KENSINGTON CAMPUS

BORE WATER SYSTEM
OPERATING AND MAINTENANCE MANUAL

PART 2
BORE WATER SYSTEM OPERATION, MAINTENANCE AND TROUBLE SHOOTING

2023
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1 INTRODUCTION

1.1 ABOUT THIS MANUAL

The UNSW Kensington Campus bore water manual (treated and raw bore water) has been arranged into two volumes as follows:

Bore Water Manual Part 1 - Bore Water System History, Infrastructure & Overview

Bore Water Manual Part 2 - Bore Water System Operation, Maintenance and Trouble Shooting

1.2 IMPORTANT DISCLAIMER

The manual (Part 1 & 2) is a compilation of information sourced to the best of the writer's knowledge of works that have been carried out to the bore water system since its inception.

The information contained within this document is provided with the intent of providing a better understanding of technical matters associated with the bore water system as a whole and to assist with understanding the various separable installations which make up the system.

This publication should not be used in isolation and wherever possible repair, or replacement of mechanical parts should be referred to expert manufacturers' technicians for guidance.

While this is called an Operation and Maintenance Manual, it should be used to verify the logic of operation, rather than intrinsic tolerances required to repair, and maintain specific equipment.

Before working on any specific piece of mechanical plant, confirm the advice given in this document is relevant to that plant. Please refer to equipment suppliers or manufacturers for full instructions.

2 KEY CRITICAL CONTACTS

The following is a list of key critical contacts who been involved in the installation, repair, maintenance or have general knowledge about the UNSW Kensington Campus Bore Water system.

Item	Company
Bore pumps and level transducers	Enhance Cabling Systems Southwell Irrigation
Bore Pump Controls	Enhance Cabling Systems
Bores and drilling	Southwell Irrigation Highland Drilling
Tyree Raw Bore Water Pumps	Enhance Cabling Systems
Cleaning of Tyree Tank (Confined Spaces Access)	Australian Facilities Plumbing Madjic Plumbing
Chemical supply/delivery	Enhance Cabling Systems
Tyree tank infill pipework	Enhance Cabling Systems Madjic Plumbing
E10 & F21 Bore Water Treatment plants - pipework	Madjic Plumbing
E10 & F21 Bore Water Treatment plants – Controls	Enhance Cabling Systems
F21 Bore Water Treatment plant - Pumps	Enhance Cabling Systems Madjic Plumbing
General Kensington Campus Bore system knowledge	Earlmap

The contact details for each of the above companies are as follows:

Company	Primary Contact	Alternate Contact
Australian Facilities Plumbing 1300 782 387 www.ausfg.com	Adrian Menon Key Account Manager 0415 104 144 amenon@ausfp.com.au	
Earlmap PO Box 6129 UNSW Sydney NSW 1466	Trevor Stocker 0419 466 399 trevor@earlmap.com.au	
Enhance Cabling Systems 21/22-30 Northumberland Rd, Caringbah NSW 2229	Martial Lawson 0414 248 869 martial@enhancecabling.com.au	Dylan Lamour 0422 990 056 dylan@enhancecabling.com.au Andrew Box 0430 341 380 andrew@enhancecabling.com.au
Highland Drilling P.O. Box 7091 Berrima, NSW, 2577 Office : 02 4877 2118	Brett Delamont 0411 592 739	

Company	Primary Contact	Alternate Contact
Madjic Plumbing Office 02 8544-0402	Gary Hughes 0481-333-156/ gary@madjic.com.au	
Southwell Irrigation Unit 10B Sherwood Village Kirkham Road BOWRAL NSW 2576 Ph • 02 4861 6911 bowralsales@southwells.com.au	Hugh Southwell 0412 409 216 Hugh@southwells.com.au	

3 LIST OF CONSUMABLES

SUPPLIER	PART NUMBER	DESCRIPTION	PLANT
E+H	CLS21D-C1E1	CONDUCTIVITY SENSOR	UCBWTP
E+H	CPF81D-7LH11	pH SENSOR	F21 UCBWTP H6 BWRP F8 BWM
PROMINENT	S400-RT330-A33FF	pH SENSOR	E10 LCBWTP
REDOX	HE-2150	SODIUM HYDROXIDE 50%	F21 UCBWTP
PHOENIX CONTACT	2320319	UPS BATTERY (UPS-BAT/VRLA/ 24DC/ 7.2AH)	F21 UCBWTP H6 BWRP

4 TROUBLE SHOOTING AND FAULT FINDING

Scenario	Identifier	Impact	Likely Cause	Resolution
Mechanical failure Alpha Bore	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	Blocked bore pumps screen, collapse of bore, failure of pressure transducer, failure of pump	Investigate faults and replace failed part
Power Failure to Alpha Bore	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	General power failure, shutdown of a DB or substation	Confirm why the power is out and rectify if possible
Mechanical failure Bravo Bore	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	Blocked bore pumps screen, collapse of bore, failure of pressure transducer, failure of pump	Investigate faults and replace failed part
Power Failure to Bravo Bore	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	General power failure, shutdown of a DB or substation	Confirm why the power is out and rectify if possible
Mechanical failure Charlie Bore	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	Blocked bore pumps screen, collapse of bore, failure of pressure transducer, failure of pump	Investigate faults and replace failed part if easily done. If bore pump failure, serious consideration needs to be given to installing a new bore in a new location.
Power Failure to Charlie Bore	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	General power failure, shutdown of a DB or substation	Confirm why the power is out and rectify if possible
General power failure across campus	Identified as part of daily system remote monitoring checks	Winter months -minimal impact to the overall system. Summer months – the fault requires urgent attention as it will affect the overall bore water network's ability to supply enough bore water	General power failure, shutdown of a DB or substation	System will default to potable.
Failure of UNSW Intranet	Unable to remotely log into system	None other than loss of remote login/monitoring	IT issues	Lower campus will not automatically change over to potable
Tyree 300mm dia pump inlet strainer	Pump inlet strainer blocked	Pumps will starve for water. Strainer has a clear lid and is easily visually checked.	Possible tree roots within tanks	Clean out strainer
Tyree Raw bore water tank	Sediment and silt within the tanks	Minimal impact as the tanks has a built-in sediment volume	Possible broken bore screen	UNSW inspects these tanks as part of a separate UNSW Programmed Maintenance Procedure.
Tyree tank overflow	Tell-tale overflow discharging water	Potential for flood plant room	Failure of pressure transducer Failure of inlet "Mack" valve	Investigate why the overflow is discharging
Tyree Raw bore water pumps fail	Identified as part of daily system remote monitoring checks. Loss of pressure may be reported in campus irrigation system.	Loss of bore water to the campus. The treated bore water system automatically changes over to potable.	General power failure, shutdown of a DB or substation. Pump mechanical failure	Only if 2 or more pumps fail, the system won't keep up and the system will default to potable.
Broken pipe in raw bore pump header	Water bubbling out of the ground. It may be identified as part of daily system remote monitoring checks. May be detected via unusual water meter readings	Loss of infill to the Tyree tanks.	Mechanical damage, material failure	Locate and repair damage.

Scenario	Identifier	Impact	Likely Cause	Resolution
Broken pipe in lower campus raw bore water reticulation	Water bubbling out of the ground. It may be identified as part of daily system remote monitoring checks. May be detected via unusual water meter readings	Reduction in raw bore water pressure and flow to lower campus. Drop in Tyree tank levels and in ability for thank inflow to keep up with demand.	Mechanical damage, material failure	Locate and repair damage.
Broken pipe in lower campus treated bore water reticulation	It may be identified as part of daily system remote monitoring checks.	Reduction in treated bore water pressure and flow to lower campus. UCBWTP may struggle to keep up with demand	Mechanical damage, material failure	Locate and repair damage.
Broken pipe raw bore water in mall services tunnel	Visible water discharging in tunnel. May be detected via unusual water meter readings	Potential flooding of the Mall Services Tunnel. Loss of water to UCBWTP	Mechanical damage, material failure	Change upper and lower campus treated bore water systems over to potable and rectify leak.
Broken pipe treated bore water in mall services tunnel	Visible water discharging in tunnel. May be detected via unusual water meter readings	Potential flooding of the Mall Services Tunnel. Reduction in treated bore water pressure and flow to lower campus. UCBWTP may struggle to keep up with demand	Mechanical damage, material failure	Isolate tunnel valves, F21 lower campus pump and change lower campus treated bore water onto potable until issue is rectified.
Break in asbestos cement (AC) raw bore water main supplying pool	Water discharging from ground. Loss of water at pool. May be detected via unusual water meter readings	Loss of water at pool	Damage from tree roots	Run pool on potable until a new bore water pipe can be extended across the roof from the pool lawn area.
Broken pipe in upper campus raw bore water reticulation	Water bubbling out of the ground. It may be identified as part of daily system remote monitoring checks. May be detected via unusual water meter readings	Reduction in raw bore water pressure and flow to upper campus. UCBWTP may struggle to keep up with demand. Change UCBWTP onto potable if needed.	Mechanical damage, material failure	Locate and repair damage.
Broken pipe in upper campus treated bore water reticulation	Water bubbling out of the ground. It may be identified as part of daily system remote monitoring checks. May be detected via unusual water meter readings	Reduction in treated bore water pressure and flow to upper campus. UCBWTP may struggle to keep up with demand. Depending on where the issue is located, isolate the portion of the ring main and if possible use the potable back-up system for the effected buildings.	Mechanical damage, material failure	Locate and repair damage.
Broken pipe in bore water plant rooms	Flow is exceeded	Nil	Mechanical damage, material failure	System will default to potable. Locate and repair damage.
Loss of potable water to Bore water plant E10 BWTP	It may be identified as part of daily system remote monitoring checks.	Currently in Hibernation mode	Campus wide potable water issues	None, unless plant is operating on potable water.
Loss of potable water to Bore water plant F21 UCBWTP	It may be identified as part of daily system remote monitoring checks.	Loss of treated bore water	Campus wide potable water issues	Resolve and rectify why the potable supply has been lost. Check RPZD in Morven Brown Tunnel.
Failure of commerce courtyard tank	It may be identified as part of daily system remote monitoring checks.	UCBWTP unable to keep up with system demands	Mechanical damage, material failure	Bypass tank, resolve and rectify the issue
Failure of the Tyree tanks	It may be identified as part of daily system remote monitoring checks.	Raw bore water system unable to keep up with system demands	Mechanical damage, material failure	Bypass tank, resolve and rectify the issue
Cross connection between raw bore water and treated bore water pipe network	pH changes in TBW	No major impact	Likely to be an open valve in the lower campus network. Refer to **Bore water manual Part 1, Section 7.2** Lower Campus Raw Bore Water, for valve locations.	Confirm all valves nominated are closed.
Clockwise closing valves	Loss of bore water pressure and flow to the upper campus	Loss of bore water pressure and flow to the upper campus	There is one clockwise closing valve on the bore water system, located on the southern side of the University Mall between F10 Applied Sciences and F8 Law. Refer to **Bore water manual Part 1, Appendix 8**	Confirm that the valve is fully open.

