BLIGH TANNER

Drinking Water Quality Management Plan Audit Report

Isaac Regional Council

Date: 31 October 2022

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LEAD AUDITOR	Sean Hinton		
CLIENT	Isaac Regional Council		
CLIENT CONTACT	Lydia Montgomery		
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1.0	Sean Hinton	Michael Lawrence	14/10/2022
1.1	Sean Hinton	Stephen Wagner	24/10/2022
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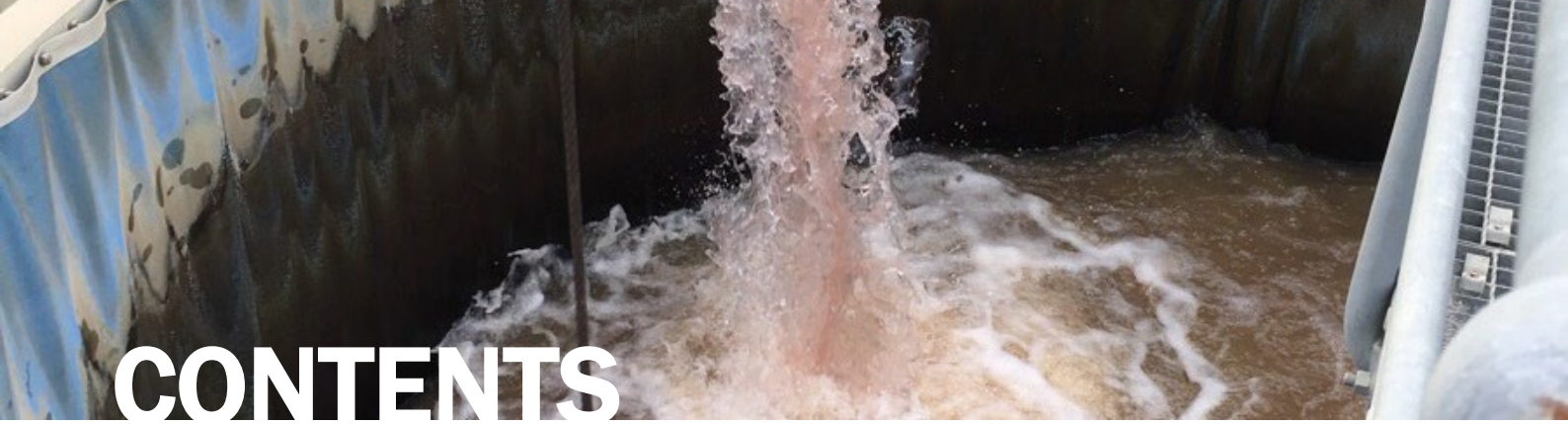

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EXECUTIVE SUMMARY

Audit Overview

Isaac Regional Council's Drinking Water Quality Management Plan Audit was undertaken by Sean Hinton between August and October 2022, with the on-site audits occurring between 4th and 6th October 2022. The audit was completed on 13 October 2022.

In accordance with the Drinking Water Quality Management Plan Review and Audit Guideline, the audit was required to:

- verify whether or not the monitoring and performance data given to the regulator under the plan is accurate;
- assess the provider's compliance with the plan and its conditions; and
- assess the plan's relevance to the water service.

Audit Findings

Overall, there were many key positive findings made during the audit. These included:

- A high quality of water being produced at all WTPs audited, and good records currently being kept for operational and verification monitoring.
- Good awareness of water quality hazards and the purpose of key treatment barriers.
- Evidence of continual improvements, particularly progress with the SCADA Project and related improvement programs.
- A proactive approach in recent years to incident reporting.
- Open and honest disclosures by Isaac Regional Council staff throughout the audit interviews.

Despite these positive aspects, there were six (6) non-conformances noted during the audit. These were all raised under the area of "compliance with the plan and its conditions", as summarised below.

1. Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.
2. Not all RMIP actions have been completed as indicated within the RMIP register.
3. Evidence could not be provided to verify that all water quality incidents (specifically, THMs exceedances in Saint Lawrence from 2018 and 2019) have been identified and reported in accordance with regulatory requirements.
4. Not all of the operational documentation listed in the DWQMP exists, or if it does, staff do not know how to access it, and not all of the available operational documentation was available through the intranet as stated in the plan.
5. The operational monitoring is not being fully implemented as stated in the DWQMP.
6. The verification monitoring program is not fully implemented as stated in the DWQMP, noting that the issues identified (e.g. gaps in sampling frequency) are considered relatively minor.

Recommendations to address the above non-conformances, as well as 28 Opportunities for Improvement have been raised in the audit report.

1. AUDIT OVERVIEW

Isaac Regional Council (Council) is a drinking water service provider, operating drinking water schemes in Carmila, Clermont, Dysart, Glenden, Nebo, Middlemount, Moranbah and Saint Lawrence. Council currently operates under an approved Drinking Water Quality Management Plan (DWQMP).

The 2022 DWQMP audit was conducted on site by Sean Hinton on 4th, 5th and 6th October 2022, with remaining audit items completed by 13 October 2022.

1.1 Audit requirements

Section 108 of the Act prescribes the requirements of the auditor, the scope of the audit and the content of the audit report. Under these requirements, the auditor is required to:

- verify whether or not the monitoring and performance data given to the regulator under the plan is accurate
- assess the provider's compliance with the plan and its conditions; and
- assess the plan's relevance to the water service

The audit report must also be prepared in accordance with any guidelines made by the regulator. At the time of the audit, the applicable audit guideline was the 'Drinking Water Quality Management Plan Review and Audit Guideline June 2019' (State of Queensland, 2019). This document provides further guidance around specific areas on which the auditor must focus.

1.2 Audit plan and details

Details of the audit are provided below:

Table 1 Audit details

Aspect	Details
Lead Auditor	Sean Hinton (Exemplar Global Certification # 133942)
Co-Auditor/Reviewer	Dr. Michael Lawrence (Exemplar Global Certification # 129230)
Field audit dates	4 – 6 October 2022
Schemes audited	Carmila, Dysart, Glenden, Nebo and Saint Lawrence
DWQMP versions within the scope	Isaac Regional Council – Drinking Water Quality Management Plan, Version H – 13 December 2021 (approved 22 March 2022) Isaac Regional Council – Drinking Water Quality Management Plan, Version E – 21 December 2017 (approved 9 April 2018)
Completion of audit date	13 October 2022

1.3 Audit timeline and agenda

The audit activities were undertaken as outlined below.

Table 2 Audit timeline / agenda

Date	Time	Location / activities
25 August 2022 – 29 September 2022	Various	Desktop review of documents, data, records in preparation for the site-based component of the audit
4 October 2022	8:00	Arrival in Mackay and travel to St Lawrence; Opening Meeting
	10:00 – 12:00	St Lawrence on-site audit and Operator interviews
	12:00 – 13:30	Lunch and travel to Carmila
	13:30 – 15:30	Carmila on-site audit and Operator interviews
	15:30	Close of day and travel to Moranbah
5 October 2022	7:45 – 8:30	Travel to Dysart
	8:30 – 11:00	Dysart on-site audit and Operator interviews
	11:00 – 12:30	Lunch and return to Moranbah
	13:00 – 16:00	Office based audit (Moranbah); interim closing meeting with management (key findings to this point)
	16:00	Close of day
6 October 2022	6:30 – 8:30	Travel to Glenden
	8:30 – 11:00	Glenden on-site audit and Operator interviews
	11:00 – 12:30	Lunch and travel to Nebo
	12:30 – 15:00	Nebo on-site audit and Operator interviews
	15:00	Informal closing meeting update, close of day and travel to Mackay

1.4 Documents audited

The following list of documents and data sources were provided by Council and reviewed as part of the audit:

+ 3. EDOCS - DW s99(1)(b) DWQMP Amendment Information Notice for the Decision Sent 20180409.PDF
+ IDC1603-02-REG-B Appendix 2 Improvement Program.xlsx
+ IDC1603-03-REG-A Appendix 3 Amendment Record.xlsx
+ IDC1603-04-REG-A Appendix 4 Documentation Register.xlsx
+ IRR1360-02-F-REG Appendix 1 Risk Register.xlsx
+ 1. IRC Drinking Water Quality Management Plan Nov 2021.pdf
+ 2. 20220322 DW_s99(1)(b)_DWQMP_Amendment_Information_Notice_for_the_Decision_Isaac RC.pdf
+ CARwsr503_DWI-486-22-09679_Chlorates 3March2021_SW.pdf
+ DYSwsr503_DWI-486-22-09512_Event Turbidity 230621 Dysart_SW.pdf
+ DYSwsr503_DWI-486-22-09513_Turbidity 111120 Dysart_SW.pdf
+ STLwsr017_DWI-486-21-09397_ManganeseExceedance_Dec2021_SW.pdf
+ STLwsr017_DWI-486-22-09510_THM 050521 StL DWI-486-22-09510_SW.pdf
+ STLwsr017_DWI-486-22-09591_ManganeseExceedance_April2022_SW.pdf
+ STLwsr017_DWI-486-22-09665_Manganese and Turbidity exceedance_June 2022_SW.pdf
+ STLwsr507_DWI-486-22-09613_StLWaterPipeBreak_SW.pdf
+ CARwsr017_DWI-486-21-09395_noncompliance_E.Coli_21122021_SW.pdf

+ CARwsr017_DWI-486-22-09484_E.Coli_23022022_SW.pdf
+ CARwsr017_DWI-486-22-09568_E.Coli_13042022_SW.pdf
+ 5. Drinking Water Quality Management Plan (DWQMP) report 2019-2020.pdf
+ 6. ECM_4699437_v2_Annual Report - Drinking Water Quality Management Plan (DWQMP) 2020-2021.pdf
+ 4. Isaac_RC_DWQMP_Audit_Report-Final.pdf
+ 7. DW_Key_Drinking_Water_Regulatory_Dates_2021_Isaac Regional Council.pdf
+ 9. MonitorProAllSchemes_01.07.2017 to 30.06.2022.xlsx
+ 0. Summary of Request For Info.xlsx
+ 3-CAR WTP Daily Data Log 2019-2020.xlsx
+ 4- CAR WTP Daily Data Log 2020 -2021.xlsx
+ 5-CAR WTP DAILY DATA LOG 2021-2022.xlsx
+ 1-CAR WTP Daily Data Log 2017-2018.xlsx
+ 2-CAR WTP Daily Data Log 2018-2019.xlsx
+ DYS WTP Daily Data Log 2019-2020.xlsx
+ DYS WTP Daily Data Log 2020-2021.xlsx
+ DYS WTP DAILY DATA LOG 2021-2022.xlsx
+ DYS WTP Daily Data Log 2017-2018.xlsx
+ DYS WTP Daily Data Log 2018-2019.xlsx
+ GLN WTP Daily Data Log 2019-2020..xlsx
+ GLN WTP Daily Data Log 2020-2021.xlsx
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+ GLN WTP Daily Data Log 2017-2018.xlsx
+ GLN WTP Daily Data Log 2018-2019.xlsx
+ NBO WTP Daily Data Log 2020-2021.xlsx
+ NBO WTP Daily Data Log 2021-2022.xlsx
+ NBO WTP Daily Data Log 2017-2018.xlsm
+ NBO WTP Daily Data Log 2018-2019.xlsm
+ NBO WTP Daily Data Log 2019-2020.xlsm
+ 4-STLWTP Daily Data Log 2020-2021.xlsx
+ 5-STLWTP DAILY DATA LOG 2021-2022.xlsx
+ 1-STLWTP Daily Data Log 2017-2018.xlsx
+ 2-STLWTP Daily Data Log 2018-2019.xlsx
+ 3-STLWTP Daily Data Log 2019-2020.xlsx
+ Drinking Water Quality Management Plan (DWQMP) annual report 2019-2020.pdf
+ IRC DWQMP Annual Report 2016-17.pdf
+ Drinking Water Quality Management Plan (DWQMP) Annual Report 2017-18.pdf
+ Drinking Water Quality Management Plan (DWQMP) annual report 2018-2019.pdf
+ St_Lawrence_WTP_Monthly_Task_Checklist.pdf
+ St_Lawrence_WTP_Weekly_Task_Checklist.pdf
+ Carmila_WTP_Monthly_Task_Checklist.pdf
+ ECM_3616223_v3_Drinking Water Compliance Sample Process.pdf
+ ECM_3850611_v1_Dysart Water Network Sample Collection Points Guideline.pdf
+ ECM_4585059_v1_Complaints Management Process.pdf
+ Nebo_WTP_Monthly_Task_Checklist.pdf
+ Nebo_WTP_Weekly_Task_Checklist.pdf

2. AUDIT FINDINGS

The following sections provide a high-level summary of the key findings against each of the key scope elements as per the Drinking Water Quality Management Plan Review and Audit Guideline, as well as summaries of non-conformances and opportunities for improvement identified during the audit. The detailed findings and collated audit evidence are provided in Attachment 1 – Audit Checklist and Evidence.

2.1 Audit requirement 1: Verification of monitoring and performance data

Verification monitoring records were comprehensive, and all data dating back to the previous 2017 audit was provided. Samples of the monitoring data were audited against the 2018-19 and 2019-20 DWQMP Reports. Overall there was a high degree of correlation/accuracy between the recorded data and the reported data, with only minor inconsistencies identified (typical of typographical or other very minor statistical errors, and not considered to be systemic in nature). In some cases it was considered likely that text results of "not supplied" or similar were accidentally being included in the count of test results.

An opportunity for improvement was raised against this item.

2.2 Audit requirement 2: Compliance with the DWQMP and approval conditions

The assessment of the compliance with the DWQMP was undertaken by determining whether the statements and/or commitments made in the DWQMP have been met. Where a commitment is made in the plan, and confirmed by evidence as being met in practice, these criteria are assessed as "Conforms". If an item was stated in the plan, but was evidently not met in practice, these criteria were assessed as "Non-conformance". Non-conformances with the DWQMP may increase the potential for a public health risk to arise. There are non-conformances with the plan that are identified in section 2.4 below with additional detail contained in Attachment 1 – Audit Checklist and Evidence.

In some instances, it was considered appropriate to identify an "Opportunity for Improvement". These are suggested based on the auditor's knowledge of water quality management and reflects his opinion. Isaac Regional Council should read and consider these broadly, and if appropriate, implement the action or alternative actions to achieve the suggested improvement.

There was one condition which was evidently not met in full:

+ Condition 7.2 - (paraphrased) *"If you become aware of an incident in your drinking water service, you must, unless you have a reasonable excuse, immediately notify the regulator of the circumstances and follow up that initial notification by giving the regulator written notice in the approved form, as soon as practicable"*

Some THM results from 2018 and 2019 were identified that were required to be reported, but not reported to the Regulator (or records were unavailable). This is detailed further in later in this audit report.

No other conditions were identified as having not been complied with.

2.3 Audit requirement 3: Relevance of the DWQMP

Across all audit areas, the auditor was required to assess the relevance of the DWQMP as it relates to the provider's drinking water service. Where the plan element was considered to be functioning well / meeting best practice, these areas were assessed as "Conforms". If the auditor considered that an element of the plan could be improved, or managed differently to achieve a lower risk outcome, an "Opportunity for Improvement" was suggested. As stated earlier, Council should consider these broadly, and if appropriate, implement the action or alternative actions to achieve the suggested improvement.

2.4 Summary of non-conformances and opportunities for improvement

The tables below summarise all non-conformances and opportunities for improvement identified during the 2022 DWQMP Audit:

Table 3 Summary of non-conformances

Non-conformance	Recommendation
1. Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.	Ensure all preventative measures listed in the approved DWQMP are implemented.
2. Not all RMIP actions have been completed as indicated within the RMIP register.	Ensure RMIP actions are completed as required and that updates made to the RMIP register are accurate.
	Urgently replace the Carmila clearwater tank hatch with a newer structure that prevents water and vermin ingress (i.e. raised flange sealed flush with the roof, with a hatch that sits over the top).
3. Evidence could not be provided to verify that all water quality incidents (specifically, THMs exceedances in Saint Lawrence from 2018 and 2019) have been identified and reported in accordance with regulatory requirements.	Ensure incident reporting requirements are well understood by all staff members, and maintain accurate records of reported incidents. It is noted that the missing incident reports are from several years prior to the audit, and in more recent years the records are complete.
4. Not all of the operational documentation listed in the DWQMP exists, or if it does, staff do not know how to access it; and not all of the available operational documentation was available through the intranet as stated in the plan.	Clarify the coverage of the operational documentation listed under the section 'Information Distribution' within the DWQMP, as well as how it is accessed.
5. The operational monitoring is not being implemented as stated in the DWQMP.	Ensure the DWQMP reflects the current operational monitoring regime and that the operational monitoring program is implemented. Consider refresher training or staff reminders to ensure Operators understand the monitoring requirements. If the intention is to undertake 'daily' tests only on weekdays or days when the WTP is attended by staff, ensure this is clear in the DWQMP.
	Ensure the Dysart online water quality analysers are serviced, calibrated and in good working order as these form an important part of the operational monitoring for this scheme as per the approved DWQMP.
6. The verification monitoring program is not fully implemented as stated in the DWQMP, noting that the issues identified (e.g. gaps in sampling frequency) are considered relatively minor.	Implement the verification monitoring program as stated in the DWQMP, and/or describe the circumstances in which the stated monitoring frequencies may not fully apply (e.g. inaccessible sampling points, reduced staff available for sampling etc).

