



# Catherine Hill Bay Water Utility

## **Operational Audit**

#20025-10-001 Version 2.0

Independent Pricing and Regulatory Tribunal

March 2022



## Document History

### Catherine Hill Bay Water Utility

Operational Audit

### Independent Pricing and Regulatory Tribunal

This document has been issued and amended as follows:

Version	Date	Description	Created by	Checked by	Approved by
1.0	8 March 2022	Draft	Jim Sly	-	Jim Sly
1.1	15 March 2022	Revised Draft	Jim Sly	-	Jim Sly
2.0	31 March 2022	Final	Jim Sly	Dan Deere	Jim Sly

**Cobbitty Consulting Pty Ltd**  
ABN: 45 164 692 488

PO Box 561, Bayswater VIC 3153  
Telephone: +61 (0) 423 326 693  
Email: [jim.sly@cobbittyconsulting.com.au](mailto:jim.sly@cobbittyconsulting.com.au)

Cobbitty Consulting has prepared this document in accordance with the instructions of *Independent Pricing and Regulatory Tribunal* for its sole and specific use. Any other persons who use the information contained herein do so at their own risk.

© Cobbitty Consulting Pty Ltd, 2022



## Contents

<b>1. Executive Summary</b>	<b>1</b>
1.1 Auditor Declaration	1
1.2 Major Findings	1
1.3 Recommendations	1
<b>2. Introduction</b>	<b>2</b>
2.1 Objectives	2
2.2 Licensee's Infrastructure, Systems and Procedures	2
2.3 Audit Method	3
2.4 Regulatory Regime	4
2.5 Quality Assurance Process	5
2.6 Audit Findings	5
<b>3. Water Quality and Sewage Management</b>	<b>6</b>
3.1 Summary of Findings	6
3.2 Review of Actions	6
3.3 Opportunities for Improvement	6
<b>4. Infrastructure</b>	<b>7</b>
4.1 Summary of Findings	7
4.2 Review of Actions	7
4.3 Opportunities for Improvement	7
<b>5. Incident Notification</b>	<b>8</b>
5.1 Summary of Findings	8
5.2 Review of Actions	8
5.3 Opportunities for Improvement	8
<b>6. Reporting</b>	<b>9</b>
6.1 Summary of Findings	9
6.2 Review of Actions	9
6.3 Opportunities for Improvement	9
<b>Appendix A Detailed Audit Findings – Water Quality and Sewage Management</b>	<b>11</b>
Table A.1 Water Quality and Sewage Management – WIC Reg Sch 1 cl.7(4)(a)	13
Table A.2 Water Quality and Sewerage Management – WIC Reg Sch 1 cl.14(3)(a)	23
Table A.3 Water Quality and Sewage Management – Network Operator's Licence Sch B cl.7.2	27
Table A.4 Water Quality and Sewage Management – Network Operator's Licence Sch B cl.7.3	30
<b>Appendix B Detailed Audit Findings –Infrastructure</b>	<b>33</b>
Table B.1 Infrastructure – WIC Reg Sch 1 cl.6(2)(a)	35
Table B.2 Infrastructure – WIC Reg Sch 1 cl.8(1)	43
Table B.3 Infrastructure – WIC Reg Sch 1 cl.8(2)	46
Table B.4 Infrastructure – WIC Reg Sch 1 cl.11	49
Table B.5 Infrastructure – Network Operator's Licence Sch B cl.11	54
<b>Appendix C Detailed Audit Findings – Incident Notification</b>	<b>57</b>
Table C.1 Incident Notification – WIC Reg Sch 1 cl.1(2)	59
<b>Appendix D Detailed Audit Findings – Reporting</b>	<b>67</b>
Table D.1 Reporting – Network Operator's Licence Sch B cl.5	69



# 1. Executive Summary

## 1.1 Auditor Declaration

This report presents the findings of an Operational Audit of Catherine Hill Bay Water Utility Pty Ltd's compliance with the requirements of its Network Operator's Licence (Licence No: 16\_035) and the relevant provisions of the *Water Industry Competition (General) Regulation 2021* as they relate to the drinking water, sewerage and recycled water schemes at Catherine Hill Bay.

The auditor confirms that:

- the auditor was provided with sufficient evidence 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 Guidelines*<sup>1</sup> 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

The Licensee, Catherine Hill Bay Water Utility Pty Ltd, was found to have operated and maintained the drinking water, sewerage and recycled water schemes at Catherine Hill Bay in compliance with the assessed audit criteria (no design or construction activities were undertaken during the audit period).

## 1.3 Recommendations

No recommendations have been made as a result of this audit.

Four (4) opportunities for improvement, which the Licensee may wish to consider, are identified in the body of the report.

---

<sup>1</sup> IPART, *Audit Guideline; under the Water Industry Competition Act 2006*, July 2020.

## 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, Catherine Hill Bay Water Utility Pty Ltd (Catherine Hill Bay Water or CHBWU), in meeting the requirements of the relevant legislation (the *Water Industry Competition Act 2006* and *Water Industry Competition (General) Regulation 2021*) and its Network Operator's Licence (Licence No: 16\_035) as they relate to the drinking water, sewerage and recycled water schemes at Catherine Hill Bay.

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

The infrastructure, systems and procedures subject to audit are those related to the drinking water, sewerage and recycled water schemes (the schemes) that service "The Beaches" land and housing development at Catherine Hill Bay, approximately 20 kilometres south of Newcastle (refer <http://www.solowater.com.au/schemes/>). The Water Industry Infrastructure comprises:

- a pumping station and transfer main that draws water from an existing bulk potable water supply and transfers it to the site for distribution;
- an on-site drinking water storage and chlorine dosing facility;
- a potable (drinking) water network;
- a pressure sewer collection network;
- a treatment plant for the production of recycled water from sewage;
- facilities for the onsite storage of recycled water prior to distribution; and
- a non-potable (recycled) water network.

Catherine Hill Bay Water Utility Pty Ltd (ACN 163 381 922) is the Licensee, holding Network Operator's Licence No: 16\_035. As Licensee, Catherine Hill Bay Water owns and is responsible for the ongoing operation and maintenance of the drinking water network, sewerage network and the recycled water network in accordance with its management plans (Licence Plans).

