Western Corridor Recycled Water Scheme

Recycled Water Management Plan Annual Report 2021-22

Scheme Reference Number SRN013

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seqwater
WATER FOR LIFE

SOURCE STORE SUPPLY

Distribution list

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1 Executive summary

The Queensland Bulk Water Supply Authority trading as Seqwater (**Seqwater**) (SPID SRN013), is the Scheme Manager of the multiple-entity Western Corridor Recycled Water Scheme (**WCRWS** or **the Scheme**). On 6 July 2021 Water Supply Regulation (**WSR** or **Regulator**) issued an Information Notice for the Decision[1] approving Seqwater's amended WCRWS Recycled Water Management Plan (**RWMP)** for supply of purified recycled water (**PRW or recycled water**) to electricity generation and industrial uses. The Notice explicitly excludes approval to augment a drinking water supply with recycled water. The supply of recycled water for industrial uses commenced in the reporting period (1 July 2021 to 30 June 2022 - **Reporting Period**).

The purpose of this annual report is to provide the Regulator with information on the overall performance of the Scheme for the Reporting Period. This annual report has been produced in accordance with section 273 of the *Water Supply (Safety & Reliability) Act 2008* (**the Act**) and the Department of Regional Development, Manufacturing and Water's (**DRDMW**) *Annual Reporting Guidelines for Recycled Water Schemes (2010)*. This report also provides an accountability mechanism to recycled water customers and the South East Queensland community.

During the Reporting Period, the Luggage Point Advanced Water Treatment Plant (**AWTP**) was the sole operable plant in the Scheme and produced 3,284 mega litres (**ML**) of recycled water. Recycled water was supplied to meet demand from CleanCo's Swanbank Power Station, Stanwell Corporation's Tarong Power Station and Urban Utilities for on-supply to Incitec Pivot Limited for industrial applications.

As part of Seqwater's drought response, restart of two additional process trains was undertaken at Luggage Point AWTP in the Reporting Period. This increased the available operational capacity of the Scheme to 70 ML per day. In addition, Period of Enhanced Monitoring (**POEM**) was undertaken in the Reporting Period for the pre-existing operational train. This was in accordance with the Commissioning Validation and Commissioning Verification processes described in the *Recycled water management plan and validation guidelines (2008).* Undertaking Commissioning Validation and Verification is a requirement if Seqwater was to seek approval to supply recycled water to augment a supply of drinking water.

A total of 57,438 external laboratory tests were performed on purified recycled water samples in the Reporting Period. N-nitrosodiethylamine (**NDEA**) and N-nitrosomorpholine (**NMOR**) were detected in 24 samples at concentrations more than the value stated in Section 53 of the Public Health Regulation 2018 (**PHR**) quality standard for recycled water intended to augment a supply of drinking water. Although recycled water was not supplied to Lake Wivenhoe, a public health risk assessment showed the probability of exceeding the quality standard at the Lake Wivenhoe Dam Wall Offtake, for both NDEA and NMOR, was <0.1%. Extensive additional testing undertaken as part of the investigation into the elevated results found there was no nitrosamine formation potential in recycled water produced by the Luggage Point AWTP process, rather the elevated results were likely to be from intermittent contamination at the analytical laboratory.

Of the 57,438 tests for 829 parameters undertaken in the Reporting Period at the recycled water Points of Supply, a total of 288 tests were not completed. Of these, 276 were due to a misalignment of the verification monitoring requirement at the Lake Wivenhoe Point of Supply. The remaining were due to logistics and laboratory information management system issues. Replacement samples were collected in all instances within the Reporting Period and improvements have been implemented, or planned to be implemented, to reduce likelihood of reoccurrence. These improvements were also reflected in the findings of the regular (external) audit undertaken in the Reporting Period. A compliant audit finding has been made by the auditor under section 261(2) of the Act, with nil non-conformances identified. Five opportunities for improvement (OFIs) were identified, and action has been taken, or planned to be taken, to address these during the next Reporting Period.

