



**Cobbitty**Consulting  
Engineering and Advisory Services

# Lendlease Recycled Water (Barangaroo South) Pty Ltd

Operational Audit

Version 3.0

Independent Pricing and Regulatory Tribunal

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16 November 2020



## Document History

### Lendlease Recycled Water (Barangaroo South) Pty Ltd

Operational Audit

### Independent Pricing and Regulatory Tribunal

This document has been issued and amended as follows:

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# 1. Executive Summary

## 1.1 Auditor Declaration

This report presents the findings of an Operational Audit of Lendlease Recycled Water (Barangaroo South) Pty Ltd's compliance with the requirements of its Network Operator's Licence (Licence No: 15\_029) and the relevant provisions of the *Water Industry Competition (General) Regulation 2008* as they relate to the Lendlease Recycled Water (Barangaroo South) (LLRW) sewage collection, recycled water treatment plant and distribution network.

The auditor confirms that:

- the auditor was provided with sufficient evidence, as described in the *IPART Audit Guideline Water Industry Competition Act 2006 (July 2020)* (WIC Act Audit Guideline), on which to base the conclusions reached during the audit;
- the audit findings accurately reflect the professional opinion of the auditor;
- the auditor has conducted the audit, determined the audit findings and prepared this report in accordance with the requirements of the *WIC Act Audit Guideline* and the provisions of the Audit Deed; and
- the audit findings have not been unduly influenced by the Licensee and/or any of its associates and express the auditor's opinion as to whether the Licensee has met the Licence conditions and regulatory requirements as specified in the scope.

## 1.2 Major Findings

LLRW began routinely operating the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network to produce recycled water towards the end of the audit period, from January 2020. Prior to this time, the sewage collection network discharged to a Sydney Water sewer and the recycled water distribution network was charged with potable water.

No design or construction of new infrastructure was undertaken during the audit period although some important innovative improvements and modifications to the existing infrastructure were made to resolve problems with elevated colour in the recycled water. These changes involved diverting all of the recycled water through nanofiltration by re-purposing the existing reverse osmosis units rather than only using the reverse osmosis water for purposes that require demineralised water. This was an excellent initiative although the relevant systems descriptions in the licence plans and subordinate documents had yet to catch up with those improvements.

The Licensee, LLRW, was found to be, to the extent applicable under its licensed operating regime, operating and maintaining the audited infrastructure in compliance with all but three of the assessed audit criteria. The exceptions were the following:

- **WIC Reg Sched 1 cl.3(c) – Non-compliant (non-material):**  
Sub-optimal containment resulted in minor but noticeable odour and drosophiloid flies within the area of the treatment plant and control room. The extent of this nuisance was

considered to represent a non-material non-compliance at present but with the potential to become material if not understood and curtailed.

- **WIC Reg Sched 1 cl. 7(4)(a) – Non-compliant (non-material):**

The system description in the text and process flow diagram in the *Water Quality Plan* were largely consistent with the observed infrastructure. However, the diagram was still the original WJPS version and that diagram and text didn't explain the revised pathway of water through the nanofiltration system. Process flow diagrams and system descriptions should be kept up to date so this represents a non-compliance. The non-compliance was considered non-material given that the change in process flow that had occurred had decreased, not increased risks; and that in practice, staff were using the SCADA system process flow diagram, that was kept up to date, with the SCADA process flow following that of the infrastructure as observed. In addition, it is noted that the process flow diagram has been updated since the audit period.

The UV critical limit dose in the document referenced in the *Validation and Verification Plan* is 40 mJ/cm<sup>2</sup>. However, the UV critical limit dose in the SCADA system is 22 mJ/cm<sup>2</sup>. The non-compliance was considered non-material in practice due to the additional barriers in place for the scheme. Nonetheless, critical limits documented in the *Water Quality Plan* that has been submitted to IPART and audited, or in its cited documents such as the *Validation and Verification Plan*, should align with on-ground operations.

### 1.3 Recommendations

The following recommendations have been made as a result of this audit:

- **REC-LLRW-2020.01:** It is recommended that LLRW and/or Veolia identify the root cause of poor containment of odour and flies at the recycled water treatment plant and make changes to curtail the pathways for both the odour and vector transmission, as identified in WIC Reg Sched 1 cl.3(c).
- **REC-LLRW-2020.02:** It is recommended that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (as well as relevant aspects of its *Infrastructure Operating Plan*), that describe the physical infrastructure and process flow to ensure alignment between the documentation and the infrastructure in place.
- **REC-LLRW-2020.03:** It is recommended that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (such as the *Validation and Verification Plan*), that describe the critical limit for the UV disinfection system dose to ensure alignment between the documentation and the SCADA system and ensure adequate pathogen reduction, as identified in WIC Reg Sched 1 cl.7(4)(a).

One (1) opportunity for improvement, which the Licensee may wish to consider, is identified in the body of the report.

## 2. Introduction

### 2.1 Objectives

This report presents the findings of an Operational Audit undertaken for the Independent Pricing and Regulatory Tribunal (IPART) under the provisions of the *Water Industry Competition Act 2006*.

The objective of the audit was to assess compliance of the Licensee, Lendlease Recycled Water (Barangaroo South) Pty Ltd (LLRW), in meeting the requirements of the relevant legislation (the *Water Industry Competition Act 2006* and *Water Industry Competition (General) Regulation 2008*) and its Network Operator's Licence (Licence No: 15\_029) for the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network.

### 2.2 Licensee's Infrastructure, Systems and Procedures

The infrastructure, systems and procedures subject to audit are those related to the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network. The Lendlease Recycled Water (Barangaroo South) sewage collection and recycled water treatment plant treats sewage using membrane filtration and disinfection processes to produce high quality recycled water.

Lendlease Recycled Water (Barangaroo South) Pty Ltd (ACN 158 168 686) is the Licensee, holding Network Operator's Licence No: 15\_029. As Licensee, LLRW, along with Veolia Water Australia Pty Ltd (Veolia) (an "Authorised person" under the Licence), is responsible for the ongoing operation and maintenance of the sewage collection system, recycled water treatment plant and distribution network in accordance with their Licence Plans, including those in place during the audit period:

- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016;
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016;
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018; and
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

### 2.3 Audit Method

#### 2.3.1 Audit Scope

The audit comprised an Operational Audit conducted pursuant to the *WIC Act Audit Guideline*. The specific scope of the audit was as defined in IPART's letter to LLRW (reference D20/19632) dated 24<sup>th</sup> August 2020. The nominated scope covered the audit period from 1 August 2018 to 31 July 2020 and addresses selected requirements of:

- the *Water Industry Competition (General) Regulation 2008*; and



- Network Operator’s Licence No: 15\_029.

### 2.3.2 Audit Standard

The audit has been undertaken in accordance with the principles/guidance presented in:

- ISO 19011:2011 *Guidelines for auditing management systems*; and
- *IPART Audit Guideline Water Industry Competition Act 2006 (July 2020)* (WIC Act Audit Guideline).

### 2.3.3 Audit Steps

The audit has been undertaken generally in accordance with the procedure outlined in the *WIC Act Audit Guideline*.

Following approval of an *Audit Proposal* by IPART, an *Audit Agenda* and *Information Request* were sent to both the Licensee and IPART prior to the audit fieldwork being undertaken. Audit fieldwork comprising a desktop audit of relevant documentation/records and a site inspection of the infrastructure was undertaken on 2<sup>nd</sup> November 2020. The auditor requested some items of additional information and/or clarification following the audit fieldwork; that information was subsequently provided.

A draft audit report was prepared and submitted to the Licensee for review at the same time as IPART, before being finalised and issued to both the Licensee and IPART as the final version.

The audit process involved seeking objective evidence that the Licensee had complied with the obligations identified for audit by IPART. Evidence was obtained through interview, review of relevant documentation and records, and site inspection.

### 2.3.4 Audit Team

The audit was conducted by Dan Deere on site and Jim Sly as the quality assurance reviewer. Both auditors hold relevant Lead Auditor accreditation on IPART’s Technical Services and Water Licensing Panel.





LLRW was represented by Alex Day and Louise Reeves along with Chris Smith and Matilda Sochacki of Veolia Water Australia Pty Ltd (Veolia), the latter being an “Authorised person” under the Licence.

IPART representative Maria Morahan attended as an observer during the audit fieldwork and provided insightful feedback to improve clarity and accuracy of the final draft audit report.

### 2.3.5 Audit Grades

Audit grades have been awarded in accordance with guidance presented in the *WIC Act Audit Guidelines*. The compliance grades applicable for the purposes of this audit were as identified in **Table 2.1**.

**Table 2.1 Audit Compliance Grades**

Compliance Grade	Description
 <b>Compliant</b>	Sufficient evidence is available to confirm that the requirements have been met.
 <b>Non-compliant (non-material)</b>	Sufficient evidence is not available to confirm that the requirements have been met and the deficiency does not adversely impact the ability of the Licensee to achieve defined objectives or assure controlled processes, products or outcomes.
 <b>Non-compliant (material)</b>	Sufficient evidence is not available to confirm that the requirements have been met and the deficiency does adversely impact the ability of the Licensee to achieve defined objectives or assure controlled processes, products or outcomes.
 <b>No Requirement</b>	There was no requirement for the Licensee to meet this criterion during the audit period.

## 2.4 Regulatory Regime

The LLRW sewage collection network, recycled water treatment plant and recycled water distribution network operates in accordance with the provisions of a Network Operator’s Licence (Licence No: 15\_029) issued under the *Water Industry Competition Act 2006* (NSW). Other relevant regulatory instruments and standards/guidelines include:

- *Water Industry Competition (General) Regulation 2008* (NSW);
- *IPART Audit Guideline Water Industry Competition Act 2006* (July 2020);
- *Australian Guidelines for Water Recycling 2006* (as amended from time to time under rolling revision);
- *Plumbing Code of Australia*;
- *Plumbing and Drainage Act 2011* (NSW); and
- NSW and national water industry and environmental regulations and codes of practice as applicable.

## 2.5 Quality Assurance Process

The quality of this audit report was assured through a professional review process. The report has been independently reviewed by a Lead Auditor who holds relevant accreditation on IPART’s Technical Services and Water Licensing Panel.

## 2.6 Audit Findings

Audit findings are summarised in the following **Sections 3 to 7**, and are presented in full detail in **Appendices A to E**.

