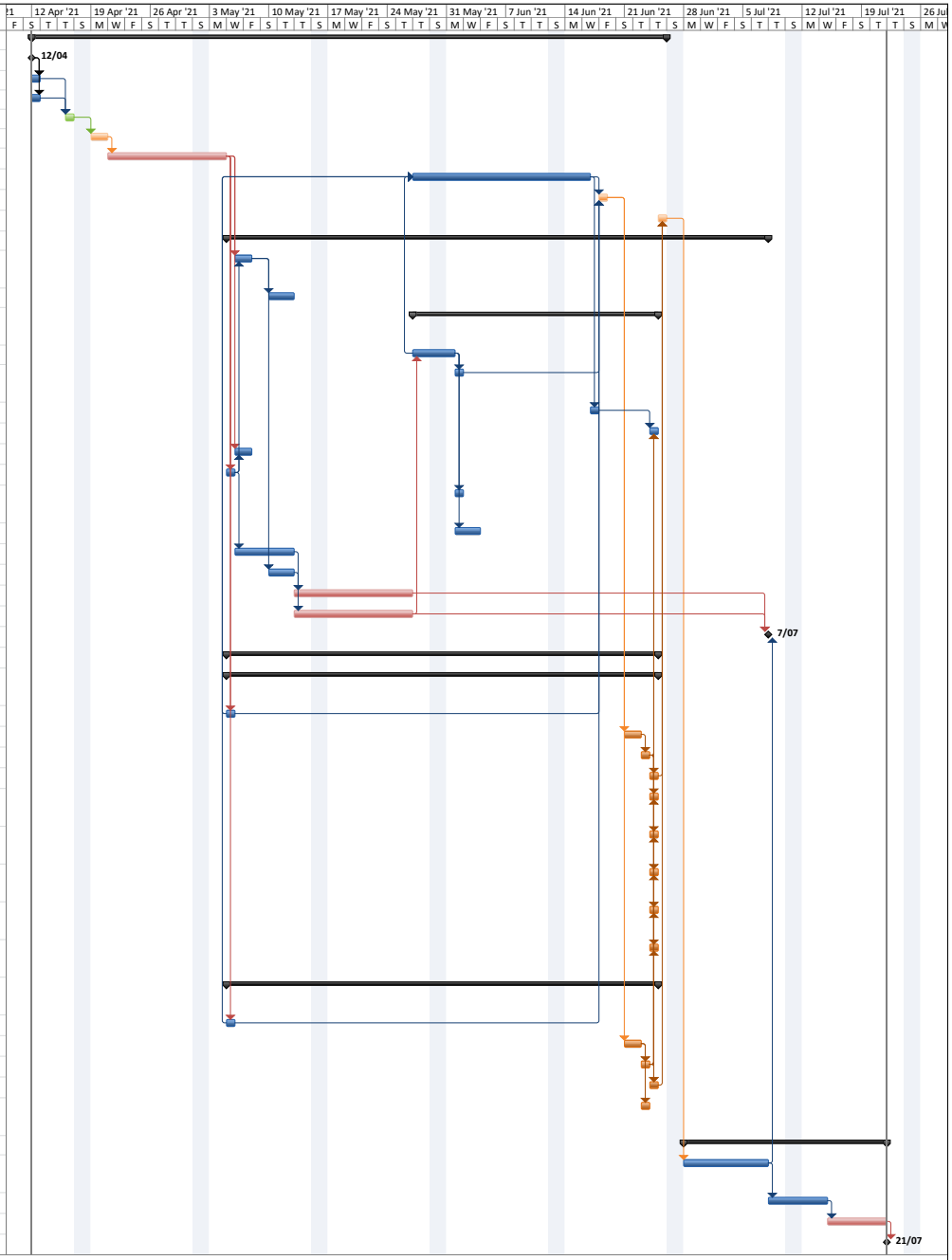
WHAT HAPPENS NEXT



Attachment B - Gantt Chart

Eromanga WTP Upgrades

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1		Establishment & Insurances	55 days?	Mon 12/04/21	Fri 25/06/21		
2		Project award	0 days	Mon 12/04/21	Mon 12/04/21		
3		Prepare Project Execution Plan (PEP)	1 day	Mon 12/04/21	Mon 12/04/21	2	
4		Prepare Project Safety Plan (PSP)	1 day	Mon 12/04/21	Mon 12/04/21	2	
5		Project kick off meeting	1 day?	Fri 16/04/21	Fri 16/04/21	3FS+3 days,4FS+	
6		Initial Site Inspection and Data Gathering (PLC Code, P&IDs, etc.)	2 days	Mon 19/04/21	Tue 20/04/21	5	
7		Request for Information (additional from inspection)	10 days	Wed 21/04/21	Tue 4/05/21	6	
8		Procurement and Site Works Planning	15 days	Thu 27/05/21	Wed 16/06/21	15SS,30SS,40SS	
9		Deploy to Eromanga for Site Works phase	1 day	Fri 18/06/21	Fri 18/06/21	8FS+1 day,16,30,	
10		Demobilise from site	1 day	Fri 25/06/21	Fri 25/06/21	33,43	
11		Category 1: Operations Manual	46 days?	Wed 5/05/21	Wed 7/07/21		
12		Item 1: Prepare procedure for opening, removing, and changing of media and media filters	2 days	Thu 6/05/21	Fri 7/05/21	20,7	
13		Item 2: Formulate monthly preventative maintenance tasks for backwashing media filters	3 days	Mon 10/05/21	Wed 12/05/21	12	
14		Item 3: Develop trend graphs for pre and post media filter pressures and display within client SCADA	21 days?	Thu 27/05/21	Thu 24/06/21		
15		Item 3a: Design - develop SCADA solution to produce hourly PV data to daily CSV file	3 days	Thu 27/05/21	Mon 31/05/21	26	
16		Item 3b: Design - develop MS Excel trend graphs that can have CSV file dropped into on daily/weekly basis	1 day	Tue 1/06/21	Tue 1/06/21	15	
17		Item 3c: Site Works to implement solution	1 day?	Thu 17/06/21	Thu 17/06/21	8	
18		Item 3d: Testing and Commissioning	1 day?	Thu 24/06/21	Thu 24/06/21	17,32,42	
19		Item 4: Prepare procedure for operation and maintenance of UV system	2 days	Thu 6/05/21	Fri 7/05/21	7,20	
20		Item 5: Develop schematic of WTP flow pathways	1 day	Wed 5/05/21	Wed 5/05/21	7	
21		Item 6: Develop trend graphs for pre and post RO membrane pressures and display in client SCADA	1 day	Tue 1/06/21	Tue 1/06/21	15	
22		Item 7: Develop trend graphs for EC display in client SCADA	3 days	Tue 1/06/21	Thu 3/06/21	15	
23		Item 8: Produce compact O&M Manual	5 days	Thu 6/05/21	Wed 12/05/21	20	
24		Item 9: Formulate ongoing preventative maintenance program for RO System	3 days	Mon 10/05/21	Wed 12/05/21	12	
25		QSC Review of O&M Manual and Procedures	10 days	Thu 13/05/21	Wed 26/05/21	23	
