Western Corridor Recycled Water Scheme

Recycled Water Management Plan Annual Report 2019-20

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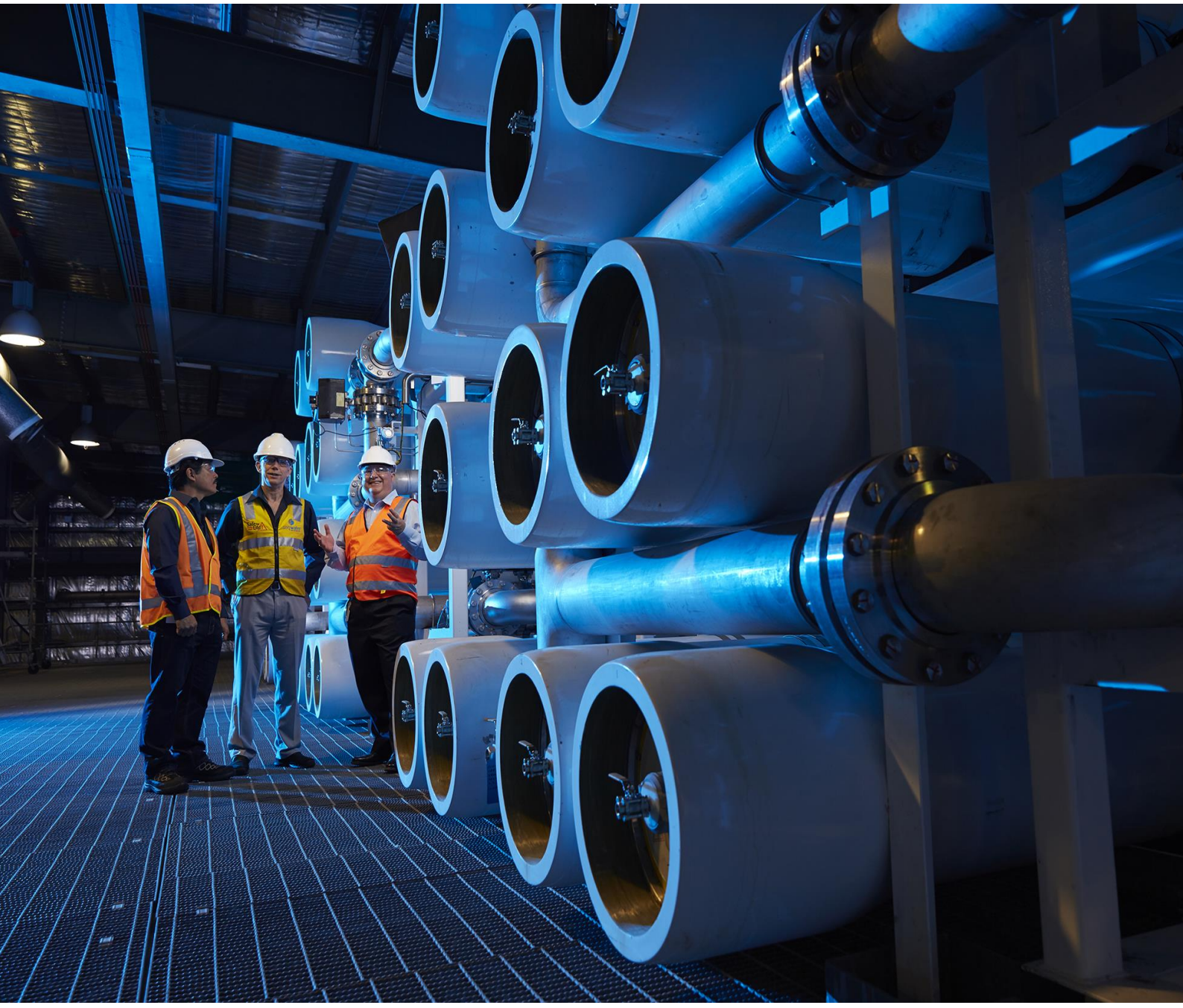

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Executive summary

The Queensland Bulk Water Supply Authority trading as Seqwater (**Seqwater**) is a party to the multiple-entity Western Corridor Recycled Water Scheme (**WCRWS**), hereafter referred to as the Scheme. On 28 May 2018, under the Notice for the Decision (**Notice of Decision**), Water Supply Regulation (**WSR** or **Regulator**) approved Seqwater's application to resume the supply of recycled water under the WCRWS Recycled Water Management Plan (**RWMP**). The Notice for the Decision states that the Scheme is approved to supply recycled water for electricity generation.