It is noted that Licence clause numbers referenced in this report are clause numbers as identified in Network Operator’s Licence No: 15\_029 issued to Lendlease Recycled Water (Barangaroo South), dated 28<sup>th</sup> February 2015 and last varied on 13 July 2015.

## 3. General Obligations of a Network Operator

### 3.1 Summary of Findings

One non-material non-compliance was identified in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *General Obligations of a Network Operator*.

WIC Reg Sched 1 cl.3(c) of the *General Obligations of a Network Operator* [The water or sewerage infrastructure is properly designed and constructed, operated in a safe and reliable manner and maintained in a proper condition, having regard to any publicly available standards or codes relating to its design, construction, operation and maintenance] – Non-compliant (non-material):

Sub-optimal containment resulted in minor but noticeable odour and drosophiloid flies within the area of the treatment plant and control room. The extent of this nuisance was considered to represent a non-material non-compliance at present but with the potential to become material if not understood and curtailed.

One recommendation has been made as a result of this audit in respect of the audited clauses related to the *General Obligations of a Network Operator*:

**REC-LLRW-2020.01:** It is recommended that LLRW and/or Veolia identify the root cause of poor containment of odour and flies at the recycled water treatment plant and make changes to curtail the pathways for both the odour and vector transmission.

### 3.2 Review of Actions

Following review of the draft report on the audit findings, the Licensee provided a response seeking further details in relation to the non-material non-compliance reported. The relevant section of the “*Code of Practice on managing the work environment and facilities*” was highlighted as the relevant publicly available standard or code against which the level of odour and flies was assessed. The licensee responded by proposing to review means to reduce the issue.

### 3.3 Opportunities for Improvement

No opportunities for improvement have been identified in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *General Obligations of a Network Operator*.

## 4. Water Supply Infrastructure

### 4.1 Summary of Findings

Two non-material non-compliance was identified in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *Water Supply Infrastructure*.

WIC Reg Sched 1 cl.7(4)(a) of the *Water Supply Infrastructure* requirements [The network operator must ensure that its water quality plan is fully implemented and kept under regular review and the network operator's activities are carried out in accordance with that plan] – Non-compliant (non-material):

The system description in the text and process flow diagram in the *Water Quality Plan* were largely consistent with the observed infrastructure. However, the diagram was still the original WJPS version and that diagram and text didn't explain the revised pathway of water through the nanofiltration system. Process flow diagrams and system descriptions should be kept up to date so this represents a non-compliance. The non-compliance was considered non-material given that the change in process flow that had occurred had decreased, not increased risks; and that in practice, staff were using the SCADA system process flow diagram, that was kept up to date, with the SCADA process flow following that of the infrastructure as observed.

The UV critical limit dose in the document referenced in the *Validation and Verification Plan* is 40 mJ/cm<sup>2</sup>. However, the UV critical limit dose in the SCADA system is 22 mJ/cm<sup>2</sup>. The non-compliance was considered non-material in practice due to the additional barriers in place for the scheme. Nonetheless, critical limits documented in the *Water Quality Plan* that has been submitted to IPART and audited, or in its cited documents (such as the *Validation and Verification Plan*), should align with on-ground operations.

Two recommendations have been made as a result of this audit in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to *Water Supply Infrastructure*, as follows:

**REC-LLRW-2020.02:** It is recommended that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (as well as relevant aspects of its *Infrastructure Operating Plan*), that describe the physical infrastructure and process flow to ensure alignment between the documentation and the infrastructure in place.

**REC-LLRW-2020.03:** It is recommended that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (such as the *Validation and Verification Plan*), that describe the critical limit for the UV disinfection system dose to ensure alignment between the documentation and the SCADA system and ensure adequate pathogen reduction.

### 4.2 Review of Actions

Following review of the draft report on the audit findings, the Licensee provided an updated process flow diagram that correctly represented the revised process flow pathway and re-emphasised that the CCP2 Alarm Response Procedures for the UV disinfection system was aligned with the SCADA system. These responses were noted in the audit report and partly addresses the recommendations made.

### 4.3 Opportunities for Improvement

One opportunity for improvement was identified in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to *Water Supply Infrastructure*, as follows:

- **OFI-LLRW-2020.01:** It would be beneficial for LLRW and Veolia to take the next opportunity for updating their documentation to carefully review and update all water quality specification and exceedance response procedures to ensure they are mutually and internally consistent, current, and not at risk of leading to confusion.

## 5. Non-Potable Water Supply Infrastructure

### 5.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to *Non-Potable Water Supply Infrastructure*.

### 5.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 5.3 Opportunities for Improvement

No opportunities for improvement have been identified in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to *Non-Potable Water Supply Infrastructure*.

## 6. Sewerage Infrastructure

### 6.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to *Sewerage Infrastructure*.

### 6.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 6.3 Opportunities for Improvement

No opportunities for improvement have been identified in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to *Sewerage Infrastructure*.

## 7. Schedule B to the Network Operator's Licence

### 7.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of *Schedule B to the Network Operator's Licence*.

### 7.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 7.3 Opportunities for Improvement

No opportunities for improvement have been identified in respect of the audited clauses of *Schedule B to the Network Operator's Licence*.






## **Appendix A** Detailed Audit Findings – General Obligations of a Network Operator

Detailed audit findings in respect of the *General Obligations of a Network Operator* are presented in this Appendix.



**Table A.1** General Obligations – WIC Reg Sched 1 cl.1(2)(a), (b), (c) and (e)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.1(2)(a), (b), (c), and (e)</b>	<p>[1(2)(a)] A network operator must immediately notify IPART of any incident in the conduct of its activities that threatens, or could threaten, water quality, public health or safety.</p> <p>[1(2)(b)] A network operator must immediately notify the Minister administering the <i>Public Health Act 2010 (NSW)</i> and the <i>Public Health Regulation 2012 (NSW)</i> of any incident in the conduct of its activities that threatens, or could threaten, water quality, public health or safety.</p> <p>[1(2)(c)] A network operator must immediately notify the Minister administering Part 2 of the <i>Water Industry Competition Act 2006 (NSW)</i> of any incident in the conduct of its activities that threatens, or could threaten, water quality, public health or safety.</p> <p>[1(2)(e)] A network operator must immediately notify any licensed network operator or public water utility whose infrastructure is connected to the licensed network operator’s infrastructure of any incident in the conduct of its activities that threatens, or could threaten, water quality, public health or safety.</p>	 <b>No Requirement</b>

**Risk**

This requirement reflects a high operational risk. It is essential that relevant stakeholders are made aware of incidents that threaten, or could threaten, water quality, public health or safety.

**Target for Full Compliance**

In the event that a notifiable incident has occurred, evidence that the Licensee provided the required notifications.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant (Reference: PL-BAR-21-8375-3)*, 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan (Reference: PL-BAR-2-8374-2)*, 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant (Reference: PL-BAR-21-8375-4)*, 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan (Reference: PL-BAR-2-8374-3)*, 23 November 2018.
- Veolia, *Barangaroo Critical Control Point Breach Response Procedure*.

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- Veolia, *Barangaroo CCP1 Alarm Response Procedure*, 21 May 2020.
  - Veolia, *Barangaroo CCP2 Alarm Response Procedure*, 3 May 2020.
  - Veolia, *Barangaroo CCP2 Alarm Response Procedure*.
  - Veolia, *Barangaroo Out of Specification Recycled Water*, 17 January 2020.
  - Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, 16 January 2020.
  - Lendlease, *Incident Notification with NSW Health*, 30 May 2019.
  - Lendlease, *Barangaroo Emergency Contact List*, 4 April 2020.
  - Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.
  - Veolia 2020 lab data.xlsm workbook.
  - Veolia, *Barangaroo Recycled Water Plant - Completion Project Validation and Verification Plan*, 3 August 2016.
  - Review of third party laboratory, internal laboratory and SCADA data for the period February 2020.
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### Summary of reasons for grade

The recycled water treatment plant was only operated towards the end of the audit period, from January 2020. Prior to that time, the recycled water network was charged with potable water.

Both during that period, and prior to the scheme operating, both LLRW and Veolia advised that no notifiable incidents had occurred during the audit period. Examination of records of monitoring and inspection of the infrastructure found no evidence to the contrary.

Therefore, it was considered that no notifiable environmental, public health or safety incidents were found to have occurred during the audit period. Accordingly, there was “No Requirement” in respect of these obligations.

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### Discussion and notes

The auditor questioned whether there had been any incidents arising from the conduct of the network operator’s activities during the audit period that threatened, or could have threatened, water quality, public health or safety and, if so, whether IPART, the Minister administering the *Public Health Act 2010 (NSW)* and the *Public Health Regulation 2012 (NSW)*, the Minister administering Part 2 of the *Water Industry Competition Act 2006 (NSW)* and any connected network operator, retail supplier or public water utility had been notified as required.

LLRW advised that the recycled water treatment plant was only operated towards the end of the audit period, from January 2020; prior to that time, the recycled water network was charged with potable water. Both during that period, and prior to the scheme operating, both LLRW and Veolia advised that no notifiable incidents had occurred during the audit period.

Examination of records of monitoring and inspection of the infrastructure found no evidence to the contrary. As described in Table B.2, a sample month of February 2020 was selected and records were reviewed relating to third party laboratory, internal laboratory and SCADA data for that period. Critical limit monitoring records were viewed on the SCADA system and internal and external laboratory monitoring records and summary worksheets were viewed on screen for important compliance monitoring parameters. Those records showed the system functioning as intended and, as concluded in

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Table C.1, there was no evidence of water that was not fit for purpose being delivered or other items that might trigger a need to issue a notification.

Therefore, it was considered that no notifiable environmental, public health or safety incidents were found to have occurred during the audit period.

Veolia and LLRW did demonstrate that they had appropriate notification procedures, forms and processes for issuing notifications if required. These included overarching documents such as the Veolia, *Barangaroo Critical Control Point Breach Response Procedure*, the Lendlease, *Incident Notification with NSW Health*, dated 30 May 2019 and the Lendlease, *Barangaroo Emergency Contact List*, dated 4 April 2020. These were supported by operational level procedures including the Veolia, *Barangaroo CCP1 Alarm Response Procedure*, dated 21 May 2020; Veolia, *Barangaroo CCP2 Alarm Response Procedure*, dated 3 May 2020; Veolia, *Barangaroo Out of Specification Recycled Water*, dated 17 January 2020; and the Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, dated 16 January 2020.

