DEWS DWQMP Audit 2016

28 June 2016.

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Contents

1. Executive Summary

1.1. Purpose

To provide a 'standard regular' audit of the way in which Mackay Regional Council (MRC) complies with its approved *Drinking Water Quality Management Plan* (DWQMP). The objective of that audit is to:

- verify the accuracy of the monitoring and performance data provided to the regulator under the plan;
- assess the service provider's compliance with the plan; and
- assess the relevance of the plan in relation to the provider's drinking water service.

The audit was conducted on behalf of the Department of Energy and Water Supply (DEWS) under the *Water Supply (Safety and Reliability) Act 2008* (Qld) (the Act). The findings of the audit are reported to DEWS.

1.2. Methodology

The principal documents that set the standard for the audit were as follows:

- Chapter 2 Infrastructure and service, Part 4 Service provider obligations, Division 2 Audit reports and reviews, Clauses 108 to 109 of the Act.
- *Drinking Water Quality Management Plan Review and Audit Guideline* (DEWS 2013).
- *ISO 19011:2011 - Guidelines for auditing management systems* (the generic auditing Guideline).

The audit involved review of hard copy documentation, review of electronic records, interview with staff and inspection of assets and systems. The audit covered a sample of MRC supply systems centering on the Water Treatment Plant (WTP) at each site as well as covering selected aspects of catchments, source waters and distribution systems. These sites were selected to provide coverage of the largest WTP, a mid-size new WTP and an example of a very small WTP.

Although there was some days notice given as to which sites were to be visited, there was only very general guidance given as to precisely what would be inspected in each area. All assets were considered potentially subject to audit and some were randomly inspected during the field audit. All records from within the audit period were considered to be within scope and portions of these records were randomly selected for inspection during the desktop and field audit.

1.3. Results

1.3.1. Key finding

Within the scope of the audit, MRC complied with its obligations under the Act, Regulations and Audit Guidelines. There was good compliance between the current version of the DWQMP in used by MRC and the observations made during the audit. That version of the DWQMP is due to be lodged with DEWS shortly after the audit. No poor quality or inadequately maintained infrastructure was observed. Therefore, a compliant audit finding has been made by the auditor under the Act on behalf of DEWS.

1.3.2. Overview of observations

The assets and systems inspected and audited were found to range from good to excellent in terms of their standard and the quality of their maintenance. MRC has made multiple significant improvements in the reliability of its water quality management system and shown some leadership in a range of areas. The depth and breadth of improvements made in recent years has greatly enhanced the ability of MRC to reliably ensure good water quality and to keep up with the rising expectations of its stakeholders and tougher industry standards. The results are paying dividends in that MRC is getting excellent treated water quality results despite very challenging source water conditions.

1.3.3. Water treatment plant highlights

At the WTPs, all records inspected at plants attended provided historical evidence of compliance with the DWQMP during the audit period. The records inspected included operational checks and on-line monitoring of critical limits. MRC maintains an effective telemetry system and was able to show evidence of consistent monitoring of critical limits with good to excellent performance. Among the records sampled, there was no evidence that at any time water was supplied to customers with CCPs operating outside of their agreed critical limits given in the DWQMP. There was good evidence of very regular and detailed manual checks being conducted to reality-check the on line monitoring. It was notable that WTP operators were able to rapidly extract the relevant data and that there were no concerning gaps in data records or results outside of the compliant range. The quality controls on procured treatment chemicals remained strong and in line with good practice.

1.3.4. Network highlights

MRC is working hard to maintain good disinfectant residual and pressure barriers across its networks and is continuing to improve that performance. No evidence of vulnerable bypass pipework and valving arrangements were identified. The stores and maintenance crews demonstrated a good understanding of water quality risks. Staff revealed sound, practical and often innovative measures to ensure MRC uses only appropriate materials in contact with water and protects potable water from cross-contamination from wastewater. There was a good separation noted between water and sewer vehicles and equipment and a good wash down bay to clean tools, plant and equipment between jobs. The stores set up was excellent and ensured good traceability of parts and equipment as well as helping ensure that only appropriate materials come into contact with drinking water. The treated water tanks observed were of a good solid design and were well maintained in vermin-proof conditions.

1.3.5. Management system highlights

The DWQMP has been regularly updated and kept sufficiently up to date. The most recent update of the DWQMP was expected to be submitted as an amendment to DEWS within a month of this audit. The process for managing and escalating incidents is clearly set out and logical. MRC has continued to maintain its training program and use of Certificate III vocational training of operators. All staff interviewed portrayed a good attitude and knowledge in relation to water quality management.

1.3.6. Opportunities for improvement

Although there were no nonconformities with the Act and Regulation, a number of opportunities for improvement (OFIs) were identified during the audit. None were considered

urgent and none represented items that should be considered essential or 'must do' recommendations. The OFIs are simply flagged as ideas for consideration. These OFIs are summarised as follows.

- Given that absence of a treatment barrier to protozoan pathogens at Finch Hatton, a more formalised and rigorous 'CCP-like' approach to protecting the catchment and bore is warranted, noting in particular the juxtaposition of the showground and its associated on site sewage management systems.
- It was noted that MRC is very well-served by the laboratory, as are surrounding councils. However, as technologies and demands on the laboratory there may be a need to expand the space provided for the well-run accredited facility in order to fully realise its value.
- There may be room to improve the formalisation of some of the cross-checking verification, calibration and maintenance tasks relating to the critical limit monitoring instruments, possibly in liaison with the experts from the MRC laboratory.
- There may be room to improve the accessibility of the flanking clarifiers at Marian WTP to help with routine cleaning, maintenance and inspection tasks to match the excellent accessibility provided for the central clarifiers.
- In the longer term it may be necessary to move to a more sophisticated organics removal system than powdered activated carbon dosing with ozone/biological activated carbon being the logical longer-term upgrade option for water from such a heavily farmed and organically rich catchment.

1.4. Acknowledgements

The auditor wishes to acknowledge the full and proactive participation of all MRC staff involved in this audit and thank them for their openness and preparedness for the interviews. The auditor particularly wishes to single out the core water quality management function of MRC for special acknowledgement (Stuart Boyd and Adele Swanton) for providing open and complete assistance to the auditor at all stages during the process.

2. Audit details

Item	Details
Title:	Regulatory audit of Mackay Regional Council's Drinking Water Quality Management Plan.
Provider:	Mackay Regional Council.
Water service:	Mackay Regional Council's water supplies (Mackay, Eton, Marian, Finch Hatton, Gargett, Sarina Koumala, Calen, Bloomsbury and Midge Point).
Auditor:	Dan Deere.
Audit date:	15 to 17 June 2016
Plan approval date:	*Drinking Water Quality Management Plan With Hazard Analysis & Critical Control Point Plan* Fifth Issue approved September 2014.

Objective:	• To provide a 'standard regular' audit of the way in which Council complies with its approved *Drinking Water Quality Management Plan* (DWQMP). The objective of that audit is to:
	  ○ verify the accuracy of the monitoring and performance data provided to the regulator under the plan;
	  ○ assess the service provider's compliance with the plan; and
	  ○ assess the relevance of the plan in relation to the provider's drinking water service.
	• To conduct that audit on behalf of the Department of Energy and Water Supply (DEWS) under the *Water Supply (Safety and Reliability) Act 2008* (Qld) (the Act) and to report the findings of the audit to DEWS.

Audit standard:	The principal documents that will set the standard for this audit are as follows: • Chapter 2 Infrastructure and service, Part 4 Service provider obligations, Division 2 Audit reports and reviews, Clauses 108 to 109 of the Act. • *Drinking Water Quality Management Plan Review and Audit Guideline* (DEWS 2013) • *ISO 19011:2011 - Guidelines for auditing management systems* (the generic auditing Guideline).