Versions of the management plans that were in place during the audit period include:

- Solo Water, *Catherine Hill Bay Water Utility; Infrastructure Operating Plan; Stage 2* (reference: IMS-OPER-B-8297-SW), including:
  - Revision 2.3, 14 September 2020; and
  - Revision 2.4, 13 October 2021;
- Solo Water, *Catherine Hill Bay Water Utility; Drinking Water Quality Management Plan; Stage 2* (reference: IMS-ENVM-B-3727-SW), including:
  - Revision 2.1, 20 September 2019; and
  - Revision 2.2, 28 June 2021;
- Solo Water, *Catherine Hill Bay Water Utility; Recycled Water Quality Management Plan; Stage 2* (reference: IMS-ENVM-B-3727-SW), including:

- Revision 1.3, 17 September 2020; and
- Revision 1.4, 13 October 2021; and
- Solo Water, *Catherine Hill Bay Water Utility; Sewage Management Plan; Stage 2* (reference: IMS-ENVM-B-3728-SW)
  - Revision 2.2, 20 September 2019; and
  - Revision 2.3, 28 June 2021.

## 2.3 Audit Method

### 2.3.1 Audit Scope

The audit comprised an Operational Audit conducted pursuant to the *WIC Act Audit Guidelines*.<sup>2</sup> The specific scope of the audit was as defined in IPART's letter to Catherine Hill Bay Water (reference D21/26478) dated 10 November 2021; the nominated scope addresses selected requirements of:

- the *Water Industry Competition (General) Regulation 2021*; and
- Network Operator's Licence No: 16\_035.

The audit period (period during which compliance has been assessed) is 1 November 2020 to 31 October 2021.

It is noted that the 2021 version of the *Regulation* came into effect on 1 September 2021, i.e. during the audit period; the previous 2008 version was in place prior to that date. Wording from the 2021 version has been adopted for the purposes of this report; however, it is noted that the updated version did not give effect to any material changes to the regulatory requirements.

### 2.3.2 Audit Standard

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

- ISO 19011:2018 *Guidelines for auditing management systems*; and
- IPART, *Audit Guideline; under the Water Industry Competition Act 2006*, July 2020 (WIC Act Audit Guidelines).

### 2.3.3 Audit Steps

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

Following approval of an *Audit Proposal* by IPART, an *Information Request* was sent to both the Licensee and IPART approximately four weeks prior to the audit fieldwork being undertaken. The Licensee provided an information pack in response to the request, which was reviewed by the auditor prior to conducting the audit fieldwork.

Audit fieldwork comprising a site inspection of the existing infrastructure followed by review and discussion (audit) of relevant documentation/records was undertaken on 10 February 2022. Some additional items of information and/or clarification were requested following the audit fieldwork and subsequently provided.

---

<sup>2</sup> IPART, *Audit Guideline; under the Water Industry Competition Act 2006*, July 2020.

A draft audit report was prepared and submitted to both the Licensee and IPART for review/comment, before being finalised and issued to both the Licensee and IPART.

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 Jim Sly and a peer/quality assurance review was undertaken by Dr Dan Deere. Both auditors hold relevant Lead Auditor accreditation on IPART’s Technical Services and Water Licensing Panel.

Catherine Hill Bay Water was represented Craig Heininger (Water Utility Engineer /Manager Operations), Ronnie Paine (Water and Wastewater Systems Operator) and Tim Sazdanoff (Water and Wastewater Systems Operator). IPART representatives Jamie Luke and Tom Banuelos attended (via video conferencing) as observers during the desktop component of the audit fieldwork.

### 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 Catherine Hill Bay Water schemes operate in accordance with the provisions of a Network Operator’s Licence (Licence No: 16\_035) issued under the *Water Industry Competition Act 2006* (NSW). Other relevant regulatory instruments and standards/guidelines include:

- *Water Industry Competition (General) Regulation 2021 (NSW)*;<sup>3</sup>
- IPART, *Audit Guideline; under the Water Industry Competition Act 2006*, July 2020;
- *Australian Drinking Water Guidelines 2011 (as amended August 2018)*;
- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) 2006*;
- *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 6**, and are presented in full detail in **Appendices A to D**.

---

<sup>3</sup> As noted in section 2.3.1, the 2021 version of the *Regulation* came into effect from 1 September 2021 and was applicable for the remainder of the audit period; the 2008 version was in place for the portion of the audit period prior to that date.

## 3. Water Quality and Sewage Management

### 3.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2021* and the *Network Operator's Licence* related to *Water quality* and *Sewage management* (refer to **Appendix A** for detailed audit findings).

### 3.2 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.

### 3.3 Opportunities for Improvement

The following opportunities for improvement have been identified in respect of the audited *WIC Regulation* clauses related to *Water quality* and *Sewage management*:

- **OFI-CHB-2021.01:** It is suggested that Catherine Hill Bay Water takes action to extend its verification monitoring program to include periodic testing of water samples taken from points within Stages 6 and 7 of the development area.
- **OFI-CHB-2021.02:** It is suggested that Catherine Hill Bay Water endeavours to ensure that the time of sample relinquishment is recorded on all *Chain of Custody* records, including those prepared by its service providers.
- **OFI-CHB-2021.03:** It is suggested that Catherine Hill Bay Water takes action to ensure that the correct sampler/sampling entity is recorded in the *CHB Water Quality Monitoring Register*.

## 4. Infrastructure

### 4.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2021* and the *Network Operator's Licence* related to *Infrastructure* (refer to **Appendix B** for detailed audit findings).

### 4.2 Review of Actions

Subsequent to issue of the draft audit report, the Licensee provided additional information demonstrating that, pursuant to Schedule B, clause 11 of the *Network Operator's Licence*, during the audit period it had identified cases in which a Customer's plumbing was not code compliant and had notified the Customers as required. The report has been updated accordingly.

### 4.3 Opportunities for Improvement

No opportunities for improvement have been identified in respect of the audited *WIC Regulation* clauses related to *Infrastructure*.

## 5. Incident Notification

### 5.1 Summary of Findings

There were no identified non-compliances in respect of the audited clause of the *Water Industry Competition (General) Regulation 2021* related to *Incident notification* (refer to **Appendix C** for detailed audit findings).

### 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

The following opportunity for improvement has been identified in respect of the audited *WIC Regulation* clause related to the *Incident notification*:

- **OFI-CHB-2021.04:** It is suggested that Catherine Hill Bay Water considers verbally reporting all incidents to IPART, including those assessed not to have threatened, or have had the potential to threaten, water quality, public health or safety, thereby providing IPART the opportunity to request further detail/formal reporting if considered appropriate.