[1] Issued in accordance with section 206 of the *Water Supply (Safety and Reliability) Act 2008*

2 Introduction

The 2021-2022 annual report for the WCRWS, outlines the operation of the Scheme under the approved RWMP to supply purified recycled water for energy generation and industrial supply. The report also includes details about proactive identification and minimisation of public health and continuity of supply related risks associated with the production and supply of purified recycled water, as well as:

- Summary of the quality of purified recycled water and details of any notifications to the Regulator.
- Outcomes of any reviews or amendments of the RWMP.
- Details of any internal or regular (external) audits performed, and the actions taken to address any non-conformances.

This report is submitted to the Regulator to fulfil the legislative requirements of the Act and is made available to the public through the Seqwater website or for inspection upon request at Seqwater's Head Office during office hours on business days.

2.1 Purpose

This annual report has been prepared in accordance with section 273 of the Act and the Regulator's *Annual Reporting Guideline for Recycled Water Schemes* (Table 1). The purpose of this annual report is to provide the Regulator with information on the overall performance of the Scheme for the period 1 July 2021 to 30 June 2022 and provide an accountability mechanism to recycled water customers and the general public.

Table 1: Annual Report Requirements

Annual report requirements	Act section	Annual Reporting Guideline	Seqwater compliance
The relevant entity for a recycled water scheme must prepare an annual report for each financial year after a recycled water management plan for the Scheme has been approved.	s273(1) of the Act	Section 2.3	This report is for the 2021-2022 financial year.
The annual report must— a. **be prepared in accordance with the guidelines, if any, made by the regulator about the preparation of annual reports.**	s273(2)(a) of the Act	Section 1 to section 2.12 (inclusive)	This report is aligned with the Annual Reporting Guidelines for Recycled Water Schemes.
b. **state the outcome of any review of the recycled water management plan in the financial year to which the annual report relates, and how the matters raised in the review have been addressed.**	s273(2)(b) of the Act	Section 2.4	Section 7 Reviews – a review of the RWMP was completed in the reporting period.

c. **contain details of the findings of, and any recommendations stated in, an internal audit report under section 260 or a regular audit report under section 261 given to the regulator in the financial year.**	s273(2)(c) of the Act	Section 2.4	Section 8 Audits – an external (regular) audit was undertaken in the reporting period.
d. **contain details of the information given to the regulator under section 270 or 271 in the financial year.**	s273(2)(d) of the Act	Section 2.4	Section 3 Recycled water compliance. Section 5 Prescribed incidents.

2.2 Plan overview

The Scheme's RWMP was developed under the Act and consists of a Scheme Manager Plan, Seqwater Scheme Provider Plan and Urban Utilities Scheme Provider Plan. Seqwater and Urban Utilities must comply with the Scheme's RWMP approved by the Regulator. The RWMP has been developed to be consistent with DRDMW's *Recycled Water Management Plan and Validation Guidelines (2008).*

2.3 Scheme overview and current status

The Scheme is one of the largest water recycling schemes in Australia, increasing and diversifying South East Queensland's water sources. The WCRWS has the capacity to deliver up to 180 ML of recycled water a day, equating to 65,700 ML of recycled water per year, however, the operational capacity during the Reporting Period was up to 70 ML per day.

The Scheme has three Advanced Water Treatment Plants (**AWTPs**), owned by Seqwater and operated under contract by Veolia, located at Bundamba, Gibson Island and Luggage Point. Combined, these plants can treat water supplied from six of Urban Utilities' Sewage Treatment Plants (**STP**) located at Bundamba, Gibson Island, Goodna, Luggage Point, Oxley Creek and Wacol to produce PRW. More than 200 kilometres of large diameter pipelines connect the STPs, AWTPs, Lake Wivenhoe, power stations and Urban Utilities for industry use.

Seqwater decided in 2013 to place the WCRWS into a state of 'care and maintenance' to improve the cost efficiency of the plants and increase the return on the assets over their life. The 'care and maintenance' state was based, for the purposes of planning, on a 15-year shutdown period, with an ability to return to full operation within two years of a decision to restart the Scheme.

Seqwater's Water Security Program *Water for Life: South East Queensland's Water Security Program 2016-2046* outlines when the Key Bulk Water Storages fall to a combined level of 60%, the decision to restart the WCRWS should be considered, with a two-year window to return to full operation.