Scenario	Identifier	Impact	Likely Cause	Resolution
pH probe calibration	It may be identified as part of daily system remote monitoring checks.	pH not reading as intended	Probe out of calibration	Re-calibrate pH probe. Inspected as part of monthly maintenance
Autoback wash filters	It may be identified as part of daily system remote monitoring checks.	Reduced flow to bore water treatment plant	Swarf from pipe repairs or major construction.	Inspected as part of monthly maintenance
Y strainers	It may be identified as part of daily system remote monitoring checks.	Reduced flow to bore water treatment plant	Swarf from pipe repairs or major construction	Inspected as part of monthly maintenance
Calcium buildup on static mixers	It may be identified as part of daily system remote monitoring checks.	Reduced flow to bore water treatment plant	An outcome of the dosing process	Bi monthly remove and wash with water as part of a preventative maintenance procedure
Failure of chemical dosing pumps	It may be identified as part of daily system remote monitoring checks.	Loss of pH maintenance	Mechanical damage, material failure	Auto changeover

5 MONITORING, INSPECTION & MAINTENANCE SCHEDULES

The following is a summary of the monitoring, inspection, and maintenance procedures for the bore water system:

Task Frequency	Task
Daily –	Long into system via VPN, Record data and update trend log tables. Check chemical level. *Note: Daily monitoring data is logged onto the spreadsheet UNSW UCBWTP Log.XLS (Refer to Appendix A for a sample of the spreadsheet and recorded information) and trend logs are reviewed for inconsistencies.* Originals of the spreadsheets can be obtained from: **https://enhancecabling.sharepoint.com/UNSW**
Monthly	Undertake monthly maintenance in accordance with monthly procedures. *Record pH probe cleaning and calibration data UNSW pH Probes.XLS (Refer to Appendix B for a sample of the spreadsheet and recorded information)* Originals of the spreadsheets can be obtained from: **https://enhancecabling.sharepoint.com/UNSW**
Bi-Monthly	Remove Static Mixers and wash with water
Annually	Ensure all valves operate as intended
Bi-Annually	Change out UPS batteries
As required	Fill chemicals

The full maintenance schedules are included in the following Appendix's and these should also be read in conjunction with the UNSW Planned Maintenance (PM) procedures:

Appendix	Building
	E10 BWTP
Appendix C	H-BWT-E10 MONTHLY PROCEDURE REV2.PDF
Appendix C	E10 HILMER BUILDING HAZARDOUS GOODS SERVICE - 27.09.2017.PDF
	F8 LAW BUILDING (pH PROBE)
Appendix D	H-BWT-F8 MONTHLY PROCEDURE REV1.PDF
	F21 UCBWTP
Appendix E	H-BWT-F21 MONTHLY PROCEDURE REV2.PDF
Appendix E	H-BWT-F21-CHEM-PROCEDURE REV1.PDF
	H6 TYREE BUILDING
Appendix F	H-BWT-H6 MONTHLY PROCEDURE REV1.PDF

UNSW maintains their own Planned Maintenance (PM) procedure for each part of the bore water system. These PM procedures are updated periodically, and the updated electronic copies should be always referred to. Appendix G includes copies of all the Bore Water and treatment system PM procedures available at the time that this manual was prepared.

Appendix A

Sample of Daily Monitoring Data Spreadsheet
Bore water System.

			kPa Pot.	K Pot.	Tot. Pot.	kPa Raw	Tot. Raw	Flowrate Raw	pH Raw	K Raw	pH Treated	K Treated	pH Res.	K Res.	kPa Res.	UC Res. Level	NaOH Level	pH LAW	kPa LAW	pH LC Res	kPa Bore Retic.	kPa LC Retic. Pumps	LC Res. Level	NaOH Daily	TBW Total	TBW Average	TBW Average	TBW Conv. Rate	
DATE	DAY	TIME	PT111	AE106	FT116 kl	PT112	FT117 kl	Flowrate (	AE101	AE102	AE104	AE105	AE141	AE142	PT145	LT143 %	LT113 l	LAW	PT LAW	Bores	PT BORE	PT H6	LC TNK	L/Day NaO	kL/Day	L/Hr Av	L/s Av	mL/L	Notes
28/02/2023	Tue	16:26	364	154.2	4706	330	90818	44	5.3	297.6	8.1	459.1	6.8	476.9	629	58	1555	6.7	540	3.5	452.0	686.0	62	115	1105	46042	12.8	0.10	ML - Completion of Monthly Maintenance
1/03/2023	Wed	6:08	292	155.6	4706	360	91273	25	5.3	295.6	8.0	489.3	7.0	486.6	552	80	1513	6.8	564	3.7	468.0	671.0	83	42	455	18958	5.3	0.09	
2/03/2023	Thu	6:19	393	156.2	4706	358	92090	20	5.3	293.9	8.1	497.4	7.1	490.9	544	83	1423	6.8	559	3.9	589.0	668.0	82	90	817	34042	9.5	0.11	
3/03/2023	Fri	10:21	344	156.2	4706	335	92969	32	5.3	296.1	8.1	486.1	7.2	494.9	509	74	1328	7.0	559	3.9	592.0	673.0	79	95	879	36625	10.2	0.11	
4/03/2023	Sat	6:05	372	155.9	4706	352	93560	20	5.3	295.8	8.1	497.2	7.2	496.0	622	84	1260	6.9	570	4.1	571.0	654.0	79	68	591	24625	6.8	0.12	
5/03/2023	Sun	10:03	372	155.6	4706	359	94192	21	5.3	296.7	8.1	482.7	7.3	490.5	576	83	1190	7.1	564	4.0	619.0	672.0	78	70	632	26333	7.3	0.11	
6/03/2023	Mon	7:15	341	155.9	4706	345	94766	27	5.3	295.7	8.1	481.7	7.2	484.9	532	78	1119	7.1	563	3.9	590.0	660.0	77	71	574	23917	6.6	0.12	ML - Weekly Visual Inspection and Monitoring
7/03/2023	Tue	8:09	360	156.3	4706	339	95716	33	5.3	295.2	8.1	479.1	7.1	480.8	614	76	999	6.9	521	3.1	470.0	668.0	67	120	950	39583	11.0	0.13	
8/03/2023	Wed	6:07	350	156.1	4706	363	96517	21	5.3	293.7	8.1	485.5	7.1	479.1	572	84	888	6.8	562	3.2	476.0	667.0	56	111	801	33375	9.3	0.14	
9/03/2023	Thu	6:10	373	156.1	4706	354	97184	15	5.3	294.3	8.0	493.5	7.2	495.7	626	87	775	6.9	551	3.8	571.0	647.0	82	113	667	27792	7.7	0.17	
10/03/2023	Fri	6:10	390	156.2	4706	360	97804	18	5.3	290.6	8.1	484.1	7.2	487.0	586	85	689	6.9	560	3.4	472.0	664.0	82	86	620	25833	7.2	0.14	
11/03/2023	Sat	6:12	372	155.9	4706	310	98535	21	5.3	293.3	8.0	496.7	7.1	484.8	640	84	608	6.9	553	3.8	620.0	625.0	81	81	731	30458	8.5	0.11	
12/03/2023	Sun	11:30	371	155.6	4706	381	99350	29	5.3	292.3	8.0	484.0	7.1	482.0	568	79	500	6.9	538	3.4	435.0	694.0	83	108	815	33958	9.4	0.13	
13/03/2023	Mon	9:32	353	156.0	4706	336	99897	29	5.3	293.0	8.1	474.3	7.2	491.5	507	78	422	7.1	555	4.0	587.0	666.0	80	78	547	22792	6.3	0.14	
14/03/2023	Tue	12:41	371	155.9	4706	360	100339	22	5.3	291.2	8.2	470.7	7.1	482.0	706	82	2519	7.1	428	3.7	469.0	666.0	84	0	442	18417	5.1	0.00	ML - Weekly Visual Inspection and Monitoring & Chemical Delivery
15/03/2023	Wed	6:16	300	155.8	4706	366	100869	19	5.3	292.4	8.1	480.0	7.1	478.1	601	84	2454	6.9	560	4.2	617.0	677.0	78	65	530	22083	6.1	0.12	
16/03/2023	Thu	9:18	338	155.8	4706	350	101754	30	5.2	292.0	8.1	474.5	7.1	485.8	692	77	2330	6.9	570	4.0	618.0	669.0	82	124	885	36875	10.2	0.14	ML - Start of Monthly Maintenance
17/03/2023	Fri	6:04	392	155.9	4706	377	102563	21	5.3	291.8	8.1	483.2	7.0	472.4	559	84	2229	6.8	550	3.3	475.0	662.0	81	101	809	33708	9.4	0.12	
18/03/2023	Sat	14:27	233	151.0	4952	382	103395	0	5.2	290.0	5.5	147.9	7.1	193.3	596	76	2126	6.7	567	4.8	618.0	649.0	78	103	832	34667	9.6	0.12	ML, DL, HF & GH - Monthly Maintenance. UCBWTP in Bypass while new pipework cures.
19/03/2023	Sun	8:55	244	142.5	5480	442	103395	0	5.2	290.0	5.6	138.9	7.3	141.0	517	81	2124	6.7	563	4.7	616.0	649.0	82	2	0	0	0.0	0.00	UCBWTP in Bypass while new pipework cures.
20/03/2023	Mon	6:11	345	130.0	5761	352	103801	28	5.2	286.7	8.1	466.5	7.1	459.4	664	79	2080	6.7	548	3.7	449.0	657.0	76	44	406	16917	4.7	0.11	UCBWTP in Auto Mode
21/03/2023	Tue	6:13	380	130.9	5761	341	104469	15.9	5.2	289.4	8.1	479.2	7.3	482.8	545	87	2001	6.7	554	4.3	616.0	645.0	78	79	668	27833	7.7	0.12	
22/03/2023	Wed	5:50	350	131.7	5761	344	105003	18	5.2	288.5	8.1	474.4	7.4	477.9	606	86	1937	6.6	558	4.4	616.0	644.0	76	64	534	22250	6.2	0.12	
23/03/2023	Thu	7:40	334	131.6	5761	357	105674	19	5.2	290.0	8.1	475.2	7.3	481.0	659	84	1868	6.6	560	3.9	462.0	664.0	80	69	671	27958	7.8	0.10	ML - Weekly Visual Inspection and Monitoring
24/03/2023	Fri	6:08	363	132.0	5761	346	106273	17	5.2	289.0	8.1	485.0	7.3	482.7	578	85	1806	6.6	557	4.0	443.0	636.0	79	62	599	24958	6.9	0.10	
25/03/2023	Sat	5:24	282	131.7	5761	362	106655	11	5.2	290.7	8.0	473.2	7.3	287.0	643	91	1762	6.6	447	4.5	616.0	645.0	78	44	382	15917	4.4	0.12	
26/03/2023	Sun	7:58	370	131.9	5761	349	107216	20	5.2	289.7	8.0	472.2	7.4	473.6	575	84	1709	6.6	555	4.4	616.0	653.0	82	53	561	23375	6.5	0.09	
27/03/2023	Mon	6:27	365	131.7	5761	349	107705	18	5.2	291.0	8.0	473.8	7.4	478.5	616	85	1658	6.6	575	4.2	436.0	638.0	76	51	489	20375	5.7	0.10	
28/03/2023	Tue	11:49	366	131.1	5761	347	108573	33	5.2	291.0	8.1	468.4	7.2	481.1	573	75	1566	6.5	540	3.9	442.0	668.0	73	92	868	36167	10.0	0.11	ML - Weekly Visual Inspection and Monitoring
29/03/2023	Wed	6:24	336	131.5	5761	342	109088	20	5.2	291.4	8.1	485.5	7.2	486.9	598	85	1515	6.5	567	4.5	616.0	653.0	80	51	515	21458	6.0	0.10	
30/03/2023	Thu	6:24	388	132.0	5761	338	109746	13	5.2	291.6	8.1	487.7	7.2	481.9	579	88	1448	6.5	557	4.4	464.0	650.0	85	67	658	27417	7.6	0.10	
31/03/2023	Fri	6:54	367	132.0	5761	351	110251	15	5.2	292.0	8.1	480.6	7.4	481.9	580	87	1393	6.5	567	4.8	617.0	647.0	76	55	505	21042	5.8	0.11	
1/04/2023	Sat	5:41	356	132.1	5761	356	110799	12	5.2	292.9	8.1	481.5	7.3	478.9	589	89	1336	6.5	565	4.5	616.0	654.0	84	57	548	22833	6.3	0.10	
2/04/2023	Sun	7:09	356	131.8	5761	360	111318	24	5.2	291.3	8.1	467.1	7.3	474.0	581	82	1276	7.4	558	4.7	617.0	658.0	80	60	519	21625	6.0	0.12	
3/04/2023	Mon	6:17	366	132.0	5761	364	111849	20	5.2	293.0	8.1	471.2	7.3	480.1	556	84	1217	7.3	563	4.8	599.0	674.0	81	59	531	22125	6.1	0.11	
4/04/2023	Tue	5:21	383	131.9	5761	364	112441	19	5.2	293.4	8.1	471.1	7.2	480.4	657	85	1156	7.2	561	4.6	618.0	661.0	84	61	592	24667	6.9	0.10	ML - Weekly Visual Inspection and Monitoring
5/04/2023	Wed	6:15	404	131.9	5761	355	113139	19	5.2	293.2	8.1	479.0	7.2	483.2	529	85	1064	7.1	561	4.7	617.0	652.0	82	92	698	29083	8.1	0.13	
6/04/2023	Thu	5:49	379	131.9	5761	351	113689	12	5.2	293.2	8.1	488.8	7.2	482.3	593	89	992	7.2	560	4.7	618.0	642.0	84	72	550	22917	6.4	0.13	
7/04/2023	Fri	6:55	367	131.8	5761	342	114205	11	5.2	263.6	8.0	475.1	7.3	481.1	594	91	917	7.2	562	4.7	427.0	650.0	80	75	516	21500	6.0	0.15	
8/04/2023	Sat	6:55	387	131.9	5761	352	114567	11	5.2	294.6	8.2	474.0	7.5	480.1	606	91	869	7.4	565	4.9	617.0	650.0	82	48	362	15083	4.2	0.13	