Table 4 Summary of Opportunities for Improvement

Plan Area	Opportunities for Improvement
Details of Infrastructure for Providing the Service	Update the DWQMP scheme descriptions to ensure accuracy with current asset configuration and operational practice.
	Additional information could be provided on the Nebo WTP UV disinfection process, i.e. design dose rate.
	Clarify control measures relating to the Nebo UV system, e.g. what alarms and interlocks are in place and what triggers a change of duty/standby.
Hazard Identification and Risk Assessment	Undertake source water *E. coli* monitoring on an ongoing basis to assist with informing the level of risk posed by raw water supplies.
	Ensure the risk assessment methodology is understood and followed at the next risk review, particularly relating to the consequence of events which may lead to pathogens being present in treated water.
	Assess the risk of protozoa in the Carmila scheme in the next review.
	Finalise the Nebo drinking water risk assessment and include this for regulatory review as part of the DWQMP amendment application.
	Confirm that the methodology followed in the June 2022 Nebo WTP risk assessment is justifiable with respect to residual risk scoring for microbiological hazards.
	Consider reviewing the risk assessment to improve its conciseness and clarity. The risk register is very lengthy, information is often duplicated both within a scheme's risk assessment but also between different scheme risk assessments. One issue is perhaps that information has been copied and pasted between different scheme risk register without full 'ground-truthing' with operational staff.
Risk Management	It is recommended that the Carmila WTP flash mixer agitator motor is repaired/replaced so that there is adequate mixing of coagulant through the water column to allow effective floc formation.
	When chemical dosing pumps are upgraded for the SCADA/monitoring upgrade project, ensure drop testing rigs are part of the scope of works (it is expected that this would be standard).
	Clarify and formalise the requirements for WTP and water networks routine maintenance tasks, implement the new process and ensure complete records are kept.
	Ensure the SCADA and online monitoring projects provide the ability for water quality monitoring of the key processes (e.g. CCPs) with the ability to set alarms and interlock the plant on CCP failure.
	Consider installing an automatic chlorine gas cylinder changeover system at Dysart to manage the risk of running a cylinder empty.
	Consider whether there are opportunities to reduce sodium hypochlorite decay (and the resulting chlorate formation) at Glenden WTP. These may include monitoring temperature inside the storage shed and identifying improved means of cooling/ventilation; diluting chemical with water, improving ability to drain and clean tanks etc.
	Make the SCADA alarm setpoints consistent with the Critical Control Points wherever possible so that CCP failures are immediately identified and are able to be reported to the relevant staff (e.g. Supervisors, Compliance Officer) in close to real time.
	Undertake SCADA modifications/upgrades at the Nebo WTP to provide real time UV dose measurements back to SCADA with ability to set alarm levels.
	Inspect all reservoirs for integrity (including vermin proofing e.g. any small holes, gaps under the corrugation profiles), rectify any issues found, implement an ongoing Reservoir Inspection program, and update the DWQMP to reflect the new process.

Plan Area	Opportunities for Improvement
Risk Management, cont.	Consider calculating C.t for all drinking water schemes, as well as identifying the log reduction values able to be claimed against the Nebo UV process. This will assist Council moving forwards with aligning to the Australian Drinking Water Guidelines health based targets framework and identifying long term water treatment performance upgrades (if/where necessary).
	Consider reviewing and simplifying the structure of the RMIP. In the auditor's opinion, the current layout (Excel spreadsheet with 500 rows) makes action tracking difficult.
Operational and Verification Monitoring	Ensure operational monitoring frequencies stated in the approved DWQMP are met. If there are circumstances under which the testing requirements do not necessarily apply, ensure these are described in the DWQMP.
	Clarify operational monitoring requirements in circumstances when water is being tankered in from elsewhere, specifically what deviations there would be from the monitoring specified in the approved DWQMP.
	Formalise UVA testing into the operational monitoring program at the relevant WTPs, including target values and corrective actions to be undertaken if the limits are exceeded.
	The verification monitoring program could be clarified in the DWQMP to provide the actual sample site locations.
	Consider including filtered water turbidity analysis in the Operational Monitoring program for Nebo WTP, as this is currently monitored online and is relevant to the production of safe high quality water.
Supporting Aspects	Confirm the statistical methods used to summarise data for annual DWQMP reporting is accurate, for example, the count of total number of results excludes entries such as "Not Supplied."
	Consider including internal reporting/awareness mechanisms, such as the monthly Operators meetings, in the DWQMP.
	More detail could be provided in the DWQMP around management of staff skills and training.

3. AUDIT STATEMENT

This audit report is a true and accurate reflection of the findings of the audit, and the opinions of the auditor; the audit outcomes are based on the review of the information provided. In some cases the extent of the records provided was insufficient for the auditor to make a clear informed decision for a criterion (e.g. uncertainty regarding whether or not the Saint Lawrence incident was reported to the Regulator). In these instances where information was unavailable/unable to be provided, the auditor has had to assume that the information does not exist.

As is the case for any audit, only a portion of all possible information was assessed. As such, components of the audit may have been assessed differently had different information been reviewed.

The auditor would like to thank Isaac Regional Council staff for their open and honest disclosures throughout the audit interviews, and commends Council on its commitment to ongoing improvements in drinking water quality management.

Both the auditor and Council's most senior representative involved in the audit have signed Statutory Declarations as to the integrity of the audit process. These documents are attached at the end of this report.

A1. AUDIT CHECKLIST AND EVIDENCE

Registered Service Details	
Compliance with the DWQMP: Are requirements being met?	Not Applicable
No areas in which to check compliance.	
Relevance of the DWQMP: Is the plan relevant?	Conforms
The registered service details remain accurate.	

Details of Infrastructure for Providing the Service

1

Name of Scheme St Lawrence

Compliance with the DWQMP: Are the infrastructure details and flow diagrams accurate?

Opportunity for Improvement

The flow diagram and infrastructure details were verified, with only very minor inconsistencies identified. The schematic shows calcium hypochlorite dosing for pre-chlorination which no longer occurs (potassium permanganate is now utilised exclusively for pre-oxidation). However calcium hypochlorite dosing is noted as optional in the text, and the optional dosing location still physically exists, so this does not necessarily need to be amended. The plan states that automatic desludging of the clarifier takes place but it does not; the Operator does it manually. The plan also states that filter backwash is automatic based on differential pressure, but it is only based on time which is manually configured by the Operator.

Opportunity for Improvement: Update the DWQMP scheme descriptions to ensure accuracy with current asset configuration and operational practice.


Photo 1


Photo 2


Photo 3


Photo 4


Photo 5


Photo 6


Photo 7


Photo 8


Photo 9


Photo 10


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Photo 23

Photo 24

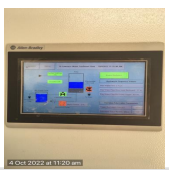

Photo 25 Photo 26

Relevance of the DWQMP: Is the plan relevant? Conforms

The relevant drinking water infrastructure has been described in the DWQMP.

2

Name of Scheme Carmila

Compliance with the DWQMP: Are the infrastructure details and flow diagrams accurate? Conforms

The scheme operates as described in the DWQMP.

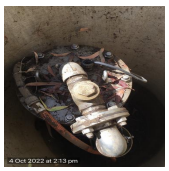
Photo 27


Photo 28


Photo 29


Photo 30


Photo 31


Photo 32

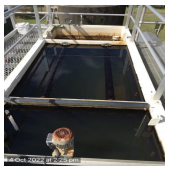
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Photo 41

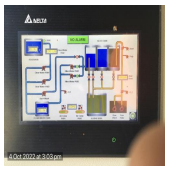


Photo 42


Photo 43


Photo 44


Photo 45


Photo 46

Relevance of the DWQMP: Is the plan relevant? Opportunity for Improvement

The DWQMP refers to a flash mixer at the Carmila WTP, however as the actual mixer motor is broken down and has been for some years, and the dimensions of the tank appear unlikely to promote significant agitation, in the auditor's opinion this functions more as a contact tank. Flocculation performance would likely be improved with greater agitation/mixing.

Opportunity for Improvement: It is recommended that the Carmila WTP flash mixer agitator motor is repaired/replaced so that there is adequate mixing of coagulant through the water column to allow effective floc formation.

3

Name of Scheme Dysart

Compliance with the DWQMP: Are the infrastructure details and flow diagrams accurate?

Opportunity for Improvement

The flow diagram and infrastructure details were verified, with the main elements of the flow diagram and scheme information appropriately described. Online monitoring of raw water is stated, however these instruments are not currently operational and have not been for some time. Online monitoring is stated as a preventative measure in the risk assessment and a non-conformance has been raised against that section in the audit report.

Opportunity for Improvement: Update the DWQMP scheme descriptions to ensure accuracy with current asset configuration and operational practice.


Photo 47


Photo 48


Photo 49


Photo 50


Photo 51


Photo 52


Photo 53


Photo 54


Photo 55


Photo 56


Photo 57

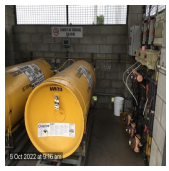
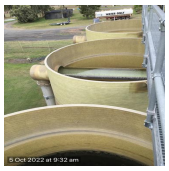


Photo 58


Photo 59


Photo 60


Photo 61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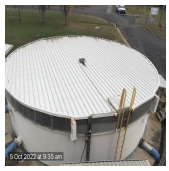
Photo 63


Photo 64


Photo 65

Photo 66


Photo 67

Photo 68


Photo 69

Relevance of the DWQMP: Is the plan relevant?

Conforms

The relevant drinking water infrastructure has been described in the DWQMP.

4

Name of Scheme Glenden

Compliance with the DWQMP: Are the infrastructure details and flow diagrams accurate?

Conforms

The scheme operates as described in the DWQMP other than supernatant is not currently being recycled.


Photo 70


Photo 71


Photo 72


Photo 73


Photo 74


Photo 75


Photo 76


Photo 77


Photo 78


Photo 79


Photo 80


Photo 81


Photo 82


Photo 83

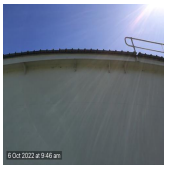
Photo 84


Photo 85

Relevance of the DWQMP: Is the plan relevant? Conforms

The relevant drinking water infrastructure has been described in the DWQMP.

5

Name of Scheme Nebo

Compliance with the DWQMP: Are the infrastructure details and flow diagrams accurate? Conforms

The scheme operates as described in the DWQMP.


Photo 86


Photo 87


Photo 88


Photo 89


Photo 90


Photo 91


Photo 92

Photo 93


Photo 94


Photo 95

Photo 96


Photo 97


Photo 98


Photo 99


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Photo 102


Photo 103

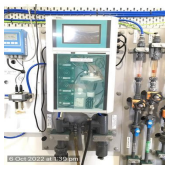
Photo 104


Photo 105


Photo 106

Relevance of the DWQMP: Is the plan relevant?

Opportunity for Improvement

The relevant drinking water infrastructure has been described in the DWQMP. The UV dose rate during the audit appeared to be sitting at 146mJ/cm2, significantly greater than the critical limit of 40mJ/cm2. It is unclear as to the specification or design dose rate for the UV disinfection system.

Opportunity for Improvement: Additional information could be provided on the Nebo WTP UV disinfection process, i.e. design dose rate.

Hazard identification and risk assessment

1

Name of Scheme St Lawrence

Relevance of the DWQMP: Is sufficient information available to support hazard identification? Opportunity for Improvement

In general, there is sufficient data to inform robust hazard identification, with the exception of raw water E. coli monitoring which would assist in confirming catchment vulnerability assessments.

Opportunity for Improvement: Undertake source water E. coli monitoring on an ongoing basis to assist with informing the level of risk posed by raw water supplies.

Relevance of the DWQMP: Are the hazards identified? Conforms

In the auditors opinion, the key hazards are identified.

Relevance of the DWQMP: In the auditor's opinion, is the assessment of risk justified? Opportunity for Improvement

There are a number of risks in which 'Pathogens' has been listed as a limiting hazard, however the residual risk consequence has been downgraded from a Major to a Moderate. In the auditor's opinion, the definition of Moderate Consequence ("potential widespread aesthetic impact or repeated breach of chronic health parameter") is not applicable to a scenario in which the risk involves pathogens in treated water.

Opportunity for Improvement: Ensure the risk assessment methodology is understood and followed at the next risk review, particularly relating to the consequence of events which may lead to pathogens being present in treated water.

2

Name of Scheme Carmila

Relevance of the DWQMP: Is sufficient information available to support hazard identification? Opportunity for Improvement

In general, there is sufficient data to inform robust hazard identification, with the exception of raw water E. coli monitoring which would assist in confirming catchment vulnerability assessments.

Opportunity for Improvement: Undertake source water E. coli monitoring on an ongoing basis to assist with informing the level of risk posed by raw water supplies.

Relevance of the DWQMP: Are the hazards identified? Opportunity for Improvement

The shallow bores and unprotected nature of the catchment mean that protozoan pathogens are a hazard that should be considered and managed under the DWQMP. It is noted that this has been raised by the DRDMW in their approval notice of March 2022, through the condition of approval to assess the risk of protozoa in the Carmila scheme in the next review.

Opportunity for Improvement: Assess the risk of protozoa in the Carmila scheme in the next

review.

Relevance of the DWQMP: In the auditor's opinion, is the assessment of risk justified? Opportunity for Improvement

There are a number of risks in which 'Pathogens' has been listed as a limiting hazard, however the residual risk consequence has been downgraded from a Major to a Moderate. In the auditor's opinion, the definition of Moderate Consequence ("potential widespread aesthetic impact or repeated breach of chronic health parameter") is not applicable to a scenario in which the risk involves pathogens in treated water.

Opportunity for Improvement: Ensure the risk assessment methodology is understood and followed at the next risk review, particularly relating to the consequence of events which may lead to pathogens being present in treated water.

3

Name of Scheme Dysart

Relevance of the DWQMP: Is sufficient information available to support hazard identification? Opportunity for Improvement

In general, there is sufficient data to inform robust hazard identification, with the exception of raw water E. coli monitoring which would assist in confirming catchment vulnerability assessments.

Opportunity for Improvement: Undertake source water E. coli monitoring on an ongoing basis to assist with informing the level of risk posed by raw water supplies.

Relevance of the DWQMP: Are the hazards identified? Conforms

In the auditors opinion, the key hazards are identified.

Relevance of the DWQMP: In the auditor's opinion, is the assessment of risk justified? Opportunity for Improvement

There are a number of risks in which 'Pathogens' has been listed as a limiting hazard, however the residual risk consequence has been downgraded from a Major to a Moderate. In the auditor's opinion, the definition of Moderate Consequence ("potential widespread aesthetic impact or repeated breach of chronic health parameter") is not applicable to a scenario in which the risk involves pathogens in treated water.

Opportunity for Improvement: Ensure the risk assessment methodology is understood and followed at the next risk review, particularly relating to the consequence of events which may lead to pathogens being present in treated water.

4

Name of Scheme Glenden

Relevance of the DWQMP: Is sufficient information available to support hazard identification? Opportunity for Improvement

In general, there is sufficient data to inform robust hazard identification, with the exception of raw water E. coli monitoring which would assist in confirming catchment vulnerability assessments.

Opportunity for Improvement: Undertake source water E. coli monitoring on an ongoing basis to assist with informing the level of risk posed by raw water supplies.

Relevance of the DWQMP: Are the hazards identified? Conforms

In the auditors opinion, the key hazards are identified.

Relevance of the DWQMP: In the auditor's opinion, is the assessment of risk justified? Opportunity for Improvement

There are a number of risks in which 'Pathogens' has been listed as a limiting hazard, however the residual risk consequence has been downgraded from a Major to a Moderate. In the auditor's opinion, the definition of Moderate Consequence ("potential widespread aesthetic impact or repeated breach of chronic health parameter") is not applicable to a scenario in which the risk involves pathogens in treated water.

Opportunity for Improvement: Ensure the risk assessment methodology is understood and followed at the next risk review, particularly relating to the consequence of events which may lead to pathogens being present in treated water.

5

Name of Scheme Nebo

Relevance of the DWQMP: Is sufficient information available to support hazard identification? Opportunity for Improvement

In general, there is sufficient data to inform robust hazard identification, including 2-3 years of raw water E. coli monitoring.

Opportunity for Improvement: Undertake source water E. coli monitoring on an ongoing basis to assist with informing the level of risk posed by raw water supplies.

Relevance of the DWQMP: Are the hazards identified? Opportunity for Improvement

The approved DWQMP was prepared prior to the new WTP being commissioned. A process of hazard identification and risk assessment was undertaken in June 2022, however was not part of the DWQMP audit.

Opportunity for Improvement: Finalise the Nebo drinking water risk assessment and include this for regulatory review as part of the DWQMP amendment application.

Relevance of the DWQMP: In the auditor's opinion, is the assessment of risk justified? Opportunity for Improvement

Within the existing (approved DWQMP) risk assessment there are a number of risks in which 'Pathogens' has been listed as a limiting hazard, however the residual risk consequence has been downgraded from a Major to a Moderate. In the auditor's opinion, the definition of Moderate Consequence ("potential widespread aesthetic impact or repeated breach of chronic health parameter") is not applicable to a scenario in which the risk involves pathogens in treated water.

Opportunity for Improvement: Confirm that the methodology followed in the June 2022 Nebo WTP risk assessment is justifiable with respect to residual risk scoring for microbiological hazards.

Risk Management

1

Name of Scheme St Lawrence

Compliance with the DWQMP: Are the preventative measures implemented? Non-conformance

A range of preventative measures were extracted from the risk assessment prior to the site audit, for verification through auditor observations and/or staff interviews.