In 2018, a single process train at Luggage Point AWTP was restarted and provided the ability to supply recycled water for electricity generation. This also enabled supply for industrial uses to be explored, water quality monitoring of recycled water to be resumed and identification of any potential issues that may arise during a full restart. Seqwater applied to resume supply of recycled water for electricity generation on 23 February 2018 and the WSR approved the RWMP for this use only on 28 May 2018.

On 26 November 2020, Seqwater, as Scheme Manager, completed a review of the RWMP. An amended RWMP was submitted to the Regulator for approval on 23 December 2020. On 23 April 2021, the Regulator issued an Information Requirement Notice (**IRN**), to obtain further information on the amended RWMP. Seqwater submitted a response to the IRN on the 2 June 2021, including a further amended RWMP. On 2 July

2021 the Regulator issued an amended – Critical Scheme Declaration and on 6 July 2021 the Regulator issued an Information Notice for the Decision to approve the RWMP.

In 2021, restart commenced of two additional process trains at Luggage Point AWTP. This allows for the existing operational train to be taken offline for maintenance for an extended period and increased the operational capacity of the Scheme to 70 ML per day. The restart activity commenced as the Key Bulk Water Storages reached the 60% Drought Response WCRWS restart commencement trigger in accordance with Seqwater's Water Security Program. Subsequent rain events in South East Queensland in late 2021 and early 2022 resulted in Key Bulk Water Storages combined level increasing above the Drought Response trigger levels. The restart of the additional process trains continued through the Reporting Period however production remains limited to meeting energy and industry demand and pipeline water quality requirements.

This operating philosophy of supplying recycled water for energy generation and industry assists Seqwater in monitoring the quality of the recycled water at the Luggage Point AWTP Point of Supply and Lake Wivenhoe Point of Supply against the quality standard for recycled water intended to augment a supply of drinking water as per Section 53 of the PHR.

2.3.1 Bundamba AWTP Point of supply

The Bundamba AWTP was non-operational and did not produce or supply recycled water at any time during the Reporting Period. As such, no monitoring from the Bundamba AWTP Point of Supply was required.

2.3.2 Gibson Island AWTP Point of Supply

The Gibson Island AWTP was non-operational and did not produce or supply recycled water at any time during the reporting period. As such, no monitoring from the Gibson Island AWTP Point of Supply was required.

2.3.3 Luggage Point AWTP Point of Supply

The Luggage Point Advanced Water Treatment Plant was the sole operable plant in the Scheme and provided a cumulative volume of 3284 ML of recycled water for the Reporting Period. The Luggage Point AWTP was available to supply recycled water to power stations and Urban Utilities during the Reporting Period. Supply of recycled water to Urban Utilities is for on-supply to Incitec Pivot Limited for industry use and commenced during this Reporting Period. Although the Scheme is currently not approved to supply recycled water to augment a supply of drinking water, under the current Information Notice for the Decision, the quality standard for recycled water intended to augment a supply of drinking water is as per Section 53 of the Public Health Regulation applies at this Point of Supply. This assessment is provided below in Section 3.

During the Reporting Period the following volumes of recycled water were supplied to:

- CleanCo's Swanbank Power Station: 244 ML
- Stanwell's Tarong Power Station: 2314 ML
- Urban Utilities (for on-supply to Incitec Pivot): 718 ML

2.3.4 Lake Wivenhoe Point of Supply (augmentation of drinking water supply)

Recycled water was not supplied to Lake Wivenhoe during the Reporting Period, however Seqwater undertakes sampling from the Lake Wivenhoe Point of Supply when PRW is being supplied to Tarong Power Station. Although the Scheme is currently not approved to supply recycled water to augment a supply of drinking water via the Lake Wivenhoe Point of Supply, under the current Information Notice for the Decision, the quality standard for recycled water at this Point of Supply is the standard for recycled water intended to augment a supply of drinking water described in Section 53 of the PHR. This assessment is provided below in Section 3.