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 2019 to 30 June 2020 (**reporting period**). This annual report has been produced in accordance with section 273 *Water Supply (Safety & Reliability) Act 2008* (**the Act**) and the Department of Natural Resources, Mines and Energy's (**DNRME**) Annual Reporting Guidelines for Recycled Water Schemes (2010). This report also provides an accountability mechanism to users of the recycled water and to the general public.

During the reporting period, the Scheme was available to supply recycled water to meet demand from the Stanwell Corporation's Swanbank Power Station. The Luggage Point Advanced Water Treatment Plant (**AWTP**) was the only AWTP in the Scheme that was operable during this time. During this reporting period Luggage Point AWTP provided a cumulative volume of 896 ML of recycled water to Swanbank Power Station. A scheduled maintenance shutdown occurred between August 2019 and November 2019 during which time the membranes were placed into preservation.

Throughout the reporting period, verification monitoring at Swanbank Point of Supply was consistently compliant with the Class A+ water quality criteria, with the exception of the annual 95 percent pass value for F-specific RNA coliphage. Following a single F-specific RNA coliphage detection, the rolling annual value dropped below the required 95 percent pass criteria for Class A+ recycled water, due to the number of samples in the preceding 12 months falling below 20. Weekly samples were collected when water was supplied to Swanbank, however, due to a scheduled maintenance shutdown, water was not supplied to Swanbank for an extended period, which reduced the number of samples over the period. The F-specific RNA coliphage detection was investigated and found to most likely be a 'false positive', however the result was reported to WSR as a non-compliance with the rolling annual value for Class A+ recycled water in accordance with the Act.

The RWMP is in the process of internal review and will be submitted to the Regulator for approval in the coming financial year. There were no incidents or critical limit exceedances recorded.

An internal audit was conducted in the reporting period, which confirmed a high level of compliance to the intent and conditions of the approved RWMP. The majority of non-conformances will be addressed during the amendment to the RWMP in the next financial year, 2020-2021.

As specified in the Notice of Decision, the Scheme was not approved for supply of recycled water for augmentation of drinking water supply and it did not undertake this activity.

Seqwater submitted a revised WCRWS Validation Program to the Regulator in June 2019 and this was approved by WSR on 9 August 2019.

1 Annual reporting compliance

In 2013, the Scheme was placed into 'care and maintenance' for a nominal estimated period of 15 years. On 28 April 2014, Seqwater submitted a Notice of Unscheduled Stoppage under section 208 of the *Water Supply (Safety & Reliability) Act 2008* (**the Act**) to the Regulator, requesting that the RWMP be suspended. Pursuant to section 214 of the Act, a Notice of Suspension was issued by the Regulator on 11 June 2014. On 23 February 2018, Seqwater applied to the Regulator to approve the resumption of recycled water supply under the RWMP from the Scheme for electricity generation. This application was approved by the Regulator on 28 May 2018, to the extent it related to the supply of recycled water from the Scheme for electricity generation.

It is a requirement under Section 273 of the Act and a condition of approval of the RWMP that an annual report is prepared and submitted to the WSR within 120 business days of the end of the financial year. Table 1 outlines this Annual Report's compliance against DNRME's Annual Reporting Guidelines for Recycled Water Schemes and Section 273 of the Act.

Table 1: Annual Report Requirements

Annual report requirements			Seqwater compliance
	Act section	Annual Reporting Guideline	
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 2019-20 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 5 Reviews – a review of the RWMP was commenced in the 2019-20 financial year.
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 6 Audits – an internal audit was undertaken in the 2019-20financial year. A regular (external) audit is currently scheduled for next financial year.