Scope:	• Audit type: 'Standard regular' audit of the DWQMP.
	• Criteria:
	  ○ Relevant clauses of the Act, associated DEWS regulations and guidelines and any relevant notices provided to Council by DEWS.
	  ○ Relevant components of the Australian Drinking Water Guidelines (ADWG).
	  ○ Follow up of recommendations from previous audits.
	• Sites: The audit will sample randomly selected sites to be agreed with Council.
	• Records: The audit will sample randomly selected records to be agreed with Council.
	• Services: Drinking water.
	• Audit period: From the date the plan was approved, as per the approval notice.

Item	Details
Contacts:	Dan Deere: • Tel: 0409 28 3737; Email: dan@waterfutures.net.au.
Deliverables and timing:	• May 2016: Quote to Council for review. • June 2016: Selection of sites and records to review and finalisation of audit agenda. • June 2016: Supply of background data and information to the auditor. • 15 to 17 June 2016 June: Site audit. • June 2016: Working draft audit report to Peter Zemek for quality review. • June 2016: Draft audit report to Council for review. • June 2016: Final audit report to Council for supply to DEWS.

Personnel:	• Principal interviewees: Janice Wilson, Adele Swanton and Stuart Boyd
	• Auditor: Dan Deere.
	  ○ Exemplar Global Lead/Principal Auditor and Skill Examiner (ID 022400) for Drinking Water Quality Management Systems; Recycled Water Quality Management Systems; and Food Safety (HACCP/ISO 22000).
	  ○ NSW IPART Water Licensing and Technical Services Panel Lead Auditor for: Drinking water quality; Recycled water quality; Sewage management; Sustainability assessment; Environmental management; Licence and regulatory compliance; and Retail supply.
	  ○ SA *Safe Drinking Water Act 2011* (SA) Level 1 Drinking Water Auditor #AWQ003.
	  ○ *Safe Drinking Water Act 2003* (Vic) Auditor for Vic Department of Health and Human Services.
	  ○ *Public Health Act 1997* (Tas) Auditor for Tas Department for Health and Human Services.
	  ○ WSAA Utility Benchmarking Auditor for Aquality and Requality.
	  ○ NATA Assessor for Laboratory and Testing Facilities (AIN 18697).
	  ○ Member, NHMRC Water Quality Advisory Committee.
	  ○ Member, Water Services Association of Australia (WSAA) Health-based Treatment Targets Working Group.
	  ○ Seqwater Water Security Program Independent Review Panel Member.
	  ○ WSAA Health Based Targets Working Group Member.
	  ○ NATA *Cryptosporidium* and *Giardia* Proficiency Testing Program Technical Group Member.
	  ○ NATA Biological Accreditation Advisory Committee Member.
	  ○ NSW Health *Cryptosporidium* and *Giardia* Testing Independent Expert Panel Member.
	  ○ NSW Decentralised Systems Working Group Member.
	• Quality assurance auditor and audit director: Peter Zemek RPEQ

3. Audit Timetable

3.1. Day 1. Wednesday 15 June 2016

Time	Audit topic	Location	Audit questions and actions
09:00	Introduction and welcome	Nebo Rd WTP	Clarify the audit period Finalise the audit agenda
09:30	Changes and updates	Nebo Rd WTP	What has changed since the DWQMP was approved by DEWS? These changes may include personnel, procedures, documents, records, responsibilities, environment, infrastructure, regulations, legislation, guidelines or organisational structure and contractors. How has the risk assessment and DWQMP been updated to reflect those changes? How are improvement needs identified and how are improvements made and managed? How have such changes been reported to DEWS?
10:30	Morning break		Transfer to Laboratory
11:00	Verification monitoring	MRC Laboratory at Nebo Rd WTP	How does MRC ensure compliance between the DWQMP and the verification monitoring program? How does MRC ensure the reliability of monitoring results? Consider sampling site selection, sampling, transport of samples, analysis, quality assurance and control, reporting and communication. Audit some records of a sample of results through from sample receipt to reporting. How have such monitoring results been reported to DEWS?
11:45	Operational monitoring	Nebo Rd WTP	How does MRC ensure compliance between the DWQMP and the SCADA systems? How does MRC ensure the reliability of monitoring results? Consider analyser sample line site selection, verification and calibration, reporting and communication. Audit some records of a sample of results from the SCADA systems through to reporting. How have such monitoring results been reported to DEWS?
12:30	Lunch		
13:30	WTP audit #1	Nebo Rd WTP	How does the infrastructure in the field compare to the DWQMP description? Field inspect random samples from the catchment, reservoir, bore, treatment and network for the selected system and compare to the DWQMP description. How are assets maintained in a secure, functional and readily operable state in order to protect water quality outcomes? What are the operational monitoring instruments reading during the audit, how does that compare to the DWQMP, and how are the instruments and SCADA outputs routinely verified and calibrated? What are the SCADA system process control set points during the audit, how do they compare to the DWQMP, and how are they modified and controlled? How are chemicals, standards and reagents stored and maintained to ensure their quality and efficacy? Consider both treatment chemicals that are added to the water and laboratory chemicals used for monitoring purposes. How are records retained and reported as they relate to water quality operational monitoring? Who is responsible for operating the system and what are their credentials with respect to training, experience and qualifications?
15:00	Afternoon break		
15:30	Incident management	Nebo Rd WTP	How does MRC maintain readiness to response to water quality incidents? Consider detection and communication of incident triggers, duty arrangements, incident management facilities and documents. Have there been any examples of incidents during the audit period? How have incidents been reported to DEWS?
17:00	Close of day 1		

3.2. Day 2. Thursday 16 June 2016

Time	Audit topic	Location	Audit questions and actions
Morning	WTP audit #2	Marian WTP	How does the infrastructure in the field compare to the DWQMP description? Field inspect random samples from the catchment, reservoir, bore, treatment and network for the selected system and compare to the DWQMP description. How are assets maintained in a secure, functional and readily operable state in order to protect water quality outcomes? What are the operational monitoring instruments reading during the audit, how does that compare to the DWQMP, and how are the instruments and SCADA outputs routinely verified and calibrated? What are the SCADA system process control set points during the audit, how do they compare to the DWQMP, and how are they modified and controlled? How are chemicals, standards and reagents stored and maintained to ensure their quality and efficacy? Consider both treatment chemicals that are added to the water and laboratory chemicals used for monitoring purposes. How are records retained and reported as they relate to water quality operational monitoring? Who is responsible for operating the system and what are their credentials with respect to training, experience and qualifications?
Afternoon	WTP audit #3	Finch Hatton WTP	How does the infrastructure in the field compare to the DWQMP description? Field inspect random samples from the catchment, reservoir, bore, treatment and network for the selected system and compare to the DWQMP description. How are assets maintained in a secure, functional and readily operable state in order to protect water quality outcomes? What are the operational monitoring instruments reading during the audit, how does that compare to the DWQMP, and how are the instruments and SCADA outputs routinely verified and calibrated? What are the SCADA system process control set points during the audit, how do they compare to the DWQMP, and how are they modified and controlled? How are chemicals, standards and reagents stored and maintained to ensure their quality and efficacy? Consider both treatment chemicals that are added to the water and laboratory chemicals used for monitoring purposes. How are records retained and reported as they relate to water quality operational monitoring? Who is responsible for operating the system and what are their credentials with respect to training, experience and qualifications?

3.3. Day 3. Friday 17 June 2016

Time	Audit topic	Location	Audit questions and actions
Morning	Site audit #4	Maintenance depot and maintenance works site	How are materials that may come into contact with water (e.g. pipes and jointing compounds) sourced, stored and quality assured? How is sewage to potable water cross-contamination mitigated? How is suspected contamination of compromised mains identified and mitigated?
14:00	Write up	Nebo Rd WTP	
15:00	Closing meeting	Nebo Rd WTP	Summary of findings Addressing any minor remaining items, if required
16:00	Close of audit	Nebo Rd WTP	

4. Audit Report

4.1. *Verify accuracy of monitoring and performance data*

4.1.1. Verification monitoring

Evidence (records viewed and infrastructure or scheme components sighted)

GoogleEarth view of analytical sample points.