Within the Reporting Period, Seqwater received the *Purified Recycled Water and Lake Wivenhoe modelling of pathogen fate and transport (2021)* report from the Australian Rivers Institute, Griffith University. This project

was undertaken to further inform and assess Lake Wivenhoe as an effective barrier to mitigate risk to public health should incidents arise when augmenting a drinking water storage with recycled water. This project was specifically designed to inform the assessment of the capacity of Lake Wivenhoe to mitigate the health risk from any pathogenic micro-organisms or chemicals that may occur in recycled water, as required by section 54 of the PHR. This information is then applied to instances where a Public Health Risk Assessment is required following the detection of a parameter in exceedance of Section 53 of the PHR, as outlined in Section 3.2 below, or a treatment failure scenario.

The report found pathogen inputs from the catchment dominated the concentrations in Lake Wivenhoe even with a simulated extreme treatment process failure, no matter the volume of the PRW or lake water levels. The maximum pathogen concentrations were associated with major rainfall events in the catchment and were not related to the introduction or timing of PRW input. The report confirms Lake Wivenhoe forms an effective barrier against pathogen contamination under an extreme treatment failure. Under normal operating conditions, PRW does not present a public health risk due to the significant pathogen log reductions continuously achieved through the AWTP process and the final stringent quality standard for recycled water as per Section 53 of the PHR in which indicator microorganisms should not be detected in recycled water.

2.4 Membrane units placed into preservation

No membrane filtration and reverse osmosis membranes were preserved during the Reporting Period. For noting there are currently no membranes installed at the Gibson Island or Bundamba AWTPs.

3 Quality standard for recycled water intended to augment a supply of drinking water

Seqwater's PLN-00447 WCRWS Monitoring Plan (**Monitoring Plan**) details the Verification Monitoring component of the Scheme Monitoring program. It represents a final assessment of the performance of the WCRWS verifying that critical control points are set and maintained correctly and consistently, recycled water meets the quality standard and to monitor for any long-term trends or changes in recycled water quality. Verification Monitoring is separate to Operational Monitoring and is undertaken by independent laboratories that are National Association of Testing Authorities (**NATA)** accredited for most of the analyses. Analysis that is not NATA accredited - where cutting-edge specialised analysis is required - is undertaken under a robust quality system, typically at research laboratories.

Under the Monitoring Plan, a total of 29,070 tests were performed on samples from the Luggage Point AWTP Point of Supply and a total of 28,368 tests were performed on samples from the Lake Wivenhoe Point of Supply. Furthermore, there were a total of 42,046 tests performed on treated wastewater, the source water to the AWTPs. The summary statistics from the Monitoring Plan for all parameters for source water and recycled water is provided within Enclosure 1 and Enclosure 2a and 2b.

Under Seqwater's Information Notice for the Decision, the quality of the recycled water produced or supplied by the WCRWS must be tested for the presence of each required parameter at the frequency specified in the Monitoring Plan at the Lake Wivenhoe Point of Supply and at the AWTP Points of Supply. Each sample of the water taken at the Point of Supply and tested for a parameter must comply with the quality standard for recycled water intended to augment a supply of drinking water prescribed in Section 53 of the PHR.

Table 2 summarises instances in which a sample of recycled water (excluding points of supply to energy generation and industry), returned a result for which the concentration of a parameter is more than the value stated in Section 53. Further description of the exceedances and improvements is provided in Section 90 below.

Table 2. Incidents for non-compliance with water quality criteria: regulated standard for recycled water intended to augment a supply of drinking water

Incident Number	Date Reported	Parameter	Regulated Standard	Point of Supply	Number of tests exceeding standard and date(s)
RWI-SRN013-21-09101	17 September 2021	N-nitrosodiethylamine (**NDEA**)	0.01 µg/L	Luggage Point AWTP Point of Supply	**6** 7/09/2021; 22/09/2021; 27/09/2021; 29/09/2021; 12/10/2021; 29/12/2021
				Lake Wivenhoe[1] Point of Supply	**4** 27/09/2021; 29/09/2021; 5/10/2021; 20/10/2021
RWI-SRN013-21-09103	17 September 2021	N-nitrosomorpholine (**NMOR**)	0.001 µg/L	Luggage Point AWTP Point of Supply	**6** 14/09/2021; 22/09/2021; 27/09/2021; 29/09/2021; 25/10/2021; 29/12/2021
				Lake Wivenhoe[1] Point of Supply	**8** 7/09/2021; 20/09/2021; 22/09/2021; 27/09/2021; 29/09/2021; 5/10/2021; 20/10/2021; 8/12/2021

[1]Recycled water was not supplied to Lake Wivenhoe, however, Seqwater undertakes sampling from the Lake Wivenhoe Point of Supply when PRW is being supplied to Stanwell Corporation's Tarong Power Station.