The Veolia procedures were assembled as part of an incident and emergency response manual retained on site. This package of documents, or earlier drafts thereof, was endorsed by NSW Health on 11 June 2019.<sup>1</sup>

In addition LLRW proactively notified a sewer spill incident subsequent to the audit period (albeit not necessarily required to do so since the spill was contained).

Accordingly, there was “No Requirement” in respect of these obligations.

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### **Recommendations**

There are no recommendations in respect of these obligations.

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### **Opportunities for improvement**


No opportunities for improvement have been identified in respect of these obligations.

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<sup>1</sup> Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.

**Table A.2 General Obligations – WIC Reg Sched 1 cl. 3(c)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.3(c)</b>	The water or sewerage infrastructure is properly designed and constructed, operated in a safe and reliable manner and maintained in a proper condition, having regard to any publicly available standards or codes relating to its design, construction, operation and maintenance.	 <b>Non-compliant (non-material)</b>

**Risk**

This requirement reflects a high operational risk. Proper design and construction, safe and reliable operation, and maintenance of infrastructure in proper condition is essential to the effective (safe and reliable) delivery of agreed levels of service.

**Target for Full Compliance**

Evidence that the Licensee has procedures in place for ensuring that practices are kept up to date with changes to such standards or codes.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

**Summary of reasons for grade**

No new infrastructure was constructed during the audit period. The existing infrastructure had been previously assessed under the New Infrastructure Audit as having been designed and constructed having regard to publicly available standards and codes.

Although the recycled water treatment plant has only been operated since January 2020, towards the end of the audit period, it was apparent that, to the extent possible, both the sewerage and recycled water infrastructure was largely maintained in a proper condition, and the recycled water network was being charged with potable water and commercially operated accordingly. Furthermore, on the basis of the auditor’s experience, it appeared that maintenance had been/was being undertaken having regard to the relevant publicly available standards and/or codes and industry practice.

The only exception was the presence of sub-optimal containment of odour and flies within the basement site. Specifically, the sub-optimal containment resulted in minor but noticeable odour and drosophiloid flies in the treatment plant and office areas. The extent of this nuisance was considered to represent a non-material non-compliance.

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## Discussion and notes

### *Overview:*

For the purposes of assessing compliance with WIC Reg Sched 1 cl.3(c), publicly available standards or codes are deemed to include relevant water industry standards, codes and standards published by Standards Australia (or recognised standards organisation) and typical industry practice.

### *Standards of construction:*

No new infrastructure was brought into commercial operation during the audit period, nor is any new infrastructure currently proposed. The infrastructure was previously assessed to have been constructed having regard to compliance with standards and codes,<sup>2</sup> and the following observations made during this audit (by way of example) were consistent with that assessment:

- Instruments, pipes, chemical storage tanks and plant and equipment were clearly labelled, accessible and in good visual condition.
- Chemical storages containing potentially hazardous chemicals (such as 12.5% sodium hypochlorite and citric acid) were bunded and the site as a whole is largely contained over two levels and self-bunded (e.g. bunded small tanks or tank-in-tank bunding for larger tanks).
- By observation, building structures appeared to be consistent with relevant design standards and a high standard of construction.
- By observation, visible pipework appeared to be consistent with applicable standards and industry practice.
- It was apparent that relevant safety considerations have been incorporated into the infrastructure.

On this basis, it is assessed that the infrastructure remained properly designed and constructed having regard to the relevant publicly available standards or codes and good industry practice.

### *Operation and Maintenance of Infrastructure:*

Although the recycled water treatment plant has only been operated since January 2020, towards the end of the audit period, it was apparent that, to the extent possible, both the sewerage and recycled water infrastructure was largely maintained in a proper condition.

It was noted that both the duty and standby process trains were functional and being operated during this audit, providing redundancy to the scheme, particularly under its current low flow conditions (due to COVID).

Labelling was sufficiently clear on all infrastructure and chemicals were suitably stored, very clearly labelled and suitably bunded. Material Safety Data Sheets were in place for the chemicals on site.

On the day of the audit, the process monitoring instruments were functional and reading appropriately to the functional SCADA system. Instruments inspected included the PT-300 and PT-400 pressure transducers on membrane Skids 3 and 4, respectively, of Train 2; the AIT-320 TBS321 turbidimeter downstream of the membranes; instrument AIT-500 CLS510/CLS520/CLS530 reading chlorine, pH and temperature (respectively), downstream of chlorination; and the UV disinfection system control panel and UVT sensor. In addition, flow meters were shown to be operational, such as the main water meter measuring the supplied water, being RWMT-100 (displaying 5708 kL at the time of the audit), and the customer meter supplying Tower 2, being BB1 B1 RWMT 400 (displaying 95309 kL at the time of the audit). The SCADA system was kept up to date, with the process flow diagram aligned with the system as observed.

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<sup>2</sup> Cobbitty Consulting and Viridis Consultants, *New Infrastructure Audit Report, Barangaroo Recycled Water Scheme, February 2017*.



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The only exception was the presence of sub-optimal containment of odour and flies within the basement site that has become apparent now that the system is in operation. The sub-optimal containment resulted in minor but noticeable odour and drosophiloid flies. The extent did not impact on the nearby basement car park and was limited to the footprint of the treatment plant and office.

Whilst no more than a minor nuisance, and not sufficient to render the workplace intolerable, it isn't normal practice to have this level of odour or fly activity in a basement recycled water scheme. For the purposes of the audit, the situation was assessed from the perspective of the requirement for the infrastructure to be "...operated in a safe and reliable manner and maintained in a proper condition, having regard to any publicly available standards or codes...". Consideration was given to the fact that whilst the odour wasn't strong and flies were limited in number, the scheme isn't running at its probable future flow and sewer input rate due to COVID restrictions, it's still quite a young scheme, and it's not yet summer temperatures. Over time, the odour and flies may worsen.

In relation to odour, the level of ventilation provided by the air conditioning system doesn't clearly meet the recommendations set out in the "*Code of Practice on managing the work environment and facilities*", being an approved code of practice under section 274 of the *Work Health and Safety Act* from Safe Work Australia. The Code requires that "*Workplaces should be adequately ventilated...prevent the excessive accumulation of odours*". It is possible that sensitive persons, or persons not familiar with sewage, would find the level of odour 'excessive'.

In relation to flies, it was noted that the level of activity was higher than the sort of background levels found in any workplace, and that the flies are coming from raw sewage and sludge. This presents a reasonably foreseeable risk to health and safety that needs to be reduced to as low as reasonably practicable.

Steps had been taken to reduce this risk, such as the use vent stacks to remove odours, keeping the office area of the workspace separated by a door from the main treatment plant, and adding UV lamp insect 'zappers' to help keep fly numbers down. Nonetheless, both the odour and flies could impact on operations due to their effect on worker morale and potential to cause distraction, as well as presenting a risk of pathogen transmission noting that food consumption is permitted within the site, which is a workplace.

At this point the extent of this nuisance was considered to represent a non-compliance that at present was non-material. There is, however, the possibility that the non-compliance could become material in future if it became intolerable and threatened worker safety, particularly in summer as the sewage becomes warmer, and post-COVID as more people return to work in the towers supplying the plant. Therefore, it is recommended (**REC-LLRW-2020.01**) that LLRW and/or Veolia identify the root cause of poor containment of odour and flies at the recycled water treatment plant and make changes to curtail the pathways for both the odour and vector transmission.

#### ***Currency of Standards and Codes:***

Under the provisions of its operation and maintenance service contracts with LLRW, Veolia is responsible for the preparation and maintenance of all relevant procedural documentation and for undertaking all operation and maintenance activities. When required, access to current versions of relevant standards and codes is available via Veolia's subscription to the SAI Global "Standards Online" portal.

Accordingly, LLRW is considered to have complied with this obligation during the audit period.

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#### **Recommendations**

The following recommendation is made in respect of these obligations:

- **REC-LLRW-2020.01:** It is recommended that LLRW and/or Veolia identify the root cause of poor containment of odour and flies at the recycled water treatment plant and make changes to curtail the pathways for both the odour and vector transmission.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of these obligations.

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## **Appendix B** Detailed Audit Findings – Water Supply Infrastructure

Detailed audit findings in respect of the obligations related to *Water Supply Infrastructure* are presented in this Appendix.



**Table B.1 Water Supply Infrastructure – WIC Reg Sched 1 cl. 6(2)(a) and 6(3)(a)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl. 6(2)(a) and 6(3)(a)</b>	[6(2)(a)] The network operator must ensure that the infrastructure operating plan is fully implemented and kept under regular review and all of the network operator’s activities are carried out in accordance with that plan.	Clause 6(2)a:  <b>Compliant</b>
	[6(3)(a)] If the Minister or IPART so demands, or if any significant change is made to its infrastructure operating plan, the licensee must provide the Minister or IPART with a report, prepared by an approved auditor in such manner and form as the Minister or IPART may direct, as to the adequacy of the plan, and as to the condition of its infrastructure, having regard to the purpose for which it is licensed.	Clause 6(3)(a):  <b>No Requirement</b>

**Risk**

This requirement reflects a high operational risk. Maintenance and implementation of the *Infrastructure Operating Plan* ensures the effective (safe and reliable) delivery of agreed levels of service.

**Target for Full Compliance**

Evidence that the *Infrastructure Operating Plan* is fully implemented and the Licensee’s activities are carried out in accordance with that *Plan*; evidence that the *Plan* is kept under regular review; evidence that if the plan is subjected to any significant change then the plan is submitted and subjected to audit.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

**Summary of reasons for grade**

***Clause 6(2)(a) – Implementation of the Infrastructure Operating Plan:***

LLRW demonstrated that it is fully implementing, and is carrying out its infrastructure management activities in accordance with principles/arrangements documented in, the *Infrastructure Operating Plan*.

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LLRW also demonstrated that the *Infrastructure Operating Plan* was kept under review having been updated during the audit period.

Accordingly, LLRW was assessed as having demonstrated full compliance with this obligation during the audit period.

***Clause 6(3)(a) – Significant Change to the Infrastructure Operating Plan:***

There were no significant changes to the *Infrastructure Operating Plan* during the audit period or subsequently.

Accordingly, LLRW was assessed as having no requirement with this obligation during the audit period.

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**Discussion and notes**

***Clause 6(2)(a) – Implementation of the Infrastructure Operating Plan:***

The auditors checked for evidence that the *Infrastructure Operating Plan* was being fully implemented and kept under regular review and that all of the Network Operator’s activities are carried out in accordance with that Plan.