Example of Daily monitoring data as logged onto the spreadsheet UNSW UCBWTP Log.XLS Maintained by Enhanced Cabling Systems ECS

Appendix B

Sample of pH Probe Cleaning and Calibration Data for:

E10 BWTP
F8 LAW BUILDING (pH PROBE)
F21 UCBWTP
H6 TYREE BUILDING

	BORE INLET PH		Other Information
DATE	ZERO	SLOPE	
Unit	pH	mV/pH	
14/03/2021	6.95	57.77	REPLACED PROBE
17/05/2021	6.72	58.59	
8/06/2021	6.77	58.48	
13/07/2021	6.64	58.66	
12/08/2021	6.36	60.2	
30/09/2021	6.08	58.71	
20/10/2021	5.98	58.34	
12/11/2021	5.85	58.57	
20/12/2021	7.87	54.07	
20/01/2022			
23/02/2022	6.88	55.61	
26/03/2022	5.64	59.31	
11/04/2022	5.62	56.49	
18/05/2022	5.39	56.4	
7/06/2022	5.36	58.99	
6/07/2022	5.25	56.95	
15/08/2022	5.42	57.97	
7/09/2022	5.39	57.41	
12/10/2022	5.54	59.8	
16/11/2022	5.26	57.31	
20/12/2022	5.18	56.3	
17/01/2023	5.13	56.75	

Probe Type: CPF81D-7LH11

ZERO	SLOPE
pH 5.00 - 9.00	38.00 - 65.00 mV/pH

BWTP E10 pH PROBE CALIBRATION

DATE	PH01 ZERO mV	PH01 SLOPE mV/pH	PH02 ZERO mV	PH02 SLOPE mV/pH	PH03 ZERO mV	PH03 SLOPE mV/pH	PH04 ZERO mV	PH04 SLOPE mV/pH	PH05 ZERO mV	PH05 SLOPE mV/pH	Other Information
											-60mV to +60mV
											40mV/pH to 65mV/pH
11/11/2021	-9	58.6	-2.6	59.05	-0.6	58.84	-0.8	59.49	-3.2	59.29	REPLACED ALL PROBES
15/12/2021	-40.2	58.43	-30.6	54.82	-31.6	49.97	-29.9	58.84	-35.2	57.1	
20/01/2022	-47.7	60.48	-29.5	59.25	-28.8	58.08	-21.5	59.59	-41.1	59.66	
23/02/2022	-42	58.84	-40.6	54.2	-48.5	59.01	-36.9	56.08	-43.4	52.19	
26/03/2022	-36.5	59.42	-46.5	59.01	-33.5	59.83	-29.3	59.76	-51.2	59.73	
7/04/2022	-54.8	59.26	-56.6	57.56	-54.1	54.03	-58.5	57.83	-54.1	57.05	
18/05/2022	-58.9	58.88	-55.4	52.6	-60.8	58.06	-55.8	54.37	-55.6	55.33	PH03 FAILED CALIBRATION
7/06/2022	-58.9	58.88	-56.9	52.56	-54.1	58.06	-57.8	53.69	-59.5	43.48	
6/07/2022	-42.3	58.84	-40.3	54.28	-33.4	59.82	-21.9	59.59	-55.4	55.28	
11/08/2022	-59	58.88	-57.6	54.61	-65	56.86	-54.5	52.32	-69	43.48	HIBINATION MODE
7/09/2022	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	
12/10/2022	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	
16/11/2022	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	
20/12/2022	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	
17/01/2023	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	ALL PROBES NEED REPLACING
28/02/2023	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	
18/03/2023	-75.1	60.45	-57.9	57.79	-58.6	58.54	-55.4	57.47	-80.8	36.99	

Probe Type: Broadly & James S400-RT330-A33FF

ZERO	SLOPE
-60mV to +60mV	40mV/pH to 65mV/pH

DATE	LAW PH ZERO pH	LAW PH SLOPE mV/pH	Other Information
16/12/2021	6.97	57.65	REPLACED PROBE
20/01/2022	6.79	55.58	
23/02/2022	6.66	57.75	
26/03/2022	6.51	59.34	
7/04/2022	6.4	56.72	
18/05/2022	6.31	55.21	
7/06/2022	6.19	55.26	
6/07/2022	6.17	54.4	
15/08/2022	6.02	54.77	
14/09/2022	5.91	56.8	
12/10/2022	5.79	56.94	
16/11/2022	5.7	59.57	
20/12/2022	5.68	60.2	
17/01/2023	5.55	56.39	
28/02/2023	5.27	49.09	
18/03/2023	5.41	58.59	