## 6. Reporting

### 6.1 Summary of Findings

There were no identified non-compliances in respect of the audited clause of the *Network Operator's Licence* related to *Reporting* (refer to **Appendix D** for detailed audit findings).

### 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 *Network Operator's Licence* clause related to *Reporting*.



## **Appendix A** Detailed Audit Findings – Water Quality and Sewage Management

Detailed audit findings in respect of the obligations related to *Water quality* and *Sewage management* are presented in this Appendix.



Table A.1 Water Quality and Sewage Management – WIC Reg Sch 1 cl.7(4)(a)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sch 1 cl.7(4)(a)</b>	The licensee must ensure that the licensee’s water quality plan is fully implemented and kept under regular review and that all of the licensee’s activities are carried out in accordance with the plan.	 <b>Compliant</b>
<b>Risk</b> This requirement reflects a high operational risk. Implementation of the <i>Water Quality Plan</i> ensures that the water supplied complies with the specified quality requirement. Regular review ensures that the <i>Plan</i> remains current and reflects the current circumstances of the scheme.		<b>Target for Full Compliance</b> Evidence that the <i>Water Quality Plan</i> is fully implemented, and that the Licensee’s activities are carried out in accordance with the <i>Plan</i> ; evidence that the <i>Plan</i> is kept under regular review.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 10 February 2022.</li> <li>▪ Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Drinking Water Quality Management Plan; Stage 2</i> (reference: IMS-ENVM-B-3727-SW) (Revision 2.1), 20 September 2019.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Recycled Water Quality Management Plan; Stage 2</i> (reference: IMS-ENVM-B-3727-SW), including:                         <ul style="list-style-type: none"> <li>○ Revision 1.2, 20 September 2019; and</li> <li>○ Revision 1.3, 17 September 2020.</li> </ul> </li> <li>▪ MS Excel workbook, <i>IMS-ENVM-G-3635-SW - Risk Register - Stage 2.xlsx</i>.</li> <li>▪ Solo Water, <i>RWTP CCP1 – MBR UF Membranes Management</i> (reference: IMS-GNRL-D-4411-SW) (Issue No: 1.1), July 2020.</li> <li>▪ Solo Water, <i>RWTP CCP2 – UV Disinfection Management</i> (reference: IMS-GNRL-D-4412-SW) (Issue No: 1.1), July 2020.</li> <li>▪ Solo Water, <i>RWTP CCP3 – Chlorine Contact Tank Management</i> (reference: IMS-GNRL-D-4413-SW) (Issue No: 1.1), July 2020.</li> <li>▪ Solo Water, <i>CCP Residual Chlorination Management Procedure</i> (reference: IMS-GNRL-D-4414-SW) (Issue No: 1.3), August 2021.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Operator’s Manual; Recycled Water Treatment Plant (RWTP); Stage 2</i> (reference: IMS-OPER-C-1690-SW) (Revision 1.2), 17 December 2020.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Operator’s Manual; Distribution System Networks; Stage 2</i> (reference: IMS-OPER-C-8298-SW) (Revision 2.2), 17 February 2021.</li> <li>▪ Solo Resource Recovery, <i>COVID-Safe management Plan</i> (IMS-COMP-B-0900) (Issue No: 4.0), July 2021.</li> <li>▪ Solo, <i>COVID-19 Directives for Solo Group</i> (IMS-COMP-F-0886) (Issue No: 3.0), October 2021.</li> <li>▪ Document (standard form): <i>IMS-CONT-F-1693-SW - CHB Daily Log Sheet.pdf</i>.</li> <li>▪ Document: <i>Chemical Stocktake - Solo Water 202108.pdf</i>.</li> <li>▪ MS Excel workbook, <i>IMS-CONT-G-1698-SW - Continuous Improvement Request Register.xlsx</i>.</li> </ul>		

- 
- Solo, *Water Quality Monitoring Procedure* (reference: IMS-OPER-D-8305-SW) (Issue No: 1.3), July 2020.
  - Solo Water, *Free Chlorine Field Verification Monitoring Procedure* (reference: IMS-OPER-D-8301-SW) (Issue No: 1.4), February 2021.
  - MS Excel workbook: *IMS-CONT-G-1675-SW - CHB Free Chlorine Field Verification.xlsx*.
  - MS Excel workbook, *IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx*.
  - MS Excel workbook: *Solo Water Customer Feedback - Complaints Register.xlsx*.
  - Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; April – June 2021*, August 2021 [October – December 2020 dated February 2021, January – March 2021 and July – September 2021 dated November 2021 also sighted].
  - Document: *IMS-DOCC-G-2414 - Master Register – SW.pdf*.
  - Email correspondence dated 7 March 2022 between Cobbitty Consulting and Catherine Hill Bay Water (re: *2021 Operational Audit of Catherine Hill Bay Water Schemes – Update*).
- 

### Summary of reasons for grade

Catherine Hill Bay Water demonstrated that it had fully implemented and carried out its activities in accordance with the arrangements detailed in both the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan*, as appropriate. This was evident from the effective implementation of the documented arrangements in relation to elements 2-6 of the *Australian Drinking Water Guidelines* and the *Australian Guidelines for Water Recycling* respectively, including (for example) ensuring that the system analyses (including hazard identification and risk assessment) remained up to date; water quality operational and verification monitoring was effectively implemented; and that short-term analysis of performance was undertaken and improvement actions identified and implemented as appropriate.

Catherine Hill Bay Water also demonstrated that it has kept both the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan* under regular review.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

---

### Discussion and notes

#### **Overview:**

The auditor checked for evidence that both the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan* were being fully implemented and kept under regular review and that all of the Network Operator's activities were carried out in accordance with the *Plans*.

Consistent with the scope defined by IPART, the audit was focused on implementation of the arrangements in relation to elements 2-6 of the *Australian Drinking Water Guidelines* and the *Australian Guidelines for Water Recycling*, as appropriate. It is noted that some discussion in respect of water quality monitoring (sampling and testing) is presented in Table A.3 and Table A.4, and water quality performance is discussed in Table C.1.

#### ***Element 2 – Assessment of the Drinking/Recycled Water Systems:***

##### ***System analysis:***

There have been no material changes to either the drinking water or recycled water systems during the audit period. The main change, which has been reflected in updates to both the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan*, is that servicing of Stages 6 and 7 of the “Beaches” development (area serviced by Catherine Hill Bay Water) has commenced as houses are constructed.