Worksheet summarising sample points per system and number of sample required per period.

Inspection of the MRC laboratory facilities (including the main laboratory and microbiology laboratory).

MRC potable water sample number record books (covering the full audit period).

Labelled sample containers within the MRC laboratory for samples collected 14 June 2016.

MonitorPro database (undated: living system).

MRC *LIMS* database including the Analytical Batch module (undated: living system).

Daily results export worksheets generated by LIMS for transferring data into the MonitorPro data analysis tool (for the period 13 June 2016 and several weeks prior to that, generated at just after 17:00 daily).

Current NATA accreditation status for the MRC microbiology and chemistry laboratories (Accreditation Number 17048; www.nata.com.au/nata/scopeinfo/?key=18626 and www.nata.com.au/nata/scopeinfo/?key=18604).

Example of potable water signed NATA accredited test certificate for sample "PW 9317" from 10 May 2016 sample, reported 14 June 2016, Analytical Report for Mirani Reticulation.

MRC Drinking Water Monitoring Program worksheet (updated: living document)

Annual Report to DEWS for the 2014/15 period (pdf file).

Instrument-mounted laminated copies of the MRC *ADWG Health Based Values and Actions to be Taken for Potable Water* posted at the MRC laboratory.

Wall-mounted laminated copy of the MRC *Drinking Water Quality Incident Reporting Process* flow diagram dated February 2010.

Email alert from MonitorPro for Ball Bay/Halliday Bay Reservoir for exceedance from sample taken on 30 March 2016.

A completed *Notice of Noncompliance with Water Quality Criteria – Drinking Water* standard form notification to DEWS, dated 31 March 2016, 2:40 pm, signed by Stuart Boyd, reported to Atual Panchi showing the Ball Bay/Halliday Bay Reservoir *E. coli* exceedance as sampled 30 March 2016.

Incident Register workbook showing the Ball Bay/Halliday Bay Reservoir exceedance.

Summary of what was being audited and what was observed

Most of the results routinely reported to DEWS have been through the MRC NATA-accredited process. The remainder have been through reasonably equivalent internal processes. The NATA accreditation process covers field testing by samplers (e.g. pH, turbidity and chlorine),

field filtration of samples, metals testing by ICP-OES and indicator bacteria (including total coliforms and *E. coli* by both MNP and CFU methods). The NATA accreditation process is yet to cover sampling processes, agricultural chemicals, semi-volatile organic carbon, algae, pathogens or molecular biology, but these areas are being slowly considered for future accreditation.

Sample points are shown on GoogleEarth and are maintained in sufficient number through consideration of population numbers per water supply system. A number of sample points have recently been added to provide coverage of new developments. The sample number and location of sample points appears sensible.

Water samples are collected by MRC staff and the majority of analyses occur within the MRC laboratory. As such, MRC has a high level of control over the quality, reliability and consistency of verification monitoring.

MRC uses a potable water sample number record book to assign unique sequential numerical identities to each sample. The current and previous record books were inspected (covering the full audit period) to verify that the process was working. Sample labels are printed out in a sequential manner using these numbers as entered into a worksheet, the labels are then attached to sample containers. Sample numbers were sighted on sample containers in the laboratory (dated 14 June 2016). The process appears to be simple and effective albeit with a manual record being required for the sample numbering in the sample number record book.

Following analysis, data is entered from analysed samples either manually or using automated analysers, depending on the assay type. The data is entered or uploaded into LIMS. The LIMS unique identification number is cross-referenced to the sample number. An example was sighted of *E. coli* data generated using assays reporting as MPN and CFU for the full audit period for an example sample site. Using its Analytical Batch module, data entered into LIMS is entered is shown only as having been entered until approved. Following supervisory oversight the entered data is updated to having been approved. The Quality Manual for the MRC laboratory describes this process which is part of the NATA accreditation requirements. This same level of rigour is required for MRC"s third party work for other councils, such as Isaac and Whitsundays, as well as the Port Authority.

The LIMS data is then fed to MonitorPro on a daily basis via a worksheet. Examples were sighted of these daily results export worksheets generated by LIMS for transferring data into the MonitorPro data analysis tool (for the period 13 June 2016 and several weeks prior to that, generated at just after 17:00 daily). The process appears to be functional and reliable.

The MonitorPro system can be used to query data by showing samples on GoogleEarth and by selecting sample sites and reviewing data trends and results. An example was sighted for the Aspley Way sample site that was selected in GoogleEarth and for which historical data was then tabulated. In addition MonitorPro generates regular emails of both exceedances and other unusual or outlying results.

The MRC *ADWG Health Based Values and Actions to be Taken for Potable Water* was seen posted at the MRC laboratory and is laminated and located on analytical instruments. The versions posted are coloured to highlight the most relevant values. The values shown are sensible and appropriate. This provides good evidence of MRC awareness of the communication requirements of the exceedance values of concern and interest to DEWS and Qld Health.

The MRC *Drinking Water Quality Incident Reporting Process* flow diagram document dated February 2010 was seen laminated and posted at the MRC laboratory as well as at the Nebo

Rd Treatment Plant. The process flow directly highlights when (both the circumstances and timeframe) and how (contact email and phone details) DEWS should be notified. This provides good evidence of MRC awareness of the exceedance reporting process to DEWS.

The MRC Drinking Water Monitoring Program worksheet summarises all verification monitoring and is very comprehensive. The worksheet covers the weekly, monthly quarterly and annual testing for a wide range of parameters.

The Marian reticulation system was audited within MonitorPro to check results against the requirements. Data goes back before July 2012. Weekly samples were sighted for *E. coli* within the database that was displayed within MonitorPro.

The Annual Report summary was randomly checked against Monitor Pro for 2014/15. In general, there was good evidence that the report accurately summarised the data as captured within Monitor Pro. An exception was noted for the Gargett reticulation system for As for which there appeared to be a mismatch between the sample number in the Annual Report and the Monitor Pro record. This discrepancy appears to have been an isolated misallocation of sample sites within LIMS that has since been resolved.

In addition to the manual alert system, the MonitorPro 'Compliance Grid' has been set up to alert staff to results that are exceedances. This includes both breaches of CCP limits and ADWG health and aesthetic values. An example was sighted of an *E. coli* exceedance (8 per 100 ml) at the Ball Bay/Halliday Bay Reservoir from a sample collected 30 March 2016. This exceedance was followed up. The relevant completed *Notice of Noncompliance with Water Quality Criteria – Drinking Water* standard form notification to DEWS, dated 31 March 2016, 2:40 pm, was sighted, signed by Stuart Boyd, reported to Atual Panchi. This provides good evidence of MRC of the exceedance values of concern and interest to DEWS and Qld Health.

4.1.2. Operational monitoring

Evidence (records viewed and infrastructure or scheme components sighted)

MRC Drinking Water Monitoring Program worksheet (living document)

Field inspection of:

- Parts of the Pioneer River and Cattle Creek catchments.
- MRC water laboratory.
- Nebo Rd WTP.
- Marian WTP.
- Finch Hatton WTP.
- Finch Hatton bore.
- Finch Hatton water sampling point.
- Paget stores.
- Paget vehicle wash down.
- Treated water storage.
- Maintenance vehicle.
- Leaking service repair at Ginger St.