Probe Type: CPF81D-7LH11

ZERO	SLOPE
pH 5.00 - 9.00	38.00 - 65.00 mV/pH

COMMERCE COURTYARD F21 pH PROBE CALIBRATION

	AE141		AE101		AE103		AE104		Other Information
DATE	ZERO	SLOPE	ZERO	SLOPE	ZERO	SLOPE	ZERO	SLOPE	
	pH	mV/pH	pH	mV/Ph	pH	mV/Ph	pH	mV/Ph	
15/08/2022	6.9	57.33	6.82	55.64	6.87	56.03	7.11	57.17	UCBWTP OPERATIONAL
7/09/2022	6.87	58.42	6.67	57.39	6.87	58.42	6.7	58.34	
12/10/2022	6.7	58.52	6.86	58.25	6.59	57.1	6.18	57.89	
24/11/2022	6.7	58.67	6.9	59.01	6.24	58.4	5.5	58.08	
12/12/2022	6.7	58.69	6.85	59.48	6.32	57.3	6.12	57.86	
17/01/2023	6.7	58.41	5.3	58.67	6.86	58.67	6.15	57.76	
28/02/2023	6.95	57.25	5.96	56.19	4.35	57.06	6.8	57.63	
18/03/2023	7.1	58.07	5.76	56.5	4.11	57.87	6.82	58.51	

Probe Type: CPF81D-7LH11 Endress + H

ZERO pH 5.00 - 9.00

SLOPE 38.00 - 65.0

Appendix C

E10 BWTP
Maintenance Schedule

E10 MS&E BUILDING

LOWER CAMPUS BORE WATER TREATMENT PLANT - Monthly Maintenance Check List (HIBERNATION MODE)

1) Check the plant is in HIBERNATION MODE (on HMI)	
2) Check the plant for leaks in the pipes, tank and dosing system. Check and record all alarms (on HMI)	
2) Check pH meters (should be reading around 5-7)	
3) Turn all drives to MAN (off) on HMI.	
4) Turn all valves to MAN (off) on HMI.	
5) Run untreated bore water through the plant • Open the MV002 – Untreated Bore Water Inlet Valve • Open the MV004 – Treated Bore Water Drain Valve • Check that there is 1 litre/second flow through the plant • Close MV002 & MV004 again • Run the two caustic dosing pumps as well as the recirculation pump • Leave running for 5 minutes, making sure the dosing pumps are pumping correctly • Turn off all pumps and check all the valves are closed	
6) Make sure everything is off in MAN. Then return all drives and the valve to AUTO	
7) Check the plant is in HIBINATION MODE and there are no alarms	
8) Check the plant for leaks in the pipes, tank and dosing system	
9) Clean up and wash the floors. Sweep the excess water away	

REFER TO **UNSW BORE WATER MANUAL PART 1 - APPENDIX 10 - E10 BWTP** – **HILMER BUILDING OPERATION AND MAINTENANCE MANUAL** FOR DETAILS OF EQUIPMENT

HILMER BUILDING – LIFT 139 – PROCEDURE FOR USING THE HAZARDOUS GOODS MODE

The procedure below is to be followed exactly as described in this document. This procedure is to only be completed by authorised persons who have completed training in operating this lift using this mode.

Step	Instruction	Photo
1	From the landing call the lift to the floor by turning the spring loaded key switch from the **OFF** to **CALL** position and then remove the key. *An automated voice within the lift car will inform passengers the lift is required for special service, once all car calls have been answered the lift will proceed to the landing where the operator has called the lift.*	
2	When the lift arrives enter the lift car and using the same key turn the key switch from **OFF** to **ON.** Remove the key leaving the switch in this position. *This will hold the lift on this floor and the doors will remain open.* ***If you do not follow this step the lift will return to normal service after 60 seconds.***	
3	Load the goods into the lift car. *Local procedures for the transport of hazardous goods **must** be followed at times.*	
4	From the landing turn the spring loaded key switch from **OFF** to **CLOSE**, holding the key in this position until the doors fully close. *The lift will remain on this level with the doors closed.*	
5	Use the stairs or another lift to proceed to the floor you want to receive the goods at.	
6	From the receiving floor landing turn the spring loaded key switch from **OFF** to **CALL**. *The lift will start to travel to the receiving level and the doors will open.*	
7	Unload the goods from the lift car.	
8	ONLY AFTER ALL THE GOODS ARE REMOVED Turn the key switch inside the lift car from **ON** to **OFF.** *The lift will return to normal service.*	

Appendix D

F8 LAW BUILDING (pH PROBE)
Maintenance Schedule

F8 LAW

BORE WATER MONITORING - Monthly Maintenance Check List

1) Check the plant for leaks in the pipes, and connections.	
2) Check pH meter (should be reading around 6.5-7.5)	
3) Check pressure meter (should be reading around 550kPa)	
4) Isolate manual valves either side of the pH probe, and open the bypass valve	
5) Remove the pH probe	
6) Calibrate all pH probe using two-point calibration • Fill rinse jar with deionised water • Fill jar with buffer pH4 • Fill jar with buffer pH7 • Rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH7 • Push CAL button and follow the instructions of the software • Once stage one is complete rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH4 and continue • Meter will either accept or deny calibration • If it accepts, press ok Cal is finished, then rinse probe • If it does not calibrate, note down values of zero point and slope, enter the values manually • If values are a long way out of range soak, probe in buffer pH4 for half an hour and try again • Log the zero & slope results for each probe	
7) Place the probe back into position	
8) Turn isolation valves back to the on position, and close the bypass valve	
9) Check the plant for leaks	
10) Clean up and sweep the excess water away	

Appendix E

F21 UCBWTP
Maintenance Schedule

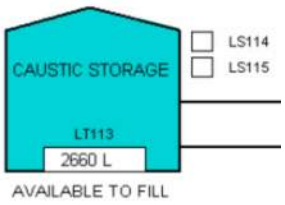
BORE WATER TREATMENT PLANT - Monthly Maintenance Procedure & Check List

1) Check the plant for leaks in the pipes, tank, pumps, and dosing system. Check and record all alarms (on HMI)	
2) Check pH probes (should be reading around 5-8)	
3) Check Conductivity probes (should be reading around 100-600 uS/cm)	
4) Put plant into RESERVOIR BYPASS	
5) Isolate upper campus reservoir outfeed manual valve to booster pumps. Close all upper and lower campus booster pump valves including outfeed to upper and lower campus. Once all pumps have low flow fault turn off at isolator switch. (Reticulation area).	
6) Remove pH probe AE141 monthly and conductivity probe AE142 yearly for calibration.	
7) Clean Probes • Fill container with detergent & water • Clean with toothbrush on tip and body if needed • Rinse pH probes with clean water and soak in deionised water • Clean outside of chemical injector valves & rinse • Clean dosing pump connection points & rinse	
8) Calibrate all pH probes using two-point calibration • Fill rinse jar with deionised water • Fill jar with buffer pH4 • Fill jar with buffer pH7 • Rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH7 • Push CAL button and follow the instructions of the software • Once stage one is complete rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH4 and continue • Meter will either accept or deny calibration • If it accepts, press ok Cal is finished, then rinse probe • If it does not calibrate, note down values of zero point and slope, enter the values manually • If values are a long way out of range soak, probe in buffer pH4 for half an hour and try again • Log the zero & slope results for each probe	
9) Calibrate all conductivity probes • Fill rinse jar with deionised water • Fill jar with 500 uS/cm KCl Calibration Solution • Push CAL button and follow the instructions of the software • Log the results for each probe	
10) Place probes AE141 & AE142 back into probe holder.	
11) Open upper campus reservoir outfeed manual valve to booster pumps, open the booster pump valves and finally the booster pump outfeed valves to upper and lower campus. Make sure all valves are open	
12) Turn booster pump isolators back on and check they all come back up to pressure and are ready to run.	
13) Place plant into BWTP BYPASS	
14) Check pH probes (should be reading around 5-8)	
15) Isolate the two manual valves at the start and end of bore water treatment line in bore water plant room. Check AV122 closes.	

16) Remove pH probes AE101, AE103 and AE104 monthly and conductivity probe AE102 yearly	
17) Clean Probes • Fill container with detergent & water • Clean with toothbrush on tip and body if needed • Rinse pH probes with clean water and soak in deionised water. • Clean outside of chemical injector valves & rinse • Clean dosing pump connection points & rinse	
18) Calibrate all pH probes using two-point calibration • Fill rinse jar with deionised water • Fill jar with buffer pH4 • Fill jar with buffer pH7 • Rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH7 • Push CAL button and follow the instructions of the software • Once stage one is complete rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH4 and continue • Meter will either accept or deny calibration • If it accepts, press ok Cal is finished, then rinse probe • If it does not calibrate, note down values of zero point and slope, enter the values manually • If values are a long way out of range soak, probe in buffer pH4 for half an hour and try again • Log the zero & slope results for each probe	
19) Calibrate all conductivity probes • Fill rinse jar with deionised water • Fill jar with 500 uS/cm KCl Calibration Solution • Push CAL button and follow the instructions of the software • Log the results for each probe	
20) Clean basket out under the inlet pipe. Put back into position	
21) Place probes AE101, AE103 & AE104 back into Probe holder	
22) Remove air pockets from the line by pushing the manual back wash button on the judo back wash filter, open manual valves either side of the first and last probe	
23) Place plant into AUTO, checking operation and correct position indicator of actuator valve AV122	
24) Check the plant runs in AUTO and there are no alarms	
25) Check the plant for leaks in the pipes, tank and dosing system	
26) Clean up and wash the floors. Sweep the excess water away	

REFER TO **UNSW BORE WATER MANUAL PART 1 - APPENDIX 11 - F21 UCBWTP - LIBRARY BUILDING OPERATION AND MAINTENANCE MANUAL** FOR DETAILS OF EQUIPMENT

The procedure below is to be followed exactly as described in this document. This procedure is to only be completed by authorised persons who have completed training in bulk sodium hydroxide filling.

Step	Instruction	Photo
1	Check the level in the tank using the HMI to confirm that there is enough volume to add the ordered amount of sodium hydroxide to the tank. *The tank volume is 3,300 litres, and the fill level cut off is 2,500 litres.*	
2	Unlock chemical fill area and chemical fill HMI panel in preparation for the truck arrival. Connect hose to water supply in case of spill or clean up. Take SDS for Sodium Hydroxide 50% from plant room up to chemical fill area for further information.	
3	Close bunded pit drain valve using the valve key tool before truck arrives. *This closes the pit to retain any spillage from the filling process. This removes any risk of the spillage entering the stormwater system.*	
4	When truck arrives, setup barricades to prevent pedestrians from coming into contact with work personnel or equipment during delivery. The driver will connect the hose lines and pump for ready for unloading. *The delivery contains two 1,000 litre IBCs of Sodium Hydroxide 50% and one IBC containing 100 litres of water to flush the lines once the two IBCs are emptied*.	