"Operators adjust chemical dosing based on turbidity" - through interview with the Operator, this measure was confirmed as implemented. If raw water turbidity increases suddenly, the Operator will bypass the treatment plant (i.e. pump raw water to waste) until either the issue passes/resolves, or he decides to re-initiate treatment. If conditions are significantly different to the previous operation he will undertake a jar test to determine optimal dose rates. Without online monitoring, alarms and remote operability, this preventive measure is limited in its effectiveness, nevertheless is implemented as stated in the plan.

"Duty/standby raw water pumps with alarms on failure" - through interview with the Operator, this measure was confirmed as implemented. There is no automatic changeover from duty to standby, however pump failure will send an alarm via SMS. If the high level raw water pump fails, the Operator can manually switch to the low level pump. If the water level was below the high level pump intake and the low level pump failed, the Operator would have to manually swap the pumps over which would be a more labour intensive process.

"Coagulant dose rate charts" - through auditor observation and Operator interview, this measure was confirmed as implemented although slightly misleading in its wording. The Operator has access to a spreadsheet which calculates chemical dose rates according to flow, and other information (e.g. soluble Fe and Mn to determine potassium permanganate dose rate).

"Interlocks for WTP shutdown" - through Operator interview, this measure was confirmed as implemented. The WTP will interlock in response to pump failure, loss of power, no raw water flow, filter backwash failure and valve failure.

"Option for pot perm dosing" - through auditor observation and Operator interview, this measure was confirmed as implemented. Potassium permanganate was being dosed at the time of the audit and the dose rate was adjusted in response to an increase in soluble Fe and Mn while the auditor was onsite.

"Backwash recycle monitored by Operator" - through auditor observation and Operator interview, this measure was identified as being irrelevant, as sludge supernatant is not being recycled and has not been for some time.

"Filter media disinfection monthly" and "Annual filter media inspections" - through Operator interview, these measures were identified as not being implemented. The Operator advised that he does not carry out either of these tasks according to any schedule. Filter media is visually observed from some height (the viewing platform), typically daily when backwashes are undertaken. Filter media was replaced in 2018.

"Automatic filter backwash based on headloss" - through Operator interview, this measure was identified as not being implemented. The only trigger is time which is adjusted by the Operator in response to water quality.

"BGA management plan with triggers for escalation" - through staff interview, this measure was confirmed as implemented. Actions are based on weekly raw water algae results taken from each raw water source. Operators are encouraged to review and react, however the Compliance Officer or the Supervisor will call the Operator to ensure actions are implemented as per the BGA management plan.

"PSA with service supplier for chlorine system" - through Operator interview, this measure was identified as not being implemented. The chlorine batching and dosing system is very basic, with the only preventative maintenance being to ensure the pump is dosing the required amount (see finding relating to drop tests below) and that lines are not blocked. This will become more relevant in future following WTP and monitoring upgrades.

"Regular drop tests to verify chemical dosing" - through auditor observation and Operator interview, this measure was identified as not being implemented. There is no ability to perform proper drop tests with the current equipment; though the Operator could potentially perform the task by pulling dosing lines out of their dosing points and measuring the amount dispensed within a certain time into a graduated vessel.

Non-conformance: Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.

Recommendation: Ensure all preventative measures listed in the approved DWQMP are implemented.

Opportunities for Improvement:
- when chemical dosing pumps are upgraded for the SCADA/monitoring upgrade project, ensure drop testing rigs are part of the scope of works (it is expected that this would be standard).
- consider reviewing the risk assessment to improve its conciseness and clarity. The risk register is very lengthy, information is often duplicated both within a scheme's risk assessment but also between different scheme risk assessments. One issue is perhaps that information has been copied and pasted between different scheme risk register without full 'ground-truthing' with operational staff.


Photo 107


Photo 108


Photo 109

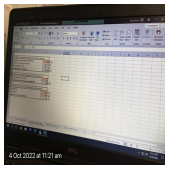
Photo 110


Photo 111

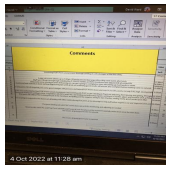
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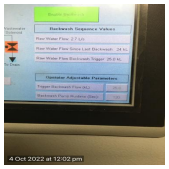
Photo 113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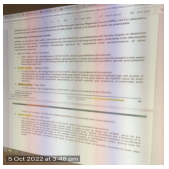
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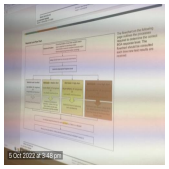
Photo 116

Compliance with the DWQMP: Are the procedures implemented?

Opportunity for Improvement

The WTP routine operational tasks (weekly/monthly) checklists were partially implemented. The Supervisor advised that the Operators do not always have time to complete all tasks, and records were incomplete within the ECM system.

Opportunity for Improvement: Clarify and formalise the requirements for WTP and water networks routine maintenance tasks, implement the new process and ensure complete records are kept.


Photo 117

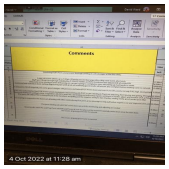
Photo 118

Compliance with the DWQMP: Have improvement actions been completed or progressed within the required timeframes?

Non-conformance

The following RMIP actions were included within the audit and verified through staff interviews and/or auditor observation:

SL3 - PAC Dosing - this was confirmed as in place.
SL10 - Onsite Generator - this was confirmed as in place.
SL22 - Settled water turbidity testing - this has not been implemented. Filtered water turbidity is tested regularly however settled water is not tested for turbidity.

Non-conformance: Not all RMIP actions have been completed as indicated within the RMIP register.

Recommendation: Ensure RMIP actions are completed as required and that updates made to the RMIP register are accurate.

Compliance with the DWQMP: Have incidents been identified and responded to as required under the DWQMP and approval conditions?

Non-conformance

The breaches of water quality criteria identified in the monitoring dataset included several exceedances of the total trihalomethanes health guideline value (>250µg/L), the most recent being a result of 341µg/L from the WTP treated water sample point on 5/05/2021. The incident report for this result was provided, however incident reports for the previous exceedances were not able to be provided (Jan-2018, Mar-2018, Mar-2019, May-2019). From a review of the 2017-2018 and 2018-2019 DWQMP reports, only the March 2018 THM exceedance was referenced as a notification to the Regulator.

There were also incidents in December 2021 and April 2022 in which the ADWG health guideline for manganese (>0.5mg/L) was exceeded, and these were reported.

Non-conformance: Evidence could not be provided to verify that all water quality incidents (specifically, THMs exceedances in St Lawrence from 2018 and 2019) have been identified and reported in accordance with regulatory requirements. If the missing incident reports can be produced, this non-conformance will be removed.

Recommendation: Ensure incident reporting requirements are well understood by all staff members, and maintain accurate records of reported incidents. It is noted that the missing incident reports are from several years prior to the audit, and in more recent years the records are complete.

Relevance of the DWQMP: In the auditor's opinion, are the preventative measures relevant, and/or are other preventative measures recommended to manage the relevant hazards?

Opportunity for Improvement

Opportunity for Improvement: Ensure the SCADA and online monitoring projects provide the ability for water quality monitoring of the key processes (e.g. CCPs) with the ability to set alarms

and interlock the plant on CCP failure.

2

Name of Scheme Carmila

Compliance with the DWQMP: Are the preventative measures implemented? Non-conformance

A range of preventative measures were extracted from the risk assessment prior to the site audit, for verification through auditor observations and/or staff interviews.

"Disinfection" - through auditor observation and Operator interview, this measure was confirmed as implemented. There should be sufficient contact time in between the very small clear water tank, the dedicated rising main to the reservoir (no customer offtakes as advised by the Operator), the reservoir, and the outlet main to the first customer. C.t should be formally calculated for each scheme and stated in the DWQMP.

"Two bores duty/standby" - through auditor observation and Operator interview, this measure was confirmed as implemented. Two bores are in place and have recently (post Cyclone Debbie) been rehabilitated, and the Operator cycles between the bores every few weeks on average.

"Operators adjust plant flow rates and chemical dosing to match" - through Operator interview, this measure was confirmed as implemented. Plant flow rate varies depending on bore selection as the pumps deliver different flow rates to the WTP. The Operator typically instigates a temporary increase in alum and poly for the first few hours as sometimes water can be slightly dirty initially, and also adjusts the chlorine dosage to suit the changed flow rate for consistent chlorination.

"Interlocks for WTP shutdown" - through Operator interview, this measure was confirmed as implemented. The WTP will interlock if no flow is detected.

"Filter media disinfection monthly" and "Annual filter media inspections" - through Operator interview, these measures were identified as not being implemented. The Operator advised that he does not carry out either of these tasks according to any schedule. Filter media is visually observed during backwash.

"Operator backwashes more frequently if required based on NTU" - through Operator interview, this measure was confirmed as implemented, but in practice this is usually based on raw water turbidity.

"Critical spare backwash pump" - through Operator interview, this measure was identified as not being implemented. There is no spare pump on-hand.

"Chlorine dose adjusted based on test results" - through Operator interview, this measure was confirmed as implemented. The Operator aims for 2.4-2.8mg/L in filtered water, and not significantly lower than that in the small clear water tank. If results drop, he would investigate and increase chlorine dose if needed, and vice versa.

Non-conformance: Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.

Recommendation: Ensure all preventative measures listed in the approved DWQMP are implemented.


Photo 119


Photo 120


Photo 121

Compliance with the DWQMP: Are the procedures implemented?

Opportunity for Improvement

The WTP routine operational tasks (weekly/monthly) checklists were partially implemented. The Supervisor advised that the Operators do not always have time to complete all tasks, and records were incomplete within the ECM system.

Opportunity for Improvement: Clarify and formalise the requirements for WTP and water networks routine maintenance tasks, implement the new process and ensure complete records are kept.


Photo 122


Photo 123


Photo 124

Compliance with the DWQMP: Have improvement actions been completed or progressed within the required timeframes?

Non-conformance

The following RMIP actions were included within the audit and verified through staff interviews and/or auditor observation:

CA62 - replace clearwater tank hatch/lid - a clearwater reservoir hatch was to be installed in 2019-2020, to address the hazardous event of human/animal access. Notes on the RMIP register from 2021 indicate that this had been completed, however during the audit it was identified that the clearwater tank hatch was in poor condition, did not sit flush with the tank roof, and would allow both rainwater run-off and vermin access directly into the tank as shown in the photograph. It is the auditor's opinion that the risk of animal access to the clearwater tank is now increased.

CA11 - emergency plan for potable water supply - this was verified as in place, water had been tankered from Mackay to St Lawrence in early 2022.

Non-conformance:
- Not all RMIP actions have been completed as indicated within the RMIP register, and/or have not achieved the intent of reducing residual risk.

Recommendation:
- Ensure RMIP actions are completed as required and that updates made to the RMIP register are accurate.
- Urgently replace the Carmila clearwater tank hatch with a newer structure that prevents water and vermin ingress (i.e. raised flange sealed flush with the roof, with a hatch that sits over the top).


Photo 125


Photo 126

Compliance with the DWQMP: Have incidents been identified and responded to as required under the DWQMP and approval conditions?

Opportunity for Improvement

The verification monitoring dataset shows 3 instances where E. coli was detected: 21/12/2021 (Music St), 23/02/2022 (Music St) and 24/02/2022 (Council Depot). Incident reports confirm these were reported, however there was a delay for the December 2021 incident report (information contained on the form indicated results were received on 22/12/2021 but the telephone notification was made on 24/12/2021 - this was confirmed by IRC as being due to uncertainties around reporting responsibilities). The data also shows a result of 897µg/L for chlorate on 3/03/2021 which was reported.

Opportunity for Improvement: Ensure incident reporting requirements are well understood by all staff members.

Relevance of the DWQMP: In the auditor's opinion, are the preventative measures relevant, and/or are other preventative measures recommended to manage the relevant hazards?

Opportunity for Improvement

The filtered water tank is an old concrete tank with a hatch that doesn't close properly. Water could run off the roof directly into the tank and vermin could easily access the tank interior.

Opportunity for Improvement:
- Urgently replace the Carmila clearwater tank hatch with a newer structure that prevents water and vermin ingress (i.e. raised flange sealed flush with the roof, with a hatch that sits over the top). Note: this has also been raised as a recommendation against a nonconformance elsewhere in this report.
- Ensure the SCADA and online monitoring projects provide the ability for water quality monitoring of the key processes (e.g. CCPs) with the ability to set alarms and interlock the plant on CCP failure.


Photo 127


Photo 128


Photo 129

3

Name of Scheme Dysart

Compliance with the DWQMP: Are the preventative measures implemented?

Non-conformance

A range of preventative measures were extracted from the risk assessment prior to the site audit, for verification through auditor observations and/or staff interviews.

"PAC dosing" - through auditor observation, this measure was confirmed as implemented.

"Daily taste/odour testing by Operators to trigger PAC" - through Operator interview, this measure was identified as being irrelevant, as PAC is now always dosed.

"BGA management plan with triggers for escalation" - through staff interview, this measure was confirmed as implemented. Actions are based on weekly raw water algae results taken from each raw water source. Operators are encouraged to review and react, however the Compliance Officer

or the Supervisor will call the Operator to ensure actions are implemented as per the BGA management plan.

"Duty/standby raw water pumps" - through auditor observation and Operator interview, this measure was confirmed as implemented. The Operator cycles use of the two raw water pumps.

"Regular drop tests to verify chemical dosing" - through Operator interview, this measure was identified as not being implemented. There is the ability to perform drop tests on some chemicals but the Operator advised that his current workload does not allow this to be regularly undertaken.

"Interlocks for WTP shutdown" (based on CCPs and raw water) - through auditor observation and Operator interview, this measure was identified as not being implemented. The online raw water instruments and final treated water instruments have not been operational for some time. The WTP will interlock on various other faults including low tank levels, low chemical dosing flow, DAFF fault, low GAC filter levels. The Operator manages this risk by only producing water when the WTP is attended.

"Daily checks of flocculation system" - through Operator interview, this measure was confirmed as implemented. The Operator undertakes visual checks and daily turbidity monitoring of both the DAF and conventional coagulation/clarification processes.

"Jar testing" - through Operator interview, this measure was identified as not being implemented. There is the ability to perform jar tests onsite but the Operator advised that his current workload does not allow this to be regularly undertaken. The Operator uses judgment based on DAF and clarifier performance to adjust dose rates when required.

"Online monitoring" (flocculation) - through auditor observation and Operator interview, this measure was confirmed as partially implemented. There is online subnatant turbidity monitoring at the DAF plant which feeds back to SCADA, and settled water turbidity monitoring at each of the two clarifiers (also fed back to SCADA) however one clarifier turbidity instrument is non-operational (needs probe replacing). None of the analysers are being routinely calibrated, however this will soon be starting with the new Instrument Technician position being recently filled.

"Online monitoring" (individual filter NTU) - through auditor observation and Operator interview, this measure was confirmed as partially implemented. There are online turbidity analyser installed, but not sending data back to SCADA; i.e. they are local view only.

"Automated backwash triggers" - through auditor observation and Operator interview, this measure was confirmed as partially implemented. The only automated backwash trigger in the Operator's knowledge is time, however there did appear to be set points configurable in SCADA for turbidity and differential pressure (though it was not clear whether these instigated a backwash, sent an alarm, or neither). The Operator manually monitors turbidity and differential pressure and reacts if needed.

"Duty/standby backwash pumps" - through auditor observation and Operator interview, this measure was confirmed as implemented.

"Duty/standby Cl2 and trim dosing" - through auditor observation and Operator interview, this measure was confirmed as implemented. There are 3 chlorine systems and delivery lines. At the time of the audit the duty clear water dosing system was out of action and the pre dose system was being used (as the standby) to deliver chlorine into the clear water tank.

Non-conformance: Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.

Recommendation: Ensure all preventative measures listed in the approved DWQMP are implemented.


Photo 130


Photo 131


Photo 132


Photo 133


Photo 134


Photo 135

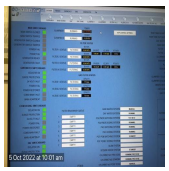
Photo 136


Photo 137

Compliance with the DWQMP: Are the procedures implemented?

Opportunity for Improvement

The WTP routine operational tasks (weekly/monthly) checklists were partially implemented. The Supervisor advised that the Operators do not always have time to complete all tasks, and records were incomplete within the ECM system.

Opportunity for Improvement: Clarify and formalise the requirements for WTP and water networks routine maintenance tasks, implement the new process and ensure complete records are kept.

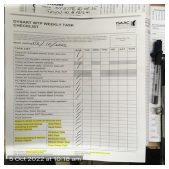
Photo 138


Photo 139

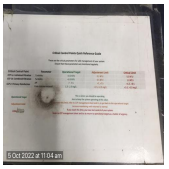
Photo 140

Compliance with the DWQMP: Have improvement actions been completed or progressed within the required timeframes?

Non-conformance

The following RMIP actions were included within the audit and verified through staff interviews and/or auditor observation:

D14,D44,D45 - "PSA for SCADA engineer" - Council has an arrangement in place with 360 Engineering, as well as a local engineer. The Operator has the ability to call on these resources when required.

D43 - "LiquID analyser commissioned" - this instrument was in place in the raw water pumps building, however was not functioning correctly at the time of the audit; readings were being sent to SCADA however some were clearly nonsensical values based on the raw water quality entering the plant. The Operator was not aware of the instrument, nor its purpose, and no maintenance or calibration program was in place.

D27 - "WTP Operating Manual in place" - this manual was sighted at the WTP.