Summary of what was being audited and what was observed

The MRC Drinking Water Monitoring Program worksheet covers both MRC laboratory testing (e.g. for raw water) as well as on site benchtop/field and on line monitoring that takes place and is very comprehensive. The program was up to date. For instance, the entries for the new Marian WTP were assessed and the document had been updated to cover on line critical limit monitoring, on site operator benchtop/field checks of that monitoring and recent updates such as a LiquidID analyser.

Operational monitoring was checked at Nebo Rd, Marian and Finch Hatton WTPs. The processes were found to be running effectively with the readings sighted on SCADA systems being consistent with good water quality and treatment performance. The SCADA system was running fast and effectively was readily able to be interrogated to view both current and historical data as well as process limits. MRC is looking to move to ClearSCADA as a next imitative. Smart metering had been rolled out (Figure 19), possibly more effectively than by any other Australian utility, and this is helping to indirectly improve water quality by helping optimise hydraulic water age and detect unusual water usage patterns consistent with leaks or low pressure events.

Operational monitoring instruments are subjected to cross-checking between multiple independent measurements: on line instruments within the WTP and network, benchtop and handheld instruments utilised by WTP staff, benchtop, handheld and laboratory instruments used by the MRC laboratory and some third party contractor instruments. For instance, on line instruments often operate in series, e.g. pre- and post clear water tank chlorine, or individual and combined filter effluent turbidity. On line instruments are checked regularly by WTP operators against benchtop instruments. The MRC laboratory undertakes both field and laboratory tests and runs a proficiency testing scheme for some parameters, such as fluoride, to help identify outlying results. Finally, Hach and Evoqua have been utilised to conduct third party instrument checks, cleans and calibrations at intervals.

4.2. Implementation of the DWQMP

4.2.1. The provisions and conditions in the approval notice

Evidence (records viewed and infrastructure or scheme components sighted)

DEWS *Drinking water quality management plan application for approval - Information notice of the decision* letter to MRC dated 9 July 2012

DEWS *Drinking water quality management plan amendment application - Information Notice for the decision* letter to MRC 8 December 2014.

Summary of what was being audited and what was observed

MRC appears to have complied with its obligations under the approval notice. The updated, reviewed DWQMP was supplied to DEWS as required during 2014 and was approved. In addition an audit (as reported in this document) took place before end June 2016. Therefore, it is concluded that MRC has complied with the provisions and conditions in the approval notice.

4.2.2. Implementation of all preventive measures for managing hazards and hazardous events as described in the plan

Evidence (records viewed and infrastructure or scheme components sighted)

Field inspection of:

- Parts of the Pioneer River and Cattle Creek catchments.
- MRC water laboratory.
- Nebo Rd WTP.
- Marian WTP.
- Finch Hatton WTP.
- Finch Hatton bore.
- Finch Hatton water sampling point.
- Paget stores.
- Paget vehicle wash down.
- Treated water storage.
- Maintenance vehicle.
- Leaking service repair at Ginger St.

Summary of what was being audited and what was observed

With respect to risks, the catchment is heavily farmed, primarily for cane farming, but also some cattle farming. There are no significant buffers to protect drainage depressions and stormwater infrastructure that drains to the river. Whilst this is far from ideal as a water catchment these risks were recognised in the DWQMP.

The Nebo Rd WTP was inspected to look for evidence of implementation of preventive measures, as follows:

- The plant held stores of ACH to help provide reliable coagulation across a range of pH values, caustic to help balance pH, KMnO4 to help control Mn, PAC to help control algal toxins, geosmin, MIB, organics and pesticides and herbicides.
- Operators can detect dirty water arising after storm events based on on-line monitoring devices in the raw water. To a limited extent and for short periods operators can choose to avoid surface water. In addition, two viable water supplies can be sourced to the Nebo Rd WTP including the river water as the usual source and the borefield that can supply bore water post storm event permitting the flow of the river water source that has to be treated to be reduced in flow rate. These only provide temporary and short-tern or partial solutions. The water supplied by SunWater is not provided with any kind of quality guarantee and whilst it comes from a high quality upstream dam source, the surface water supplying the Nebo Rd WTP is fed through approximately 60 km of agricultural river catchment. Therefore, Mackay remains somewhat vulnerable should the river water become heavily compromised for periods of days or more.
- Chemical fill points were clearly labeled and retained within a secured site (Figure 3). The fill points were separate from one another and distinct so no reasonable person

could become confused as to what chemical was required to be filled at what point. This indicates good control of risks to final water quality associated with the wrong chemical being dosed at a particular point. In addition, all chemical deliveries are met on site.

- It was noted that Qld Health conducted a site audit of the fluoridation facilities at Nebo Rd WTP during May 2016. Therefore, the fluoridation plant was not audited in detail during this audit.

The Marian WTP was inspected to look for evidence of implementation of preventive measures, as follows:

- The plant held stores of ACH and polymers to help provide reliable coagulation across a range of pH values, caustic to help balance pH, KMnO4 to help control Mn, PAC to help control algal toxins, geosmin, MIB, organics and pesticides and herbicides.
- Operators can detect dirty water arising after storm events based on on-line monitoring devices in the raw water. To a limited extent and for short periods operators can choose to avoid raw water.
- Chemical fill points were clearly labeled and retained within a secured site (Figure 4). The fill points were separate from one another and distinct so no reasonable person could become confused as to what chemical was required to be filled at what point. This indicates good control of risks to final water quality associated with the wrong chemical being dosed at a particular point. In addition, all chemical deliveries are met on site.

The Finch Hatton WTP was inspected to look for evidence of implementation of preventive measures, as follows:

- The main water supply bore for Finch Hatton appeared to be securely fenced and secure to direct surface water ingress, even in conditions of flood. The juxtaposition of the bore and showground was noted. The showground may attract significant animal manure or agricultural and vehicular chemicals to the site as well as human activity. A toilet block and septic tanks were within 20 m of the bore. MRC needs to keep a careful watching brief on the potential for contamination of the bore, e.g. by ensuring bore casing integrity and pushing for good management and notification of potential pollution sources very close to the bore. An OFI was raised as follows: Given that absence of a treatment barrier to protozoan pathogens at Finch Hatton, a more formalised and rigorous 'CCP-like' approach to protecting the catchment and bore is warranted, noting in particular the juxtaposition of the showground and its associated on site sewage management systems.
- The river water supply source to Finch Hatton was found to be unfit for the purpose of potable water supply in this context since the chlorine-only treatment wouldn't handle some potential hazards from the Cattle Creek. However, the river pumps have not been operated to date and are not intended to be operated under the current treatment arrangements. Source water from Cattle Creek has never been utilised. Therefore, no finding was made in relation to this observation.
- The Finch Hatton WTP was a well set up duty/standby sodium hypochlorite dosing system with telemetered automated process controls. The sodium hypochlorite is directly topped up by the operators and no other chemicals are present on site.

The Paget Depot was inspected to look for evidence of implementation of preventive measures, as follows:

- The stores were found to be very well set up. The physical arrangement of the stores means that most parts are stored indoors on racks with careful inventory management to provide sufficient stock without excessive asset aging.
- Parts were stored off the ground and most under cover. The parts sighted during the audit met relevant Australian standards and appeared to be fit for purpose in relation to materials being in contact with drinking water.
- The main disinfectant used for network operations was sodium hypochlorite, which was found in the stores in good condition. This is an effective disinfectant and is a better alternative to some other so-called disinfectants that are sometimes used by some utilities but that are not very effective in field situations.
- There was good evidence of predominant and systematic separation of sewer tools, equipment and vehicles from those used for potable water work. Some sewer tools were marked in purple to help avoid confusion. In addition, for plant and equipment used for a range of works, e.g. heavy vehicles, there is an excellent wash down bay to clean equipment between works (Figure 13).
- Field staff interviewed were well aware of cross-contamination risks as well as risks associated with organic ingress through PE pipes. The staff appeared to demonstrate an appropriate attitude and understanding and were full cooperative with the audit despite not having any more than minimal notice. This provided evidence that MRC maintains a good level of water quality management practice as an inherent cultural norm within the organisation.
- The network maintenance vehicle inspected was found to be well set up and well maintained (Figure 14). Parts and equipment were stored in a clean condition unfit parts were not observed.