5	Once the hoses and pump are connected, the filling process is ready to stat. Press 'START' button on chemical fill HMI to allow the pumping of chemical from truck IBCs. *The truck has a pump which is controlled locally by the driver*. *The IBCs are emptied one at a time. Once the two IBCs are emptied the 100 litres of water is then flushed to clean the pump and lines.*	
6	The chemical fill HMI displays the caustic storage tank level. The system will automatic shut-down if the caustic storage tank level is greater than 2,500 litres. *Once the truck is full unloaded, the will driver will then flush the hoses and lines with water to prevent any residual caustic build up or spills*.	
7	When truck leaves, check for any spills or leaks in pipeline. Open bunded pit drain if no chemical spills have occurred, disconnect hose from water supply, close chemical fill panel, lock chemical fill area and remove safety barricades.	

Appendix F

H6 TYREE BUILDING
Maintenance Schedule

H6 TYREE

BORE WATER RESERVOIR - Monthly Maintenance Check List

1) Check the plant for leaks in the pipes, tank, and pumps. Check and record all alarms (on HMI)	
2) Check pH meter (should be reading around 5)	
3) Manually close the automatic inlet valve (HMI)	
3) Isolate manual valve either side of the pH probe and inlet screen	
4) Remove the inlet screen and clean	
5) Remove the pH probe	
6) Calibrate all pH probe using two-point calibration • Fill rinse jar with deionised water • Fill jar with buffer pH4 • Fill jar with buffer pH7 • Rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH7 • Push CAL button and follow the instructions of the software • Once stage one is complete rinse probe with deionised water & wipe down with clean dry cloth • Place probe in buffer pH4 and continue • Meter will either accept or deny calibration • If it accepts, press ok Cal is finished, then rinse probe • If it does not calibrate, note down values of zero point and slope, enter the values manually • If values are a long way out of range soak, probe in buffer pH4 for half an hour and try again • Log the zero & slope results for each probe	
7) Place the probe back into position	
8) Return the inlet screen and tighten tri clover fitting	
9) Slowly open the inlet valve	
10) Manually open the automatic inlet valve (HMI)	
11) Once the air is purged through the automatic valve, open the drain valve and allow water to blead out of the system, then close the drain valve	
12) Return the automatic inlet valve to AUTO(HMI)	
13) Check the pump set inlet basket is clean	
14) Check the four reticulation pump VSDs (Hydrovars) are in auto with no faults	
15) Check the plant for leaks in the pipes, tank and reticulation system	
16) Clean up and sweep the excess water away	

REFER TO **UNSW BORE WATER MANUAL PART 1 - APPENDIX 7 - TYREE RAW BORE WATER EQUIPMENT** FOR DETAILS OF EQUIPMENT

Appendix G

UNSW PM Procedures for the Bore Water System

(To be used as a guide only, refer to UNSW electronic copy for current PM Procedure)

	H-BWT
PMS Group Description	Alpha, Bravo and Charlie Bore Water Pump Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-D1	Check function Record Reading and General Condition Check and Adjustments **Using Online Connection**	1 Daily scheduled monthly	N/A

PM Steps

Objective: On a daily basis, monitor the function & operations of the plant

Warnings: - There are no warning for this procedure.

Cautions: - There are no precautions for this procedure.

Daily Procedure Using On Line IT connection:
1) Check all indicators to ensure the system is working within the design intent parameters. Report any significant variance in theses parameters.

NOTE 2:- Where significant variance in the Plant parameters has been noted or/if the plant has disabled the reticulation pumps and has not started them back within the designed limits attend site and provide a report
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

Dated 4/02/2020

PMS Group	H-BWT
PMS Group Description	Alpha, Bravo and Charlie Bore Water Pump Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-W1	Check function Record Reading and General Condition check - On Site	1 Weekly	N/A

Objective: On a Weekly basis, physically inspect and monitor the function, operations of monitoring plant.

Warnings: - No Warnings Present
Cautions: - No Cautions Present

Procedure:
1) Check all indicators to ensure the system is working within the design intent parameters.
2) Check for water leaks.
3) Check for alarms on the control panel
4) Confirm the general condition of the switchboard enclosure

Dated 31/7/2018

PMS Group	H-BWT
PMS Group Description	Alpha, Bravo and Charlie Bore Water Pump Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-M1	Check Pump for Leaks and perform maintenance as required	1 Month	N/A

PM Steps

{PM Procedure H-BWT-M1 Frequency 1 Monthly}
Objective: To provide continual circulation of bore water.

Applicable Standards and regulations:
1) Nil

Procedure:

1) check control panel and VSD indication for alarms or fault codes.
2) Visually inspect pump components and connections for:
   a) physical damage or excessive wear;
   b) corrosion or wastage of surfaces and connections;
   c) leaks from joints, gaskets and pipework unions;
3) Attach reports or certificate to Archibus Work Order and raise appropriate reactive Service Request as required.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31/7/2018

PMS Group	H-BWT
PMS Group Description	David Phillips Field Bore Water Pump Systems
Equipment Category	North Bore, South Bore & Hockey Field System
Equipment Standards	Bores

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-M1	Check Pump for Leaks and perform maintenance as required	1 Month	N/A

PM Steps

{PM Procedure H-BWT-M1 Frequency 1 Monthly}
Objective: To provide continual circulation of bore water.

Applicable Standards and regulations:
1) Nil

Procedure:

1) check control panel and VSD indication for alarms or fault codes.
2) Visually inspect pump components and connections for:
   a) physical damage or excessive wear;
   b) corrosion or wastage of surfaces and connections;
   c) leaks from joints, gaskets and pipework unions;
3) Attach reports or certificate to Archibus Work Order and raise appropriate reactive Service Request as required.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31/7/2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-D1	Check function Record Reading and General Condition Check and Adjustments **Using Online Connection**	1 Daily scheduled monthly	N/A

PM Steps

{PM Procedure H-BWT-E10-D1 Frequency 1 Day Scheduled Monthly}
Objective: On a daily basis, monitor and adjust the function, operations and control of Bore Water Treatment Plant and monitor the use of consumable chemicals.

Warnings: - There are no warning for this procedure.

Cautions: - There are no precautions for this procedure.

Daily Procedure Using On Line IT connection:
1) Check all indicators to ensure the system is working within the design intent parameters. Make required adjustments to the process loop and Report any significant variance in theses parameters.
2) Check that the plant has not transferred over to operating on potable water supply.

NOTE 2:- Where significant variance in the Bore Water Treatment Plant parameters has been noted or/if the plant has failed “to” potable water and has not converted back within the designed limits attend site and provide a report
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

Dated 8 September 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-W1	Check function Record Reading and General Condition check - On Site	1 Weekly	N/A

PM Steps

{PM Procedure H-BWT-E10-W1 Frequency 1 Week}
Objective: On a Weekly basis, physically inspect and monitor the function, operations and control of Bore Water Treatment Plant and monitor the use of consumable chemicals.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE.

Procedure:
1) Check all indicators to ensure the system is working within the design intent parameters.
2) Check that the plant has not transferred over to operating on potable water supply.
3) Check for liquid caustic leaks.
4) Check for potable/non potable water leaks.
5) Check for alarms on the control panel.
6) Confirm the general condition of the plant, plant room and doors
7) Check the bulk Caustic Reserve for the minimum of 2 x 200 litre drums. If the Caustic Reserve has been reached, raise an Archibus reactive Work Request from within this PM Work Request to supply deliver and load CS50 Caustic Solution to 100%capacity of the reserve.

Dated 8 September 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Pumps
Equipment Standards	PUMP-METERING

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-M1	Check Condition of Solenoid Metering Pumps	1 Monthly	NA

PM Steps

{PM Procedure H-BWT-E10-M1 Frequency 1 Monthly}
Objective: To supply metered chemical dose to static mixers in the treatment of bore water.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Avoid excessive spraying and splashing of water in the vicinity of acid tanks and pumps.

Applicable Standards and regulations:
1) Product Information for ProMinent® gamma/ L Solenoid Metering Pump

1)Standard liquid ends:
a) Check the diaphragm for damage (see section 10)
b) Check chemical seepage at vent hole
c) Check that the discharge tubing is connected firmly to the liquid end
d) Check that discharge and suction valves are firmly fixed
e) Check that the liquid end is generally watertight (especially vent hole! See fig. 20)
f) Check for correct feed: run the gamma/ L run for a short period (press both arrow keys together)
g) Check electrical connections for wear
h) Check that liquid end screws are fastened tightly (on coarse/fine bleeding versions, first remove knob and cover) Screw fastening torque: 4,5 to 5 Nm

2) For PP liquid end, check fastening torque
a) Additionally, for liquid ends with coarse/fine bleed function and SEK type:
b) Check that the bypass tubing is connected firmly to the liquid end
c) Check that the bleed valve is firmly fixed in place
d) Examine the discharge and bypass tubing for kinks
e) Check that the coarse/fine bleed function is working correctly

3) Check screwed synthetic joints for leakage and repair any leaks found.

4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1).N/A

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	Recycle Pump

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-M1	Check Pump for Leaks and replace as required	1 Month	N/A

PM Steps

{PM Procedure H-BWT-E10-M1 Frequency 1 Monthly}
Objective: To provide continual minimal circulation of water in the bore water treatment plant.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Clean pump components and connections with soft bristled brush to remove build-up of dirt, grit and other contaminants and wipe over with soft rag.
2) Visually inspect pump components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from joints, gaskets and pipework unions;
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Tanks Chemical
Equipment Standards	TANK-CHEMICAL:- Tank - Storage - Chemical

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-M1	Check Chemical Tank Volume Digital Readout Against Visual Tank Volume	1 Monthly	N/A

PM Steps

{PM Procedure H-BWT-E10-M1 Frequency 1 Monthly}
Objective: To provide cleaning and wash down facilities for Bore Water treatment Plant Room.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Avoid excessive spraying and splashing of water in the vicinity of acid tanks and pumps.