3.1 Description of exceedances and improvements

N-nitrosodiethylamine (**NDEA**) and N-nitrosomorpholine (**NMOR**) are tested at a weekly frequency at the Luggage Point AWTP Point of Supply and the Lake Wivenhoe Point of Supply. NDEA and NMOR are organic disinfection by-products and are part of a group of disinfection by-products known as nitrosamines. The AWTP Ultraviolet Disinfection and Advanced Oxidation (**UV/AO**) critical control point (**CCP**) process is specifically designed to remove nitrosamines and there were no critical limit exceedances in the Reporting Period.

As part of POEM, outlined in Section 6 below, a different laboratory providing NATA-accredited analysis at lower levels of reporting (**LOR**) for NMOR was sourced. Shortly after this change, samples taken from the Luggage Point Point of Supply and Lake Wivenhoe Point of Supply returned results for which the concentration was more than the value stated in Section 53 of the PHR 2018. Extensive additional sampling by three separate independent external laboratories was undertaken and the exceedances were not replicated by other laboratories.

In addition to continued duplicate sampling and analysis, a targeted program investigating the source or variable(s) leading to elevated nitrosamine results was undertaken. The program specifically sought to identify if the source of nitrosamine results was related to analytical challenges by the commercial laboratories, or if NDEA and NMOR precursors could lead to formation potential in the recycled water. The program found there is no nitrosamine formation potential in recycled water disinfected with chlorine, that is, the report shows it was not forming in the purified recycled water. This finding is also supported by scientific literature to date, such as The Water Research Foundation Project *Nitrosamine Precursors in Direct and Indirect Potable Reuse Water (2022).* The report did show a potential for intermittent contamination at the commercial laboratory that returned NDEA and NMOR results in exceedance of the Section 53 of the PHR 2018 however it could not identify the specific source of contamination within the laboratory. The potential for contamination was not able to be replicated at the other laboratories.

3.2 Public health risk assessment

In accordance with the RWMP (Scheme Manager Plan), an assessment of the risk to public health from recycled water is required if any sample of recycled water (excluding points of supply to energy generation and Urban Utilities), returns a result for which the concentration of a parameter is more than the value stated in Section 53 of the PHR. The concentration prediction at Wivenhoe Dam Wall Offtake was determined using a fate and probability model that incorporates factors including dilution and environmental fate processes. This assessment was undertaken based on research undertaken for the Scheme including the project *Purified Recycled Water and Lake Wivenhoe modelling of pathogen fate and transport (2021)* discussed in section 2.3.4.

The public health risk assessment output is a probability measure of exceedance of the guideline standard at the Wivenhoe Dam Wall Offtake. The scenarios that most closely reflect the operating conditions at the time of the exceedances showed that the probability of exceeding the standards at the Wivenhoe Dam Wall Offtake for both NDEA and NMOR were <0.1%.

The Wivenhoe Dam Wall Offtake is representative of source water to the Wivenhoe Water Treatment Plant and a conservative assessment of source water to the Lowood and Mount Crosby Water Treatment Plants. For the Lowood and Mount Crosby Water Treatment Plants, this does not factor in any further inputs (dilution) or fate along the Mid-Brisbane River. The assessment does not include the contribution of NDEA and NMOR from other sources, such as where these chemicals are used in commercial or industrial activities that may contribute to the concertation in the source water. However, sanitary surveys of the catchment have not identified any significant likely additional sources of these chemicals.

The outcome of the public health risk assessment was provided to, and accepted by, the Regulator. Feedback included improvements to target the required outputs of the public health risk assessment.