---

---

Changes to the *Drinking Water Quality Management Plan* are minimal; however, it has been revised to reflect (for example) the increase in scheme capacity to 550ET following the recent (1 November 2020) approval of a variation to the Network Operator's Licence which will allow offsite disposal of surplus recycled water, thereby removing a current operational limitation.

The *Recycled Water Quality Management Plan* has been revised to reflect the approved Licence variation which will facilitate the proposed construction of a pipeline for offsite disposal of excess recycled water instead of using the water for irrigation as part of development Stages 6 and 7 (the *Plan* will be further updated to reflect this new infrastructure prior to commissioning). Use of recycled water for construction and other purposes, as now approved under the amended Licence, has also been acknowledged.

On this basis it is assessed that the system analysis, as documented in the management plans, has been kept up to date.

*Hazard identification and risk assessment:*

Both the *Drinking Water Quality Management Plan*<sup>4</sup> and *Recycled Water Quality Management Plan*<sup>5</sup> indicate that the *Risk Register*<sup>6</sup> is to be updated annually. Review of the "Document History" worksheet indicates that a routine review of the *Risk Register* was undertaken in September 2021 (Revision 3.3, dated 24 September 2021).

It is noted that, as part of that review, hazards/risks associated with the offsite cartage of recycled water for maintenance or construction purposes, as permitted under the amended Licence, have been assessed. Hazards/hazardous events identified in respect of this activity include the impact of pathogens through unintended uses of (exposure to) recycled water; the impact of nutrients if a water cartage contractor illegally disposes of recycled water; and cross contamination if an incorrect tanker truck (drinking water tanker instead of recycled water tanker) is used; these are considered appropriate.

Separate worksheets (risk registers) are maintained for the drinking water and recycled water schemes (and the sewerage scheme). This ensures that hazards/risks are clearly and appropriately assigned and understood.

***Element 3 – Preventative Measures for Water Quality Management:***

*Preventative measures and multiple barriers:*

There have been no changes to the preventive measures/barriers implemented in respect of either the drinking water or recycled water supply during the audit period.

Catherine Hill Bay Water purchases bulk drinking water, which is compliant with the requirements of the *Australian Drinking Water Guidelines*, from Central Coast Council. The principal preventative measure/barrier implemented in respect of the drinking water supply is the maintenance of residual chlorine levels through monitoring and trim dosing at the drinking water storage and the point of discharge into supply.

During the audit discussions regarding removal of the drinking water storage from service for maintenance purposes, it was noted that water can be bypassed directly into supply. Under these arrangements, a separate chlorinator skid (used during the initial operational stage of the scheme) is used to top-up chlorine levels.

There have been no changes to treatment processes implemented to produce recycled water, which are the principal barrier in respect of the recycled water supply. Chlorine residual post-production is maintained through monitoring and trim dosing at the recycled water storage and the point of discharge into supply.

---

<sup>4</sup> *Drinking Water Quality Management Plan*, section 2.2.3.

<sup>5</sup> *Recycled Water Quality Management Plan*, section 2.2.4.

<sup>6</sup> MS Excel workbook, *IMS-ENVM-G-3635-SW - Risk Register - Stage 2.xlsx*.

---

Robust water quality monitoring (refer discussion below) and the implementation of infrastructure operation and maintenance procedures (refer Table B.1) ensure that barriers are effective in maintaining water quality.

Critical control points:

Critical control points (CCPs) are identified and documented in the *Drinking Water Quality Management Plan*<sup>7</sup> and *Recycled Water Quality Management Plan*<sup>8</sup> respectively. CCP targets, operational limits, critical limits and response procedures are further detailed in relevant procedures, including:

- *CCP Residual Chlorination Management Procedure*;<sup>9</sup>
- *RWTP CCP1 - MBR UF Membranes Management*;<sup>10</sup>
- *RWTP CCP2 - UV Disinfection Management*;<sup>11</sup> and
- *RWTP CCP3 - Chlorine Contact Tank Management Procedure*.<sup>12</sup>

A review of SCADA operational and critical limit setpoints revealed that all were consistent with settings (parameter values and time delays) documented in the above *Plans* and procedures for all CCPs, including the following:

- CCP1 – MBR permeate turbidity (instruments AIT1051 and AIT2051);
- CCP2 – UV disinfection flow rate (instrument FIT8010), UVT (instrument AIT8010), UVI (instrument AIT8011) and dose (instrument AIT-DOSE);
- CCP3 – free chlorine (instrument AIT8040) and pH (instrument 8041); and
- Free chlorine residual in potable water (instrument AIT5001) and recycled water (instrument AIT6001) at the point of supply to the respective networks.

This indicates that CCPs were being implemented in accordance with the documented arrangements. Monitoring of performance against these CCPs is discussed below.

***Element 4 – Operational Procedures and Process Control:***

Operational procedures:

Operation of the Catherine Hill Bay Water schemes, including the drinking water and recycled water schemes, is undertaken in accordance with the *Operator's Manuals (Recycled Water Treatment Plant*<sup>13</sup> and *Distribution System Networks*,<sup>14</sup> as appropriate) and a host of procedures referenced in these manuals, as well as the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan*. It is noted that both of the *Operator's Manuals* were updated during the audit period, which indicates that they are kept under review.

Catherine Hill Bay Water demonstrated that its parent company had developed and implemented procedures in response to the COVID pandemic. These included the *COVID-Safe Management Plan*<sup>15</sup> and *COVID-19 Directives for Solo Group*.<sup>16</sup> These procedures were provided to both IPART and the auditor prior to the audit; the guidance presented therein was implemented to the extent applicable

---

<sup>7</sup> *Drinking Water Quality Management Plan*, section 2.3.2

<sup>8</sup> *Recycled Water Quality Management Plan*, section 2.3.2.

<sup>9</sup> Solo Water, *CCP Residual Chlorination Management Procedure* (IMS-GNRL-D-4414-SW) (Issue No: 1.3), August 2021.

<sup>10</sup> Solo Water, *RWTP CCP1 - MBR UF Membranes Management* (IMS-GNRL-D-4411-SW) (Issue No: 1.1), July 2020.

<sup>11</sup> Solo Water, *RWTP CCP2 - UV Disinfection Management* (IMS-GNRL-D-4412-SW) (Issue No: 1.1), July 2020.

<sup>12</sup> Solo Water, *RWTP CCP3 - Chlorine Contact Tank Management* (IMS-GNRL-D-4413-SW) (Issue No: 1.1), July 2020.