Annual report requirements			Seqwater compliance
	Act section	Annual Reporting Guideline	
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 – a notice of noncompliance with water quality criteria was issued in June 2020. Section 6 Prescribed incidents – there were no incidents recorded in the 2019-20 financial year.
The relevant entity must give a copy of the annual report to the regulator within 120 business days after the end of the financial year.	s273(3) of the Act	Section 2.3	This report has been submitted to the regulator within the specified time period.
If a relevant entity is a recycled water provider for a single entity recycled water scheme, the annual report may be combined with a report given to the regulator under section 141.	s273(4) of the Act		The WCRWS is a multiple-entity scheme. As such this requirement does not apply.

2 Introduction

2.1 Purpose

The purpose of this annual report is to provide Water Supply Regulation (**WSR** or **Regulator**) of Department of Natural Resources Mines and Energy (**DNRME**) with information on the overall performance of the Western Corridor Recycled Water Scheme (**WCRWS or the Scheme**) for the period 1 July 2019 to 30 June 2020 (**reporting period**). This report also provides an accountability mechanism to users of the recycled water and to the general public.

2.2 Plan overview

Seqwater must comply with the Seqwater Recycled Water Management Plan (**RWMP**) approved by the Regulator. The Seqwater RWMP was developed under the Act. The RWMP forms part of the corporate recycled water quality management system that Seqwater has implemented to oversee the WCRWS assets and activities that are covered by the Act. The Seqwater water quality management system has been developed to be consistent with DNRME's Recycled Water Management Plan and Validation Guidelines (2008).

2.3 Scheme overview

2.3.1 Western Corridor Recycled Water Scheme

The Scheme is one of the largest water recycling schemes in Australia, increasing and diversifying South East Queensland's water sources.

The Scheme has three advanced water treatment plants (**AWTPs**) located at Bundamba, Gibson Island and Luggage Point. Combined, these plants can treat water supplied from six existing sewage treatment plants located throughout Brisbane and Ipswich (Bundamba, Gibson Island, Goodna, Luggage Point, Oxley Creek and Wacol). Water from these plants is further treated to produce recycled water using world best-practices.

More than 200 kilometres of large diameter pipelines connect the sewage treatment plants, AWTPs, Lake Wivenhoe and power stations.

The WCRWS has the commissioned capacity to deliver up to 180 million litres (**ML**) of water a day.

2.3.2 Current status

Seqwater made the decision during 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 that when the Key Bulk Water Storages fall to a combined level of 60 percent, 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 water for electricity generation. This also enabled supply for industrial uses to be explored, water quality monitoring of Purified Recycled Water (**PRW**) to be resumed and identify 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 by way of the Notice of Decision.

The Notice of Decision permitted work to be undertaken for the commissioning verification and validation of Luggage Point AWTP's Train 1. This process was required to:

1. Facilitate risk minimisation by way of trialling restart works should a full scheme recommissioning for the supply of recycled water compliant with the water quality criteria for augmentation of a drinking water storage be required.
2. Confirm the AWTP process successfully produces the quality of recycled water required to augment drinking water supply.
3. Supply recycled water for electricity generation, reducing demand on drinking water storages that would otherwise be used for this purpose.

2.3.3 Validation Program Approved

Seqwater submitted a revised WCRWS Validation Program to WSR in 2019. This revision was undertaken to align the content of the WCRWS Validation Program with recent regulatory changes and to capture the implication of these changes on operations and monitoring of source water and recycled water. The amended WCRWS Validation Program was approved by WSR on 9 August 2019.

2.4 Membrane units placed into preservation

The membrane filtration and reverse osmosis membrane were preserved for a period between August 2019 and November 2019, due to the scheduled maintenance shutdown of Luggage Point and associated networks, as outline in Table 2 below. All other membrane units at Luggage Point are in 'care and maintenance'. No membranes are installed at the Gibson Island or Bundamba AWTPs.