4 Monitoring program compliance

It is a condition of Seqwater's Information Notice for the Decision dated 6 July 2021 that notification and replacement sampling occurs, where the quality of recycled water produced by the scheme is tested for the presence of a parameter at the Points of Supply as specified in the Monitoring Plan, and a test result of 'no result' or 'laboratory error' is recorded.

A total of 57438 tests for 829 parameters were undertaken in Reporting Period at the recycled water Points of Supply. A total of 288 test from 6 July 2021 returned a test result constituting a failure to test or missing data.

Table 3 summaries these incidents and contributing factors.

Table 3. Luggage Point AWTP and Lake Wivenhoe Points of Supply incidents for non-compliance with water quality criteria: failure to test or missing data

Incident Number	Date Reported	Parameter, regulated standard, dates and resample dates	Number of tests missed	Contributing factors
RWI-SRN013-21-09060	12/08/2021	Dicofol, 4-Nonylphenol, dioxins. Refer Enclosure 3.	6[1]	Operations contractor (Veolia) schedule misalignment with Monitoring Plan. Misalignment of analysis suite codes between contracted laboratory and sub-contractor.
RWI-SRN013-22-09554	4/04/2022	Lake Wivenhoe routine suites. Refer Enclosure 3.	276	Misalignment of verification sampling requirement at Lake Wivenhoe Point of Supply following period of enhanced monitoring and maintenance shutdowns

Incident Number	Date Reported	Parameter, regulated standard, dates and resample dates	Number of tests missed	Contributing factors
				resulting in four weekly and two monthly suites being missed.
RWI-SRN013-22-09593	29/04/2022	Aldehyde suite. Refer Enclosure 3.	4	Sample collected late in week due to production schedule, resulting in failure of sample to reach external contracted laboratory interstate in business hours.

Note[1]: Previously determined to be eight tests missed however on further investigation it was found that for two of these tests, the analysis was performed however the test results were not transferred within the laboratory information management systems.

4.1 Description of exceedances and improvements

In all instances, replacement samples for the missed analysis were undertaken within the Reporting Period. Of the 288 tests missed, 276 were due to a misalignment of verification sampling requirement at the Lake Wivenhoe Point of Supply following the completion of POEM and maintenance shutdowns resulting in four weekly suites and two monthly suites being missed. Sampling continued weekly as required at the Luggage Point AWTP Point of Supply throughout this time, which is representative of recycled water supplied. There were no instances of results in exceedance of Section 53 of the PHR at the Luggage Point AWTP Point of Supply during the time meaning.

The remaining missed tests were due to external contractor laboratory logistics and laboratory information management system issues. Resourcing within the water quality and process engineering team by the Operations contractor (Veolia) has been put in place to improve implementation of the Monitoring Plan, address misalignment issues, logistics and Management of Change (**MoC**) processes. A process confirming Monitoring Plan verification sampling requirements around shutdown activities has also been implemented. Updating to a modern laboratory information management system is also being explored as an improvement to address misalignment issues, which is expected to prevent reoccurrence of non-compliance with the Monitoring Plan.

5 Prescribed incidents

In addition to the incidents listed in section 3 and section 5 above, there were no additional prescribed incidents, under section 271 of the Act, for the Reporting Period.

6 Re-validation assessment

During 2021, in accordance with Seqwater's Water Security Program, Seqwater was working towards improving readiness of the Scheme for restart as the Key Bulk Water Storages approached the 60% Drought Response trigger. As part of this, Seqwater undertook the POEM program. POEM was designed to meet the Commissioning Validation and Commissioning Verification processes described in the *Recycled water management plan and validation guidelines (2008),* should the RWMP be amended to include using recycled water to augment a supply of drinking water under the Drought Response trigger framework.

The POEM Commissioning Validation program was undertaken over four weeks from September 2021 to October 2021 and showed that the five Critical Control Points (CCPs) for the Luggage Point AWTP:

- were fully implemented and performance within the critical limits can be consistently achieved and all monitoring required under the approved Validation Program was completed.