26		QSC Review of Maintenance Program and appicable Work Instructions	10 days	Thu 13/05/21	Wed 26/05/21	24	
27		Incorporate all QSC comments and final changes and issue FINAL	0 days	Wed 7/07/21	Wed 7/07/21	46,25,26	
28		Category 2: Systems Improvements	37 days?	Wed 5/05/21	Thu 24/06/21		
29		Item 10: (Provisional) Consider moving the CIP tank at the end of the WTP building outside the building to provide easier access to the RO membranes.	37 days?	Wed 5/05/21	Thu 24/06/21		
30		Item 10a: Design	1 day?	Wed 5/05/21	Wed 5/05/21	7	
31		Item 10b: Cut-in, re-routing pipework and wiring	2 days	Mon 21/06/21	Tue 22/06/21	9	
32		Item 10c: MCC reconnection and PLC	1 day	Wed 23/06/21	Wed 23/06/21	31	
33		Item 10d: Testing and Commissioning	1 day	Thu 24/06/21	Thu 24/06/21	32	
34		Item 11: Ensure that it is possible to trigger a manual backwash. If not, modify the PLC to allow this.	1 day	Thu 24/06/21	Thu 24/06/21	32,42	
35		Item 12: Determine the acceptable EC of the final water to consumers and modify the PLC EC shutdown setpoint accordingly.	1 day	Thu 24/06/21	Thu 24/06/21	32,42	
36		Item 13: Modify the SCADA to include an operator adjustable EC setpoint on the touch screen.	1 day	Thu 24/06/21	Thu 24/06/21	32,42	
37		Item 14: Ensure that the chlorine tank low low level alarm exists and functions and does shut the plant once activated.	1 day	Thu 24/06/21	Thu 24/06/21	32,42	
38		Item 15: Establish true duty standby chlorine dosing with alarm activation and plant shutdown on dosing pump failure.	1 day	Thu 24/06/21	Thu 24/06/21	32,42	
39		Item 16: Install an online chlorine residual analyser and PLC controlled feedback chlorine set point dosing.	37 days	Wed 5/05/21	Thu 24/06/21		
40		Item 16a: Design	1 day	Wed 5/05/21	Wed 5/05/21	7	
41		Item 16b: Cut-in, sample pipework and wiring	2 days	Mon 21/06/21	Tue 22/06/21	9	
42		Item 16c: Connections to MCC and PLC	1 day	Wed 23/06/21	Wed 23/06/21	41	
43		Item 16d: Testing and Commissioning	1 day	Thu 24/06/21	Thu 24/06/21	32,42	
44		Item 17: Develop a system for the storage of sodium hypochlorite that results in shorter holding times.	1 day	Wed 23/06/21	Wed 23/06/21	41	
45		Category 3: System Maintenance	18 days	Mon 28/06/21	Wed 21/07/21		
46		Item 18: Investigate the elevated post RO membrane EC and provide recommendations. (ie due to failed membranes, or faulty seals, etc).	8 days	Mon 28/06/21	Wed 7/07/21	10	
47		Issue Commissioning Report and associated documentation	5 days	Thu 8/07/21	Wed 14/07/21	46	
48		QSC Review and Acceptance	5 days	Thu 15/07/21	Wed 21/07/21	47	
49		Practical Completion	0 days	Wed 21/07/21	Wed 21/07/21	48	