Applicable Standards and regulations:
1) N/A

Procedure:
1) Examine chemical storage tank volume digital readout and compare the readout against the visual tank volume. Make note of both volumes in the Achibus Work request notes. If the difference between the two readings is greater than 10 Percent the sensors require calibration
2) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Hose Reels (not Fire related)
Equipment Standards	HOSEREEL-DOM:-Hosereel - Domestic

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-M6	Check and Inspect hose and real for damage and function	1 Year	N/A

PM Steps

{PM Procedure H-BWT-E10-M6 Frequency 1 Yearly}
Objective: To provide cleaning and wash down facilities for Bore Water treatment Plant Room.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Avoid excessive spraying and splashing of water in the vicinity of CS50 Caustic tanks and pumps.

Applicable Standards and regulations:
1) DIN EN ISO / IEC 17025; and
2) Product Information for PG2454.E1

Procedure:
1) fully extend hose from retraction reel.
2) check extent of hose, hose joints and connections for damage or leaks.
3) ensure hose fully retracts.
4) check security of hose mountings an attachments.
5) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-M6	Cycle Actuated Butterfly Valves on UPS Power UPS Test	6 Monthly	N/A

PM Steps

{PM Procedure H-BWT-E10-M6 Frequency 6 Monthly}
Objective: To provide reliability of UPS power that supplies power to the four actuated butterfly valves to auto bypass from bore water to towns water, in the event of power or control panel failure.

Warnings: - Electrical hazards are present in the Bore Water Treatment Plant Motor Control Centre that houses the UPS.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Simulate power outage and observe that the actuated butterfly valves (PID Reference MV001, MV002, MV003, and MV004) cycle to the correct position for bypass to town water.
2) Measure and record the residual Power (Va) in the UPS for tend analysis

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-M6	Remove and Clean Y Strainer Basket	6 Monthly	N/A

PM Steps

{PM Procedure H-BWT-E10-M6 Frequency 6 Monthly}
Objective: To provide coarse material straining of water entering the treated bore water reticulation circuit.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Isolate appropriate system components to enable maintenance to be conducted
2) remove cast iron cover retaining bolts, remove cover and remove stainless steel strainer from the body of the Y strainer
3) clean built up debris from strainer, cover and internal area of Y strainer body.
4) examine the cover gasket for damage or deformation and renew gasket as necessary
5) examine cover retaining bolts for corrosion and burs and renew bolts as necessary
6) reinstall components to the Y Strainer in reverse order, ensure retaining bolt screws are lightly lubricated with appropriate graphite based grease.
7) De-isolate and pressurise system, examine strainer for leaks.
8) Wipe down Y strainer body and visually inspect Y Strainer for damage.
9) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Valves
Equipment Standards	VALVE-GATE:- Valve - Gate - Water

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-Y1	Exercise Valve and check for damage and leaks	1 Yearly	N/A

PM Steps

{PM Procedure H-BWT-E10-Y1 Frequency 1 Monthly}
Objective: To ensure valve is able to operate through the full range of travel and adequately isolate system.

Caution: - The operation of these valve requires the operator to be on a ladder greater than two meters high. Ensure adequate safety procedures are followed.

Applicable Standards and regulations:
1) N/A

Procedure:
1) Provide a shutdown notice prior to the any isolations and examination for leaks.
2) Clean valve spindle/stem to remove build-up of dirt, grit and other contaminants.
3) Lightly lubricate spindle/stem with tap grease that is suitable for potable water applications.
4) Exercise valve through its full range of travel at least twice. Note any binding or inconsistent action
5) Examine packing glands and seals for leaks.
6) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL:-Gauge - Pressure Indicating - Digital

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-Y2	Calibrate Digital Pressure Gauge.	2 Yearly	H-BWT-E10-M6

PM Steps

{PM Procedure H-BWT-E10-Y2 Frequency 2 Yearly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum PH Range of 7.2 @ 2 to12 Litres per second.

Applicable Standards and regulations:
1) DIN EN ISO / IEC 17025; and
2) Product Information for PG2454.

Procedure:
1) Calibrate Digital Pressure Gauge.
2) Provide Calibration Certificate.
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request..

PM Procedures to be carried out in conjunction with this PM:
1) Suppressed subordinate Planned Maintenance Procedure H-BWT-E10-M6 Digital Pressure Gauge Inspection.

Dated 31 July 2018

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-Y2	Replace UPS Power Supply, UPS Control Unit and UPS Battery Unit.	2 yearly	H-BWT-E10-M6

PM Steps

{PM Procedure H-BWT-E10-Y2 Frequency 2 Yearly}
Objective: To provide reliability of UPS power supply that supplies power to the four actuated butterfly valves to auto bypass from bore water to towns water, in the event of power or control panel failure.

Warnings: - Electrical hazards are present in the Bore Water Treatment Plant Motor Control Centre that houses the UPS.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Renew the following components within the Bore Water Treatment Plant Motor Control Centre:
   a. UPS Power Supply;
   b. UPS Control Unit; and
   c. UPS Battery Unit.

Note: when replacing these components new or post two years from new or updated models can be used if the new models are compatible with the installation. Any updated models are to be reflected into the Operation and Maintenance Manual as part of this work. Protect and Retain the components in plant room as emergency Spares.

2) Vacuum the interior of the Motor Control Centre:
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) 6 Monthly

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Sensors
Equipment Standards	SENSOR-FLOW:- Sensor - FLOW

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-E10-Y2	Calibrate Flow Sensor and Transmitter	2 Yearly	N/A

PM Steps

PM Procedure H-BWT-E10-Y2 Frequency 2 Yearly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum PH Range of 7.2 @ 20 to 30 Litres per minute.

Applicable Standards and regulations:
1) Product Information for Siemens 7ME6580-3TN14-2AA1 Magnetic Flow Sensor; and
2) Product Information for Siemens 7ME6910-1AA30-1AA0 Magnetic Flow Transmitter.

Procedure:
1) Calibrate Flow Sensor and Transmitter in accordance with the manufacturers recommendations.
2) Provide Calibration Certificate.
3) Visually inspect Magnetic Flow Sensor and Magnetic Flow Transmitter components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from connections and pipework unions;
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 31 July 2018

PMS Group	H-BWT
PMS Group Description	Law building PH & Pressure Monitoring Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F8-D1	Check function Record Reading and General Condition Check and Adjustments **Using Online Connection**	1 Daily scheduled monthly	N/A

PM Steps

{PM Procedure H-BWT-F8-D1 Frequency 1 Day Scheduled Monthly}
Objective: On a daily basis, monitor and adjust the function, operations and control of Bore Water Treatment Plant and monitor the use of consumable chemicals.

Warnings: - There are no warning for this procedure.

Cautions: - There are no precautions for this procedure.

Daily Procedure Using On Line IT connection:
1) Check all indicators to ensure the system is working within the design intent parameters. Make required adjustments to the process loop and Report any significant variance in theses parameters.
2) Check that the plant has not transferred over to operating on potable water supply.

NOTE 2:- Where significant variance in the Bore Water Treatment Plant parameters has been noted or/if the plant has failed “to” potable water and has not converted back within the designed limits attend site and provide a report
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

Dated 8 September 2022

PMS Group	H-BWT
PMS Group Description	Law building PH & Pressure Monitoring Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F8-W1	Check function Record Reading and General Condition check - On Site	1 Weekly	N/A

PM Steps

Objective: On a Weekly basis, physically inspect and monitor the function, operations of monitoring plant.

Warnings: - No Warnings Present
Cautions: - No Cautions Present

Procedure:
1) Check all indicators to ensure the system is working within the design intent parameters.
2) Check for potable/non potable water leaks.
3) Check for alarms on the pH control panel
4) Confirm the general condition of the plant, plant room and doors

Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Commerce Courtyard Bore Water Reticulation Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F8-M1	Calibrate pH Probe and controller and chart results (replace probe on as needs basis)	1 Monthly	N/A

PM Steps

Frequency 1 Monthly}
Objective: To provide instrumentation accuracy for monitoring of Commerce Courtyard bore water supply.

Applicable Standards and regulations:

1) Product Information for PROBE pH CPF81D7LH31; and
2) Product Information for Controller CPM223.

Procedure:
1) Calibrate pH probe and controller with pH Calibration Fluid.
2) Record calibration reading on a spreadsheet

15 March 2016.

PMS Group	H-BWT
PMS Group Description	Commerce Courtyard Bore Water Reticulation Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL: -Gauge - Pressure Indicating - Digital

PM ID	**PM Procedure Title**	**Frequency**	**Suppressed PM ID**
H-BWT-F8-M6	Clean and Inspect Digital Pressure Gauge.	6 Monthly	N/A

PM Steps

{Frequency 6 Monthly}
Objective: To provide instrumentation accuracy for monitoring of Commerce Courtyard bore water supply.

Applicable Standards and regulations:
1) Nil

Procedure:
1) Clean pressure gauge with soft bristled brush to remove build-up of dirt, grit and other contaminants and wipe over with soft rag.
2) Visually inspect Pressure Gauge Components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from dial face and pipework unions;
  d) dial gauge fluid for discoloration; and
  e) reading consistency between dial and digital read outs.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Commerce Courtyard Bore Water Reticulation Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL: -Gauge - Pressure Indicating - Digital

PM ID	**PM Procedure Title**	**Frequency**	**Suppressed PM ID**
H-BWT-F8-2Y	Calibrate Digital Pressure Gauge.	2 Yearly	

PM Steps	{Frequency 2 Yearly} Objective: To provide instrumentation accuracy for monitoring of Commerce Courtyard bore water supply. Applicable Standards and regulations: 1) DIN EN ISO / IEC 17025; and 2) Product Information for PG2454. Procedure: 1) Calibrate Digital Pressure Gauge. 2) Provide Calibration Certificate. PM Procedures to be carried out in conjunction with this PM: 1) Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21	Check function Record Reading and General Condition Check and Adjustments **Using Online Connection**	1 Daily scheduled monthly	N/A

PM Steps

{PM Procedure H-BWT-F21 Frequency 1 Day Scheduled Monthly}
Objective: On a daily basis, monitor and adjust the function, operations and control of Bore Water Treatment Plant and monitor the use of consumable chemicals.