<sup>13</sup> Solo Water, *Catherine Hill Bay Water Utility; Operator's Manual; Recycled Water Treatment Plant (RWTP); Stage 2* (reference: IMS-OPER-C-1690-SW) (Revision 1.2), 17 December 2020.

<sup>14</sup> *Solo Water, Catherine Hill Bay Water Utility; Operator's Manual; Distribution System Networks; Stage 2* (reference: IMS-OPER-C-8298-SW) (Revision 2.2), 17 February 2021.

<sup>15</sup> Solo Resource Recovery, *COVID-Safe management Plan* (IMS-COMP-B-0900) (Issue no: 4.0), July 2021.

<sup>16</sup> Solo, *COVID-19 Directives for Solo Group* (IMS-COMP-F-0886) (Issue No: 3.0), October 2021.

during the audit fieldwork. It is noted that IPART representatives did not attend on site as they deemed themselves not to be “essential personnel” for the purposes of maintaining utility services.

Catherine Hill Bay Water advised that, as part of its COVID response planning, it had considered a scenario in which neither of the two operators were unable to attend the site. Analysis revealed that the only operation that could not be undertaken remotely was the replenishment of chemicals. As a result, another Solo Group employee was trained in the process, for which a documented procedure was available. A copy of the procedure was readily available in the chemical storage/dosing area of the treatment plant to provide guidance in the event that it was required.

Operational monitoring:

Operational monitoring of water quality undertaken in respect of the Catherine Hill Bay Water drinking and recycled water networks, pursuant to the requirements of the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan*, comprises online monitoring (via the SCADA system) of recycled water critical control point (CCP) parameters, and free chlorine in both recycled and drinking water at the booster pumping stations (point of discharge into supply).

As reported above, review of CCP set points in the SCADA system confirmed that they were all consistent with the operational and critical limits documented in the relevant management procedure.

To assess data consistency between the monitoring instrument and SCADA system, readings were taken at a sample of monitoring instruments and the corresponding SCADA readings checked. A summary of these checks, which also included a check against the documented limits, is as follows:

Parameter	Time	Instrument Reading	SCADA Consistent?	Within Operational /Critical Limits?
CCP1 - MBR Permeate (Train 2): <ul style="list-style-type: none"> <li>▪ Turbidity</li> <li>▪ TS</li> </ul>	~10:09am	0.018 8.36 mg/L	✓ ✓	✓ (OCP)
CCP2 - UV Disinfection: <ul style="list-style-type: none"> <li>▪ UVT (transmission)</li> <li>▪ UVI (intensity)</li> <li>▪ Flow</li> </ul>	~10:48am	84.7% 90.2 W/m <sup>2</sup> 3.5 L/s	✓ ✓ ✓	✓ ✓ ✓
CCP3 - Chlorination: <ul style="list-style-type: none"> <li>▪ Free chlorine</li> <li>▪ pH</li> </ul>	~10:50am	2.93 mg/L 7.78	✓ ✓	✓ ✓
CCP - Drinking water discharge to network: <ul style="list-style-type: none"> <li>▪ Free chlorine</li> <li>▪ pH</li> </ul>	~10:33am	1.29 mg/L 7.72	✓ ✓	✓ ✓
CCP - Recycled water discharge to network: <ul style="list-style-type: none"> <li>▪ Free chlorine</li> <li>▪ pH</li> </ul>	~10:38am	1.98 mg/L 7.93	✓ ✓	✓ ✓

A review of online monitoring data (SCADA trends) for selected CCP parameters is documented in Table C.1. This revealed that, in each case, performance had remained within the defined operational limits.

It is noted that SCADA readings for CCPs and a host of other operational parameters are checked and recorded on a *Daily Log Sheet*<sup>17</sup> each working day. This task ensures that plant performance is actively monitored by the operators as part of their daily activities. Completed forms for January 2021 and September 2021 were sighted during the audit fieldwork; both were complete with annotations when any variance from normal was observed.

<sup>17</sup> Document (standard form): *IMS-CONT-F-1693-SW - CHB Daily Log Sheet.pdf*.

---

Equipment capability and maintenance:

Equipment capability is maintained through routine monitoring and maintenance, which includes daily inspection and performance monitoring and undertaking both scheduled and corrective maintenance. The implementation of these activities is discussed in Table B.1.

Materials and chemicals:

No new infrastructure was constructed during the audit period; most of the network extension work to service Stages 6 and 7 of the “Beaches” estate development was completed at the time of the last Operational Audit. Nonetheless, it was apparent from components of the infrastructure that were visible during the audit site inspection that materials were compliant with the relevant standards.

Catherine Hill Bay Water maintains a manifest which identifies and provides details of all chemicals held at the treatment plant site. A *Chemical Stocktake Record*,<sup>18</sup> to which a copy of the manifest is attached, indicates that MSDS (material safety data sheets) are available online for all chemicals, and that where required, printed copies are available in an onsite folder.

It was specifically noted that MSDS can also be accessed by scanning a QR code, which is displayed at the treatment plant (refer Figure A.1.1). This provides online access to a site-specific listing of chemicals from where the relevant MSDS can be accessed via a link.

In respect of chemicals, in particular reference standards used for instrument calibration purposes, it was noted (for example) that:

- Expiry dates for pH buffer standards were May 2022 for pH10.0 and January 2022 (i.e. just expired) for pH7.0; and
- Expiry date for Chlorine standard was August 2022.

Catherine Hill Bay Water advised that replacement standards had been ordered, but not yet received. It further advised that out of date standards had not been used.

***Element 5 – Verification of Drinking/Recycled Water Quality:***

Water Quality Monitoring:

Verification monitoring of drinking water and recycled water quality, undertaken pursuant to the requirements of the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan* (and referenced subsidiary documents including the *Water Quality Monitoring Procedure*<sup>19</sup> and *Free Chlorine Field Verification Monitoring Procedure*<sup>20</sup>), comprises:

- Weekly laboratory testing of samples from the source drinking water and both the recycled water and drinking water networks for *E. coli* and total coliforms;
- Weekly field monitoring (using calibrated hand-held equipment) of samples from the source drinking water and both the recycled water and drinking water networks for pH, Turbidity, Electrical Conductivity, Water Temperature, Free Chlorine and Total Chlorine;
- Monthly laboratory testing of samples from the drinking water source water, treated water storage and network for *E. coli* and total coliforms;
- Monthly laboratory testing of samples from the recycled water source water (MBR permeate), treated water storage and network for parameters including *E. coli*, total coliforms, somatic coliphage, *Clostridium perfringens* spores, sulphite reducing *clostridia* spores, BOD, Suspended Solids, Total Dissolved Solids, Nitrogen (TN, TKN, NOx and NH) and Phosphorus (TP and PO4) (parameters vary by location);
- Monthly field monitoring (using calibrated hand-held equipment) of samples from both the recycled water and drinking water source water, treated water storages and networks for pH, Turbidity, Electrical Conductivity, Water Temperature, Free Chlorine and Total Chlorine;

---

<sup>18</sup> Document: *Chemical Stocktake - Solo Water 202108.pdf*.