Table 2: Luggage Point AWTP Membrane Preservation Periods

Membrane Train	Date Placed in Preservation	Date Operational
Microfiltration Train 1	15/08/19	30/10/2019
Microfiltration Train 2	15/08/19	30/10/2019
Microfiltration Train 3	16/08/19	30/10/2019
Microfiltration Train 4	09/08/19	31/10/2019
Microfiltration Train 5	09/08/19	31/10/2019
Microfiltration Train 11	16/08/19	30/10/2019
Reverse Osmosis Train 1	15/08/2019	5/11/2019

3 Recycled water compliance

3.1 Gibson Island AWTP Point of Supply

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

3.2 Luggage Point AWTP Point of Supply

The resumption of recycled water supply for electricity generation purposes was approved under the Notice for the Decision for the Scheme's RWMP (Scheme Manager Plan, Seqwater Scheme Provider Plan and Urban Utilities Scheme Provider Plan). Under this approval, the Luggage Point AWTP was available to supply recycled water to meet the demand of Stanwell Corporation's Swanbank Power Station throughout the reporting period.

Luggage Point AWTP supplied 896 ML of recycled water to the Swanbank Power Station via the connection at the Bundamba AWTP and the Bundamba Point of Supply. A peak supply of recycled water to Swanbank Power Station of 23.4 ML/day was recorded.

3.2.1 Class A+ compliance

The RWMP identifies the Swanbank Pump as the Swanbank Point of Supply and hence compliance with the water quality criteria for Class A+ is discussed further in Section 3.4.

The commissioning verification and validation undertaken in 2018 at Luggage Point for Train 1 demonstrated compliance with all implemented processes and controls at all Critical Control Points (CCPs). The final recycled water quality consistently met water quality criteria.

During the reporting period there were zero critical limit exceedances. In late 2018, the chlorine disinfection CCP control monitoring analyser and associated alarm at Luggage Point was disabled. This alarm was causing operational disruption on start-up due to the chlorine decay in offline pipelines. However, the required log

removal for electricity generation could still be achieved without this CCP, as shown in Table 3. Actual performance of chlorine disinfection during continuous operation achieved the validated log reductions.

Table 3: Claimed Microbiological Removal Log Removal as per WCRWS Validation Program

Critical Treatment Process	Microbial Log Removal			
	Viruses	Bacteria	Protozoa	Helminths
Total Validated Log Removal	**10.5**	**14.5**	**10**	**8**
Current Validated LP AWTP Log Removal	**6.5**	**10.5**	**10**	**8**
Required Log Removal (augmenting drinking water supplies)	*9.5*	*8*	*8*	*8*
Required Log Removal for Class A+ (other uses, including electricity generation)	*6.5*	*5*	*5*	*5*

3.2.2 Assessment against augmentation of a drinking water supply water quality criteria

The RWMP identifies the criteria for augmenting drinking water supply applies only at the Point of Supply, the Lowood Pump Station. No water was supplied through this part of the Scheme during the reporting period.

3.3 Bundamba AWTP supply

The Bundamba AWTP was non-operational and did not at any time produce or supply recycled water between 1 July 2019 and 30 June 2020.

3.4 Swanbank Power Station Point of Supply

The recycled water produced at Luggage Point AWTP and supplied to Stanwell Corporation's Swanbank Power Station began on 1 July 2018. Between 1 July 2019 and 30 June 2020 (inclusive) the Swanbank Power Station was supplied with 896 ML of recycled water.

Microbial indicator monitoring was scheduled weekly at the Swanbank Power Station Point of Supply, located at Swanbank Pump Station at the Bundamba AWTP. Sample collection occurred during periods of supply and 18 samples were collected from the Swanbank Power Station Point of Supply during the period 1 July 2019 to 30 June 2020.

Each of these samples was analysed and yielded non-detect results, with the exception of a single F-specific RNA coliphage analysis, for the 11 February 2020 sampling event. During the investigation of this result, it was determined to most likely be a 'false positive' as:

- Duplicate samples analysed by an alternate external laboratory indicated no detection for F-RNA coliphage for the 11 February event.
- A process review did not identify any issues that would indicate a CCP breach.
- A free chlorine residual was present at the time of sampling.