Warnings: - There are no warning for this procedure.

Cautions: - There are no precautions for this procedure.

Daily Procedure Using On Line IT connection:
1) Check all indicators to ensure the system is working within the design intent parameters. Make required adjustments to the process loop and Report any significant variance in theses parameters.
2) Check that the plant has not transferred over to operating on potable water supply.
3) Check and record the CS50 Caustic Solution levels within the tank to ensure that the level is greater than 30% residual (three days' supply).

NOTE 2:- Where significant variance in the Bore Water Treatment Plant parameters has been noted or/if the plant has failed "to" potable water and has not converted back within the designed limits attend site and provide a report
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-W1	Check function Record Reading and General Condition check - On Site	1 Weekly	N/A

PM Steps

{PM Procedure H-BWT-F21-W1 Frequency 1 Week}
Objective: On a Weekly basis, physically inspect and monitor the function, operations and control of Bore Water Treatment Plant and monitor the use of consumable chemicals.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE.

Procedure:
1) Check all indicators to ensure the system is working within the design intent parameters.
2) Check that the plant has not transferred over to operating on potable water supply.
3) Check for liquid caustic leaks.
4) Check for potable/non potable water leaks.
5) Check for alarms on the control panel.
6) Confirm the general condition of the plant, plant room and doors
7) Check and record the CS50 Caustic Solution levels within the day tank and fill the tank to 75% 2250L

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Valves
Equipment Standards	VALVE-BUTTERFLY :- Valves Actuated Butterfly

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M1	Operate Emergency Stop and confirm closure of valves	1 Monthly	N/A

PM Steps

{PM Procedure H-BWT-F21-M1 Frequency 1 Monthly}
Objective: To test that the emergency stop operates and the two actuated butterfly valves fail over to auto bypass from bore water to towns water.

Applicable Standards and regulations:
1) N/A

Procedure:
1) Press emergency stop to ensure valves close, confirm closure on HMI.
2) Reinstate system on completion.
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Mixers
Equipment Standards	MIXER-C-STATIC Mixer - Chemical - Static

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M1	Clean and inspect Static Mixer Components	1 Monthly	N/A

PM Steps

{PM Procedure H-BWT-F21-M1 Frequency 1 Monthly}
Objective: To provide effective mixing of chemical to obtain an optimum PH level of 7.0 to 7.2 in the treated bore water.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Leaks from mixer injection points contain NaOH Sodium Hydroxide

Applicable Standards and regulations:
1) Nil

Procedure:

1) Visually inspect Static Mixer
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from joints, gaskets and pipework unions;
2) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	pH Probes
Equipment Standards	Endress + Hauser Specification

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M1	Calibrate pH Probe and controller and document results (replace probe on as needs basis)	1 Monthly	N/A

PM Steps

{PM Procedure H-BWT-F21-M1 Frequency 1 Monthly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum PH Range of 7.0 to 7.2 @ 11m^3 to 29m^3 per hour
Applicable Standards and regulations:
1) Product Information for PROBE pH CPF181D-7LH11; and
2) Product Information for Controller CM448-AAD8A26AABAA.

Procedure:
1) Calibrate PH probe and controller with PH Calibration Fluid.
2) Record calibration reading on a spreadsheet
3) Provide Calibration Certificate.
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1).

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Pumps
Equipment Standards	PUMP-METERING

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M1	Check Condition of Solenoid Metering Pumps	1 Monthly	NA

PM Steps

{PM Procedure H-BWT-F21-M1 Frequency 1 Monthly}
Objective: To supply metered chemical dose to static mixers in the treatment of bore water.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Avoid excessive spraying and splashing of water in the vicinity of acid tanks and pumps.

Applicable Standards and regulations:
1) Product Information for ProMinent® gamma/ L Solenoid Metering Pump

1)Standard liquid ends:
a) Check the diaphragm for damage (see section 10)
b) Check chemical seepage at vent hole
c) Check that the discharge tubing is connected firmly to the liquid end
d) Check that discharge and suction valves are firmly fixed
e) Check that the liquid end is generally watertight (especially vent hole! See fig. 20)
f) Check for correct feed: run the gamma/ L run for a short period (press both arrow keys together)
g) Check electrical connections for wear
h) Check that liquid end screws are fastened tightly (on coarse/fine bleeding versions, first remove knob and cover) Screw fastening torque: 4,5 to 5 Nm

2) For PP liquid end, check fastening torque
a) Additionally, for liquid ends with coarse/fine bleed function and SEK type:
b) Check that the bypass tubing is connected firmly to the liquid end
c) Check that the bleed valve is firmly fixed in place
d) Examine the discharge and bypass tubing for kinks
e) Check that the coarse/fine bleed function is working correctly

3) Check screwed synthetic joints for leakage and repair any leaks found.

4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1).N/A

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Tanks Chemical
Equipment Standards	TANK-CHEMICAL:- Tank - Storage - Chemical

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M1	Check Chemical Tank Volume Digital Readout Against Visual Tank Volume	1 Monthly	N/A

PM Steps

{PM Procedure H-BWT-F21-M1 Frequency 1 Monthly}
Objective: To provide cleaning and wash down facilities for Bore Water treatment Plant Room.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Avoid excessive spraying and splashing of water in the vicinity of acid tanks and pumps.

Applicable Standards and regulations:
1) N/A

Procedure:
1) Examine chemical storage tank volume digital readout and compare the readout against the visual tank volume. Make note of both volumes in the Achibus Work request notes. If the difference between the two readings is greater than 10 Percent the sensors require calibration
2) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL:-Gauge - Pressure Indicating - Digital

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M6	Clean and Inspect Digital Pressure Gauge.	6 Monthly	

{PM Procedure H-BWT-F21-M6 Frequency 6 Monthly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum PH Range of 7.0 to 7.2 @ 11m^3 to 29m^3 per hour.

Applicable Standards and regulations:
1) Nil

Procedure:
1) Clean pressure gauge with soft bristled brush to remove build-up of dirt, grit and other contaminants and wipe over with soft rag.
2) Visually inspect Pressure gauge Components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from dial face and pipework unions;
  d) dial gauge fluid for discoloration; and
  e) reading consistency between dial and digital read outs.
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request..

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Hose Reels (not Fire related)
Equipment Standards	HOSEREEL-DOM:-Hosereel - Domestic

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M6	Check and Inspect hose and real for damage and function	1 Year	N/A

PM Steps

{PM Procedure H-BWT-F21-M6 Frequency 1 Yearly}
Objective: To provide cleaning and wash down facilities for Bore Water treatment Plant Room.

Warnings: - Caustic Soda (NaOH Sodium Hydroxide) is present in this room. NaOH Sodium Hydroxide is classified as Dangerous Goods and Hazardous in accordance with the Australian Dangerous Goods Code (ADG Code) and the criteria of ASCC [NOHSC:1008(2004)]. NaOH Sodium Hydroxide is Corrosive, Causes severe burns and presents a Risk of serious eye damage.

Cautions:- Refer to the MSDS available in the room and wear appropriate PPE. Avoid excessive spraying and splashing of water in the vicinity of CS50 Caustic tanks and pumps.

Applicable Standards and regulations:
1) DIN EN ISO / IEC 17025; and
2) Product Information for PG2454.E1

Procedure:
1) fully extend hose from retraction reel.
2) check extent of hose, hose joints and connections for damage or leaks.
3) ensure hose fully retracts.
4) check security of hose mountings an attachments.
5) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	CONDUCTIVITY PROBE
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-Y1	Calibrate conductivity probes and document results (replace probe on as needs basis)	1 Year	N/A

PM Steps

{PM Procedure H-BWT-F21-Y1 Frequency 1 yearly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum Range of 400 to 500 micro siemens @ $11m^3$ to $29m^3$ per hour
Applicable Standards and regulations:
1) Product Information for PROBE CLS21D-C1E1 &
2) Product Information for Controller CM448-AAD8A26AABAA.

Procedure:
1) Calibrate Reservoir conductivity probe and controller.
2) Record calibration reading on a spreadsheet
3) Provide Calibration Certificate.
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1).

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Bore Water Treatment Plant Systems
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M6	Cycle Actuated Butterfly Valves on UPS Power UPS Test	6 Monthly	N/A

PM Steps

{PM Procedure H-BWT-F21-M6 Frequency 6 Monthly}
Objective: To provide reliability of UPS power that supplies power to the four actuated butterfly valves to auto bypass from bore water to towns water, in the event of power or control panel failure.

Warnings: - Electrical hazards are present in the Bore Water Treatment Plant Motor Control Centre that houses the UPS.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Simulate power outage and observe that the actuated butterfly valves (PID Reference MV120, MV119, AV122, and AV124) cycle to the correct position for bypass to town water.
2) Measure and record the residual Power (Va) in the UPS for tend analysis

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-M6	Remove and Clean Y Strainer Basket	6 Monthly	N/A

PM Steps

{PM Procedure H-BWT-F21-M6 Frequency 6 Monthly}
Objective: To provide coarse material straining of water entering the treated bore water reticulation circuit.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Isolate appropriate system components to enable maintenance to be conducted
2) remove cast iron cover retaining bolts, remove cover and remove stainless steel strainer from the body of the Y strainer
3) clean built up debris from strainer, cover and internal area of Y strainer body.
4) examine the cover gasket for damage or deformation and renew gasket as necessary
5) examine cover retaining bolts for corrosion and burs and renew bolts as necessary
6) reinstall components to the Y Strainer in reverse order, ensure retaining bolt screws are lightly lubricated with appropriate graphite based grease.
7) De-isolate and pressurise system, examine strainer for leaks.
8) Wipe down Y strainer body and visually inspect Y Strainer for damage.
9) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Valves
Equipment Standards	VALVE-GATE:- Valve - Gate - Water

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-Y1	Exercise Valve and check for damage and leaks	1 Yearly	N/A

PM Steps

{PM Procedure H-BWT-F21-Y1 Frequency 1 Monthly}
Objective: To ensure valve is able to operate through the full range of travel and adequately isolate system.