Non-conformance: Not all RMIP actions have been completed as indicated within the RMIP register.

Recommendation: Ensure RMIP actions are completed as required and that updates made to the RMIP register are accurate.

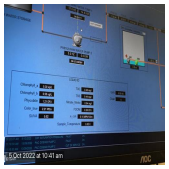

Photo 141

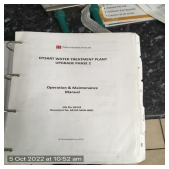

Photo 142

Compliance with the DWQMP: Have incidents been identified and responded to as required under the DWQMP and approval conditions?

Conforms

No incidents were identified from the Dysart water quality information reviewed, and the only incident reports provided related to incorrect reporting of turbidity measurements which were subsequently identified as not real events.

Relevance of the DWQMP: In the auditor's opinion, are the preventative measures relevant, and/or are other preventative measures recommended to manage the relevant hazards?

Opportunity for Improvement

Opportunity for Improvement: Consider installing an automatic chlorine gas cylinder changeover system at Dysart to manage the risk of running a cylinder empty.

4

Name of Scheme Glenden

Compliance with the DWQMP: Are the preventative measures implemented?

Non-conformance

A range of preventative measures were extracted from the risk assessment prior to the site audit, for verification through auditor observations and/or staff interviews.

"Duty/standby raw water pumps with alarms on failure" - through auditor observation and Operator interview, this measure was confirmed as implemented. Duty/standby pumps were physically in place and the Operator advised that he receives alarms (e.g. pump failure) via the VTSCADA system.

"Operators adjust plant flow rate and chemical dose rates to suit" - through auditor observation and Operator interview, this measure was confirmed as implemented. Plant flow rate is adjustable via the control board in the WTP office, and the Operator adjusts dose rates as needed to maintain performance.

"Operators adjust chemical dosing based on turbidity" - through Operator interview, this measure was confirmed as implemented. The Operator mainly makes adjustments to poly dosing based on raw water turbidity. These are typically incremental changes rather than jar tests, however the Operator has a jar testing rig and knows how to use it (will soon be training the trainee Operator).

"Regular drop tests to verify chemical dosing" - through auditor observation and Operator interview, this measure was identified as not being implemented. Drop tests are rarely undertaken and equipment is not available to undertake these readily for all chemicals (e.g. calibration cylinders and necessary valving) however the Operator could perform manual checks at the various chemical dosing points if required to confirm the rate of chemical dosing.

"SOP for manual WTP operation" - through auditor observation and Operator interview, this measure was identified as not being implemented. The Operator advised that he knows how to run

the plant manually if required but to his knowledge there is no formal SOP. A basic SOP for performing manual filter backwashes was sighted during the audit.

"WTP only operates when manned" - through Operator interview, this measure was confirmed as implemented. With minimal remote visibility of plant operations, and relatively low water demand, the Operator only runs the plant while he is on-site.

"Online turbidity monitoring" - through auditor observation and Operator interview, this measure was confirmed as implemented. There is a single combined filtered water turbidity analyser which is calibrated and serviced by an external service provider annually. The analyser is located in the office so can be seen easily by the Operators, but is not available for remote viewing and does not generate any alarms.

"Reservoir maintenance and inspections" - through auditor observation and Operator interview, this measure was confirmed as only partially implemented. No internal reservoir inspections are being undertaken as a matter of routine, and the Operator advised that he had never been on the roof of the Water Tower. The only inspections are undertaken by external contractors (internal cleaning undertaken at this time also), which the Operator thinks was last done around 5 years ago. During the audit, the roof of the Clear Water Tank was inspected and some small holes were identified as well as corrosion around the hatch (no holes visible yet).

"Chemical tank and pipe labelling and signage" - through auditor observation, this measure was confirmed as implemented. Chemical delivery pipes were labelled, and the water transfer pipework between different parts of the WTP were painted green, purple or blue to reflect raw water, wastewater, or filtered water, respectively.

Catchment/weir fencing weekly inspections - this measure was not fully audited as it is understood that this refers to the source catchment under Sunwater/Xstrata management. However locally, the Operator protects his turkeys nest storage from cattle in the adjacent paddocks by maintaining his fencing. There have been previous incidents of cattle getting through the fencing and accessing the turkeys nest storage, which have necessitated the Operator making his own fencing repairs.

Non-conformance: Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.

Recommendation: Ensure all preventative measures listed in the approved DWQMP are implemented.


Photo 143


Photo 144

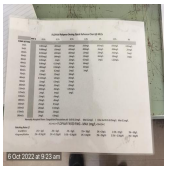
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Photo 146

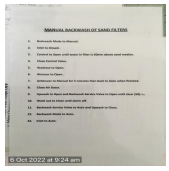
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Photo 148


Photo 149


Photo 150


Photo 151

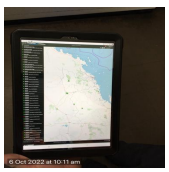


Photo 152

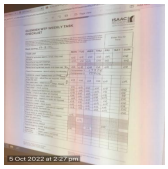
Compliance with the DWQMP: Are the procedures implemented?

Opportunity for Improvement

The WTP routine operational tasks (weekly/monthly) checklists were partially implemented. The Supervisor advised that the Operators do not always have time to complete all tasks, and records were incomplete within the ECM system. Records for the Glenden WTP Weekly/Monthly Checklist

were saved in ECM for September 2022. Some but not all monthly tasks were marked off. However Operator has years worth of checklist records on site.

Opportunity for Improvement: Clarify and formalise the requirements for WTP and water networks routine maintenance tasks, implement the new process and ensure complete records are kept.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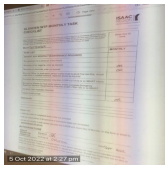
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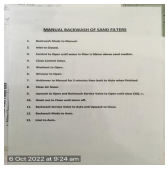
Photo 155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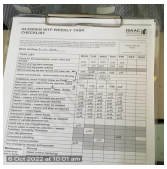


Photo 157

Compliance with the DWQMP: Have improvement actions been completed or progressed within the required timeframes?

Conforms

The following RMIP actions were included within the audit and verified through staff interviews and/or auditor observation:

G14 - flow variations & installation of control valve - this valve has been installed, and the Operator can control the flow rate at the raw water controller
G50 - raw water fill point signage - this was sighted as in place
G59 - filter refurbishment - this was confirmed by the Operator. Works included new air diffusers, rust protection, new filter media.


Photo 158


Photo 159

Compliance with the DWQMP: Have incidents been identified and responded to as required under the DWQMP and approval conditions?

Conforms

No incidents were identified from the Glenden water quality information reviewed.

Relevance of the DWQMP: In the auditor's opinion, are the preventative measures relevant, and/or are other preventative measures recommended to manage the relevant hazards?

Opportunity for Improvement

Although the assessed risk for chlorate is a medium risk, and this is supported by there being no results greater than the 0.8mg/L interim guideline, the sodium hypochlorite storage and use is not ideal in the auditor's opinion. The chemical is stored in a small building which receives full sunlight (though it is relatively well vented), and the Operator advised that the chlorine strength does degrade significantly over time. Chlorate results over the past 4 years have approached but not exceeded the guideline (4 results >0.6mg/L including 1 result >0.7mg/L). The Operator is constrained by supply issues, primarily that the supplier will only deliver larger quantities meaning that he is forced to top up his sodium hypochlorite tanks when chemical is being delivered to the Glenden Pool. He has attempted to manage the risk of topping up old chemical by periodically draining and cleaning the tank(s).

Opportunity for Improvement: Consider whether there are opportunities to reduce sodium hypochlorite decay (and the resulting chlorate formation) at Glenden WTP. These may include

monitoring temperature inside the storage shed and identifying improved means of cooling/ventilation; diluting chemical with water, improving ability to drain and clean tanks etc.

Photo 160

5

Name of Scheme Nebo

Compliance with the DWQMP: Are the preventative measures implemented? Opportunity for Improvement

A range of preventative measures were extracted from the risk assessment prior to the site audit, for verification through auditor observations and/or staff interviews. The selected measures were limited as it is understood that the risk assessment for the new Nebo WTP was only cursory in the approved DWQMP and a more comprehensive risk assessment has recently been undertaken.

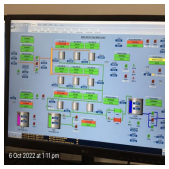
"PSA with service supplier for chlorine system" - through Operator interview, this measure was confirmed as implemented. There is an annual external servicing arrangement in place with a preferred supplier who can be called upon for reactive maintenance as well.

"Online monitoring & alarms (disinfection)" - through auditor observation and Operator interview, this measure was confirmed as implemented. There are chlorine analysers installed on both the treated water line (post-dose) and the clearwater storage tank recirculation line. Trends were reviewed for the weeks leading up to the audit date and chlorine performance was very stable. It was noted that the SCADA limits don't align with CCP limited (e.g. the Low Low was set to 0.5mg/L vs the CCP low critical limit of 1.0mg/L).

"UV - alarm & change duty on low UVT" and "UV isolation valves to prevent undisinfected water to flow through the UV units" - through auditor observation and Operator interview, these measures were unable to be fully verified. Alarms are raised based on configurable levels relating to the UVT measurement however it is unclear if low UVT would cause a change of duty/standby UV unit. It is also unclear what benefit this would provide, as the UVT is not impacted by which unit is online. It would seem likely that the change of duty/standby unit would be triggered by low UV lamp intensity/dose rate rather than UVT. It is also unclear what is meant by the preventative measure relating to the isolation valves preventing "undisinfected" water from flowing through the UV units. No disinfection is undertaken prior to the UV units.

"Turbidity analysers generate alarm on high turbidity" - through auditor observation and Operator interview, this measure was confirmed as implemented. There are two combined filtrate turbidity analysers, one on each bank of three filters. SCADA alarms are configurable, however as noted earlier, alarms did not correlate with the CCP critical limits.

Opportunity for Improvement:
- Make the SCADA alarm setpoints consistent with the Critical Control Points wherever possible so that CCP failures are immediately identified and are able to be reported to the relevant staff (e.g. Supervisors, Compliance Officer) in close to real time.
- Clarify control measures relating to the Nebo UV system, e.g. what alarms and interlocks are in place and what triggers a change of duty/standby.
- Undertake SCADA modifications/upgrades at the Nebo WTP to provide real time UV dose measurements back to SCADA with ability to set alarm levels.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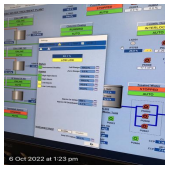
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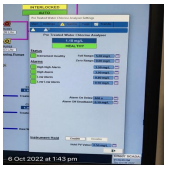
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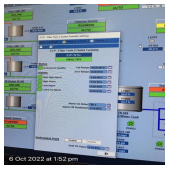


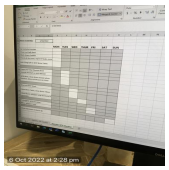
Photo 164

Compliance with the DWQMP: Are the procedures implemented?

Opportunity for Improvement

The WTP routine operational tasks (weekly/monthly) checklists were partially implemented. The Supervisor advised that the Operators do not always have time to complete all tasks, and records were incomplete within the ECM system.

Opportunity for Improvement: Clarify and formalise the requirements for WTP and water networks routine maintenance tasks, implement the new process and ensure complete records are kept.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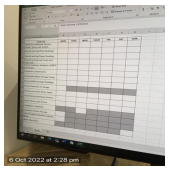
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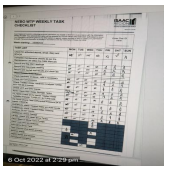


Photo 167

Compliance with the DWQMP: Have improvement actions been completed or progressed within the required timeframes?

Non-conformance

The following RMIP actions were included within the audit and verified through staff interviews and/or auditor observation:

N13 - "new WTP constructed" - the plant has been built and commissioned and appeared to be working well.
N23 - "flushing procedure" - as noted elsewhere in this audit, the only flushing procedure able to be located was a specific one for Clermont.
N27 - "CCPs up on wall" - this was verified during the audit.
N36 - "risk assessment" - the Compliance Officer confirmed that this had been carried out in June 22.

Non-conformance: Not all RMIP actions have been completed as indicated within the RMIP register.

Recommendation: Ensure RMIP actions are completed as required and that updates made to the RMIP register are accurate.


Photo 168

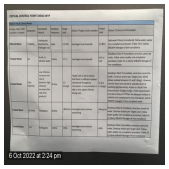


Photo 169

Compliance with the DWQMP: Have incidents been identified and responded to as required under the DWQMP and approval conditions?

Conforms

No incidents were identified from the Nebo water quality information reviewed.

Relevance of the DWQMP: In the auditor's opinion, are the preventative measures relevant, and/or are other preventative measures recommended to manage the relevant hazards?

Not Applicable

This question was deemed to be of limited relevance given that the Nebo risk assessment in the approved DWQMP pre-dates the new WTP. It is understood that the new risk assessment will be part of the next DWQMP amendment application to be submitted shortly.

6

Name of Scheme Whole of System

Compliance with the DWQMP: Are the preventative measures implemented?

Non-conformance

Due to time constraints, the only preventative measure from the All/Whole of System part of the risk assessment selected for audit was management of reservoirs.
Reservoir vermin proofing is generally of a reasonably high standard based on the reservoirs sighted (Carmila clear water tank, Carmila reservoir, Saint Lawrence clear water tank, Saint Lawrence reservoir, Dysart clear water tank, Glenden clear water tank and Nebo clear water tank), with the exception of the Carmila clear water tank and to a lesser extent the Glenden clear water tank.
Reservoir inspections were not undertaken weekly as stated in the risk register.

Non-conformance: Not all of the preventative measures listed in the risk assessment were implemented as stated in the Plan.

Recommendation:
- Ensure all preventative measures listed in the approved DWQMP are implemented.
- Urgently replace the Carmila clearwater tank hatch with a newer structure that prevents water and vermin ingress (i.e. raised flange sealed flush with the roof, with a hatch that sits over the top).

Opportunity for Improvement: Inspect all reservoirs for integrity (including vermin proofing e.g. any small holes, gaps under the corrugation profiles), rectify any issues found, implement an ongoing Reservoir Inspection program, and update the DWQMP to reflect the new process.

Compliance with the DWQMP: Are the procedures implemented?

Non-conformance

A functional description exists for the new Nebo WTP but not the other schemes. Some information (alarm lists) was available on the shared network drive but not through the IRC intranet as stated. On the IRC intranet, Carmila, Saint Lawrence and Nebo Monthly and Weekly checklists were available, but not the other schemes. The Water Main Flushing program and procedures could not be located either on the intranet written direction search or through the Master Tracking Document Register spreadsheet, however a procedure "Clermont Mains Flushing Process" was later found through search the ECM system.

Non-conformance: Not all of the operational documentation listed in the DWQMP exists, or if it does, staff do not know how to access it; and not all of the available operational documentation was available through the intranet as stated in the plan.

Recommendation: Clarify the coverage of the operational documentation listed under the section 'Information Distribution' within the DWQMP, as well as how it is accessed.

Compliance with the DWQMP: Have improvement actions been completed or progressed within the required timeframes?

Non-conformance

The following RMIP actions were included within the audit and verified through staff interviews and/or auditor observation:

WS1 - A SCADA Strategy has been written for full SCADA upgrade at all WTPs, WWTPs and Pump Stations. Has been approved by Council, and funding has been allocated over 2 years to implement the work. Currently Council's SCADA is on 6 different platforms, the project will bring these into one common platform and provide remote access. There is a parallel 'compliance project' which will bring online water quality monitoring to WTPs that don't currently have it.

GEN6 - A flushing procedure could not be located, except for a Clermont specific one.

GEN15 - PSA labour hire - this is in place. Council has arrangements with Simmonds & Bristow, 360 Engineering, and other local companies.

Non-conformance: Not all RMIP actions have been completed as indicated within the RMIP register.

Recommendation: Ensure RMIP actions are completed as required and that updates made to the RMIP register are accurate.

Compliance with the DWQMP: Have incidents been identified and responded to as required under the DWQMP and approval conditions?

Not Applicable

Not applicable to Whole of System

Relevance of the DWQMP: In the auditor's opinion, are the preventative measures relevant, and/or are other preventative measures recommended to manage the relevant hazards?

Conforms

There is a comprehensive set of preventative measures identified to control the hazards associated with whole of system risks, which, if implemented appropriately, can be effective.

Operational and Verification Monitoring

1

Name of Scheme St Lawrence

Compliance with the DWQMP: Has the operational monitoring program been implemented? Non-conformance

Raw Water - Turbidity and pH - DWQMP Requirement - Daily: Records for March 2019 showed results were available for all weekdays in that month. However records for January 2022 only contain 1-3 results per week; however during the audit interviews it was identified that water was being tankered into the town during this period.

Treated Water - Free chlorine - DWQMP Requirement - Daily: Records for January 2022 show only one recorded result for the month. Records for May 2022 show only four results for the month, however again, this was during the period of water tankering.

Reticulation Water - Free chlorine - DWQMP Requirement - Daily: Records for February, March, April and May were incomplete, with only between 3 - 13 results available per month. This did correspond with the water tankering period, however in the auditor's opinion this should not have impacted on reticulation chlorine monitoring as per the approved DWQMP.

Non-conformance: The operational monitoring is not being implemented as stated in the DWQMP.

Recommendation: Ensure the DWQMP reflects the current operational monitoring regime and that the operational monitoring program is implemented. Consider refresher training or staff reminders to ensure Operators understand the monitoring requirements. If the intention is to undertake 'daily' tests only on weekdays or days when the WTP is attended by staff, ensure this is clear in the DWQMP.