At the time of the F-specific RNA coliphage detection, the annual value was compliant with the Class A+ water quality standards, this being less than 1pfu/100mL found in 95 percent of the samples taken for a 12-month period. However, due to the scheduled maintenance shutdown and subsequent non-supply to Swanbank Power Station, the number of samples fell below 20 for the reporting year. This resulted in the number of samples less than 1 pfu/100mL falling below 95 percent, with a result of 94.4 percent at 30 June 2020.

A notice of non-compliance with water quality criteria was issued to WSR on 5 June 2020, notifying the annual value dropped below the annual performance criteria for A+ recycled water. No corrective or preventative

actions could be implemented as the annual pass value decreased a period after the detection due to a reduction in the number of samples taken in the rolling annual period.

The monitoring compliance against the Class A+ recycled water criteria is shown below in Table 4. Table 5 outlining the detail of the sample that caused the non-compliance of F-specific RNA coliphage annual value

Table 4: Swanbank Point of Supply Class A+ Compliance

Parameter	Testing frequency required	Water Quality A+ Criteria	LOR	Maximum	Annual Value	No of Results Available
F-specific RNA Coliphage	Weekly	<1 PFU/100 mL in 95% of samples	1	1	94.4%	18
Escherichia coli	Weekly	<1 CFU/100 mL in 95% of samples	1	ND	ND	18
Somatic Coliphages	Weekly	<1 PFU/100 mL in 95% of samples	1	ND	ND	18
Clostridium perfringens	Weekly	<1 CFU/100 mL in 95% of samples	1	ND	ND	18

Table 5: Detail of Sample that Caused Non-Compliance of F-specific RNA Coliphage Annual Value

Date sample collected	Details of sample that contributed to non-compliance with water quality criteria.	Circumstances that gave rise to the non-compliance	Any action taken, or to be taken, to correct the noncompliance	Measures taken to prevent the noncompliance in the future and actions taken at the direction of the regulator
11 February 2020	1 pfu/100mL	The number of sampling events in the preceding 12 months dropped below 20, due to the scheduled maintenance shutdown and subsequently no supply to Swanbank.	No corrective or preventative actions could be implemented as annual value has decreased post the 11/02/2020 detection due to a reduction in the total number of samples in the rolling previous 12-month period.	

3.5 Tarong Power Station Point of Supply at Caboonbah tank

The Scheme did not at any time supply recycled water to the Stanwell Corporation's Tarong and Tarong North Power Station between 1 July 2019 and 30 June 2020. No monitoring at this Point of Supply was required.

3.6 Lake Wivenhoe Point of Supply at Lowood Pump Station (augmentation of drinking water storage)

The current RWMP approval permits the supply of recycled water for electricity generation but not the supply of recycled water to Lake Wivenhoe for the augmentation of a drinking water supply. Recycled water was not supplied to Lake Wivenhoe or further west to the Stanwell Corporation Tarong and Tarong North Point of Supply. As such no recycled water was supplied to or beyond the Lake Wivenhoe Point of Supply at Lowood Pump Station and as such no samples were collected from this Point of Supply.

3.7 Public health risk assessment

The Scheme was not approved to supply recycled water for the augmentation of a drinking water supply during the reporting period. As such the Scheme did not supply recycled water for this purpose and public health risk assessments were not conducted, submitted or required.

4 Re-validation assessment

During the 2019-20 financial year, no changes were identified that required a revalidation assessment to be completed in this reporting period.

5 Reviews

The RWMP was not scheduled for regular review in the reporting period. However, the RWMP is currently under a Scheme Manager (Seqwater) initiated review to address internal audit findings. Seqwater will apply to the Regulator to amend the RWMP during the 2020-2021 financial year, in line with regular review conditions of the approved RWMP.

6 Audits

Seqwater, as the Scheme Manager, undertook an internal audit of the RWMP to assess compliance with the RWMP and its conditions in June 2020. The internal audit report was supplied to DNRME within 30 business days of completing the internal audit.

Generally, the internal audit found that the Scheme Manager (Seqwater), Scheme Providers (Urban Utilities and Seqwater) displayed a high level of compliance to the intent of the approved RWMP and Regulator conditions. The evidence indicates the risks associated with the Scheme are being appropriately managed and the stakeholders are fundamentally operating to the intent of the RWMP.