Caution: - The operation of these valve requires the operator to be on a ladder greater than two meters high. Ensure adequate safety procedures are followed.

Applicable Standards and regulations:
1) N/A

Procedure:
1) Provide a shutdown notice prior to the any isolations and examination for leaks.
2) Clean valve spindle/stem to remove build-up of dirt, grit and other contaminants.
3) Lightly lubricate spindle/stem with tap grease that is suitable for potable water applications.
4) Exercise valve through its full range of travel at least twice. Note any binding or inconsistent action
5) Examine packing glands and seals for leaks.
6) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL:-Gauge - Pressure Indicating - Digital

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-Y2	Calibrate Digital Pressure Gauge.	2 Yearly	H-BWT-F21-M6

PM Steps

{PM Procedure H-BWT-F21-Y2 Frequency 2 Yearly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum PH Range of 7.0 to 7.2 @ 11m^3 to 29m^3 per hour

Applicable Standards and regulations:
1) DIN EN ISO / IEC 17025; and
2) Product Information for PG2454.

Procedure:
1) Calibrate Digital Pressure Gauge.
2) Provide Calibration Certificate.
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request..

PM Procedures to be carried out in conjunction with this PM:
1) Suppressed subordinate Planned Maintenance Procedure H-BWT-F21-M6 Digital Pressure Gauge Inspection.

Dated 30 August 2022

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-Y2	Replace UPS Power Supply, UPS Control Unit and UPS Battery Unit.	2 yearly	H-BWT-F21-M6

PM Steps

{PM Procedure H-BWT-F21-Y2 Frequency 2 Yearly}
Objective: To provide reliability of UPS power supply that supplies power to the four actuated butterfly valves to auto bypass from bore water to towns water, in the event of power or control panel failure.

Warnings: - Electrical hazards are present in the Bore Water Treatment Plant Motor Control Centre that houses the UPS.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Renew the following components within the Bore Water Treatment Plant Motor Control Centre:
   a. UPS Power Supply;
   b. UPS Control Unit; and
   c. UPS Battery Unit.

Note: when replacing these components new or post two years from new or updated models can be used if the new models are compatible with the installation. Any updated models are to be reflected into the Operation and Maintenance Manual as part of this work. Protect and Retain the components in plant room as emergency Spares.

2) Vacuum the interior of the Motor Control Centre:
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) 6 Monthly

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Bore Water Treatment Plant Systems
Equipment Category	Sensors
Equipment Standards	SENSOR-FLOW:- Sensor - FLOW

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-F21-Y2	Calibrate Flow Sensor and Transmitter	2 Yearly	N/A

PM Steps

PM Procedure H-BWT-F21-Y2 Frequency 2 Yearly}
Objective: To provide instrumentation accuracy for monitoring and control of Bore Water treatment Plant, to produce treated bore water with an optimum PH Range of 7.0 to 7.2 @ 11m^3 to 29m^3 per hour

Applicable Standards and regulations:
1) Product Information for Siemens 7ME6580-3TN14-2AA1 Magnetic Flow Sensor; and
2) Product Information for Siemens 7ME6910-1AA30-1AA0 Magnetic Flow Transmitter.

Procedure:
1) Calibrate Flow Sensor and Transmitter in accordance with the manufacturers recommendations.
2) Provide Calibration Certificate.
3) Visually inspect Magnetic Flow Sensor and Magnetic Flow Transmitter components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from connections and pipework unions;
4) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 30 August 2022

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-D1	Check function Record Reading and General Condition Check and Adjustments **Using Online Connection**	1 Daily scheduled monthly	N/A

PM Steps

Objective: On a daily basis, monitor the function & operations of the plant

Warnings: - There are no warning for this procedure.

Cautions: - There are no precautions for this procedure.

Daily Procedure Using On Line IT connection:
1) Check all indicators to ensure the system is working within the design intent parameters.
2) Check that the plant has stopped the reticulation pumps
Report any significant variance in theses parameters.

NOTE 2:- Where significant variance in the Plant parameters has been noted or/if the plant has disabled the reticulation pumps and has not started them back within the designed limits attend site and provide a report
3) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request.

Dated 4/02/2020

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-W1	Check function Record Reading and General Condition check - On Site	1 Weekly	N/A

PM Steps

Objective: On a Weekly basis, physically inspect and monitor the function, operations of monitoring plant.

Warnings: - No Warnings Present
Cautions: - No Cautions Present

Procedure:

1) Check all indicators to ensure the system is working within the design intent parameters.
2) Check for potable/non potable water leaks.
3) Check for alarms on the control panel.
4) Confirm the position of the main fill and reticulation paths within the room
5) Confirm the general condition of the plant, plant room and doors
6) Push the Manual Test pushbutton and confirm valve opens reading the water meter

Dated 4 Feb 2019.

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-M1	Calibrate pH Probe and controller and chart results (replace probe on as needs basis)	1 Monthly	N/A

PM Steps

Frequency 1 Monthly}
Objective: To provide instrumentation accuracy for monitoring of Lower Campus bore water supply.

Applicable Standards and regulations:

1) Product Information for PROBE pH CPF81D7LH31; and
2) Product Information for Controller CPM223.

Procedure:
1) Calibrate pH probe and controller with pH Calibration Fluid.
2) Record calibration reading on a spreadsheet

15 March 2016.

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	Pumps
Equipment Standards	Bore Reticulation pumps

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-M1	Check Pump for Leaks and perform maintenance as required	1 Monthly	N/A

PM Steps

{1 Monthly}
Objective: To provide continual circulation of bore water.

Applicable Standards and regulations:
1) Nil

Procedure:

1) check control panel and VSD indication for alarms or fault codes.
2) Visually inspect pump components and connections for:
   a) physical damage or excessive wear;
   b) corrosion or wastage of surfaces and connections;
   c) leaks from joints, gaskets and pipework unions;
3) Attach reports or certificate to Archibus Work Order and raise appropriate reactive Service Request as required.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL: -Gauge - Pressure Indicating - Digital

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-M6	Clean and Inspect Digital Pressure Gauge.	6 Monthly	N/A

PM Steps

{Frequency 6 Monthly}
Objective: To provide instrumentation accuracy for monitoring of Lower Campus bore water supply.

Applicable Standards and regulations:
1) Nil

Procedure:
1) Clean pressure gauge with soft bristled brush to remove build-up of dirt, grit and other contaminants and wipe over with soft rag.
2) Visually inspect Pressure Gauge Components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from dial face and pipework unions;
  d) dial gauge fluid for discoloration; and
  e) reading consistency between dial and digital read outs.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	Valves
Equipment Standards	Valves

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-Y1	4 x Butterfly valve Function Test and Maintenance.	1 Yearly	N/A

PM Steps	{PM Procedure H-BWT-H6-Y1 Frequency 1 Yearly} Objective: To ensure valve is able to operate through the full range of travel and adequately isolate system. Caution: - The operation of these valve requires the operator to be on a ladder greater than two meters high. Ensure adequate safety procedures are followed. Procedure: 1) Provide a shutdown notice prior to the any isolations and examination for leaks. 2) Clean valve spindle/stem to remove build-up of dirt, grit and other contaminants. 3) Lightly lubricate spindle/stem with tap grease that is suitable for potable water applications. 4) Exercise valve through its full range of travel at least twice. Note any binding or inconsistent action 5) Examine packing glands and seals for leaks. 6) Attach reports or certificate to Archibus Work Order and raise any appropriate reactive Service Request, as required from within the appropriate Work Request. Reviewed By Ken Lees - UNSW Reviewed by Andrew Box – ECS

PMS Group	H-BWT
PMS Group Description	Raw Bore Water Reticulation Plant Systems
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL: -Gauge - Pressure Indicating - Digital

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-H6-2Y	Calibrate Digital Pressure Gauge.	2 Yearly	

PM Steps

{Frequency 2 Yearly}
Objective: To provide instrumentation accuracy for monitoring of Lower Campus bore water supply.

Applicable Standards and regulations:
1) DIN EN ISO / IEC 17025; and
2) Product Information for PG2454.

Procedure:
1) Calibrate Digital Pressure Gauge.
2) Provide Calibration Certificate.

PM Procedures to be carried out in conjunction with this PM:
1)
Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Service Tunnel Bore Water Reticulation.
Equipment Category	Gauges
Equipment Standards	GAUGE-P-DIGITAL: -Gauge - Pressure Indicating - Digital

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-MST-M1	Clean and Inspect Digital Pressure Gauge.	1 Monthly	N/A

PM Steps

{Frequency 1 Monthly}
Objective: To provide instrumentation accuracy for monitoring of Service Tunnel bore water supply.

Applicable Standards and regulations:
1) Nil

Procedure:
1) Clean pressure gauge with soft bristled brush to remove build-up of dirt, grit and other contaminants and wipe over with soft rag.
2) Visually inspect Pressure Gauge Components and connections for:
  a) physical damage or excessive wear;
  b) corrosion or wastage of surfaces and connections;
  c) leaks from dial face and pipework unions;
  d) dial gauge fluid for discoloration; and
  e) reading consistency between dial and digital read outs.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 15 March 2016.

PMS Group	H-BWT
PMS Group Description	Alpha, Bravo and Charlie Bore Water Pump Systems
Equipment Category	
Equipment Standards	

PM ID	PM Procedure Title	Frequency	Suppressed PM ID
H-BWT-M6	Check Pump for Leaks and perform maintenance as required	6 Month	N/A

PM Steps

{PM Procedure H-BWT-M6 Frequency 6 Monthly}}
Objective: To provide continual circulation of bore water.

Applicable Standards and regulations:
1) Nil

Procedure:

1) Clean the MCC and cooling filters.
2) Visually inspect MCC and connections for:
   a) physical damage or excessive wear;
   b) corrosion;

3) Attach reports or certificate to Archibus Work Order and raise appropriate reactive Service Request as required.

PM Procedures to be carried out in conjunction with this PM:
1) Nil.

Dated 19/3/2020