Opportunity for Improvement: Clarify operational monitoring requirements in circumstances when water is being tankered in from elsewhere, specifically what deviations there would be from the monitoring specified in the approved DWQMP.


Photo 170


Photo 171


Photo 172


Photo 173


Photo 174


Photo 175


Photo 176

Compliance with the DWQMP: Has the verification monitoring program been implemented? Non-conformance

WTP Treated Water - MIB/Geosmin - DWQMP Requirement - monthly - Monthly results available over the period July 2017 to June 2022, with the exception of January to April 2022 through which

no results were recorded. However raw water sampling continued over this period.
Reticulated water - pH - DWQMP Requirement - weekly - 260 results available over the 5 year period July 2017 to June 2022. From a review of the sampling frequency there are occasional missed weeks, for example there was no reticulation pH result between 29/08/2018 and 12/09/2022.
Reticulated water - E. coli - DWQMP Requirement - weekly - 260 results available over the 5 year period July 2017 to June 2022. From a review of the sampling frequency there are occasional missed weeks, for example there was no reticulation E. coli result between 4/05/2022 and 18/05/2022.

Non-conformance: The verification monitoring program is not fully implemented as stated in the DWQMP, noting that the issues identified (e.g. gaps in sampling frequency) are considered relatively minor.

Recommendation: Implement the verification monitoring program as stated in the DWQMP, and/or describe the circumstances in which the stated monitoring frequencies may not fully apply (e.g. inaccessible sampling points, reduced staff available for sampling etc).

Opportunity for Improvement: The verification monitoring program could be clarified in the DWQMP to provide the actual sample site locations.

Relevance of the DWQMP: Is there additional monitoring recommended to assist in hazard identification? Opportunity for Improvement

Opportunity for Improvement: Formalise UVA testing into the operational monitoring program at the relevant WTPs, including target values and corrective actions to be undertaken if the limits are exceeded.

2

Name of Scheme Carmila

Compliance with the DWQMP: Has the operational monitoring program been implemented? Non-conformance

Raw Water - Total Manganese - DWQMP Requirement - Daily: Records for July 2020 showed results were available for all weekdays in that month. However records for April 2022 only contain a single result per week.
Treated Water - Turbidity - DWQMP Requirement - Daily: Records for June 2021 show 22 results for the month which generally (but not always) correlate with weekdays. Some weekdays were missed and some weekend samples were collected. It was noted that the first 19 results for the month were recorded as "0" which would seem unlikely if the measurement was being performed correctly.
No operational monitoring results were able to be provided for the 6 months between July 2021 and December 2021.

Non-conformance: The operational monitoring is not being implemented as stated in the DWQMP.
Recommendation: Ensure the DWQMP reflects the current operational monitoring regime and that the operational monitoring program is implemented. Consider refresher training or staff reminders to ensure Operators understand the monitoring requirements. If the intention is to undertake 'daily' tests only on weekdays or days when the WTP is attended by staff, ensure this is clear in the DWQMP.




Photo 177 Photo 178 Photo 179 Photo 180

Compliance with the DWQMP: Has the verification monitoring program been implemented?

Conforms

WTP Treated Water - E. coli - DWQMP Requirement - weekly - 268 results available over the period 5 July 2017 to 29 June 2022, with 52 or 53 results available each calendar year 2018,2019,2020 and 2021.
WTP Treated Water - THMs - DWQMP Requirement - monthly - at least one sample result available per month over the period 5 July 2017 to 29 June 2022.

Relevance of the DWQMP: Is there additional monitoring recommended to assist in hazard identification?

Conforms

The monitoring program is comprehensive.

3

Name of Scheme Dysart

Compliance with the DWQMP: Has the operational monitoring program been implemented?

Non-conformance

Filtered Water - Turbidity - DWQMP Requirement - Online/Daily: Analysers are in place but do not report data via SCADA so can only be viewed when the Operator is physically in front of the units. Analysers are not calibrated or serviced in accordance with any maintenance program. Daily grab sample results are available for most days throughout 2021-22, though there are periods of missing data.

Treated Water - Free chlorine - DWQMP Requirement - Online/Daily: Analysers are physically in place but have not been operational for some time. Daily grab sample results are available for most days throughout 2021-22, though there are periods of missing data.

Non-conformance: The operational monitoring is not being implemented as stated in the DWQMP.
Recommendations:
- Ensure the DWQMP reflects the current operational monitoring regime and that the operational monitoring program is implemented. Consider refresher training or staff reminders to ensure Operators understand the monitoring requirements. If the intention is to undertake 'daily' tests only on weekdays or days when the WTP is attended by staff, ensure this is clear in the DWQMP.
- Ensure the Dysart online water quality analysers are serviced, calibrated and in good working order as these form an important part of the operational monitoring for this scheme as per the approved DWQMP.


Photo 181


Photo 182


Photo 183


Photo 184


Photo 185

Compliance with the DWQMP: Has the verification monitoring program been implemented?

Conforms

WTP Treated Water - E. coli - DWQMP Requirement - weekly - 208 results available for the four year period 2018-2021.

WTP Treated Water - cadmium - DWQMP Requirement - quarterly - 16 results available for the four year period 2018-2021.

WTP Treated Water - chlorate - DWQMP Requirement - monthly - 47 results available for the four year period 2018-2021.

Network sites - free chlorine - DWQMP Requirement - weekly - 207 results available for the four year period 2018-2021.

Note: results were only assessed in terms of total sample numbers against the number expected over the timeframe.

Relevance of the DWQMP: Is there additional monitoring recommended to assist in hazard identification?

Conforms

The monitoring program is comprehensive.

4

Name of Scheme Glenden

Compliance with the DWQMP: Has the operational monitoring program been implemented?

Opportunity for Improvement

Filtered Water - Turbidity - DWQMP Requirement - Online: analyser was confirmed to be functional with data reported and trends able to be interrogated via the plant SCADA system. Hach service and calibrate the turbidity analyser annually.

Treated Water - Turbidity - DWQMP Requirement - Daily: July 2018-January 2019 - daily results available for most days. Several results noted to be missing in January 2019 including 1st, 7th, 21st, 26th, 27th, 28th and 29th January. June 2022 - daily results available for most days (the exception was 10th June 2022).

Opportunity for Improvement: Ensure operational monitoring frequencies stated in the approved DWQMP are met. If there are circumstances under which the testing requirements do not necessarily apply, ensure these are described in the DWQMP.


Photo 186

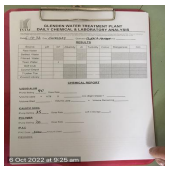


Photo 187


Photo 188


Photo 189

Photo 190


Photo 191

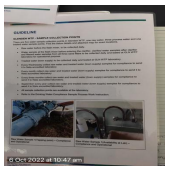


Photo 192

Compliance with the DWQMP: Has the verification monitoring program been implemented?

Conforms

WTP Treated Water - free chlorine - DWQMP Requirement - weekly - Weekly results available through calendar year 2021.

WTP Treated Water - arsenic - DWQMP Requirement - quarterly - Quarterly results available through calendar years 2019 and 2020.

Network sites - free chlorine - DWQMP Requirement - weekly - weekly results available for calendar years 2019 and 2020.


Photo 193


Photo 194


Photo 195

Relevance of the DWQMP: Is there additional monitoring recommended to assist in hazard identification?

Conforms

The monitoring program is comprehensive.

5

Name of Scheme Nebo

Compliance with the DWQMP: Has the operational monitoring program been implemented?

Opportunity for Improvement

Raw Water - Turbidity and pH - DWQMP Requirement - Online: analysers were confirmed to be functional with data reported and trends able to be interrogated via the plant SCADA system.

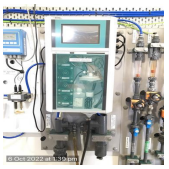
Treated Water - Free chlorine - DWQMP Requirement - Online: analysers were confirmed to be functional with data reported and trends able to be interrogated via the plant SCADA system.

Treated Water - Turbidity - DWQMP Requirement - Daily: Results were available for every day over the period July 2021 to October 2021 with the exception of 26/07/21.

Opportunity for Improvement: Consider including filtered water turbidity analysis in the Operational Monitoring program for Nebo WTP, as this is currently monitored online and is relevant to the production of safe high quality water.


Photo 196


Photo 197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Compliance with the DWQMP: Has the verification monitoring program been implemented?

Non-conformance

WTP Treated Water - pH, turbidity, E. coli - DWQMP Requirement - weekly - Weekly results available through calendar year 2021, with the exception of one missing turbidity result for 23/06/2021.

WTP Treated Water - bromate and chlorate - DWQMP Requirement - monthly - Monthly results available through calendar year 2021.

Network sites - free chlorine - DWQMP Requirement - weekly - 50 results available for calendar year 2021 (excluding WTP Treated Water site). No results for the week of 7 July 2021 and 22 December 2021.

Non-conformance: The verification monitoring program is not fully implemented as stated in the DWQMP, noting that the issues identified (e.g. gaps in sampling frequency) are considered relatively minor.

Recommendation: Implement the verification monitoring program as stated in the DWQMP, and/or describe the circumstances in which the stated monitoring frequencies may not fully apply (e.g. inaccessible sampling points, reduced staff available for sampling etc).

Relevance of the DWQMP: Is there additional monitoring recommended to assist in hazard identification?

Conforms

The monitoring program is comprehensive.

Supporting Aspects

Reporting

Was the monitoring and performance data provided to the Regulator accurate?

Opportunity for Improvement

The 2019-20 DWQMP Report was reviewed against the available data (spreadsheet database extract). Findings are summarised here:
Carmila WTP Treated Water Aluminium - Count, Min, Max, Average - match
Carmila WTP Treated Water E. coli - Count, Min, Max, Average - match
Carmila WTP Treated Water pH - Count, Min, Max, Average - match
Carmila WTP Treated Water turbidity - Count, Min, Max, Average - match
Carmila WTP Treated Water Radiological (gross alpha/beta) - Count did not match - Annual Report states 4 samples were collected however only one result is available. This appears to be a typographical error in the report as the DWQMP requirement is only for annual sampling (this has not been raised as a non-conformance).
Carmila Network 6 Music St - Count, Min, Max, Average - match
Dysart WTP Treated Water Fluoride - Count did not match - Annual Report states 13 samples were collected however 12 results were provided in the database extract. Min/Max/Average statistics matched.
Dysart Network 1 Fisher St E. coli - Count did not match - Annual Report states 9 samples were collected however 8 results were provided in the database extract. Min/Max/Average statistics matched (all results <1 mpn/100mL).
Glenden WTP Treated Water Iron - Count, Min, Max, Average - match
Glenden Network Library E. coli - Count, Min, Max, Average - match
Glenden Network Library Free chlorine - Count, Min, Max, Average - match

The 2018-19 DWQMP Report was reviewed against the available data (spreadsheet database extract). Findings are summarised here:
Nebo WTP Treated Water Conductivity - Count, Min, Max, Average - match
Nebo WTP Treated Water E. coli - Count, Min, Max, Average - match
Nebo WTP Treated Water Arsenic - Count, Min, Max, Average - match
Nebo WTP Treated Water Copper - Count, Min, Max, Average - match
Nebo Network Office E. coli - Count, Min, Max, Average - match
Nebo Network Depot Free Chlorine - Count, Min, Max, Average - match
St Lawrence WTP Treated Water Turbidity - Count did not match - Annual Report states 64 samples were collected however 62 were provided in the database extract with an additional 2 results of "Not Supplied" which were presumably included in the Count. Min/Average/Max were a match between the two information sources.
St Lawrence WTP Treated Water E. coli - Count, Min, Max, Average - match
St Lawrence WTP Treated Water Free chlorine - Count, Min, Max, Average - match
St Lawrence Network 36 Macartney St Free chlorine - Count, Min, Max, Average - match

Opportunity for Improvement: Confirm the statistical methods used to summarise data for annual DWQMP reporting is accurate, for example, the count of total number of results excludes entries such as "Not Supplied."

Compliance with the DWQMP: Are requirements being met?

Conforms

Annual reports for the years 2016-17, 2017-18, 2018-19, 2019-20 and 2020-21 were sighted, and the 2020-21 DWQMP report was available on the Council website.

Relevance of the DWQMP: Is the plan relevant?

Opportunity for Improvement

There are some internal reporting processes relevant for consideration in the DWQMP. These include monthly meetings attended by Operators and Network team members (all staff not

required for direct operations) with remote attendance also available. The Compliance Officer often attends these meetings and presents information relevant to drinking water quality management. The meetings are intended to be a free and open forum for discussing operational issues.

Opportunity for Improvement: Consider including internal reporting/awareness mechanisms, such as the monthly Operators meetings, in the DWQMP.

Commitment to Drinking Water Quality Management

Compliance with the DWQMP: Are requirements being met? Not Applicable

The DWQMP does not explicitly address this element.

Relevance of the DWQMP: Is the plan relevant? Not Applicable

As above.

Employee Awareness and Training

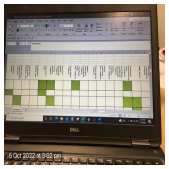
Compliance with the DWQMP: Are requirements being met? Conforms

Based on the audit interviews, Operators are generally aware of water quality hazards and the purpose of individual treatment processes, and to report CCP failures and other significant incidents or events to Supervisors for assistance and reporting (if required).

Relevance of the DWQMP: Is the plan relevant? Opportunity for Improvement

Council has developed a staff training matrix identifies staff needs, which informs requests to HR for training programs. Supervisors receive reports on their direct reports for any outstanding training.

Opportunity for Improvement: More detail could be provided in the DWQMP around management of staff skills and training.



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Research and Development

Compliance with the DWQMP: Are requirements being met? Not Applicable

This element is not explicitly addressed in the DWQMP.

Relevance of the DWQMP: Is the plan relevant? Opportunity for Improvement

The DWQMP identifies the importance of disinfection as a control measure for managing microbiological hazards in drinking water, however the approved version does not contain

evidence that sufficient disinfection is being achieved. For example, C.t for chlorine based disinfection at the different WTPs has not been stated in the plan, nor the dose rate and corresponding pathogen log reductions for the Nebo UV system.

Opportunity for Improvement: Consider calculating C.t for all drinking water schemes, as well as identifying the log reduction values able to be claimed against the Nebo UV process. This will assist Council moving forwards with aligning to the Australian Drinking Water Guidelines health based targets framework and identifying long term water treatment performance upgrades (if/where necessary).

Review and Continual Improvement

Compliance with the DWQMP: Are requirements being met? Opportunity for Improvement

Opportunity for Improvement: Consider reviewing and simplifying the structure of the RMIP. In the auditor's opinion, the current layout (Excel spreadsheet with 500 rows) makes action tracking difficult.

Relevance of the DWQMP: Is the plan relevant? Conforms

Broadly, the DWQMP is helping to drive a major upgrade of monitoring equipment and SCADA platform which, once complete, will be a significantly improvement to the management of drinking water quality.