Project: P2102-003_Eromanga W
Date: Fri 19/03/21

Task | Summary | External Milestone | Inactive Summary | Manual Summary Rollup | Finish-only
Split | Project Summary | Inactive Task | Manual Task | Manual Summary | Deadline
Milestone | External Tasks | Inactive Milestone | Duration-only | Start-only | Progress

Project: P2102-003_Eromanga W
Date: Fri 19/03/21

Task	Summary	External Milestone	Inactive Summary	Manual Summary Rollup	Finish-only
Split	Project Summary	Inactive Task	Manual Task	Manual Summary	Deadline
Milestone	External Tasks	Inactive Milestone	Duration-only	Start-only	Progress

Attachment C-Certificates

By Royal Charter

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Simmonds & Bristow Pty Ltd
40 Reginald Street
Rocklea QLD 4106

Holds Certificate Number: **FS 520982**

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

For the provision of analytical and environmental management support services to the water, wastewater and environmental industries including: Engineering process design; Training program design; Development and delivery; Scientific and environmental services; Sampling and monitoring; Air monitoring and modelling; Analysis of waters; Wastewaters and soil for biological and chemical parameters.

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 1995-11-29
Latest Revision Date: 2020-01-28

Effective Date: 2020-01-27
Expiry Date: 2023-02-15

...making excellence a habit.™

NATA
ACCREDITED LABORATORY

National Association of Testing Authorities, Australia

(ABN 59 004 379 748)

has accredited

Simmonds & Bristow Pty Ltd
Field Services Group

following demonstration of its technical competence to operate in accordance with

ISO/IEC 17025

This facility is accredited for the tests shown on the *Scope of Accreditation* issued by NATA

Jennifer Evans
Chief Executive Officer

Date of issue: 11 February 2019
Date of accreditation:23 December 1980
Accreditation number: 1500

Acknowledgement of Application

This may be used as
evidence of the commitment of

Simmonds & Bristow Pty Ltd

ABN 33 010 252 418

having applied for

ISO 14001 Environmental
ISO 45001:2018 Occupational Health and Safety Management Systems

Date Applied: 19/01/2021

Adam Christensen
Regional Director, APAC

SAI Global Limited

680 George Street
Sydney NSW 2000
Australia
Phone 1300 360 314

ABN 67 050 611 642

www.saiglobal.com

Queensland Government

Licence to provide labour hire services

SIMMONDS & BRISTOW PTY. LTD.

Trading as

Simmonds & Bristow Pty. Ltd.

Licence number: **LHL-02237-P3R5M**

is licensed under the *Labour Hire Licensing Act 2017* (Qld) to provide labour hire services in Queensland.

Licensee/s:

SIMMONDS & BRISTOW PTY. LTD.

It is a condition of this licence that the licensee must comply with all relevant laws applying to this licensee.

26/07/2018	**26/07/2021**
Date of issue	Date of expiry

Issued by

N Wakefield
Director
Labour Hire Licensing Compliance Unit
Office of Industrial Relations

As authorised delegate for the Chief Executive
under section 16 of the *Labour Hire Licensing Act 2017* (Qld)

Australian Government
Australian Skills Quality Authority

Certificate of Registration

This is to certify that

SIMMONDS & BRISTOW PTY. LTD.

trading as

is registered by the Australian Skills Quality Authority
under the *National Vocational Education and Training Regulator Act 2011*
(the Act) as an NVR Registered Training Organisation (RTO).

commences **01 June 2016**

expires **31 May 2023**

RTO Code: **1735**

The organisation's scope of registration
is listed on the National Register.

Registration is subject to continued compliance with the:

- VET Quality Framework.
- Conditions set out in sections 22 to 28 of the Act
- Conditions imposed on the organisation's registration under subsection 29(1) of the Act.

Chris Robinson
Chief Commissioner
Australian Skills Quality Authority

Issued on: 04 April 2016 under Section 19 of the Act