As reported in Table A.2, no new infrastructure was brought into commercial operation during the audit period. As also reported in Table A.2, operation and maintenance of the infrastructure is undertaken in accordance with the general principles outlined in the *Infrastructure Operating Plan* and *Water Quality Plan*.

Although no new water supply infrastructure was constructed during the audit period, and the recycled water treatment plant was only operated routinely from January 2020, significant repair and maintenance work was undertaken during the audit period. It is noted that some of the processes present within the scheme have changed during the audit period in ways that are not reflected in the *Infrastructure Operating Plan*. Specifically, water has been routed via a repurposed reverse osmosis system that is now a nanofiltration system. This is an excellent innovation but needs to be reflected in the *Infrastructure Operating Plan*. A non-compliance has not been noted under the audit of the *Infrastructure Operating Plan* but has been noted under the audit of the *Water Quality Plan* in Table B.2.

A detailed assessment of asset condition was conducted, including draining and assessing tanks and storages and assessing conditions of pumps, pipes and walls for corrosion and integrity. The new nanofiltration system was shown to be effective at removing colour to make the water more acceptable for use. Therefore, whilst the infrastructure was not operated to produce recycled water during most of the audit period, robust maintenance practices were effectively implemented.

Similarly, no new sewerage infrastructure was constructed during the audit period; however, the existing infrastructure was operated to collect sewage and discharge it to the Sydney Water sewerage network under agreement. Minimal operation and maintenance activity was required in respect of this passive infrastructure.

Veolia, being an “Authorised person” contracted to undertake operation and maintenance of the infrastructure for LLRW, uses its VAMS (Veolia Asset Management System), a Computerised Maintenance Management System (CMMS) to manage (and record) its maintenance activities. Examples were witnessed of instruments, such as the Hach 1720E turbidity analyser post the membrane filtration units and the chlorine/pH/temperature post-dosing analyser, having been calibrated during the audit period (12 March 2020). Likewise, examples were witnessed of benchtop instruments having been calibrated during the audit period including the Merck Spectroquant Prove 1000 (21 July 2020). The flow meter supplying Tower 2 (BB1 B1 RWMT 400) was calibrated 31 July 2014 (outside of the audit period; but the calibration certificate was still evident and considered current).

On the basis of the observations made, records sighted and discussions with LLRW/Veolia representatives during the audit, it is apparent that operation and maintenance of the infrastructure had

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been undertaken (to the extent applicable) in accordance with the principles/arrangements outlined in the *Infrastructure Operating Plan*.

The *Infrastructure Operating Plan* was updated to Revision 4 (dated 22 November 2018) during the audit period and, as such, has been kept largely up to date. It is noted that the recycled water treatment plant is subject to continuous review and quality assurance as part of Veolia's ISO 9001:2015 certification.

It is therefore assessed that, for the purposes of this obligation, the *Infrastructure Operating Plan* was adequately kept under review during the audit period, noting that:

- the infrastructure was only operated to produce recycled water towards the latter part of the audit period (from January 2020); and
- the primary focus of activity during the bulk of the audit period was on assessing the condition of the infrastructure and undertaking necessary repair and maintenance activities and then moving to routine supply of recycled water rather than potable water for the non-potable water infrastructure.

Accordingly, LLRW is considered to have complied with this obligation during the audit period.

***Clause 6(3)(a) – Significant Change to the Infrastructure Operating Plan:***

The *Infrastructure Operating Plan* was updated during the audit period to Revision 4 (dated 22 November 2018). The changes were routine updates that were not considered significant and, as such, a Licence Plan Audit wasn't considered warranted.

Consequently, there was no requirement to conduct such an audit.

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**Recommendations**

There are no recommendations in respect of this obligation.

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**Opportunities for improvement**

No opportunities for improvement have been identified in respect of these obligations.

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**Table B.2 Water Supply Infrastructure – WIC Reg Sched 1 cl. 7(4)(a) and 7(5)(a)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl. 7(4)(a) and 7(5)(a)</b>	[7(4)(a)] The network operator must ensure that its water quality plan is fully implemented and kept under regular review and the network operator’s activities are carried out in accordance with that plan.	Clause 7(4)a:  <b>Non-compliant (non-material)</b>
	[7(5)(a)] If the Minister or IPART so demands, or if any significant change is made to its water quality plan, the licensee must provide the Minister or IPART with a report, prepared by an approved auditor in such manner and form as the Minister or IPART may direct, as to the adequacy of the plan.	Clause 7(5)(a):  <b>No Requirement</b>

**Risk**

This requirement reflects a high operational risk. Implementation of the *Water Quality Plan* ensures that the water supplied complies with the specified quality requirement.

**Target for Full Compliance**

Evidence that the *Water Quality Plan* is fully implemented and the Licensee’s activities are carried out in accordance with that *Plan*; evidence that the *Plan* is kept under regular review; evidence that if the plan is subjected to any significant change then the plan is submitted and subjected to audit.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.
- Veolia, *Barangaroo Critical Control Point Breach Response Procedure*.
- Veolia, *Barangaroo CCP1 Alarm Response Procedure*, 21 May 2020.
- Veolia, *Barangaroo CCP2 Alarm Response Procedure*, 3 May 2020.
- Veolia, *Barangaroo CCP2 Alarm Response Procedure*.

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- Veolia, *Barangaroo Out of Specification Recycled Water*, 17 January 2020.
  - Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, 16 January 2020.
  - Lendlease, *Incident Notification with NSW Health*, 30 May 2019.
  - Lendlease, *Barangaroo Emergency Contact List*, 4 April 2020.
  - Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.
  - Veolia 2020 lab data.xlsm workbook.
  - Veolia, *Barangaroo Recycled Water Plant - Completion Project Validation and Verification Plan*, 3 August 2016.
  - Review of third party laboratory, internal laboratory and SCADA data for the period February 2020.
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### Summary of reasons for grade

#### ***Clause 7(4)(a) – Implementation of the Water Quality Plan:***

LLRW demonstrated that it is largely implementing, and is carrying out its infrastructure management activities in accordance with principles/arrangements documented in, the *Water Quality Plan*. LLRW also demonstrated that the *Water Quality Plan* was kept under review having been updated during the audit period. Two non-compliances were identified. Specifically, the system description and process flow diagram had not been updated in the *Water Quality Plan* to reflect the modified process flow since the introduction of the nanofiltration; and the UV critical limit dose in the *Validation and Verification Plan* was not aligned with that given in the SCADA system. The non-compliances were considered non-material since the addition of nanofiltration reduces risks and is of benefit to the scheme; whilst the additional barriers in place for the scheme mitigate the risk associated with the reduced UV dose critical limit. Accordingly, a non-material non-compliance was found for this clause.

#### ***Clause 7(5)(a) – Significant Change to the Water Quality Plan:***

The *Water Quality Plan* was updated during the audit period to Revision 3 (dated 23 November 2018). The changes were routine updates that were not considered significant and, as such, a Licence Plan Audit was not considered warranted. Accordingly, LLRW was assessed as having no requirement with this obligation during the audit period.

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### Discussion and notes

#### ***Clause 7(4)(a) – Implementation of the Water Quality Plan:***

The auditors checked for evidence that the *Water Quality Plan* was being fully implemented and kept under regular review and that all of the Network Operator's activities are carried out in accordance with that Plan. As reported in Table A.2, no new infrastructure was brought into commercial operation during the audit period, and operation and maintenance of the infrastructure is undertaken in accordance with the general principles outlined in the *Infrastructure Operating Plan* and *Water Quality Plan*.

#### ***Instrument maintenance***

Veolia, being an "Authorised person" contracted to undertake operation and maintenance of the infrastructure for LLRW, uses its VAMS (Veolia Asset Management System), a Computerised Maintenance Management System (CMMS) to manage (and record) its maintenance activities. Examples were witnessed of online monitoring instruments, such as the Hach 1720E turbidity analyser post the membrane filtration units and the chlorine/pH/temperature post-dosing analyser, having been calibrated during the audit period (12 March 2020). Likewise, examples were witnessed of benchtop

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instruments having been calibrated during the audit period including the Merck Spectroquant Prove 1000 (21 July 2020). These works and their completion are scheduled in the CMMS and in on-site local logbooks. Reagents kept on site were stored appropriately and remained 'in date'. This included the Merck Photocheck DPD powder (expiry 30/11/20). Records of calibration of the instrument, and cross-checking online with benchtop instruments were observed in the online log book. Although the recycled water treatment plant has only been operated since January 2020, towards the end of the audit period, it was apparent that, to the extent possible, the recycled water quality monitoring instruments were maintained in a proper condition.

### ***System description***

The system description in the text and process flow diagram in the *Water Quality Plan* were largely consistent with the observed infrastructure. However, the diagram was still the original WJPS version and that diagram and text didn't explain the revised pathway of water through the nanofiltration system. Process flow diagrams and system descriptions should be kept up to date so this represents a non-compliance. The non-compliance was considered non-material given that the change in process flow that had occurred had decreased, not increased risks; and that in practice, staff were using the SCADA system process flow diagram, that was kept up to date, with the SCADA process flow following that of the infrastructure as observed. In addition, a revised and compliant flow diagram was shared with the auditor shortly after completion of the site audit. Nonetheless, it is recommended (**REC-LLRW-2020.02**) that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (as well as relevant aspects of its *Infrastructure Operating Plan*), that describe the physical infrastructure and process flow to ensure alignment between the documentation and the infrastructure in place.

### ***CCP monitoring***

On the day of the audit process monitoring instruments inspected included the PT-300 and PT-400 pressure transducers on membrane Skids 3 and 4 of Train 2; the AIT-320 TBS321 turbidimeter downstream of the membranes; instrument AIT-500 CLS510/CLS520/CLS530 reading chlorine, pH and temperature (respectively), downstream of chlorination; and the UV disinfection system control panel and UVT sensor. In addition, flow meters were shown to be operational, such as RWIT-100 (displaying 5,708 kL at the time of the audit), noting that flow rates are critical to inform disinfection.