Field works inspected at Ginger St were carried out in a clean manner (Figure 15). The leaky service inspected was dug out and the trench evacuated of water to leave the cut ends of the pipe freely suspended in the air and not in contact with any dirt. The new parts were of appropriate quality and material (Figure 16). The cut ends were cleaned before being fitted to the new parts. The extent of the shut off was minimised. A flushing point was opened before the system was restored to service to capture a first flush and flushing took place sufficient to clean out the new works.

All water storage tanks inspected were of a good solid design and were well maintained in vermin-proof conditions with respect both to the vents (Figure 11) and hatches and roof (Figure 12) and with secure compounds, ladder shroud covers and hatch locks.

4.2.3. Implementation of operational and maintenance procedures

Evidence (records viewed and infrastructure or scheme components sighted)

Field inspection of:

- Parts of the Pioneer River and Cattle Creek catchments.
- MRC water laboratory.
- Nebo Rd WTP.

- Marian WTP.
- Finch Hatton WTP.
- Finch Hatton bore.
- Finch Hatton water sampling point.
- Paget stores.
- Paget vehicle wash down.
- Treated water storage.
- Maintenance vehicle.
- Leaking service repair at Ginger St.

Summary of what was being audited and what was observed

The WTPs were inspected to look for evidence of implementation of operational and maintenance procedures, with observations being made as follows:

- User-friendly procedures were seen on site to help guide operators in carrying out common tasks such as instrument calibration and jar tests. The procedures were well presented and referenced in a folder on site.
- The jar testing equipment was found on site and appeared to be functional. Evidence was given of the jar testing procedure and process used at the site.

4.2.4. Implementation of the process for managing incidents and emergencies as described in the plan

Evidence (records viewed and infrastructure or scheme components sighted)

Instrument-mounted laminated copies of the MRC *ADWG Health Based Values and Actions to be Taken for Potable Water* posted at the MRC laboratory.

Wall-mounted laminated copy of the MRC *Drinking Water Quality Incident Reporting Process* flow diagram dated February 2010.

Email alert from MonitorPro for Ball Bay/Halliday Bay Reservoir for exceedance from sample taken on 30 March 2016.

A completed *Notice of Noncompliance with Water Quality Criteria – Drinking Water* standard form notification to DEWS, dated 31 March 2016, 2:40 pm, signed by Stuart Boyd, reported to Atual Panchi showing the Ball Bay/Halliday Bay Reservoir *E. coli* exceedance as sampled 30 March 2016.

Incident Register workbook showing the Ball Bay/Halliday Bay Reservoir exceedance.

Summary of what was being audited and what was observed

Should an incident arise and reach significant levels the Council triggers its Emergency Response Room and can make use of its Business Continuity Plans. The lead agency for public health alerts, e.g. boil water or algal toxin advisories, is Qld Health, and as such MRC does not have draft or template advisories in place.

The MRC *ADWG Health Based Values and Actions to be Taken for Potable Water* was seen posted at the MRC laboratory and is laminated and located on analytical instruments. The versions posted are coloured to highlight the most relevant values. The values shown are

sensible and appropriate. This provides good evidence of MRC awareness of the communication requirements of the exceedance values of concern and interest to DEWS and Qld Health.

The MRC *Drinking Water Quality Incident Reporting Process* flow diagram document dated February 2010 was seen laminated and posted at the MRC laboratory. The process flow directly highlights when (both the circumstances and timeframe) and how (contact email and phone details) DEWS should be notified. This provides good evidence of MRC awareness of the exceedance reporting process to DEWS.

In addition to the manual alert system, the MonitorPro 'Compliance Grid' has been set up to alert staff to results that are exceedances. An example was sighted of an *E. coli* exceedance (8 per 100 ml) at the Ball Bay/Halliday Bay Reservoir from a sample collected 30 March 2016. This exceedance was followed up. The relevant completed *Notice of Noncompliance with Water Quality Criteria – Drinking Water* standard form notification to DEWS, dated 31 March 2016, 2:40 pm, was sighted, signed by Stuart Boyd, reported to Atual Panchi. This provides good evidence of MRC of the exceedance values of concern and interest to DEWS and Qld Health.

4.2.5. Implementation of the operational and verification monitoring programs as described in the plan

Evidence (records viewed and infrastructure or scheme components sighted)

Field inspection of:

- Parts of the Pioneer River and Cattle Creek catchments.
- MRC water laboratory.
- Nebo Rd WTP.
- Marian WTP.
- Finch Hatton WTP.
- Finch Hatton bore.
- Finch Hatton water sampling point.
- Paget stores.
- Paget vehicle wash down.
- Treated water storage.
- Maintenance vehicle.
- Leaking service repair at Ginger St.

Summary of what was being audited and what was observed

MRC is proactively and continually improving its monitoring programs.

The Nebo Rd WTP was inspected to look for evidence of implementation of operational monitoring, as follows:

- The SCADA system was audited for functionality and to check the process limits coded into the system. The audit focused on the critical limit monitoring instruments. The audit revealed that the SCADA system was found to be functional with appropriate set

points and alarm limits encoded and very good process performance being achieved (Table 1 and Table 2).

- Operators conduct checks of critical limit parameters (e.g. turbidity, chlorine and fluoride) every two hours between 6 am and 10:30 pm. These checks are used to help detect deviations from good water quality. The checks are made using benchtop instruments in the main laboratory. These Hach instruments include a $2100Q_{IS}$ turbidimeter, a DR6000 colourimeter for chlorine, fluoride and metals analysis and a pH meter. Examples of these checks were sighted during the audit and use of the benchtop turbidimeter was demonstrated by the operator. On site records showed good performance from these tests, both in hard copy and transposed electronic format.
- The MRC laboratory conducts independent checks of water treatment plant performance weekly by testing parameters such as fluoride, chlorine, pH and turbidity. The site includes individual filter effluent sight chambers that revealed very clear water quality (Figure 1).
- It was noted that the process for comparing benchtop to on line readings, comparing MRC laboratory and operator readings, and for checking, cleaning, maintaining and calibrating instruments, appeared to be working well, albeit informally. The processes were not formalised. Benchtop instruments and reagents are stored and utilised in appropriate temperature and lighting conditions within the MRC laboratory. The DPD reagent used for chlorine analysis was well within its use by date (dated to April 2020). In addition, the pH 10 standard was a long way from expiry (March 2018). However, the pH 4 and 7 standards were expired (opened 11 March 2013 and 9 June 2015, respectively, but with a nominated 9 month shelf life following opening and 12 months following manufacture). As an OFI: there may be room to improve the formalisation of some of the cross-checking verification, calibration and maintenance tasks relating to the critical limit monitoring instruments, possibly in liaison with the experts from the MRC laboratory. This may include considering shelf lives for reagents and the setting and formalising of limits.
- It was noted that Qld Health conducted a site audit of the fluoridation facilities at Nebo Rd WTP during May 2016. Therefore, the fluoridation plant was not audited in detail during this audit.

The Marian WTP was inspected to look for evidence of implementation of operational monitoring, as follows:

- The Marian WTP is very new and is in an excellent state of apparent repair. A well set up wet rack houses the critical limit monitoring instruments in one place (Figure 2) along with the benchtop instruments, jar testing equipment, reagents and procedures. The room is climate controlled and reagents are stored neatly and out of direct sunlight or in cupboards and fridges. This juxtaposition of instruments and procedures is very conducive to good operational monitoring and management.
- The plant includes extensive operational on line process monitoring, including on line turbidity in raw, clarified, individual filter, combined filter and post clear water storage water. The site is well labelled (Figure 5) and well set up although some labels are starting to fade and will need to be updated in due course. In addition, whilst the site has excellent access to most areas, some of the clarifiers are hard to access (Figure 6).