In total, there were two non-conformances and five minor non-conformances identified during the internal audit. Four of these non-conformances are within Seqwater's area of control, while the remaining three relate to the Urban Utilities Scheme Provider Plan (SPP). To address the audit's findings (non-conformances), the following continuous improvement activities will be included as part of the RWMP regular review scheduled for the next financial year:

- Update Urban Utilities' SPP to reflect ISO9001 equivalent quality management system aspects and requirements (including auditing and assurance programs).
- Update Urban Utilities' SPP to include reference to Urban Utilities' current influent and effluent monitoring programs.
- Update the Scheme Manager Plan (SMP) to reflect the current Bulk Authority Emergency Response Plan and Emergency Management Manual classifications.

- Update Seqwater's SPP and site-based documentation to capture the requirement to consider recycled water quality when undertaking works.
- Update Seqwater's SMP and SPP to reflect existing implemented process for response to non-conformances.
- Identify and implement a laboratory quality assurance program appropriate for the Scheme and incorporate into the SMP and SPP.
- Communication of potential Scheme revalidation triggers to Scheme Manager. This has been addressed and is included as an agenda item in the regular WCRWS Scheme Manager and Provider Meeting (between Seqwater and Urban Utilities).

The RWMP and associated conditions is scheduled for a regular (external) audit during the period 1 July 2020 to 30 June 2021.

7 Prescribed incidents

There were no recorded prescribed incidents at the WCRWS in the reporting period.

8 Conclusion

A summary of the activities undertaken in the reporting period are listed below:

- The WCRWS Validation Program was approved.
- The Luggage Point AWTP provided a cumulative volume of 896 ML of recycled water to Swanbank Power Station.
- The recycled water produced by Luggage Point AWTP met the microbial log reduction requirements for Class A+ and there were no critical limit exceedances.
- The recycled water supplied through the Swanbank Power Station Point of Supply complied with the water quality standard for Class A+ recycled water, with the exception of the annual value for F-specific RNA coliphage which dropped below the 95% compliance requirement. Investigation indicates this detection was most likely a 'false positive'.
- A notice of non-compliance with the Class A+ water quality criteria relating to the annual value decrease for F-specific RNA coliphage was issued to the WSR in June 2020.
- The Luggage Point AWTP membranes were preserved for a period between August 2019 and November 2019 due to a scheduled maintenance shutdown.
- An internal audit of compliance against the RWMP and its conditions was performed in June 2020, and indicated a high level of compliance with the intent of the RWMP. The findings identified two non-conformances and five minor non-conformances, the majority of which will be addressed during the review and subsequent amendment of the RWMP.
- Seqwater, as Scheme Manger, initiated a review of the RWMP commenced in the reporting period and an amendment to the RWMP will be submitted to the WSR next financial year.
- No revalidation assessments, regular (external) audits or prescribed incidents occurred during the reporting period.
- The Scheme was not approved for supply of recycled water for augmentation of drinking water supply and did not undertake this activity.

Glossary

Term	Definition
AWTP	Advanced Water Treatment Plant. A plant that contains the specific technology and requirements to produce drinking water 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.
CCP	Critical Control Point. A step in the water treatment process for purified recycled water to prevent, reduce or eliminate a hazard,
DNRME	Department of Natural Resources Mines and Energy. The Queensland Government department responsible for the management of water supply.
ML	Million Litres
PRW	Purified Recycled Water. Purified recycled water is produced by taking treated wastewater and purifying it to drinking water standards.
RWMP	Recycled Water Management Plan
SMP	Scheme Manager Plan (part of the RWMP)
SPP	Scheme Provider Plan (part of the RWMP)
The Act	*Water Supply (Safety and Reliability) Act 2008* (Qld)
The Regulator	Queensland Water Supply Regulator. Part of the Department of Natural Resources, Mines and Energy, the water supply regulator (i.e. the Director-General of DNRME) is responsible for regulating: water service provider performance. drinking water quality and provision. recycled water quality.
WCRWS	Western Corridor Recycled Water Scheme. The Western Corridor Recycled Water Scheme is a system of wastewater treatment plants, purified recycled 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 Regulator
WTP	Water Treatment Plant