- were effectively controlled. Alert and action levels and critical limits are implemented, were effective to regain process control within limits or process shutdown where appropriate and prevented any out of specification water being supplied to subsequent treatment processes and the recycled water network. The relevant corrective actions have been implemented.
- were validated in accordance with the Validation Program. The results of detailed commissioning validation for the Reverse Osmosis (RO) and chlorine disinfection step confirmed that the treatment steps have been validated in accordance with the WaterVal protocols to achieve the pathogen LRV claims in the Validation Program.

The POEM Commissioning Verification program was undertaken in September 2021 to December 2021 comprising of testing undertaken as required in the Monitoring Plan. Data analysis of the results of the POEM showed:

- There were no exceedances of the water quality criteria for the 'chemical indicator group'.
- There were no detections of microbiological indicators or pathogens.
- Further assessment was undertaken of any parameter that was detected above LOR to characterise how close detections were to the water quality criteria (Section 53 of the PHR).
- A number of parameters have a LOR equal to or greater than the water quality criteria, however the majority of the parameters recorded results below the LOR.
- Antimicrobial resistant genes, Intl1 and sul1 were detected at the Lowood sampling location. Further investigations have been initiated to interpret the results, including additional sampling.
- Two of the broader chemical group parameters exceeded the water quality criteria - NDEA and NMOR (refer Section 3 above).
- Sampling and testing were implemented in accordance with the Commissioning Verification Monitoring Plan. Sars-CoV-2 was a component of this monitoring plan however wasn't performed until later in the Reporting Period.

Subsequent rain events in South East Queensland in late 2021 and early 2022 resulted in Key Bulk Water Storages combined level increasing above the Drought Response trigger levels - however the outcome of the POEM program demonstrates the ability of the WCRWS to meet the Commissioning Validation and Commission Verification requirements should these be required as part of a future RWMP amendment.

During the Reporting Period, two additional process trains at Luggage Point AWTP were restarted as part of the Drought Response increasing the operational capacity up to 70 ML per day and to provide redundancy to the existing single process train.

There were no other changes to the Scheme that were assessed as requiring re-validation in the Reporting Period.

7 Reviews

There were no regular reviews undertaken in the Reporting Period. The next regular review of the approved RWMP is due in March 2023 as required by the Information Notice for the Decision.

8 Audits

The RWMP and associated conditions were scheduled for a regular (external) audit by 31 August 2022 in accordance with the Information Notice for the Decision. The audit was undertaken in the week of 27 June 2022 by Water Futures Pty Ltd. The purpose of the regular (external) audit was to assess compliance with the approved RWMP and Regulator-applied conditions. The audit was conducted pursuant to the requirements of the Act. The findings of the audit are reported to the Regulator.

The overall audit found Seqwater complied with its obligations under the Act and Audit Guidelines. No notifiable observations (that need immediate notification to the Regulator) were found. Observations made during the audit found the RWMP to be relevant to the Scheme.

The Audit period was from the date of the approval of the current plan (6 July 2021) to the field audit date June 2022. For the audit period, no poor quality or inadequately maintained infrastructure was observed. Therefore, a compliant audit finding has been made by the auditor under the Act.

There were no non-conformities with the Act, RWMP and Conditions in the Information Notice for Decision for the RWMP. Five opportunities for improvement (**OFIs**) were identified during the audit to align with best practice or to reduce the risk of future non-conformities. The regular audit findings are detailed in Table 4 along with action taken, or planned to be taken, to address the recommendations of the audit report.

Table 4. Details of regular (external) audit findings of RWMP and Regulator-applied conditions for the Reporting Period