- 
- Six-monthly detailed laboratory analysis of samples from both the recycled water and drinking water networks for a more extensive range of parameters; and
  - Annual detailed laboratory analysis of samples from the recycled water network for *Giardia* cysts, *Cryptosporidium* oocysts and adenovirus.

Review of the *CHB Free Chlorine Field Verification Register*<sup>21</sup> and *CHB Water Quality Monitoring Register*,<sup>22</sup> as well as sample of *Field Water Quality Sampling Forms* and laboratory testing *Certificates of Analysis* confirms that the monitoring regime was implemented throughout the audit period. For example:

- Annual sampling of recycled water from one location is to be tested for *Giardia* and *Cryptosporidium* (both from the summer 6-monthly sampling) and Adenovirus (from winter sampling).<sup>23</sup> Records show that a sample taken on 3 December 2020 was tested for *Giardia* and *Cryptosporidium* and a sample taken on 3 June 2021 was tested for Adenovirus.
- Samples for 6-monthly testing were collected on 3 December 2020 and 3 June 2021; all specified testing appeared to have been completed on both occasions.
- Field verification testing and sampling for monthly laboratory testing was undertaken by the approved contractor (ALS Environmental) typically in the first week of each month.

Review of the *CHB Free Chlorine Field Verification Register* reveals that chlorine monitoring by Catherine Hill Bay Water personnel at sampling sites located within Stages 6 and 7 of the development commenced during the audit period; weekly monitoring at one site commenced in January 2021 and at a second site in February 2021. This is consistent with progressive occupation of these areas which, although minimal at the time of the audit, will continue to increase over time. It is noted, however, that the full complement of verification testing, specifically laboratory testing of additional parameters in accordance with the *Water Quality Monitoring Procedure*, has not yet been extended to these areas.

Catherine Hill Bay Water has advised its intention to include these areas within its sampling and testing program; a major review and update of the *Water Quality Monitoring Procedure* and *Management Plans* is scheduled for July 2022 and October 2022 respectively. Notwithstanding, to formalise this observation it is suggested, as an opportunity for improvement (**OFI-CHB-2021.01**), that Catherine Hill Bay Water takes action to extend its verification monitoring program to include periodic testing of water samples taken from points within Stages 6 and 7 of the development area.

A review of verification monitoring test results, i.e. performance against targets, is documented in Table C.1.

#### Customer/User Satisfaction:

Review of the *Customer Feedback/Complaints Register*<sup>24</sup> reveals that one complaint was received in respect of the water supply systems during the audit. This related to dirty potable water, which upon investigation appeared to have been associated with a shutdown for repair of a property service connection. Although the main was flushed prior to be returned to service, additional flushing was undertaken to alleviate the problem.

During the audit discussions, Catherine Hill Bay Water advised that, in view of low initial demands in new areas of the development (Stages 6 and 7), it has implemented a program to ensure that water quality, and specifically chlorine residual levels, is maintained. This has comprised flushing of drinking water mains and pump out of recycled water (using tankers). No complaints have been recorded in these areas.

---

<sup>19</sup> Solo, *Water Quality Monitoring Procedure* (reference: IMS-OPER-D-8305-SW) (Issue No: 1.3), July 2020.

<sup>20</sup> Solo Water, *Free Chlorine Field Verification Monitoring Procedure* (reference: IMS-OPER-D-8301-SW) (Issue No: 1.4), February 2021.

<sup>21</sup> MS Excel workbook: *IMS-CONT-G-1675-SW - CHB Free Chlorine Field Verification.xlsx*.

<sup>22</sup> MS Excel workbook, *IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx*.

<sup>23</sup> Solo, *Water Quality Monitoring Procedure* (reference: IMS-OPER-D-8305-SW) (Issue No: 1.3), July 2020.

<sup>24</sup> MS Excel workbook: *Solo Water Customer Feedback - Complaints Register.xlsx*.

---

*Short-term evaluation of results:*

Both the *Drinking Water Quality Management Plan*<sup>25</sup> and *Recycled Water Quality Management Plan*<sup>26</sup> require the preparation of quarterly internal reports which provide the basis for short-term and long-term review of performance and analysis of results.

Catherine Hill Bay Water provided copies of reports,<sup>27</sup> which in each case addressed Levels of Service; Network Operator's Licence (compliance and performance indicators); Water Quality (compliance, monitoring results and incidents), Operations (community contacts and customer complaints, general operations and sewage disposal); Quality, Safety and Environment; and Maintenance. The results are extensively detailed, thereby providing a robust basis for performance review and analysis.

Considering the full 2020/21 financial year (which overlaps the first 8-months of the audit period), reporting indicated (for example) that there had been no water quality exceedances.<sup>28</sup> Similarly, there were none reported during the first quarter of the 2021/22 financial year, which also falls within the audit period.

In addition to monitoring of water quality performance, discussion in respect of (for example) operational issues and plant optimisation is also included. This indicates a more holistic review of performance, and more specifically the identification of actions to be taken in the interest of continuous improvement. Such actions are documented in the *Continuous Improvement Request Register*,<sup>29</sup> for example, documentation of arrangements for the controlled release of recycled water during major storm events (refer discussion in Table C.1) was proposed but was not progressed in view of the proposed construction of the surplus recycled water transfer main.

***Element 6 – Incident and Emergency Management:***

As discussed in detail in Table C.1, Catherine Hill Bay Water demonstrated that it was able to effectively implement its incident management protocols, including notification of stakeholders, notwithstanding that the incident in respect of which they were implemented was not strictly considered reportable. The incident, which involved the controlled release of excess recycled water to the stormwater drainage system during a major storm event was not deemed to have threatened, or to have potentially threatened, water quality, public health or safety.

As also report in Table C.1, the incident management (including notification) arrangements are clearly documented and have been kept up to date.