Appendix

Photo 1

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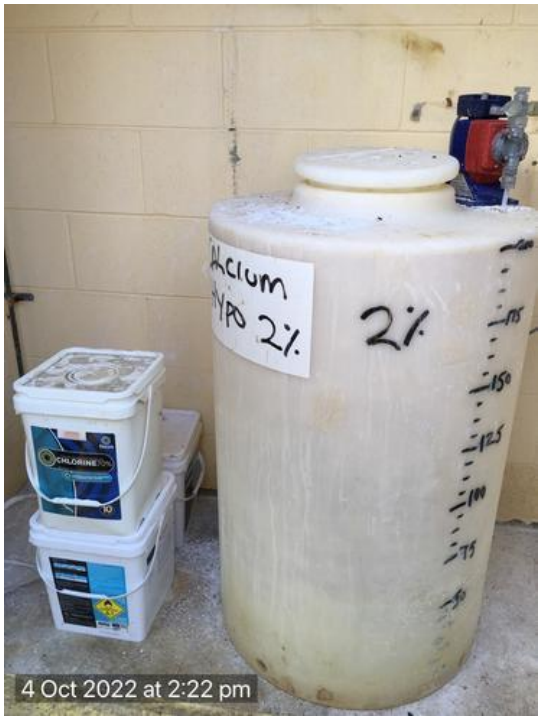

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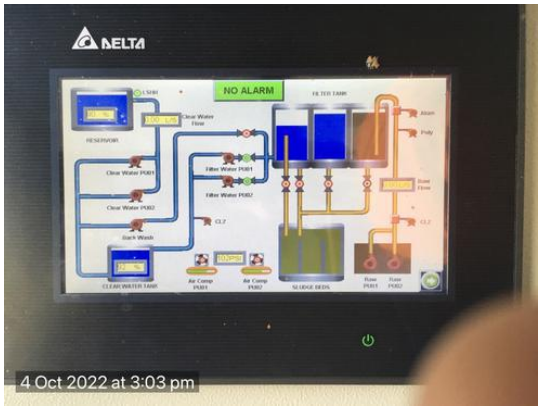

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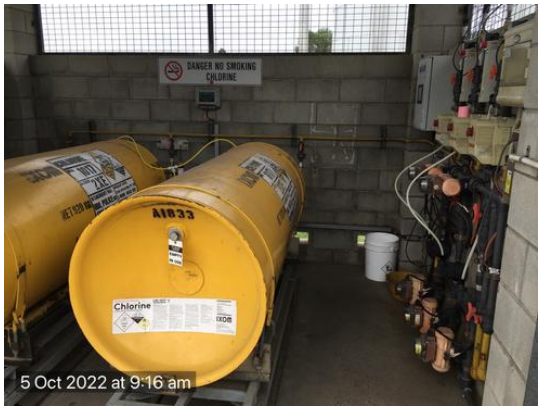

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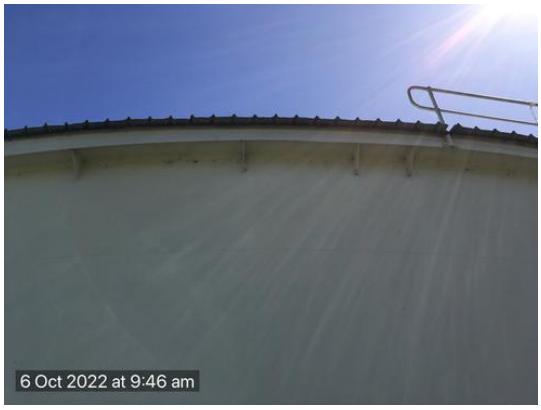

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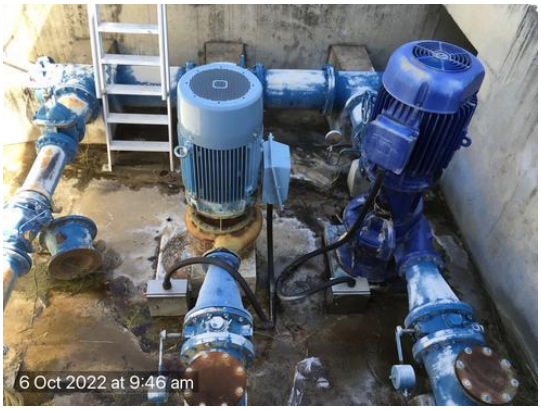

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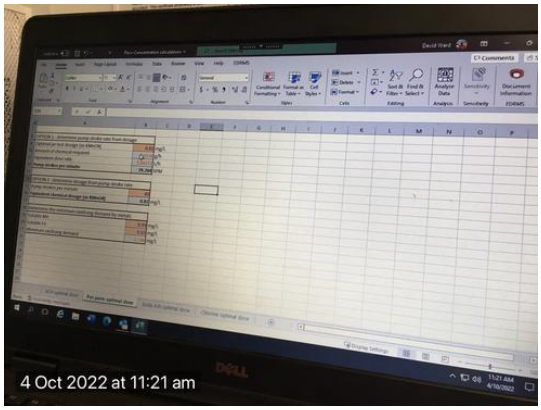

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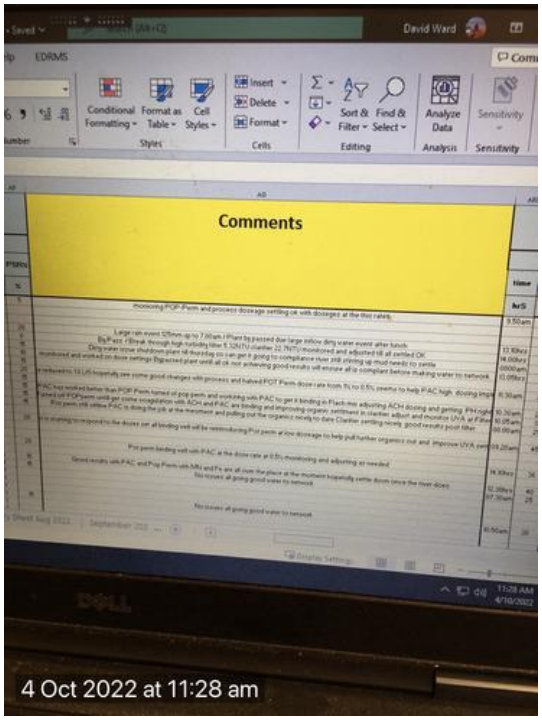

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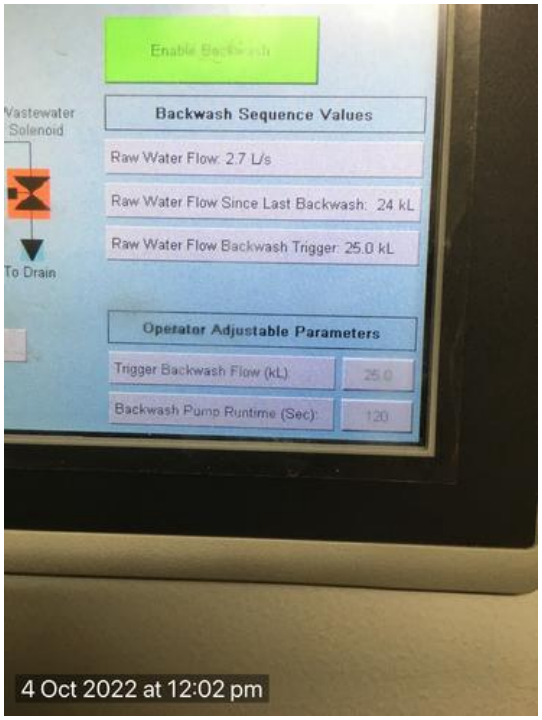

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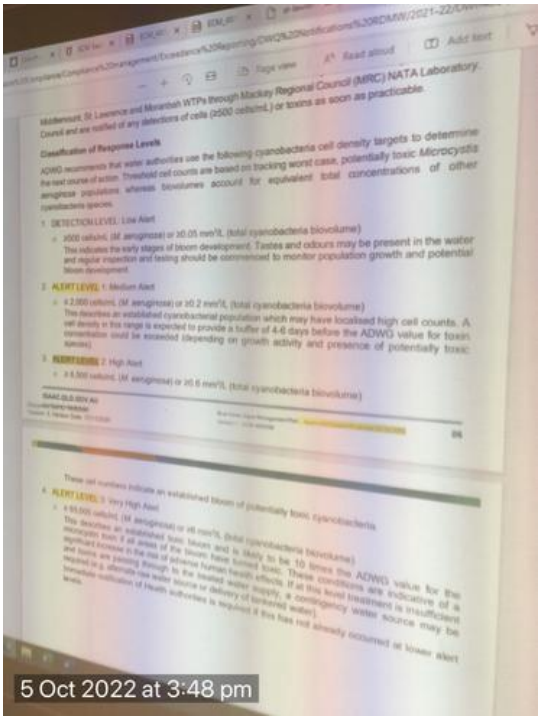

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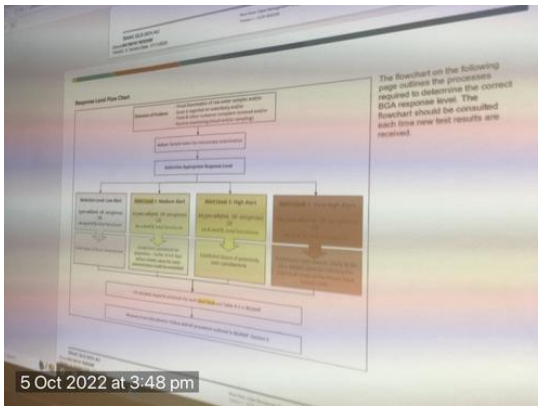

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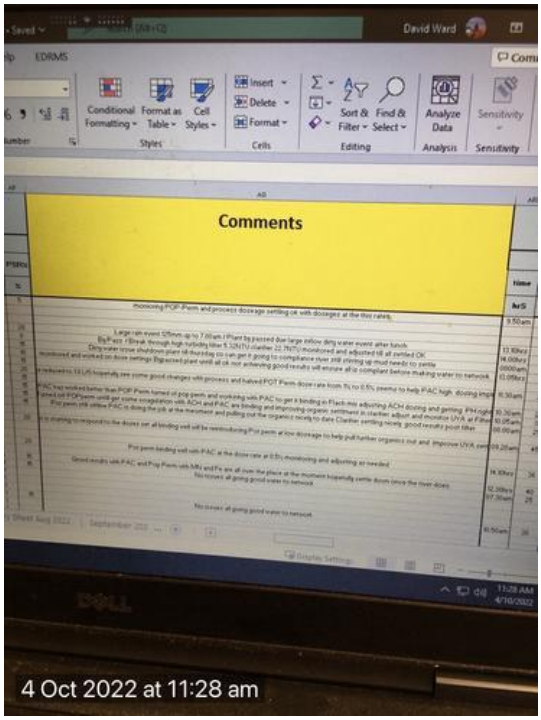

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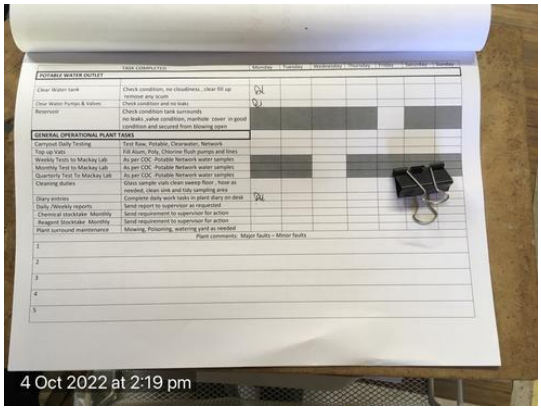

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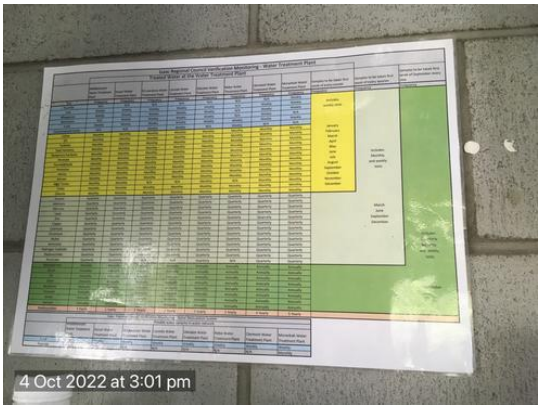

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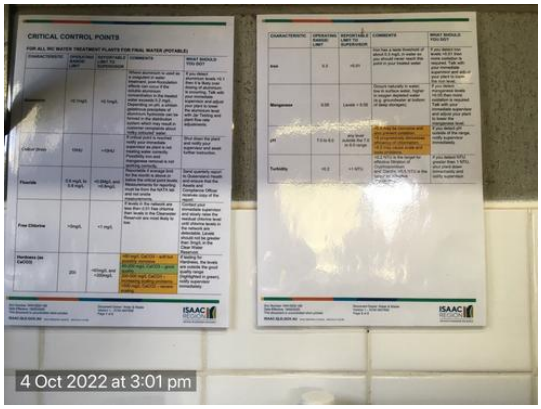

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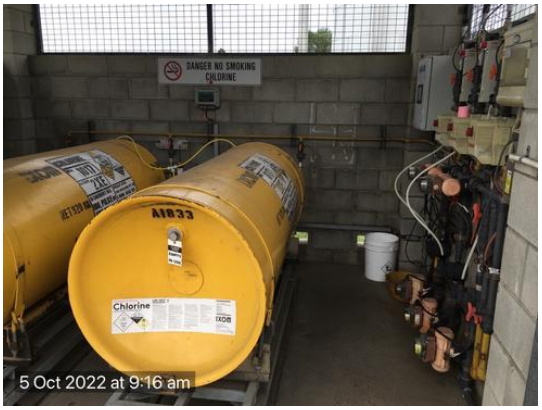

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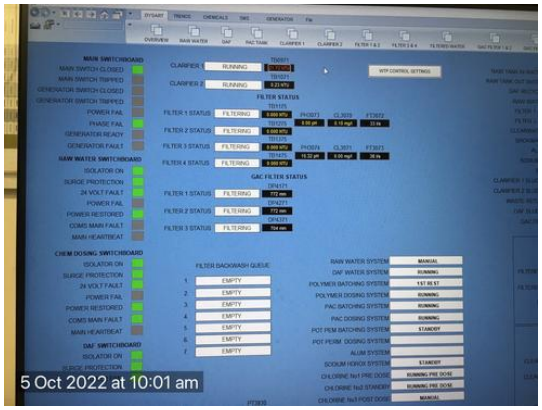

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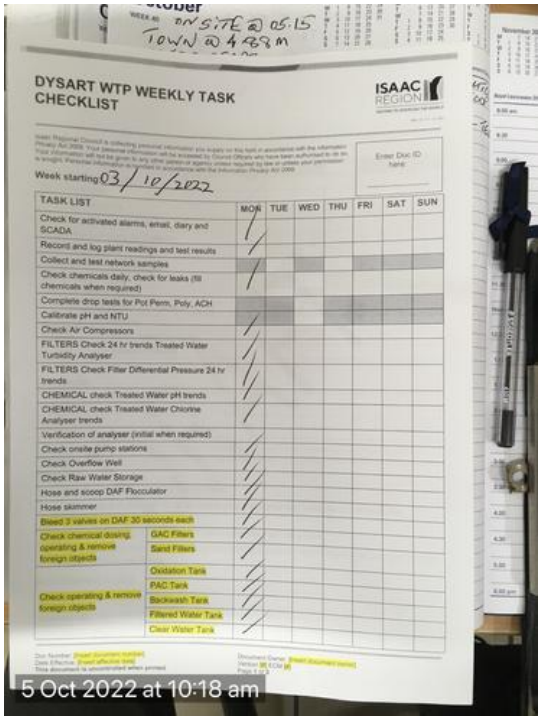

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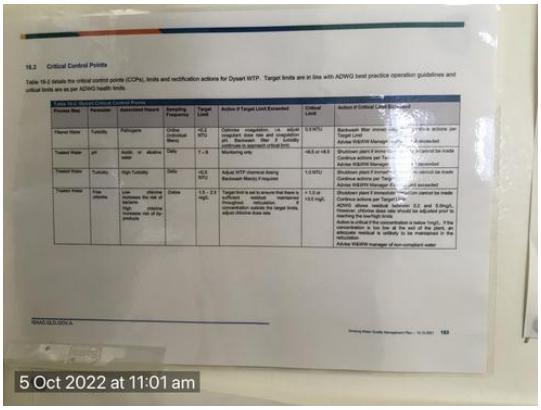

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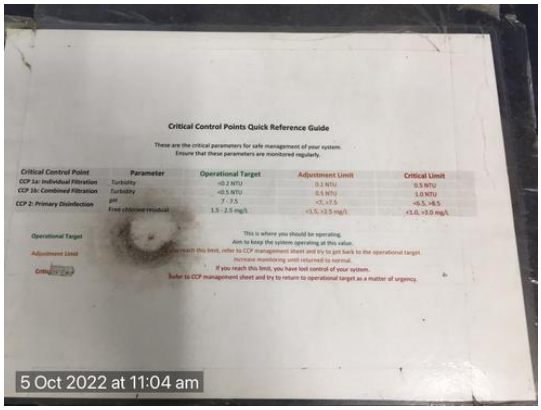

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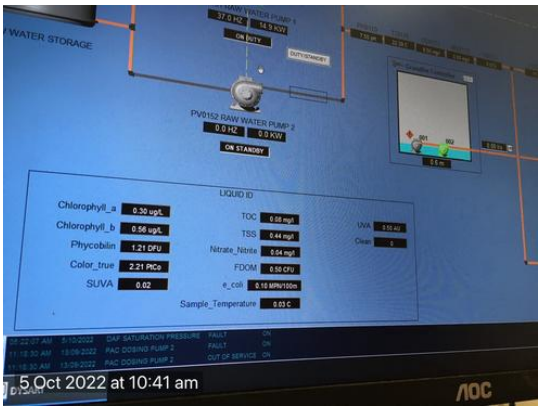

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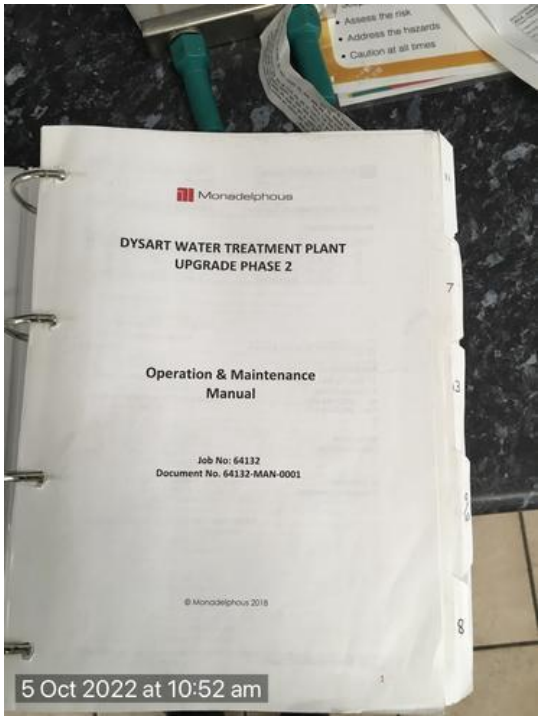

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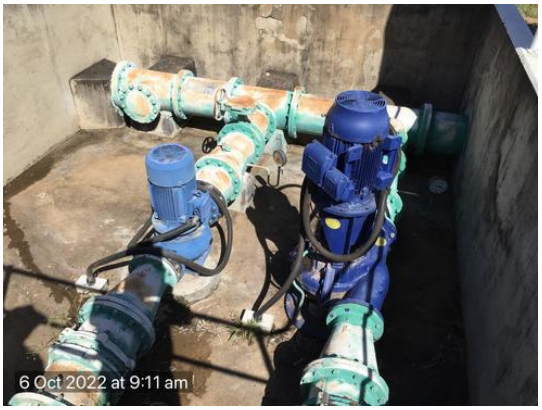