The critical limit monitoring instruments were found to be functional on the day of the audit with displays being clearly visible on both the instruments and SCADA system. Instruments and SCADA readings were found to be adequately mutually consistent and scaled appropriately and SCADA system was found to be functional. A sample of the critical limit monitoring instruments was inspected, and found to be reading within appropriate ranges and being consistent, as follows:

<b>Instrument</b>	<b>Instrument display</b>	<b>Time read</b>	<b>SCADA reading</b>	<b>Time read</b>	<b>Result</b>
PT-300 membrane Train 2 Skid 3 pressure transducer (kPa)	8.7	09:35	8.69	09:35	Consistent
PT-400 Train 2 Skid 4 pressure transducer (kPa)	9.0	09:35	9.07	09:35	Consistent
TBS321/AIT320 filtered water turbidity meter (NTU)	0.058	09:35	0.057	09:35	Consistent
CLS510/AIT-500 post dosing chlorine analyser (mg/L)	2.82	09:52	2.84	09:52	Consistent
CLS520/AIT-500 post dosing pH analyser (pH units)	7.3	09:52	7.37	09:52	Consistent
CLS530/AIT-500 post dosing temperature analyser (°C)	25	09:52	25.06	09:52	Consistent

The process control setpoints (critical, action and alert limits) for the CCPs were checked for alignment between the *Water Quality Plan* (and any relevant subordinate documents) and SCADA system. Most of the settings were adequately mutually consistent with the exception of the UV system. Specifically, the UV critical limit dose in the *Validation and Verification Plan* is 40 mJ/cm<sup>2</sup> dose to achieve 0.5 log<sub>10</sub> virus reduction. However, the critical limit dose in the SCADA system is 22 mJ/cm<sup>2</sup> *Cryptosporidium* reduction equivalent dose (RED) to achieve 4.0 log<sub>10</sub> protozoan pathogen reduction. Critical limits should be consistent between the *Water Quality Plan* (and any relevant subordinate documents) and SCADA system, albeit in some cases the SCADA system sets tighter critical limits, which is generally acceptable. In this case the critical limit in the SCADA system aligned with the *CCP2 Alarm Response Procedure* but is less stringent than that indicated in the *Validation and Verification Plan*. This discrepancy represents a non-compliance.

The non-compliance was considered non-material because in practice the 40 mJ/cm<sup>2</sup> dose given in the original documentation could potentially now be replaced with a 22 mJ/cm<sup>2</sup> *Cryptosporidium* RED dose without compromising the quality of the water produced given the additional barriers in the scheme. The *Validation and Verification Plan*, and outcomes of the workshop to review the currency of the validation evidence relating to the scheme (*Barangaroo Validation Review Workshop Minutes*, 27 March 2018), should be reviewed and updated to explain how the required additional 0.5 log<sub>10</sub> virus reduction is achieved, e.g. through attributing more virus reduction to the MBR system, the nanofiltration system or setting the UV RED for viruses in order to achieve 0.5 log<sub>10</sub> virus reduction, as per the original design. It is recommended (**REC-LLRW-2020.03**) that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents (such as the *Validation and Verification Plan*) that describe the critical limit dose for the UV disinfection system to ensure alignment between all relevant documentation and the SCADA system and ensure adequate pathogen reduction.

The observations made in relation to the critical setpoints are summarised as follows:

CCP operational monitoring parameter	SCADA system process control limits	<i>Water Quality Plan</i> (or subordinate document) process control limits	Result
Pressure decay rate across membrane skids (kPa/min)	70 (critical) 50 (action) 25 (alert)	70 (critical) 50 (action) 25 (alert)	Consistent
Turbidity leaving membrane trains (NTU after 15 min)	0.15 (critical) 0.13 (action) 0.11 (alert)	0.15 (critical) 0.13 (action) 0.11 (alert)	Consistent
UV dose (mJ/cm <sup>2</sup> )	22 (critical) 24 (action) 26 (alert)	40 (critical) 42 (action) 44 (alert)	Inconsistent for a critical limit (non-compliance)
Free chlorine in chlorine contact tank (mg/L)	1.85 (critical) 2.0 (action) 2.2 (alert) 4.5 (alert) 5.0 (action) 5.50 (critical)	1.85 (critical) 2.0 (action) 2.2 (alert) 4.5 (alert) 5.0 (action) 5.50 (critical)	Consistent
pH in chlorine contact tank (pH units)	6.5 (critical) 6.6 (action) 6.7 (alert) 7.3 (alert) 7.8 (action) 8.0 (critical)	6.5 (critical) 6.6 (action) 6.7 (alert) 7.7 (alert) 7.85 (action) 8.0 (critical)	Adequately consistent

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## Verification monitoring

Verification monitoring results were checked during the audit. It was easy to audit Veolia on this since all results were retained in a well-presented workbook (Veolia 2020 lab data.xlsm). Weekly monitoring was taking place for compliance parameters: *E. coli*, *Clostridium perfringens* spores and coliphage; with monthly monitoring taking place for compliance parameters: BOD and TSS. A number of other parameters were also tested. The same worksheets captured operational data, such as bench measurements made by Veolia. The results were viewed for February 2020 and monitoring was observed to be taking place as set out in the *Water Quality Plan* and subordinate documents with no exceedances observed in the results viewed. Results are entered into the worksheet manually to encourage operators to view the results and ensure that they are checked.

For samples for the same month of February 2020, Chains of Custody and Certificates of Analysis were viewed. For samples collected on 28 February 2020 the results for compliance parameters *E. coli*, *Clostridium perfringens* spores, coliphage, BOD and TSS were reported (Certificate of Analysis ES2007010 from ALS). No exceedances were noted from those results and all of the relevant information required under this audit clause was documented, including the NATA signatories being named on the PDF Certificates of Analysis files from the laboratory.

## Incident response

Veolia and LLRW demonstrated that they had appropriate notification procedures, forms and processes for issuing notifications if required. These included overarching documents such as the Veolia, *Barangaroo Critical Control Point Breach Response Procedure*, the Lendlease, *Incident Notification with NSW Health*, dated 30 May 2019; and the Lendlease, *Barangaroo Emergency Contact List*, dated 4 April 2020. These were supported by operational level procedures including the Veolia, *Barangaroo CCP1 Alarm Response Procedure*, dated 21 May 2020; Veolia, *Barangaroo CCP2 Alarm Response Procedure*, dated 3 May 2020; Veolia, *Barangaroo Out of Specification Recycled Water*, dated 17 January 2020; and the Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, dated 16 January 2020. The documents contain useful flow diagrams to guide incident response. The Veolia procedures were assembled as part of an incident and emergency response manual retained on site making them readily available. This package of documents, and some earlier drafts thereof, was endorsed by NSW Health on 11 June 2019.<sup>3</sup>

Upon detailed review, it became evident that this package of documents was not quite consistent. For instance, the document Veolia, *Barangaroo Out of Specification Recycled Water*, dated 17 January 2020, identifies *E. coli*, *Clostridium* and coliphages under its specifications; whereas the document Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, dated 16 January 2020, lists *Cryptosporidium*, *Giardia* and viruses (2 per 50 L) under its specifications.

Furthermore, the procedures had clear titles but the ‘purpose’ sections contained ‘copy and paste’ errors from other documents. For instance, the document Veolia, *Barangaroo Critical Control Point Breach Response Procedure* referred in its purpose to ‘sewer spills’ (as it was presumably developed using a sewer spill response document as a starting template); whilst the document Veolia, *Barangaroo Out of Specification Recycled Water*, dated 17 January 2020, referred in its purpose to ‘odour’ (as it was presumably developed using an odour response document as a starting template). In addition, the documentation still refers to LLLU and not Podium in some cases (e.g. the LLLU Operations Manager).

These typographical and other minor anomalies were not considered non-compliant but certainly represent an important OFI. Specifically, as an OFI (**OFI-LLRW-2020.01**), it would be beneficial for LLRW and Veolia to take the next opportunity for updating their documentation to carefully review and update all water quality specification and exceedance response procedures to ensure they are mutually and internally consistent, current, and not at risk of leading to confusion.

## Summary of observations

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<sup>3</sup> Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.



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On the basis of the observations made, records sighted and discussions with LLRW/Veolia representatives during the audit, it is apparent that operation and maintenance of the infrastructure had largely been undertaken (to the extent applicable) in accordance with the principles/arrangements outlined in the *Water Quality Plan*.

The *Water Quality Plan* was updated to Revision 3 (dated 23 November 2018) during the audit period and, as such, has been kept up to date. It is noted that the recycled water treatment plant is subject to continuous review and quality assurance as part of Veolia's ISO 9001:2015 certification.

It is therefore assessed that, for the purposes of this obligation, the *Water Quality Plan* was adequately kept under review during the audit period, noting that:

- the infrastructure was only operated to produce recycled water towards the latter part of the audit period (from January 2020); and
- the primary focus of activity during that period was on assessing the condition of the infrastructure and undertaking necessary repair and maintenance activities and then supplying recycled water routinely rather than using potable replacement.

Accordingly, LLRW is considered to have largely complied with this obligation during the audit period. The exceptions, as noted above, relate to the outdated process flow diagram and system description as well as the misalignment between the UV critical limit in the *Water Quality Plan's* cited subordinate documentation and the SCADA setpoint for that limit.

***Clause 7(5)(a) – Significant Change to the Water Quality Plan:***

The *Water Quality Plan* was updated during the audit period to Revision 3 (dated 23 November 2018). The changes were routine updates that were not considered significant and, as such, a Licence Plan Audit wasn't considered warranted.

Accordingly, LLRW was assessed as having no requirement with this obligation during the audit period.

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## **Recommendations**

The following recommendations are made in respect of these obligations:

- **REC-LLRW-2020.02:** It is recommended that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (as well as relevant aspects of its *Infrastructure Operating Plan*), that describe the physical infrastructure and process flow to ensure alignment between the documentation and the infrastructure in place.
  - **REC-LLRW-2020.03:** It is recommended that LLRW and Veolia update the *Water Quality Plan* and/or any subordinate documents, (such as the *Validation and Verification Plan*), that describe the critical limit dose for the UV disinfection system to ensure alignment between the documentation and the SCADA system and ensure adequate pathogen reduction.
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## **Opportunities for improvement**


One opportunity for improvement was identified in respect of the assessed audit criteria, as follows:

- **OFI-LLRW-2020.01:** It would be beneficial for LLRW and Veolia to take the next opportunity for updating their documentation to carefully review and update all water quality specification and exceedance response procedures to ensure they are mutually and internally consistent, current, and not at risk of leading to confusion.
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## **Appendix C Detailed Audit Findings** **– Non-Potable Water Supply Infrastructure**

Detailed audit findings in respect of the obligations related to *Non-Potable Water Supply Infrastructure* are presented in this Appendix.