***Regular Review of Water Quality Management Plans:***

Catherine Hill Bay Water demonstrated that both the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan* have been kept under regular review. The “Document Status” tables indicate that both the documents have undergone several revisions during their development phase and subsequently.

The *Drinking Water Quality Management Plan* was most recently updated to Version 2.2 in June 2021 and the *Recycled Water Quality Management Plan* was updated to Version 1.4 in October 2021, i.e. during the audit period. In both cases, the revisions were primarily to incorporate details of Stages 6 and 7 of the “Beaches” estate, which is serviced by the scheme.

Review of the *Document Control Register*<sup>30</sup> indicates that, consistent with the “Document Status” record in the *Plans*:

- the current version of the *Drinking Water Quality Management Plan* is Version 2.2, which was issued following review in June 2021; and
- the current version of the *Recycled Water Quality Management Plan* is Version 1.4, which was issued following review in October 2021.

The *Document Control Register* also indicates that the next regular review of the *Drinking Water Quality Management Plan* is due in June 2023 (i.e. after two years), whilst the next review of the *Recycled Water*

---

<sup>25</sup> *Drinking Water Quality Management Plan*, section 2.10.2.

---

*Quality Management Plan* is due in October 2022 (i.e. after one year). In response to the auditor's query in respect of this timing discrepancy, Catherine Hill Bay Water advised that:<sup>31</sup>

- The review timing is based on an assigned 'audit rating' which is recorded in the *Document Control Register* (Master Register); the review frequencies are based on the current 'audit ratings'.
- It is, however, intended that the key management plans (*Drinking Water Quality Management Plan*, *Recycled Water Quality Management Plan*, *Infrastructure Operating Plan* and *Sewage Management Plan*) are reviewed annually; this is reflective of actual practice to date.
- The assigned 'audit ratings' in the *Document Control Register* will be changed to ensure that these plans are reviewed annually.

Notwithstanding the discrepancies in respect of timing, it is apparent that both the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan* have been kept under regular review. In view of Catherine Hill Bay Water's proposed action, an opportunity for improvement is not formally identified in respect of this matter.

---

## Recommendations

There are no recommendations in respect of this obligation.

---

## Opportunities for improvement

The following opportunity for improvement has been identified in respect of this obligation:

- **OFI-CHB-2021.01:** It is suggested that Catherine Hill Bay Water takes action to extend its verification monitoring program to include periodic testing of water samples taken from points within Stages 6 and 7 of the development area.

---

<sup>26</sup> *Recycled Water Quality Management Plan*, section 2.10.2.

<sup>27</sup> For example, Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; April – June 2021*, August 2021.

<sup>28</sup> Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; April – June 2021*, August 2021, section 5.3.

<sup>29</sup> MS Excel workbook, *IMS-CONT-G-1698-SW - Continuous Improvement Request Register.xlsx*.

<sup>30</sup> Document: *IMS-DOCC-G-2414 - Master Register – SW.pdf*.

<sup>31</sup> Email correspondence dated 7 March 2022 between Cobbitty Consulting and Catherine Hill Bay Water (re: *2021 Operational Audit of Catherine Hill Bay Water Schemes – Update*).



Figure A.1.1 QR Code access to Material Safety Data Sheets (MSDS)

**Table A.2 Water Quality and Sewerage Management – WIC Reg Sch 1 cl.14(3)(a)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sch 1 cl.14(3)(a)</b>	The Licensee must ensure its sewage management plan is fully implemented and kept under regular review and all of its activities are carried out in accordance with the plan.	 <b>Compliant</b>

**Risk**

This represents high operational risk. Implementation of the *Sewage Management Plan* ensures the effective (safe and reliable) operation of the sewerage infrastructure without detrimental effect to the environment.

**Target for Full Compliance**

Evidence that the *Sewage Management Plan* is fully implemented, and that the Licensee’s activities are carried out in accordance with the *Plan*; evidence that the *Plan* is kept under regular review.

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- Solo Water, *Sewage Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3728-SW) (Revision 1.0), 13 June 2017.
- Solo Water, *Catherine Hill Bay Water Utility; Sewage Management Plan; Stage 2* (reference: IMS-ENVM-B-3728-SW), including:
  - Revision 2.2, 20 September 2019; and
  - Revision 2.3, 28 June 2021.
- Solo Water, *CCP Raw Sewage Containment Procedure* (IMS-GNRL-D-4415-SW) (Issue No: 1.1), July 2020.
- Document: *PSU 68 Environmental Incident report\_signed.pdf*.
- Document: *Environmental Incident Report - PSU9\_Signed.pdf*.
- MS Excel workbook: *IMS-CONT-G-1676-SW - CHB Pump Out Records.xlsx*.
- Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; April – June 2021*, August 2021 [*October – December 2020* dated February 2021, *January – March 2021* and *July – September 2021* dated November 2021 also sighted].
- MS Excel workbook: *Solo Water Customer Feedback - Complaints Register.xlsx*.
- Document: *IMS-DOCC-G-2414 - Master Register – SW.pdf*.

**Summary of reasons for grade**

Catherine Hill Bay Water demonstrated that, during the audit period it had fully implemented and carried out its activities in accordance with the arrangements detailed in the *Sewage Management Plan*. This was evident from the effective implementation of arrangements in relation to the monitoring and management of operation of the pressure sewer units, the management of raw sewage and by-product disposal and the containment of potential odours.

Catherine Hill Bay Water also demonstrated that it has kept the *Sewage Management Plan* under regular review, through implementation of its document control processes.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

---

## Discussion and notes

### **Overview:**

The auditor 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 the *Plan*. Implementation of a sample of the arrangements detailed in the *Sewage Management Plan* was reviewed for the purposes of this assessment.

### **Operational Monitoring:**

Operational monitoring of the sewerage system comprises SCADA monitoring of sewage levels in each Pressure Sewer Unit (PSU056), the treatment plant Inlet Balance Tank and the Emergency Storage Tanks located at the treatment plant. Containment of raw sewage is managed in accordance with the *CCP Raw Sewage Containment Procedure*,<sup>32</sup> which sets out staged operational arrangements to ensure that this objective is achieved. For example, if the level in the Inlet Balance Tank is 'high', a PSU Retention Mode, whereby sewage is held in the PSUs is initiated; if the level in the PSUs reaches 'high-high', pumping will be re-initiated, and sewage diverted to the Emergency Storage Tanks.