- The SCADA system was audited for functionality and to check the process limits coded into the system. The audit focused on the critical limit monitoring instruments. The audit revealed that the SCADA system was found to be functional with appropriate set points and alarm limits encoded and very good process performance being achieved (Table 3 and Table 4).
- Operators conduct checks of critical limit parameters (e.g. turbidity, chlorine and fluoride) every day. Additional checks for water quality parameters, e.g. Mn, Fe and Al, are conducted at least weekly. These checks are used to help detect deviations from good water quality. The checks are made using benchtop instruments in the main laboratory. These Hach instruments include a 2100Q turbidimeter, a DR6000 colourimeter for chlorine, fluoride, UV transmissivity and metals analysis, a HQ40d pH electrode and a HQ430d fluoride electrode. Examples of these checks were sighted during the audit. On site records showed good performance from these tests.
- The MRC laboratory conducts independent checks of water treatment plant performance weekly by testing parameters such as fluoride, chlorine, pH and turbidity.
- The process for comparing benchtop to on line readings, comparing MRC laboratory and operator readings, and for checking, cleaning, maintaining and calibrating instruments, appeared to be working well. Daily cross-checks between the on line and benchtop instruments are made and monthly calibration activities take place for the benchtop instruments (Figure 17). The only possible weakness was, as noted for the Nebo Rd WTP, that the tolerances between critical limit monitoring instruments and benchtop comparisons aren't formally agreed.
- Benchtop instruments and reagents are stored and utilised in appropriate temperature and lighting conditions within the WTP laboratory under climate controlled conditions. The expiry of the DPD was January 2020. The fluoride standards were recently prepared by the MRC laboratory for 0.5, 1 and 2 mg/L and were dated as being prepared 3 June 2016.
- As an OFI: There may be room to improve the accessibility of the flanking clarifiers at Marian WTP to help with routine cleaning, maintenance and inspection tasks to match the excellent accessibility provided for the central clarifiers.

The Finch Hatton WTP was inspected to look for evidence of implementation of operational monitoring, as follows:

- The Finch Hatton WTP is attended daily to ensure that is operating and to take chlorine readings to cross-check against on line readings using a hand held benchtop portable colourimeter and DPD chemistry. The site is serviced with pH being checked weekly. The site is actively managed, and telemetry actively oversighted, from the Marian WTP. Good records are retained by staff of these diligent checks despite the small size of the facility (Figure 18).
- The plant includes operational on line process monitoring for chlorine and pH which during the audit read appropriately at 1.33 mg/L and 7.18, respectively.
- The site is air conditioned to help promote good and reliable water quality readings and to reduce the rate of degradation of the sodium hypochlorite, which is an excellent initiative.
- The sodium hypochlorite store holds up to approximately 200 L of liquid and needs to be kept reasonably full to provide security of supply. With a draw down rate of a few L

per day and a starting strength of up to 12.5%, it is possible that chlorate levels will become excessive. Whilst there is no current standard or guideline for chlorate in Australia, there are precedents in Qld (for Western Corridor) and globally (WHO Guidelines for Drinking-water Quality), and it is likely that a chlorate guideline value of between 0.3 and 0.8 mg/L will eventuate within the ADWG and/or Qld PHR over the next five years. Therefore, MRC should get across this and consider its implications.

With respect to verification monitoring and some additional operational monitoring, a systematic program is in place to schedule and manage water quality testing. The broader details and design of the program were described above.

The use of the in-house laboratory has proved very valuable to MRC in providing a rapid turnaround as well as conscientious work by MRC laboratory staff. The MRC laboratory staff are very conveniently located alongside the treatment plant staff. This juxtaposition is inherently conducive to value adding. There is good evidence that the MRC laboratory staff work hard to ensure that results are within informative dynamic ranges of assays and provide value adding benefits such as interpreting results and introducing new methods. In addition, MRC laboratory staff are using their analytical and scientific expertise to help improve the analytical aspects of operational monitoring conducted by MRC operational staff.

The MRC laboratory is continually improving its services to Council. For instance, the range of services offered by the laboratory is being expanded. At the higher end, the MRC lab now caries out organics testing (for pesticides and SVOCs) and there is a LiquidID on line testing unit in the raw water that has been placed in the past at Dumbleton Weir and is currently at Marian Weir. In addition the lab is looking to set up chlorate and algae testing.

It was noted that the laboratory is quite crowded within its current space. Given the value provided by the laboratory, and the core role of the laboratory in water quality monitoring, there would be a good case to expand the allocation of space and quality of facilities available for the MRC laboratory, particular noting its potential as a regional centre. As an OFI: It was noted that MRC is very well-served by the laboratory, as are surrounding councils. However, as technologies and demands on the laboratory there may be a need to expand the space provided for the well-run accredited facility in order to fully realise its value.

Table 1. Critical limit on line monitoring instrument and SCADA "real time" check for Nebo Rd WTP.

Instrument	On line	Time read	SCADA	Time read	Early warning limit in SCADA	Alarm delay	Outlying alarm limit in SCADA	Alarm delay	Alarm limit in DWQMP	Critical limit in DWQMP	Finding
Individual filter effluent turbidity for Filter Number 11 (NTU)	0.055	15:20	0.022	14:40	> 0.3	100 s	> 0.4	100 s	> 0.3 for 15 min	> 1 for 5 min	Compliant
Dosed water chlorine (mg/L)	1.31	15:10	1.28	14:50	0.8 to 1.9	30 s	0.6 to 2.0	30 s	0.6 to 2	0.5 to 5	Compliant
Dosed water pH (pH units)	7.32	15:10	7.31	14:50	4.6 to 8.2	15 s	4.3 to 8.5	15 s	N/A	N/A	Compliant

Table 2. Critical limit operational monitoring historical record check for selected sample period within the audit period for Nebo Rd WTP.

Parameter	Date period	Minimum	Maximum	Deviation(s) outside of target or critical limits	Corrective action(s) recorded in response to deviations	Finding
Individual filter effluent turbidity for Filter Number 11 (NTU)	7 to 14 June 2016	0.016	0.087	No deviations outside of target or critical limits	Not required	Compliant
Dosed water chlorine (mg/L)	7 to 14 June 2016	1.08	1.40	No deviations outside of target or critical limits	Not required	Compliant
Dosed water fluoride (mg/L)	7 to 14 June 2016	0.46	0.64	Short drop below lower target limit but remaining within upper target limit and critical range	Possible concerns raised relating to the screw feeder that are being reviewed	Compliant

Table 3. Critical limit on line monitoring instrument and SCADA "real time" check for Marian WTP.

Instrument	On line	Time read	SCADA	Time read	Early warning limit in SCADA	Alarm delay	Outlying alarm limit in SCADA	Alarm delay	Alarm limit in DWQMP	Critical limit in DWQMP	Finding
Individual filter effluent turbidity for Filter Number 2 (NTU)	0.012	10:25	0.0	11:35	> 0.3	N/R	> 0.3	15 min	> 0.3 for 15 min	> 1 for 5 min	Compliant
Pre clear water storage tank chlorine (mg/L)	1.78	10:25	1.8	11:35	0.8 to 3.0	N/R	0.5 to 4.95	N/R	1.3 to 2*	0.5 to 5*	Compliant
Fluoride (mg/L)	0.72	10:25	0.72	11:35	0.85	N/R	1	N/R	0.6 to 0.8	> 1.5	Compliant

*post clear water storage tank so not directly comparable with the parameter audited

Table 4. Critical limit operational monitoring historical record check for selected sample period within the audit period for Marian WTP.