Regular audit finding	Details	Action taken or planned to be taken
OFI	Consideration should be given to implementing a Laboratory Information Management System (LIMS) to schedule, oversee, manage, and report the verification monitoring program, or seeking support from a laboratory services provider to undertake that function	Options being investigated. Implementation plan in development.
OFI	Consideration should be given to drawing upon operational experience with the scheme and setting more practical monitoring procedures, frequencies, and tolerances, based on good practice, but not being unnecessarily stringent.	Tolerance ranges under review. To be implemented Jan 2023.
OFI	Consideration should be given to uncoupling or reorienting the monitoring program such that operations and production take priority over monitoring logistics.	Under review. To be actioned as part of Regular review March 2023.
OFI	Consideration should be given to ensuring absolute clarity for all sampling points to ensure new or relief samplers or operators draw from the correct sampling points	Complete. Improvements to sample point labelling, sampling procedures and training complete.
OFI	Consideration should be given to opportunities drawing from operational experience to optimise the outfall discharge requirements and raw water criteria, and possibly look at other means to manage odour-related risks, to help move towards a more continuous and reliable draw of effluent from the STP into the AWTP.	Complete. Changes to operation of Luggage Point STP have significantly improved consistency and reliability of source water quality to Luggage Point AWTP.

There were no internal audits scheduled in the Reporting Period. The next internal audit is scheduled to be performed by 31 August 2024. A remaining finding from the previous internal audit scheduled to be addressed in the 2021-2022 reporting period was Stage 2 of the planned actions to address the Laboratory Quality Assurance minor non-conformance 5 (mNCR). This mNCR has been implemented on an as-needed basis and has also been linked to the renewal of the external laboratory contract which was issued for tender during 2022.

9 Glossary

Term	Definition
AWTP	Advanced Water Treatment Plant. A plant that contains the specific technology and requirements to produce water for augmentation of drinking water supply from treated wastewater. Also, sometimes called a Purified Recycled Water Treatment Plant in public information by Seqwater as a measure to increase understanding of Purified Recycled Water.
BWSA	Bulk Water Supply Agreement
CCP	Critical Control Point. An essential step in the water treatment process for purified recycled water to prevent, reduce or eliminate a hazard.
CFU	Colony Forming Unit. A measure used in analysis of bacteria. One (1) colony is considered to represent a single viable bacteria from the sample.
DRDMW	Department of Regional Development, Manufacturing and Water. The Queensland Government department responsible for the management of water supply.
IRN	Information Requirement Notice
LOR	Limit of Reporting
ML	Mega Litres (1 Million Litres)
mL	Millilitre (1000th of a litre). 1 cubic centimetre
mNCR	Minor non-conformance
ND	Non-detect
OFI	Opportunity for Improvement
PFU	Plaque Forming Unit. A measure used in analysis of viruses. One (1) plaque is considered to represent a single viable viral particle from the sample.
PHR	*Public Health Regulation 2018* (Qld)
POEM	Period of Enhanced Monitoring
PRW	Purified Recycled Water. Produced by taking treated wastewater and purifying it to the standards for augmentation of drinking water supply set out in section 53 of the *Public Health Regulation 2018*.
Reporting period	1 July 2020 to 30 June 2021
RWMP	Recycled Water Management Plan
Seqwater	Queensland Bulk Water Supply Authority

SMP	Scheme Manager Plan
SPP	Scheme Provider Plan
STP	Sewage Treatment Plant
The Act	*Water Supply (Safety and Reliability) Act 2008* (Qld)
The Regulator	Water Supply Regulation. Part of the Department of Regional Development, Manufacturing and Water, the water supply regulator (i.e. the Director-General of DRDMW) is responsible for regulating water service provider performance, drinking water quality and provision of recycled water.
The Scheme	Western Corridor Recycled Water Scheme – see WCRWS
Urban Utilities	Central SEQ Distributor-Retailer Authority
UV/AO	Ultraviolet Advanced Oxidation
WCRWS	Western Corridor Recycled Water Scheme. A system of sewage treatment plants, advanced water treatment plants, and pipelines that can produce and deliver purified recycled water to replenish Lake Wivenhoe and/or power stations at Swanbank and Tarong.
WSR	Water Supply Regulation – see The Regulator

10 Enclosures

Enclosure	Name
1	Luggage Point AWTP Source Water data water quality report 2021-22
2a	Luggage Point AWTP Point of Supply assessment against augmentation of a drinking water supply water quality criteria 2021-22
2b	Lake Wivenhoe Point of Supply assessment against augmentation of a drinking water supply water quality criteria 2021-22
3	Luggage Point AWTP and Lake Wivenhoe Points of Supply incidents for non-compliance with water quality criteria: failure to test or missing data 2021-22