**Table C.1 Non-Potable Water Supply Infrastructure – WIC Reg Sched 1 cl.10(a)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.10(a)</b>	The network operator under a Licence for water infrastructure to supply non-potable water for a particular purpose must ensure that the water supplied is fit for that purpose.	 <b>Compliant</b>

Risk	Target for Full Compliance
This requirement reflects a high operational risk. It is essential from a safety viewpoint that water supplied for a particular purpose is fit for that purpose.	Evidence that the water supplied is fit for purpose.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant (Reference: PL-BAR-21-8375-3)*, 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan (Reference: PL-BAR-2-8374-2)*, 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant (Reference: PL-BAR-21-8375-4)*, 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan (Reference: PL-BAR-2-8374-3)*, 23 November 2018.
- Veolia, *Barangaroo Critical Control Point Breach Response Procedure*.
- Veolia, *Barangaroo CCP1 Alarm Response Procedure*, 21 May 2020.
- Veolia, *Barangaroo CCP2 Alarm Response Procedure*, 3 May 2020.
- Veolia, *Barangaroo CCP2 Alarm Response Procedure*.
- Veolia, *Barangaroo Out of Specification Recycled Water*, 17 January 2020.
- Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, 16 January 2020.
- Lendlease, *Incident Notification with NSW Health*, 30 May 2019.
- Lendlease, *Barangaroo Emergency Contact List*, 4 April 2020.
- Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.
- Veolia 2020 lab data.xlsm workbook.



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- Veolia, *Barangaroo Recycled Water Plant - Completion Project Validation and Verification Plan*, 3 August 2016.
  - Review of third party laboratory, internal laboratory and SCADA data for the period February 2020.
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### **Summary of reasons for grade**

The recycled water treatment plant was only operated towards the end of the audit period, from January 2020. Both during that period, and prior to the scheme operating, both LLRW and Veolia advised that all water supplied was fit for purpose. Examination of records of monitoring and inspection of the infrastructure found no evidence to the contrary. Therefore, it was considered that all water supplied has been fit for purpose during the audit period.

Accordingly, LLRW was assessed to have demonstrated compliance with this obligation during the audit period.

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### **Discussion and notes**

Table B.2 provides details of the assessment of the quality of water supplied during the audit period and covers operational and verification monitoring.

Table A.1 provides details of the assessment of notifiable incidents, which would include incidents relating to the supply of water that was not fit for purpose.

Based on the evidence reviewed and set out in detail in those tables, there is no reason to believe that LLRW supplied water that was not fit for purpose and there is evidence that LLRW would have been alerted to any such occurrence. In addition it is noted that the scheme has only been fully operational (i.e. recycled water being produced and supplied) since January 2020.

Accordingly, LLRW was assessed to have demonstrated compliance with this obligation during the audit period.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of these obligations.



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## **Appendix D** Detailed Audit Findings – Sewerage Infrastructure

Detailed audit findings in respect of the obligations related to *Sewerage Infrastructure* are presented in this Appendix.



**Table D.1 Sewerage Infrastructure – WIC Reg Sched 1 cl.13(2)(a) and 13(3)(a)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.13(2)(a) and 13(3)(a)</b>	The network operator must ensure that the infrastructure operating plan is fully implemented and kept under regular review and all of the network operator’s activities are carried out in accordance with that plan.	Clause 13(2)a:  <b>Compliant</b>
	If the Minister or IPART so demands, or if any significant change is made to its infrastructure operating plan, the licensee must provide the Minister or IPART with a report, prepared by an approved auditor in such manner and form as the Minister or IPART may direct, as to the adequacy of the plan, and as to the condition of its infrastructure, having regard to the purpose for which it is licensed.	Clause 13(3)(a):  <b>No Requirement</b>

**Risk**

This requirement reflects a high operational risk. Implementation of the *Infrastructure Operating Plan* ensures the effective (safe and reliable) delivery of agreed levels of service.

**Target for Full Compliance**

Evidence that the *Infrastructure Operating Plan* is fully implemented and the Licensee’s activities are carried out in accordance with that *Plan*; evidence that the *Plan* is kept under regular review; evidence that if the plan is subjected to any significant change then the plan is submitted and subjected to audit.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

**Summary of reasons for grade**

***Clause 13(2)(a) – Implementation of the Infrastructure Operating Plan:***

As reported in Table B.1, LLRW demonstrated that it is fully implementing, and is carrying out its infrastructure management activities in accordance with principles/arrangements documented in, the

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*Infrastructure Operating Plan*. LLRW also demonstrated that the *Infrastructure Operating Plan* was kept under review having been updated during the audit period.

Accordingly, LLRW was assessed as having demonstrated full compliance with this obligation during the audit period.

***Clause 13(3)(a) – Significant Change to the Infrastructure Operating Plan:***

There were no significant changes to the *Infrastructure Operating Plan* during the audit period or subsequently.

Accordingly, LLRW was assessed as having no requirement with this obligation during the audit period.

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**Discussion and notes**

Implementation, review and changes to the *Infrastructure Operating Plan* are discussed in detail in Table B.1 and the conclusions drawn in that assessment cover the clauses assessed here. Therefore, no additional comment is made in this section of the audit report.

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**Recommendations**

There are no recommendations in respect of this obligation.



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**Opportunities for improvement**

No opportunities for improvement have been identified in respect of these obligations.

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Table D.2 Sewerage Infrastructure – WIC Reg Sched 1 cl.14(3)(a) and 14(4)(a)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.14(3)(a) and 14(4)(a)</b>	A network operator must ensure its sewage management plan is fully implemented and kept under regular review and all its activities are carried out in accordance with the plan.	Clause 14(3)a:  <b>Compliant</b>
	If the Minister or IPART so demands, or if any significant change is made to its sewage management plan, the licensee must provide the Minister or IPART with a report, prepared by an approved auditor in such manner and form as the Minister or IPART may direct, as to the adequacy of the plan.	Clause 14(4)(a):  <b>No Requirement</b>

**Risk**

This requirement reflects a high operational risk. Implementation of the *Sewage Management Plan* ensures that the services required are provided.

**Target for Full Compliance**

Evidence that the *Sewage Management Plan* is fully implemented and the Licensee’s activities are carried out in accordance with that *Plan*; evidence that the *Plan* is kept under regular review; evidence that if the plan is subjected to any significant change then the plan is submitted and subjected to audit.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

**Summary of reasons for grade**

**Clause 14(3)(a) – Implementation of the Sewage Management Plan:**

LLRW demonstrated that the principles/arrangements outlined in the *Sewage Management Plan* had been implemented (to the extent applicable) during the audit period. LLRW also demonstrated that the *Sewage Management Plan* was kept under review having been updated during the audit period.

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Accordingly, LLRW was assessed to have demonstrated compliance with this obligation during the audit period.

***Clause 14(4)(a) – Significant Change to the Sewage Management Plan:***

The *Sewage Management Plan* was updated during the audit period to Revision 3 (dated 23 November 2018). The changes were routine updates that were not considered significant and, as such, a Licence Plan Audit wasn't considered warranted.

Accordingly, LLRW was assessed as having no requirement with this obligation during the audit period.

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**Discussion and notes**

The auditors checked for evidence that the *Sewage Management Plan* was being fully implemented and kept under regular review and that all of the Network Operator's activities are carried out in accordance with that Plan. The LLRW *Sewage Management Plan* is a combined *Water Quality Plan* and *Sewage Management Plan*.

As reported in Table A.2, no new infrastructure was brought into commercial operation during the audit period. As also reported in Table A.2, operation and maintenance of the infrastructure is undertaken in accordance with the general principles outlined in the *Infrastructure Operating Plan* and *Water Quality Plan*. The latter is integrated with the *Sewage Management Plan* as one document.

Since most of the infrastructure relating to recycled water production was not operated to produce recycled water during most of the audit period, sewage management largely entailed discharging sewage to the Sydney Water sewerage system. Beyond that, from January 2020, the sewage management principally related to maintenance of the infrastructure. During the audit the standard of inspectable sewerage infrastructure was sound with no evidence of leaks or poor signage or labelling. As noted in Table A.2 a non-compliance was raised relating to odour and flies – that non-compliance is not repeated here as it relates to the condition of the infrastructure and not the implementation of the Plan.

Beyond that, implementation, review and changes to the *Sewage Management Plan* are discussed in detail in Table B.2 and infrastructure management in Table B.1, and the conclusions drawn in those assessments cover the clauses assessed here. Therefore, no additional comment is made in this section of the audit report.

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**Recommendations**

There are no recommendations in respect of this obligation.

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**Opportunities for improvement**

No opportunities for improvement have been identified in respect of these obligations.

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## **Appendix E Detailed Audit Findings – Schedule B to the Network Operator’s Licence**

Detailed audit findings in respect of the obligations under *Schedule B to the Network Operator’s Licence* are presented in this Appendix.





**Table E.1** Schedule B to the Network Operator's Licence – Clause B1

Clause	Requirement	Compliance Grade
<b>Network Operator's Licence cl.B1</b>	<p>The Licensee must carry out the activities authorised by this Licence in compliance with any requirements of NSW Health that:</p> <p>a) IPART has agreed to; and,</p> <p>b) are notified from time to time to the Licensee by IPART in writing.</p>	 <b>Compliant</b>
<b>Risk</b>	<p>This requirement reflects a high operational risk. It is essential that the activities authorised by the Licence are carried out in accordance with any requirements of NSW Health.</p>	<b>Target for Full Compliance</b>
		<p>Evidence that the Licensee carried out the activities authorised by this Licence in compliance with any requirements of NSW Health that IPART has agreed to and notified from time to time to the Licensee in writing.</p>
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.</li> <li>▪ Veolia, <i>Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant</i> (Reference: PL-BAR-21-8375-3), 16 August 2016.</li> <li>▪ Veolia, <i>Water Quality Management (and Sewage Management) Plan</i> (Reference: PL-BAR-2-8374-2), 18 April 2016.</li> <li>▪ Veolia, <i>Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant</i> (Reference: PL-BAR-21-8375-4), 22 November 2018.</li> <li>▪ Veolia, <i>Water Quality Management (and Sewage Management) Plan</i> (Reference: PL-BAR-2-8374-3), 23 November 2018.</li> <li>▪ Veolia, <i>Barangaroo Critical Control Point Breach Response Procedure</i>.</li> <li>▪ Veolia, <i>Barangaroo CCP1 Alarm Response Procedure</i>, 21 May 2020.</li> <li>▪ Veolia, <i>Barangaroo CCP2 Alarm Response Procedure</i>, 3 May 2020.</li> <li>▪ Veolia, <i>Barangaroo CCP2 Alarm Response Procedure</i>.</li> <li>▪ Veolia, <i>Barangaroo Out of Specification Recycled Water</i>, 17 January 2020.</li> <li>▪ Veolia, <i>Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response</i>, 16 January 2020.</li> <li>▪ Lendlease, <i>Incident Notification with NSW Health</i>, 30 May 2019.</li> <li>▪ Lendlease, <i>Barangaroo Emergency Contact List</i>, 4 April 2020.</li> <li>▪ Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.</li> </ul>		

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### Summary of reasons for grade

LLRW has demonstrated that it has fully implemented, to the satisfaction of NSW Health, all of the requirements identified by NSW Health that IPART has agreed to and notified to LLRW in writing.