Parameter	Date period	Observation	Deviation(s) outside of target or critical limits	Corrective action(s) recorded in response to deviations	Finding
Individual filter effluent turbidity for Filter Number 2 (NTU)	8 to 15 June 2016	< 0.1	Only very short (seconds) deviations outside of target or critical limits that represent artefactual rather than concerning results	Not required	Compliant
Pre clear water storage tank chlorine (mg/L)	8 to 15 June 2016	≈ 2	No deviations outside of target or critical limits and no results below 1 mg/L	Not required	Compliant
Post clear water storage tank chlorine (mg/L)	8 to 15 June 2016	1.8 to 2	No deviations outside of target or critical limits	Not required	Compliant

4.2.6. Implementation of the risk management improvement program as described in the plan

Evidence (records viewed and infrastructure or scheme components sighted)

Water and Wastewater Intranet system

MRC DWQMP Risk Management Improvement Plan (RMIP) worksheet.

Summary of what was being audited and what was observed

A major recent improvement includes the development of a *Water and Wastewater Intranet* system that is used to reference and provide access to critical control points, standard operating procedures, operational control points and operations and maintenance manuals.

The RMIP is maintained and reviewed and updated annually. Currently there are 170 actions listed of which 48 are completed. The RMIP has a cross-reference to specific risks from the risk register. Examples were seen of tasks 129 to 135 that were completed relating to the Rural Water Supply Upgrade Project.

It was noted that PAC is used quite extensively at MRC and that there is significant pesticide use in the catchment. Therefore, as an OFI: In the longer term it may be necessary to move to a more sophisticated organics removal system than powdered activated carbon dosing with ozone/biological activated carbon being the logical longer-term upgrade option for water from such a heavily farmed and organically rich catchment.

4.2.7. Maintaining records using the information management systems as described in the plan

Evidence (records viewed and infrastructure or scheme components sighted)

MRC intranet Water Services page

The 'Bruce' corporate documents intranet management system.

Summary of what was being audited and what was observed

The *Water Services Document Hierarchy* on the intranet links to the relevant documents. The system was tested and was readily able to show the approved DWQMP and associated appendices (June 2012) as well as each amendment that is retained on the same system.

Hyperlinks within the document link to within the DWQMP or to the intranet. The link to the disinfection and fluoride critical control points for the Marian WTP were tested and found to be functional.

Version history information is recorded within the document management system.

4.2.8. Undertaking regular reviews at the frequency specified in the approval notice.

Evidence (records viewed and infrastructure or scheme components sighted)

MRC *Drinking Water Quality Management Plan With Hazard Analysis & Critical Control Point Plan* Sixth Issue 14 June 2016 (DWQMP).

DEWS *Drinking water quality management plan application for approval - Information notice of the decision* letter to MRC dated 9 July 2012

DEWS *Drinking water quality management plan amendment application - Information Notice for the decision* letter to MRC 8 December 2014.

Summary of what was being audited and what was observed

The DWQMP has been regularly reviewed and updated since its first issue to DEWS on 28 March 2011 ("First Issue"). The document has been updated five times over the five years since 2011. The audit effort focused on checking the accuracy and currency of the DWQMP.

The key stakeholders are correctly summarized in the DWQMP (Table 3-1 of the DWQMP). A random sample of the most important emergency contact details were checked for currency and found to be current (DEWS and SunWater in relation to water supply and Coates Hire and Chaffey Power in relation generator supply). Therefore, it was concluded that MRC is keeping its critical stakeholder contact details up to date and accurate.

Recently updated process flow diagrams (PFDs) and supply scheme schematics were provided during the audit. A sample of these PFDs and schematics were checked during the site audits for currency against the assets as sighted, including for the main Nebo Road WTP as well as a new, remote WTP. The sighted assets were consistent with the PFDs and schematics. Therefore, it was concluded that MRC is keeping its PFDs and schematics up to date and accurate.

The changes that have occurred since the First Issue including the following:

- A new WTP has been commissioned at Marian WTP which has combined the Marian and Mirani systems. This was shown on the relevant scheme schematic and a new PFD was created.
- Two new chlorine booster stations were installed at Seaforth and Midge Point. These were shown in the relevant scheme schematics.
- New, repaired or replaced on line analysers have been added to several systems around the network. As a result many of the CCPs have changed following the addition of those new analysers. This was carried out as part of the Rural Water Supply Upgrade Project.
- A period contract has been set up with Evoqua to support various maintenance. The works are recorded in log books.

During 2014 a revised DWQMP was submitted to DEWS for approval as required under the approval notice. Specifically, an updated, reviewed DWQMP was supplied to DEWS as required during 2014 and was approved.

4.3. Assessment of relevance of the plan as it currently exists

4.3.1. Assessing whether the service description and details of infrastructure in the plan reflect the current circumstances for each scheme

Evidence (records viewed and infrastructure or scheme components sighted)

Field inspection of:

- Parts of the Pioneer River and Cattle Creek catchments.
- Nebo Rd WTP.

- Marian WTP.
- Finch Hatton WTP.
- Finch Hatton bore.
- Finch Hatton water sampling point.
- Paget stores.
- Paget vehicle wash down.
- Treated water storage.
- Maintenance vehicle.
- Leaking service repair at Ginger St.

Summary of what was being audited and what was observed

The DWQMP remains current with respect to the information used to describe and detail the infrastructure. The DWQMP hasn't needed to change much to reflect changing circumstances for each scheme. What has changed, e.g. the Marian WTP, has been reflected in the updated DWQMP. The updated DWQMP was to be submitted to DEWS as an amendment shortly.

4.3.2. Confirming the information in the plan used to identify hazards and hazardous events reflects the current circumstances for each scheme (including catchment characteristics, water quality information and infrastructure)

Evidence (records viewed and infrastructure or scheme components sighted)

Field inspection of:

- Parts of the Pioneer River and Cattle Creek catchments.
- Nebo Rd WTP.
- Marian WTP.
- Finch Hatton WTP.
- Finch Hatton bore.
- Finch Hatton water sampling point.
- Paget stores.
- Paget vehicle wash down.
- Treated water storage.
- Maintenance vehicle.
- Leaking service repair at Ginger St.

Summary of what was being audited and what was observed

The DWQMP remains current with respect to the information used to identify hazards and hazardous events. The DWQMP hasn't changed much to reflect changing circumstances for each scheme (including catchment characteristics, water quality information and infrastructure). What has changed, e.g. Marian WTP, has been reflected in the updates.

5. Photographic evidence summary

Figure 1. High quality water being produced at Nebo Road WTP.

Figure 2. Excellent wet rack at Marian WTP.

Figure 3. Clear chemical storage labelling at Nebo Road WTP.

Figure 4. Clear chemical storage labelling at Marian WTP.

Figure 5. Clear infrastructure labelling at Marian WTP.

Figure 6. Good but partial access at Marian WTP.

Figure 7. Good and secure bore and Finch Hatton.

Figure 8. Concerning juxtaposition of the bore and showground toilets at Finch Hatton.

Figure 9. Good duty/standby chlorine dosing at Finch Hatton WTP.

Figure 10. Good telemetered chlorine dosing control system at Finch Hatton WTP.

Figure 11. Good secure treated water storage tank at Rural View.

Figure 12. Good secure hatch on the water storage tank at Rural View.

Figure 13. Good wash down bay at the Paget Depot.

Figure 14. Well set up water-only maintenance vehicle.

Figure 15. Safely performed network repair works at Ginger Street, South Mackay.

Figure 16. Appropriate new parts in use for repair works at Ginger Street, South Mackay.