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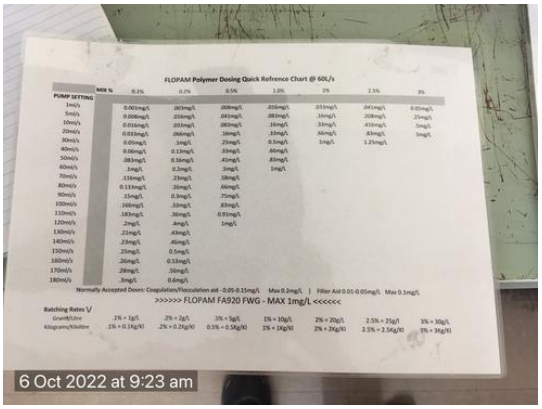

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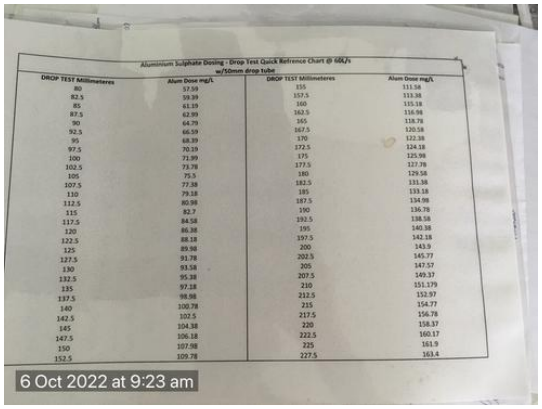

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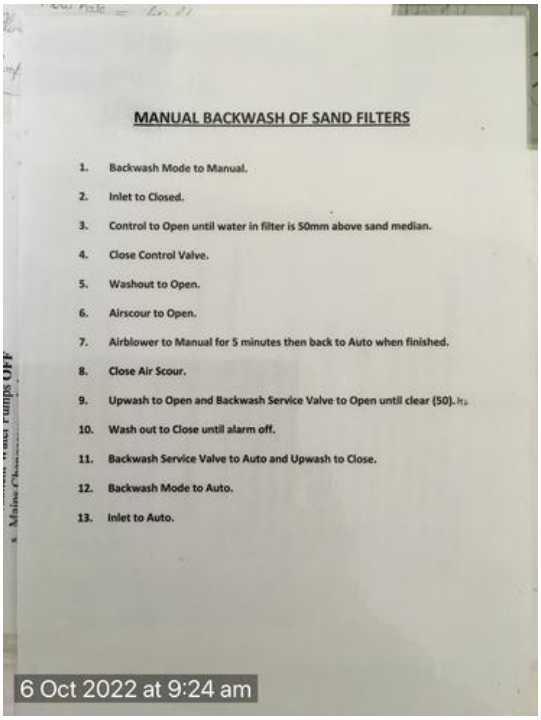

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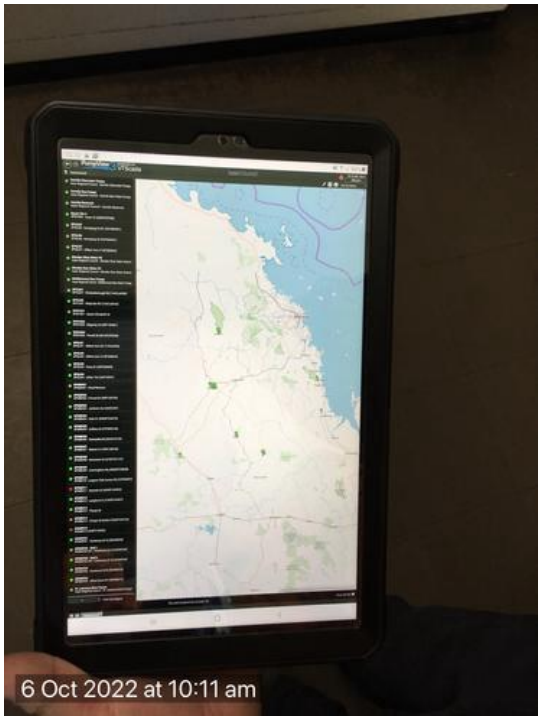

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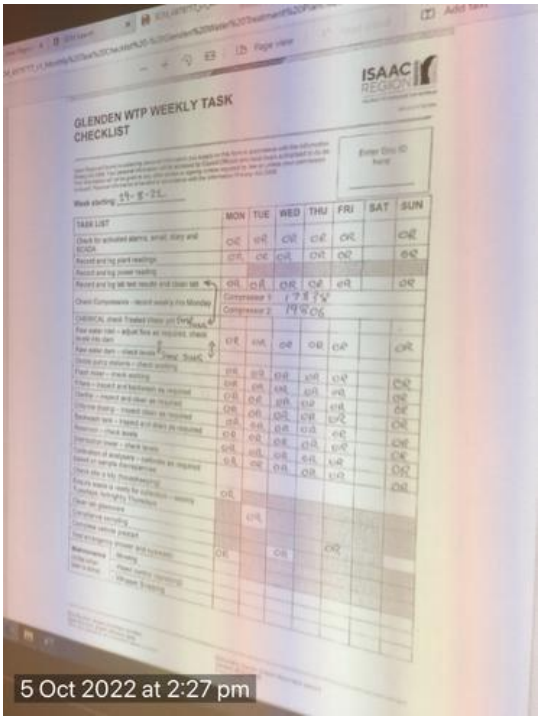

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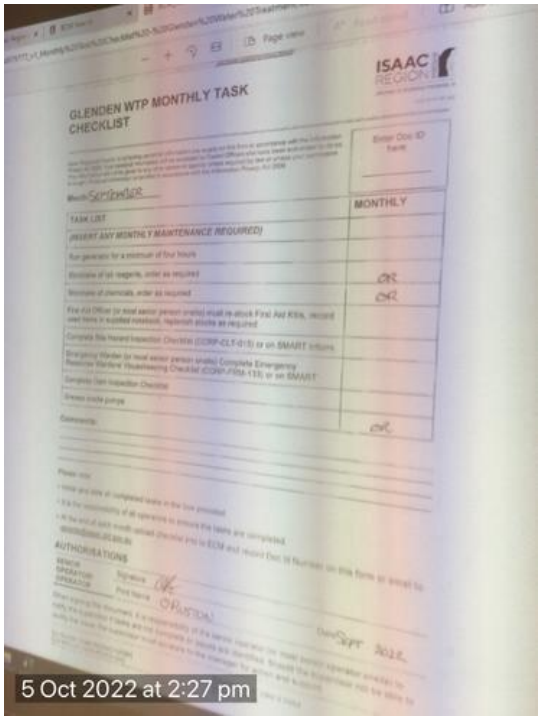

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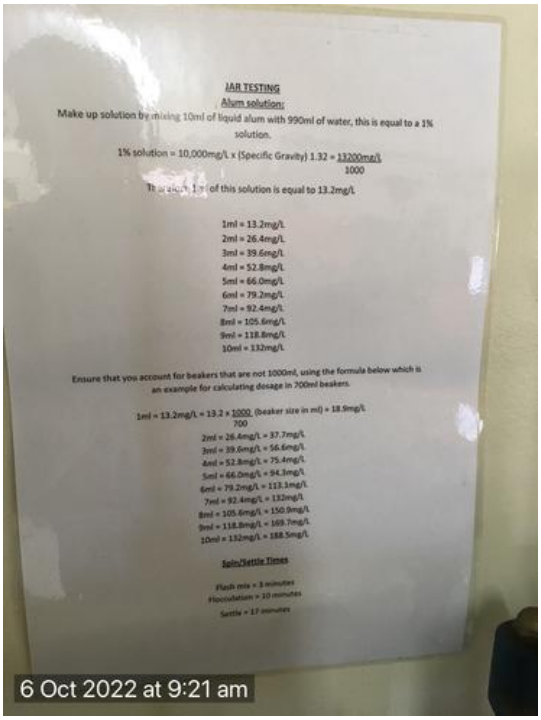

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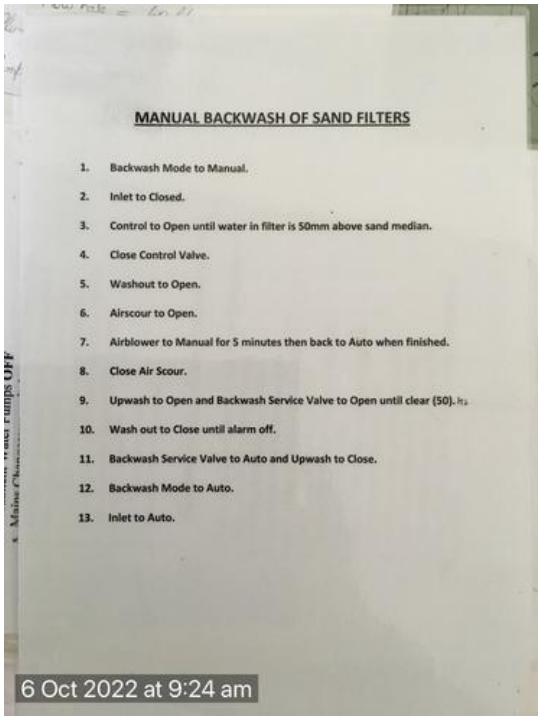

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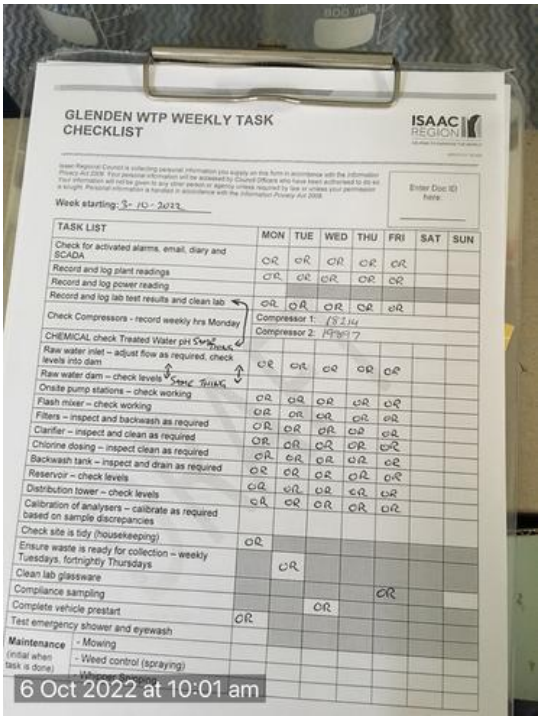

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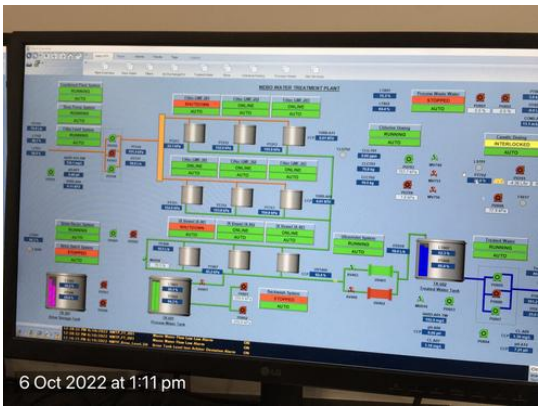

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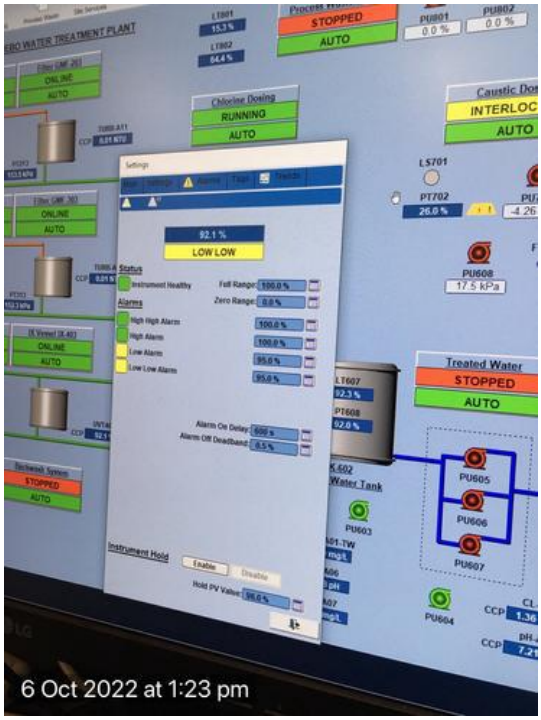

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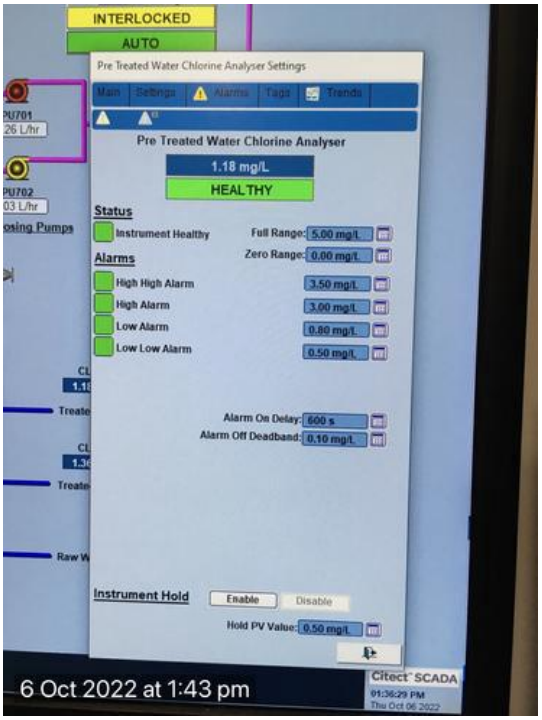

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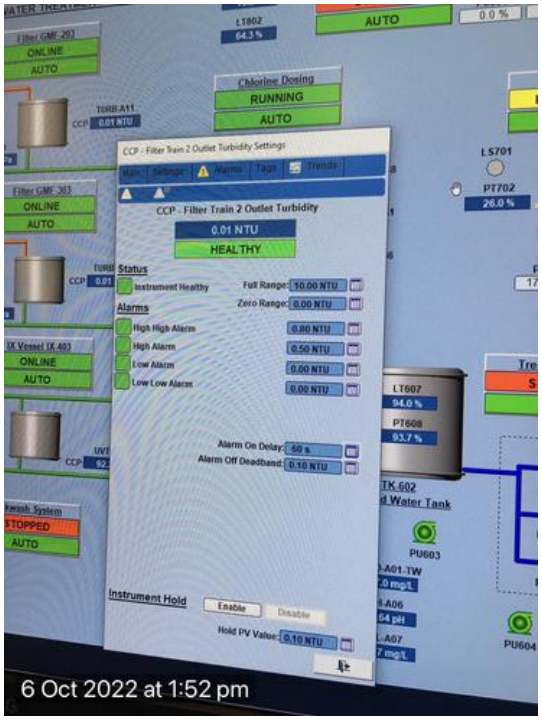

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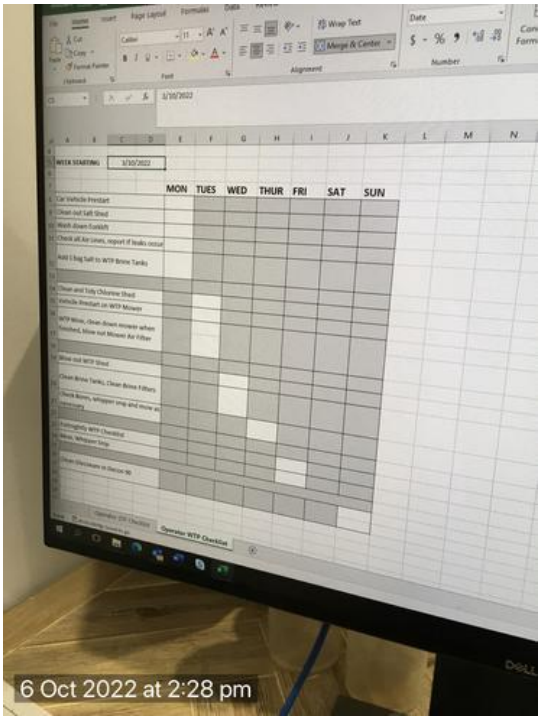

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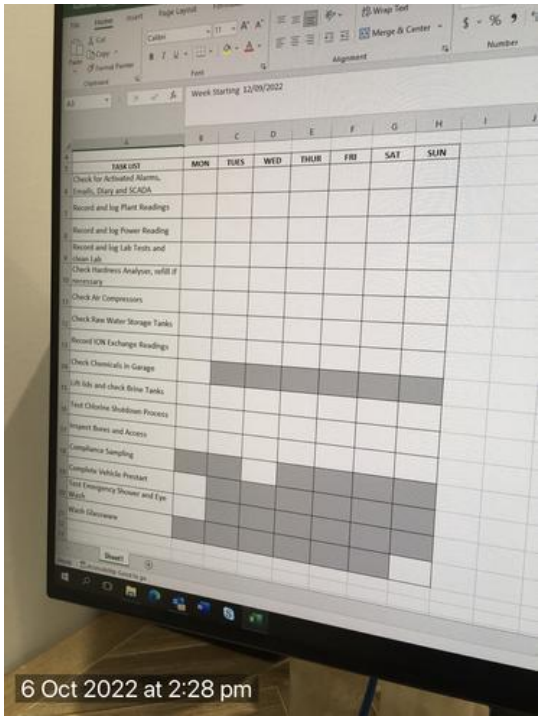