Accordingly, LLRW is considered to have complied with this obligation during the audit period.

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### Discussion and notes

IPART submitted a letter to LLRW setting out the requirements of NSW Health in writing.<sup>4</sup> In response, NSW Health was appropriately consulted and engaged in relevant activities as part of its operation.

For instance, NSW Health attended or was invited to attend risk reviews and technology assessment reviews. In addition, LLRW developed, in consultation with NSW Health, a procedure for notifying NSW Health of any health-related complaints in accordance with the relevant reporting manual published by IPART.

Veolia and LLRW demonstrated that they had appropriate notification procedures, forms and processes for issuing notifications if required. These included overarching documents such as the Veolia, *Barangaroo Critical Control Point Breach Response Procedure*; the Lendlease, *Incident Notification with NSW Health*, dated 30 May 2019; and the Lendlease, *Barangaroo Emergency Contact List*, dated 4 April 2020. These were supported by operational level procedures including the Veolia, *Barangaroo CCP1 Alarm Response Procedure*, dated 21 May 2020; Veolia, *Barangaroo CCP2 Alarm Response Procedure*, dated 3 May 2020; Veolia, *Barangaroo Out of Specification Recycled Water*, dated 17 January 2020; and the Veolia, *Barangaroo Recycled Water Samples Non Compliances for Health Related Parameters Response*, dated 16 January 2020. The Veolia procedures were assembled as part of an incident and emergency response manual retained on site. This package of documents, or earlier drafts thereof, was endorsed by NSW Health on 11 June 2019.<sup>5</sup>

There was no requirement to notify an incident to NSW Health during the audit period (as discussed in Table A.1).

Accordingly, LLRW is considered to have complied with this obligation during the audit period.

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### Recommendations

There are no recommendations in respect of this obligation.

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### Opportunities for improvement

No opportunities for improvement have been identified in respect of these obligations.


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<sup>4</sup> Letter from IPART to LLRW dated 7 December 2017, entitled “Notification of NSW Health requirements under licence clause B1”.


<sup>5</sup> Email from Toni Cains of NSW Health to Louise Reeves or LLRW dated 11 June 2019 endorsing the scheme notification and response protocols.

Table E.2 Schedule B to the Network Operator's Licence – Clause B3

Clause	Requirement	Compliance Grade
<b>Network Operator's Licence cl.B3</b>	The Licensee must prepare and submit reports in accordance with the Reporting Manual.	 <b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
Non-compliance with this requirement presents no significant risk to the operational safety of the scheme.	Evidence that the Licensee has prepared and submitted the requisite reports to IPART in accordance with the <i>Reporting Manual</i> .	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.</li> <li>▪ Email from Louise Reeves of LLRW to the IPART Compliance Mailbox with the 30 August 2019 Annual Report attached.</li> </ul>		
<b>Summary of reasons for grade</b>		
LLRW provided evidence that it had prepared and submitted its <i>Annual Compliance Reports</i> generally in accordance with the <i>Reporting Manual</i> .		
Accordingly, it was assessed that LLRW had demonstrated full compliance with this obligation.		
<b>Discussion and notes</b>		
<p>The auditor sought evidence that the Licensee had prepared and submitted reports in accordance with the <i>Reporting Manual</i>.<sup>6</sup> The <i>Reporting Manual</i> requires the submission of an <i>Annual Compliance Report</i> comprising of an Annual Compliance Report Certification, a Non Compliance Schedule (Schedule A) and a report in relation to Performance Indicators (Schedule B); the report is to be submitted to IPART no later than 31 August each year. The <i>Annual Compliance Reports</i> that needed to have been submitted within the audit period were sighted. A brief review confirmed that the reports contained the requisite information. As confirmation of submission, LLRW provided a copy of email correspondence between LLRW and IPART in respect of the 2019 submission.</p> <p>Accordingly, LLRW was assessed as having demonstrated full compliance with these obligations during the audit period.</p>		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

<sup>6</sup> IPART, *Network Operators' Reporting Manual under the Water Industry Competition Act 2006* (Issue Nos: 6 to 11), June 2018 to July 2020.

Table E.3 Schedule B to the Network Operator's Licence – Clause B4

Clause	Requirement	Compliance Grade
<b>Network Operator's Licence cl.B4</b>	<p>Within 14 days of any change in relation to the following, the Licensee must notify IPART, and provide details, of the change in accordance with the Reporting Manual:</p> <ul style="list-style-type: none"> <li>a) any source from which the water handled by the Specified Water Industry Infrastructure is derived;</li> <li>b) the Authorised Purposes of the water handled by the Specified Water Industry Infrastructure;</li> <li>c) the identity of each licensed retail supplier or public water utility that has access to the infrastructure services provided by the Specified Water Industry Infrastructure for the purpose of supplying water to its customers;</li> <li>d) any other water infrastructure to which the Specified Water Industry Infrastructure is connected;</li> <li>e) the identity of each licensed retail supplier or public water utility that has access to infrastructure services provided by the Specified Water Industry Infrastructure for the purpose of providing sewerage services to its customers;</li> <li>f) any other sewerage infrastructure to which the Specified Water Industry Infrastructure is connected; and</li> <li>g) the arrangements for the disposal of waste from the Specified Water Industry Infrastructure.</li> </ul>	 <b>No Requirement</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
Non-compliance with this requirement presents no significant risk to the operational safety of the scheme.	Evidence that the Licensee notified IPART within 14 days of any of the required changes in accordance with the <i>Reporting Manual</i> .	

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.

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- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
  - Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.
- 

### **Summary of reasons for grade**

LLRW has not made, nor does it currently plan to make, any changes in respect of the provisions nominated under this obligation.

Accordingly, notification to IPART has not been required and a “No Requirement” compliance grade has been assigned in respect of this obligation.

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### **Discussion and notes**

Evidence was sought that LLRW had not made any changes in respect of the provisions nominated under this obligation or, if it had made any such changes, it had notified IPART within 14 days in accordance with the *Reporting Manual*.

LLRW advised that it has not, nor does it propose at this stage to make any changes in respect of the nominated provisions. No evidence to the contrary was identified as part of the Audit.

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### **Recommendations**

There are no recommendations in respect of this obligation.


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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table E.4** Schedule B to the Network Operator's Licence – Clause B5.1, B5.2 and B5.3

Clause	Requirement	Compliance Grade
<b>Network Operator's Licence cl.B5.1, B5.2 and B5.3</b>	<p>[B5.1] The Licensee must undertake any monitoring that is required for the purposes of this Licence, any Plan, the Act or the Regulation in accordance to the requirements of this clause.</p> <p>[B5.2] The Licensee must keep the following records of any samples taken for monitoring purposes specified in the Water Quality Plan:</p> <ul style="list-style-type: none"> <li>a) the date on which the sample was taken;</li> <li>b) the time at which the sample was collected;</li> <li>c) the point or location at which the sample was taken; and</li> <li>d) the chain of custody of the sample (if applicable).</li> </ul> <p>[B5.3] The Licensee must ensure that analyses of all samples taken for the purposes of Verification Monitoring are carried out by a laboratory accredited for the specified tests by an independent body acceptable to NSW Health, such as the National Association of Testing Authorities or equivalent body.</p>	 <b>Compliant</b>

**Risk**

This requirement reflects a high operational risk. It is essential that:

- detailed sample records are maintained to ensure traceability in the event of a non-compliance; and
- testing is undertaken by an accredited laboratory to ensure credibility of results.

**Target for Full Compliance**

Evidence that:

- the required records have been kept in respect of collected samples; and
- sample analysis has been undertaken by NATA accredited laboratory (or equivalent).

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.

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- Veolia, *Water Quality Management (and Sewage Management) Plan (Reference: PL-BAR-2-8374-3)*, 23 November 2018.
  - Veolia 2020 lab data.xlsm workbook.
  - Review of third party laboratory data, chains of custody and certificates of analysis for the period February 2020.
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### **Summary of reasons for grade**

LLRW demonstrated that, whilst monitoring was extremely limited during the audit period due to the non-operation of the recycled water treatment plant for other than a few days of testing, the laboratory undertaking the testing was NATA (National Association of Testing Authorities) accredited.

Accordingly, LLRW was assessed as being compliant with these obligations.

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### **Discussion and notes**

The auditor sought evidence that monitoring had been undertaken pursuant to requirements set out in the Licence, any Plan or otherwise.

Laboratory monitoring results were checked during the audit. It was easy to audit Veolia on this since all results were retained in a well-presented workbook (Veolia 2020 lab data.xlsm).

Weekly monitoring was taking place for compliance parameters: *E. coli*, *Clostridium perfringens* spores and coliphage with monthly monitoring taking place for compliance parameters BOD and TSS.

A number of other parameters were also tested.

The same worksheets capture operational data, such as bench measurements made by Veolia.

The results were viewed for February 2020 and monitoring was observed to be taking place as set out in the *Water Quality Plan* and subordinate documents with no exceedance reported. Records retained included the specified items under these obligations.

Samples for the month of February 2020, including Chains of Custody and Certificates of Analysis, were viewed. For samples collected on 28 February 2020 the results for compliance parameters *E. coli*, *Clostridium perfringens* spores, coliphage, BOD and TSS were reported (Certificate of Analysis ES2007010 from ALS). No exceedances were noted and the NATA signatories were named on the PDF file from the laboratory.

A widely used and adequately NATA certified services provider (ALS) was utilised for laboratory testing, using NATA accredited methods.