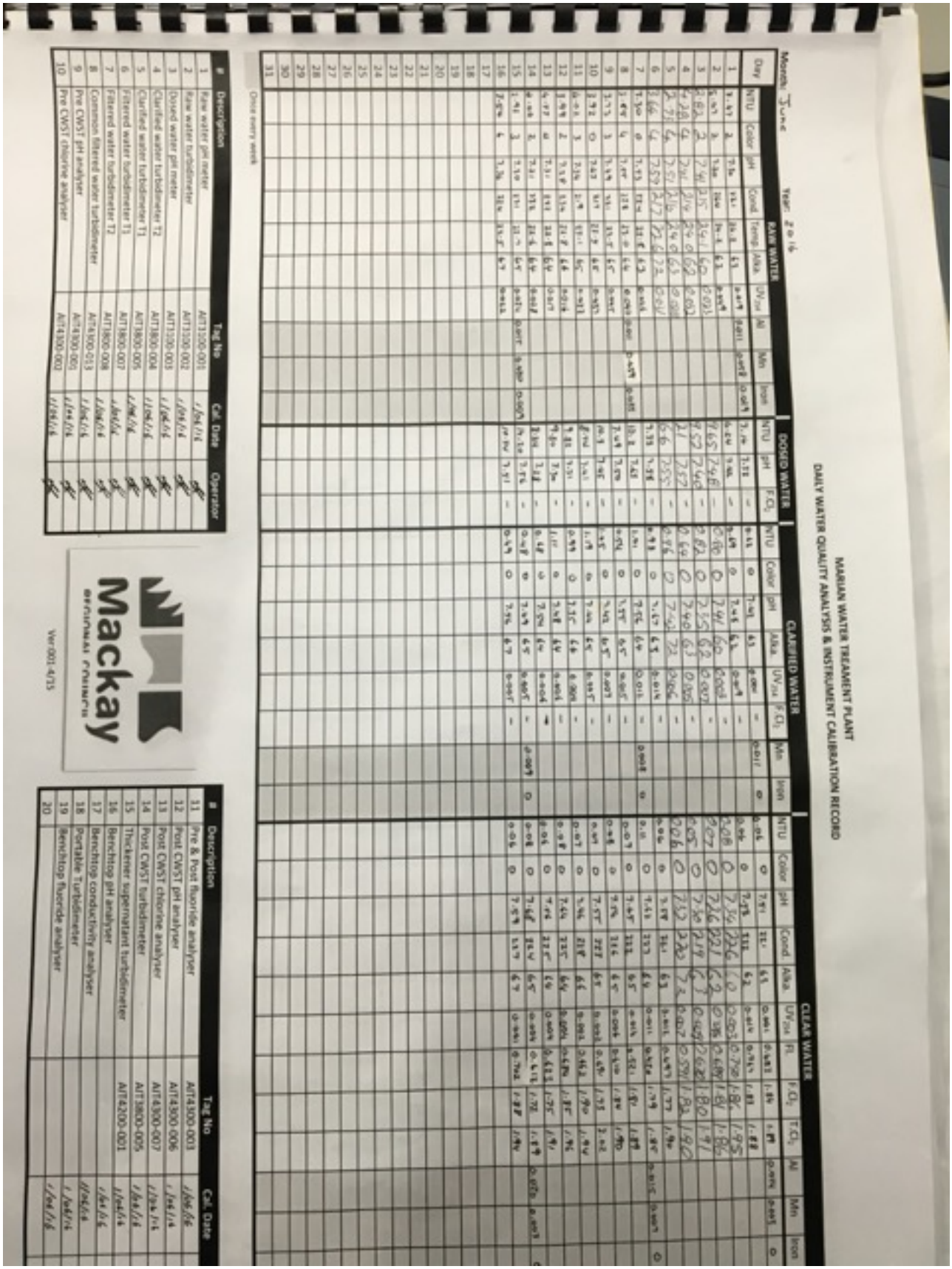

Figure 17. Clear, consistent operational monitoring and checking records at Marian WTP.

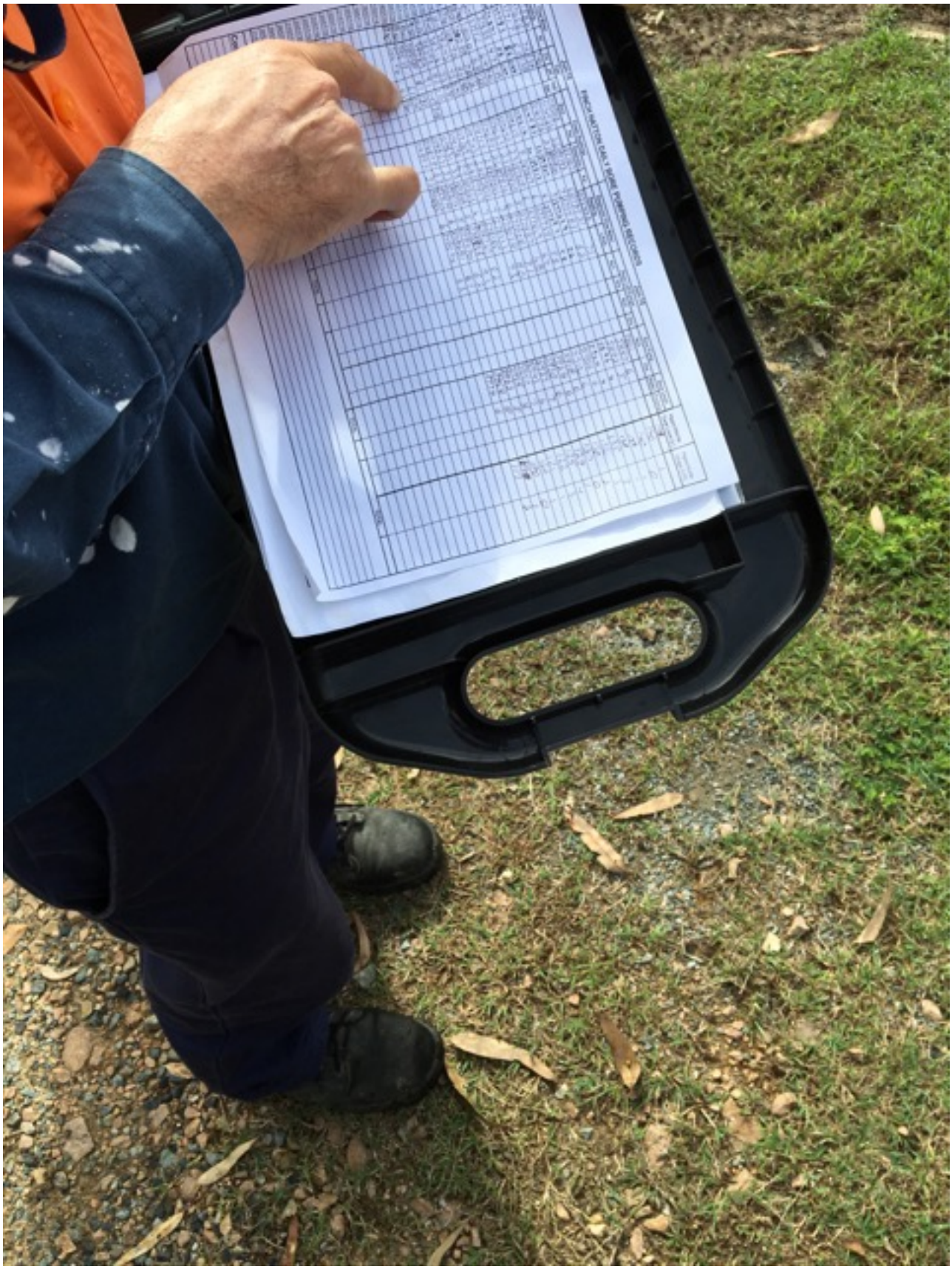

Figure 18. Clear, consistent operational monitoring and checking records at Finch Hatton WTP.

Figure 19. Industry-leading smart metering initiative.