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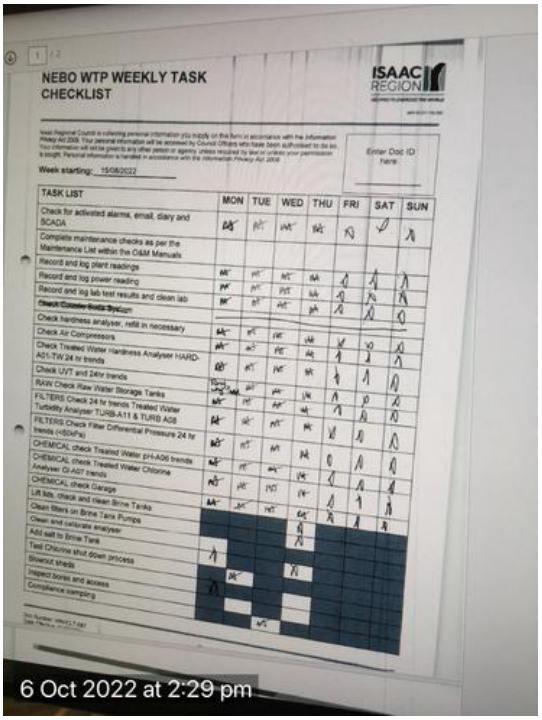

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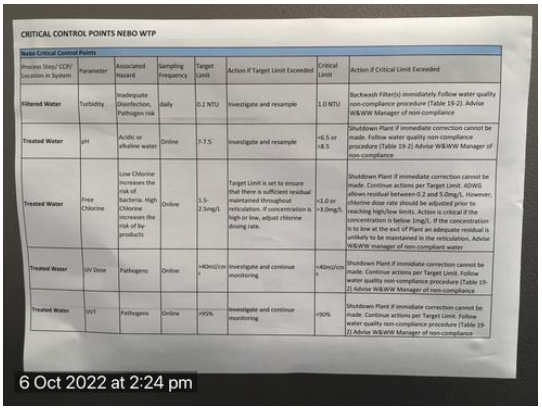

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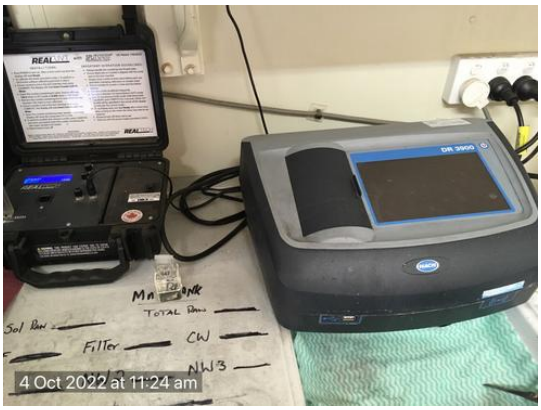

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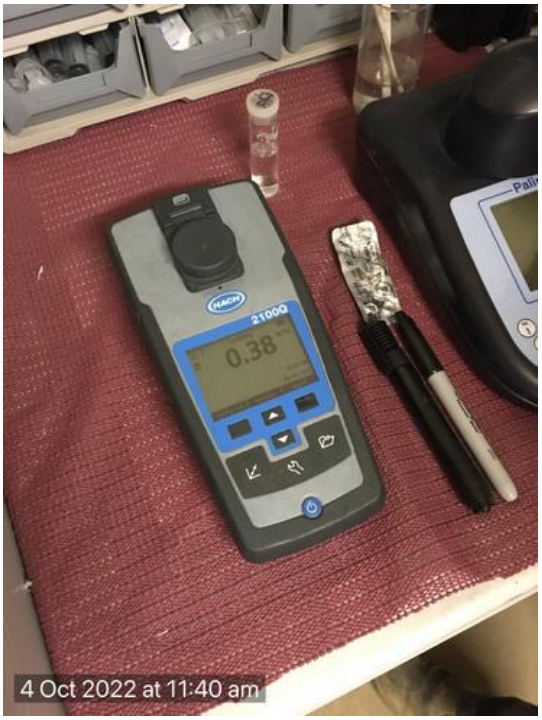

Photo 175

Photo 176

Photo 177

Photo 178

Photo 179

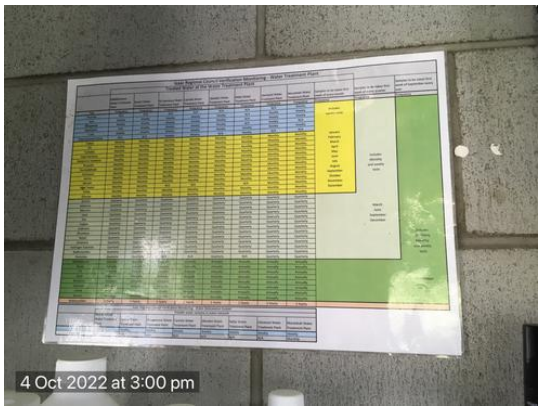

Photo 180

Photo 181

Photo 182

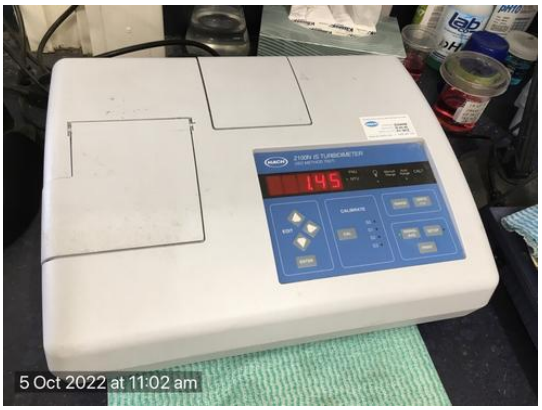

Photo 183

Photo 184

Photo 185

Photo 186

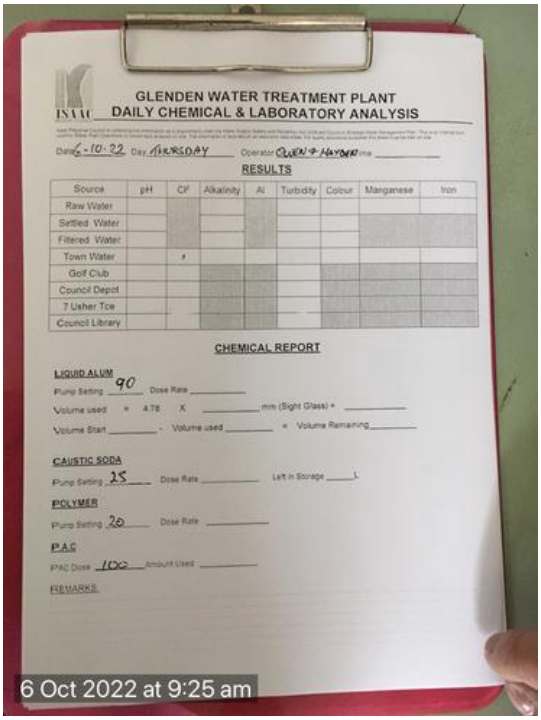

Photo 187

Photo 188

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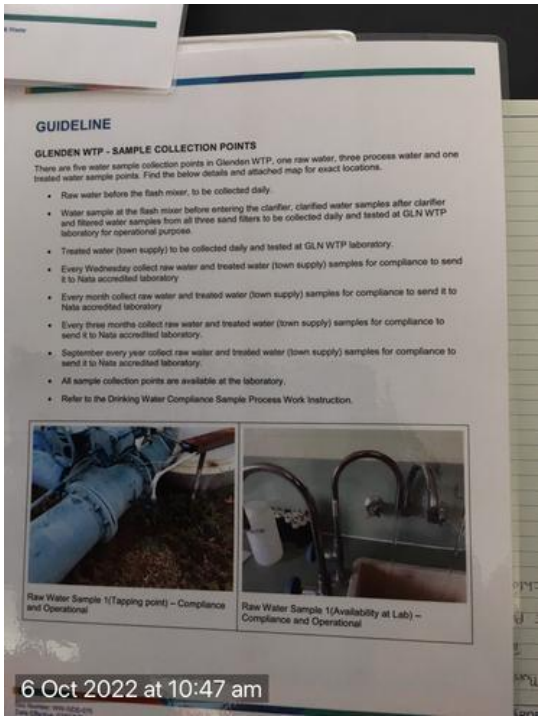
Photo 191



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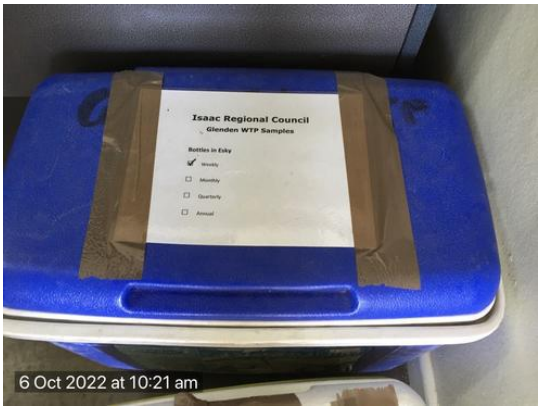

Photo 193

Photo 194

Photo 195

Photo 196

Photo 197

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Photo 200

Photo 201

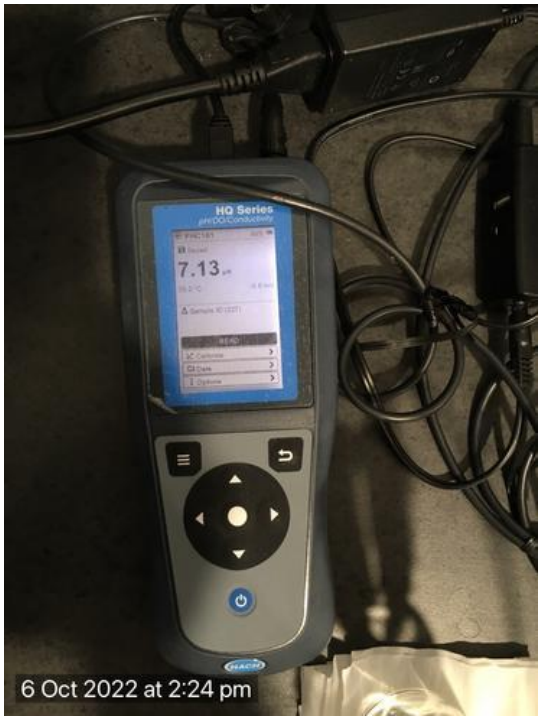


Photo 202

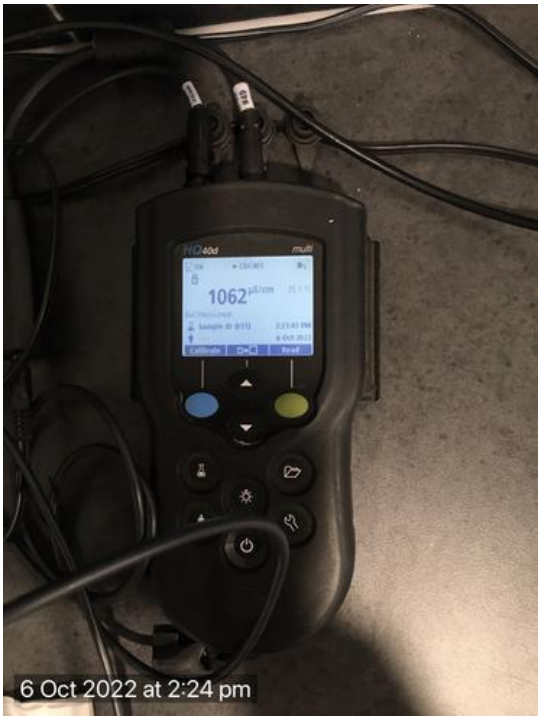


Photo 203

Photo 204

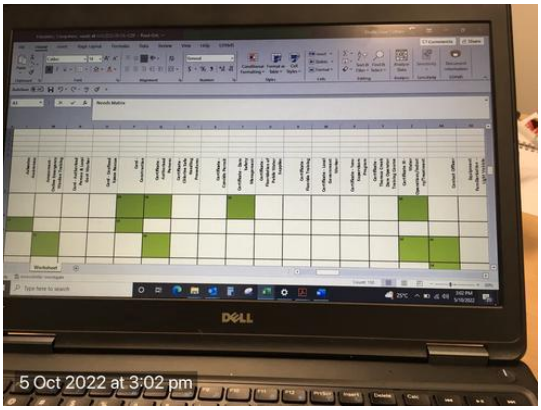


Photo 205

A2. STATUTORY DECLARATIONS

Oaths Act 1867

Statutory Declaration

QUEENSLAND
TO WIT

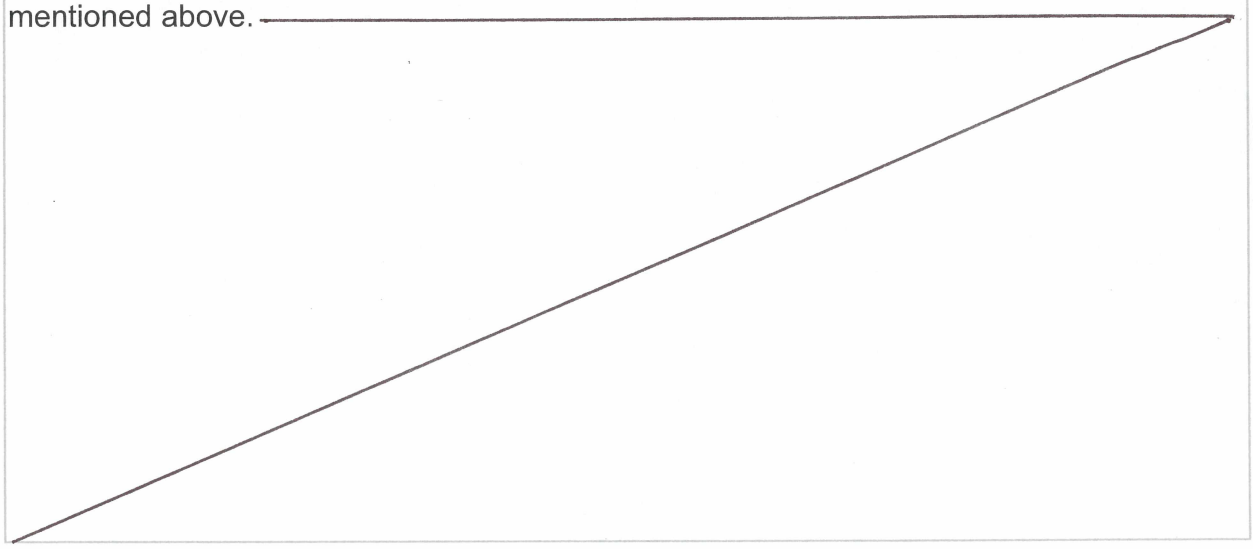
I, Stephen Wagner

of Daintree Street Clermont in the State of Queensland

do solemnly and sincerely declare that

I am the Manager of Operations and Maintenance Water and Waste Directorate of Isaac Regional Council (ABN: 39 274 142 600).

Through the course of the regular audit of the drinking water quality management plan (DWQMP) undertaken by Sean Hinton for the audit period ending 2022; which has resulted in this regular audit report dated 14 October 2022; that to the best of my knowledge, officers and employees of Isaac Regional Council have not knowingly given any false or misleading information, and have given all relevant information to the auditor mentioned above.



And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act 1867.

Signature of declarant/deponent

Taken and declared before me at Moranbah, Queensland

this 27th day of October 2022

Barbara Franklin JP(Qual)

A Justice of the Peace/Commissioner for Declarations.

JUSTICE OF THE PEACE (QUALIFIED) QUEENSLAND GOVERNMENT Reg.No.: 97208 DEPARTMENT OF JUSTICE QUEENSLAND

Oaths Act 1867

Statutory Declaration

QUEENSLAND
TO WIT

I, Sean Hinton

of Bligh Tanner Pty Ltd, L9 269 Wickham Street Fortitude Valley in the State of Queensland

do solemnly and sincerely declare that

I am certified as a Lead Water Quality Management Systems Auditor under the Exemplar Global Water Quality Management Systems Auditor Certification Scheme (#133942, expiry 10 February 2023).

To the best of my knowledge, information and belief, I have not knowingly included any false, misleading or incomplete information in the Isaac Regional Council Drinking Water Quality Management Plan Audit Report, nor knowingly failed to reveal any relevant information or document to the Regulator.

I certify that the Isaac Regional Council Drinking Water Quality Management Plan Audit Report addresses the relevant matters for evaluation, is factually correct, and that the opinions expressed in the report are honestly and reasonably held.

(Rest of text box is deliberatey blank)

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act 1867.

Signature of declarant/deponent

Taken and declared before me at Fortitude Valley

this 24th day of October 2022

JOHN JOSEPH CARPENDALE JP(Qual) 21264
Justice of the Peace, a justice approved by the chief executive under section 12(2) of the Oaths Act 1867.
Special witness under the Oaths Act 1867.
I understand the requirements for witnessing a document by audio visual link and have complied with those requirements.
This declaration was made in the form of an electronic document.
I electronically signed this declaration.

A Justice of the Peace/~~Commissioner for Declarations.~~

C/- JPs in the Community program
JP Branch, Department of Justice & Attorney-General
6/154 Melbourne Street
SOUTH BRISBANE QLD 4101

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