Accordingly, LLRW was assessed as having demonstrated full compliance with these obligations during the audit period.

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### **Recommendations**

There are no recommendations in respect of these obligations.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of these obligations.

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**Table E.5** Schedule B to the Network Operator’s Licence – Clause B6

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence cl.B6</b>	Whenever the Licensee makes a significant amendment to a Plan, the Licensee must provide a copy of the amended Plan to IPART at the same time that it provides a copy to the approved auditor engaged to prepare a report as to the adequacy of the amended Plan, as required under the Regulation.	 <b>No Requirement</b>

**Risk**

This requirement reflects a moderate operational risk. Whilst it is essential that the adequacy of the amended Plans is assessed, failure to provide a copy of the Plans to IPART presents a lesser risk.

**Target for Full Compliance**

Evidence that, in the event of a significant amendment to a Plan, the Licensee has provided a copy of the amended Plan to IPART at the same time as it provides a copy to an approved auditor engaged to prepare a report as to the adequacy of the amended Plan.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

**Summary of reasons for grade**

There were no significant changes to the *Infrastructure Operating Plan*, *Water Quality Plan* or *Sewage Management Plan* during the audit period (or subsequently); nonetheless, updated Plans were provided to IPART during the audit period.

Accordingly, LLRW was assessed as having no requirement with this obligation during the audit period.

**Discussion and notes**

LLRW advised that there had been no significant changes to the *Infrastructure Operating Plan*, *Water Quality Plan* or *Sewage Management Plan* during the audit period.

The *Infrastructure Operating Plan* was updated during the audit period to Revision 4 (dated 22 November 2018). The changes were routine updates that were not considered significant and, as such, a Licence Plan Audit and submission to IPART wasn’t considered warranted.

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The combined *Water Quality Plan* and *Sewage Management Plan* was updated during the audit period to Revision 3 (dated 23 November 2018). The changes were again routine updates that were not considered significant and, as such, a Licence Plan Audit and submission to IPART wasn't considered warranted.

Accordingly, it was considered that there was no requirement to address this clause during the audit period.

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### **Recommendations**

There are no recommendations in respect of this obligation.


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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table E.6** Schedule B to the Network Operator’s Licence – Clause B7.1, B7.2 and B7.3

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence</b> <b>cl.B7.1, B7.2 and B7.3</b>	<p>[B7.1] If a code of conduct has not been established under Clause 25 of the Regulation, the Licensee must (by a date specified by IPART) establish a code of conduct (Licensee’s Code of Conduct) in accordance with this clause B7.</p> <p>[B7.2] The Licensee’s Code of Conduct must set out the respective responsibilities of:</p> <ul style="list-style-type: none"> <li>a) the Licensee; and</li> <li>b) each licensed network operator, licensed retail supplier and/or public water utility that supplies water, provides sewerage services or constructs, maintains or operates any water industry infrastructure in the Specified Area of Operations, by, at a minimum, providing for:</li> <li>c) if the Specified Water Industry Infrastructure is connected to any other water industry infrastructure who is responsible for repairing, replacing or maintaining any pipes, pumps, valves, storages or other infrastructure connecting the Specified Water Industry Infrastructure to the other water industry infrastructure;</li> <li>d) who is responsible for water quality;</li> <li>e) who is liable in the event of the unavailability of water;</li> <li>f) who is liable in the event of failure of the Specified Water Industry Infrastructure;</li> <li>g) the fees and charges payable in respect of the use of the Specified Water Industry</li> <li>h) Infrastructure; and</li> <li>i) who is responsible for handling customer complaints.</li> </ul> <p>[B7.3] Before the Licensee brings the Specified Water Industry Infrastructure into commercial operation or by a later date specified by IPART (if any), the Licensee’s Code of Conduct must be agreed in writing with the Licensee and other licensed network operators, licensed retail suppliers and/or public water utilities referred to in clause B7.2.</p>	 <b>Compliant</b>
<b>Risk</b>	<p>This requirement reflects a high operational risk. In the absence of a clear definition of responsibilities, there is no guarantee that the licensed services will continue to be delivered in a safe and effective manner.</p>	<b>Target for Full Compliance</b>
		<p>Evidence that, in the absence of a gazetted Water Industry Code of Practice, there is an agreement setting out the respective responsibilities of the Licensee and the party(ies) that are responsible for connected infrastructure.</p>

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## Evidence sighted

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.
- LLRW's signed Utility Services Agreement (document reference: 13571213\_14).

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## Summary of reasons for grade

LLRW demonstrated that there were clear lines of delineation between connected water utilities (Sydney Water) and the customers receiving water supply.

Accordingly, LLRW was assessed as being compliant with these obligations.

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## Discussion and notes

The auditor sought evidence that agreements were still current and clear between LLRW and any inter-connected utilities and customers.

The *Utility Services Agreement* with Sydney Water (document reference: 13571213\_14) is dated 2 September 2016 to 2 September 2026 and is still current. The document covers sewer mining from the Hickson Road sewer connection with Sydney Water, brine discharge, and trade waste. Veolia showed evidence of its trade waste monitoring against that agreement.

The auditor sought on-ground and in-person evidence of clarity with respect to interface points and responsibility between parties in relation to written agreements. The interface agreement with the customer was viewed on screen and found to very clearly delineate responsibilities between LLRW and the plumbing within the property. The interface point is set out in a diagram. An inspection was undertaken of the interface point where recycled water is supplied to Tower 2 with a representative of the customer (named Mark). The inspection and discussions verified the accuracy of the diagram and the mutual understanding of the interface point.

Accordingly, LLRW is considered to have complied with this obligation during the audit period.

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## Recommendations

There are no recommendations in respect of these obligations.


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## Opportunities for improvement

No opportunities for improvement have been identified in respect of these obligations.

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Table E.7 Schedule B to the Network Operator’s Licence – Clause B8

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence cl.B8</b>	If the Licensee proposes to operate the Specified Water Industry Infrastructure to supply water for an end-use which is not set out in the most recent Water Quality Plan provided to IPART, the Licensee must notify IPART in writing at least 3 months before commencing such operation.	 <b>No Requirement</b>

**Risk**

Non-compliance with this requirement presents a low risk. Notification to IPART is required so that it can assess whether the water to be supplied is suitable for the proposed new end-use.

**Target for Full Compliance**

In the event that the Licensee proposes to operate the Specified Water Industry Infrastructure to supply water for a new end-use, evidence that it provided the requisite notification to IPART.

**Evidence sighted**

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.

**Summary of reasons for grade**

LLRW did not, during the audit period or subsequently, commence distribution of water for an end-use that is not set out in the most recent *Water Quality Plan*. Accordingly, there was “No Requirement” for compliance with this obligation during the audit period.

**Discussion and notes**

LLRW advised that it had not commenced (or proposed to commence) operation of the Specified Water Industry Infrastructure to supply water for an end-use which is not set out in its *Water Quality Plan* during the audit period or subsequently. No evidence to the contrary was identified during the audit.

On the basis of LLRW’s advice and the absence of any evidence to the contrary, it assessed that there was no requirement for compliance with this obligation.


**Recommendations**

There are no recommendations in respect of this obligation.

### Opportunities for improvement

No opportunities for improvement have been identified in respect of this obligation.

**Table E.8** Schedule B to the Network Operator's Licence – Clause B9

Clause	Requirement	Compliance Grade
<b>Network Operator's Licence cl.B9</b>	<p>This clause B9 applies each time the Licensee has brought any of the Specified Water Industry Infrastructure into commercial operation. The Licensee must:</p> <p>(a) notify IPART in accordance with the Reporting Manual that it has brought the relevant Specified Water Industry Infrastructure into commercial operation; and</p> <p>(b) provide such notification within 10 days after it has brought the relevant Specified Water Industry Infrastructure into commercial operation.</p>	 <b>Compliant</b>

Risk	Target for Full Compliance
Failure to notify IPART each time the Licensee brings any of the Specified Water Industry Infrastructure into commercial operation presents a high risk to compliance.	Evidence that if the Licensee has notified IPART when bringing any of the Specified Water Industry Infrastructure into commercial operation in accordance with the Reporting Manual.

### Evidence sighted

- Interviews with LLRW (including Louise Reeves and Alex Day) and Veolia (including Matilda Sochacki and Chris Smith) personnel held 2 November 2020.
- Site inspection of the Lendlease Recycled Water (Barangaroo South) sewage collection network, recycled water treatment plant and recycled water distribution network on 2 November 2020.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-3), 16 August 2016.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-2), 18 April 2016.
- Veolia, *Infrastructure Operating Plan; for Barangaroo South Recycled Water Plant* (Reference: PL-BAR-21-8375-4), 22 November 2018.
- Veolia, *Water Quality Management (and Sewage Management) Plan* (Reference: PL-BAR-2-8374-3), 23 November 2018.
- IPART, *Notice of approval to commence commercial operation*, letter to Living Utilities dated 16 May 2016, IPART reference D16/11370.
- Minister for Lands and Water, *Notice of approval to commence commercial operation*, 31 July 2017.

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- Minister for Lands and Water, *Notice of approval to commence commercial operation*, 14 April 2016.
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### **Summary of reasons for grade**

The sewage storage, sewage conveyance and non-potable water recycling treatment, conveyance and reticulation system has been previously approved by the Minister for commercial prior to the audit period and has been in various stages of operation during the audit period. Therefore, no new infrastructure has been brought into commercial operation during the audit period without IPART being notified.

Accordingly, LLRW was assessed as being compliant with these obligations.

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### **Discussion and notes**

The sewage storage, sewage conveyance, non-potable water recycling treatment, conveyance and reticulation system has been previously approved to commence commercial operation by the Minister and notified by IPART.<sup>7</sup> The infrastructure has been in various stages of commercial operation during the audit period, supplying potable water into the recycled water reticulation system whilst modifications to the treatment plant were completed, and ultimately supply non-potable water into the recycled system. Therefore, as defined under this obligation, no new infrastructure has been brought into commercial operation during the audit period without IPART being notified.

Accordingly, LLRW was assessed as being compliant with this obligation.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>7</sup> IPART, *Notice of approval to commence commercial operation*, letter to Living Utilities dated 16 May 2016, IPART reference D16/11370; Minister for Lands and Water, *Notice of approval to commence commercial operation*, 31 July 2017; Minister for Lands and Water, *Notice of approval to commence commercial operation*, 14 April 2016.