Evidence that monitoring is effectively implemented can be drawn from reports of two PSU overflow incidents, whereby high level (and impending overflow) of the PSUs was alarmed by the SCADA system. These incidents (which as discussed in more detail in Table C.1 were the result of stormwater ingress) include:

- *Pressure Sewer Unit Overflow Event (Incident Report No: 102-20):*

The *Environmental Incident Report*<sup>33</sup> in respect of this incident indicates that:

*“High level alarm 23:18 access SCADA and noticed level rising rapidly, changed pumps with no change, surcharge imminent alarm 23:19 with the surcharge alarm starting at 23:31 until 00:18.”*

This indicates that the sewage level was being monitored via the SCADA system and that appropriate corrective action had been taken, albeit without the desired impact.

- *Pressure Sewer Unit Overflow Event (Incident Report No: 031-21):*

The *Environmental Incident Report*<sup>34</sup> in respect of this incident indicates that the incident was identified by an “*SMS alarm*”, initiated by the SCADA system.

This indicates that, although in this case no finished houses were connected to the PSU (i.e. no sewage inflow), the unit was being actively monitored.

On this basis, it is apparent that performance of the sewage network is being actively monitored.

### **Sewage and By-product Disposal:**

Records of raw sewage and by-product disposal are maintained in the *CHB Pump Out Records Register*.<sup>35</sup> Volumes of raw sewage, MBR permeate, waste activated sludge (WAS), sludge and recycled water are separately identified; the number of tanker loads and the sites to which disposal is made are also recorded.

Volumes disposed of off-site are recorded in Catherine Hill Bay Water's quarterly internal reports. These identify the volumes of raw sewage, WAS/sludge and MBR permeate/recycled water that have been disposed, together with the percentage of treated influent that the latter two components represent. Considering the 2020/21 financial year (which overlaps the first 8-months of the audit period):<sup>36</sup>

---

<sup>32</sup> Solo Water, *CCP Raw Sewage Containment Procedure* (IMS-GNRL-D-4415-SW) (Issue No: 1.1), July 2020.

<sup>33</sup> Document: *PSU 68 Environmental Incident report\_signed.pdf*.

<sup>34</sup> Document: *Environmental Incident Report - PSU9\_Signed.pdf*.

<sup>35</sup> MS Excel workbook: *IMS-CONT-G-1676-SW - CHB Pump Out Records.xlsx*.

<sup>36</sup> Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; April – June 2021*, August 2021, section 5.3.

- 
- No raw sewage was disposed of off-site.
  - 865.4 kL of WAS/sludge, which represented 2.2% of the treated influent, was disposed off-site.
  - 16,932 kL of MBR permeate/excess recycled water, which represented 42.2% of the treated influent, was disposed off-site.

Commentary in the quarterly reports noted the comparative increase in the volume of excess recycled water/permeate being disposed of. The proposed construction of a pipeline to transfer excess recycled water to Central Coast Water's Gwandalan Wastewater Treatment Plant will more appropriately address this disposal requirement.

### ***Screenings Disposal:***

Screenings removal and disposal was not specifically assessed during the audit; however, it was noted during the audit site inspection that the screens were working and screenings were being bagged in mobile bins for disposal. All screenings material was fully contained.

### ***Odour Management:***

The odour control system at the treatment plant remains in place and appears to be operating effectively; no odour was observed during the audit site inspection. The inlet tank and all MBR process tanks are vented via the odour control system which is fitted with an activated carbon filter.

Carbon filters are also in place on all air valves in the pressure sewer network (not sighted during this audit). No odours were observed when inspecting PSUs during the audit site inspection, indicating that these are effectively controlled.

Review of the *Complaints Register*<sup>37</sup> reveals that there were no sewage related odour complaints during the audit period. This is reflected in quarterly internal reporting which indicates that no odour complaints were received during the 2020/21 financial year (which overlaps the first 8-months of the audit period)<sup>38</sup> or during the first quarter of the 2021/22 financial year.<sup>39</sup>

### ***Regular Review of Sewage Management Plan:***

Catherine Hill Bay Water demonstrated that the *Sewage Management Plan* has been kept under regular review. The "Document Status" table indicates that the document has undergone several revisions during its development phase and subsequently.

The *Sewage Management Plan* was most recently updated to Revision 2.3 in June 2021, i.e. during the audit period. This revision was primarily to incorporate details of Stages 6 and 7 of the "Beaches" estate, which is serviced by the scheme.

Review of the *Document Control Register*<sup>40</sup> indicates that the current version of the *Sewage Management Plan* is Version 2.3, which was issued following review in June 2021; this is consistent with the "Document Status" record in the *Plan*. The *Document Control Register* also indicates that the next regular review of the *Plan* is due in June 2023 (i.e. after two years); however, this is likely to change to an annual review based on advice from Catherine Hill Bay Water as reported in Table A.1.

It is therefore apparent that the *Sewage Management Plan* has been kept under regular review.

---

## **Recommendations**

There are no recommendations in respect of this obligation.

---

<sup>37</sup> MS Excel workbook: *Solo Water Customer Feedback - Complaints Register.xlsx*.

<sup>38</sup> Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; April – June 2021*, August 2021, sections 2.2 and 5.1.1.

<sup>39</sup> Solo Water, *Catherine Hill Bay Water Utility; Quarterly Report – Internal; July – September 2021*, November 2021, sections 2.2 and 5.1.1.

<sup>40</sup> Document: *IMS-DOCC-G-2414 - Master Register – SW.pdf*.

---

### **Opportunities for improvement**

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

---

Table A.3 Water Quality and Sewage Management – Network Operator’s Licence Sch B cl.7.2

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence Sch B cl.7.2</b>	<p>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>	 <b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
<p>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.</p>	<p>Evidence that the required records have been kept in respect of collected samples.</p>	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 10 February 2022.</li> <li>▪ Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Drinking Water Quality Management Plan; Stage 2</i> (reference: IMS-ENVM-B-3727-SW), including:                         <ul style="list-style-type: none"> <li>○ Revision 2.1, 20 September 2019; and</li> <li>○ Revision 2.2, 28 June 2021.</li> </ul> </li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Recycled Water Quality Management Plan; Stage 2</i> (reference: IMS-ENVM-B-3727-SW), including:                         <ul style="list-style-type: none"> <li>○ Revision 1.3, 17 September 2020; and</li> <li>○ Revision 1.4, 13 October 2021.</li> </ul> </li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Operator’s Manual; Recycled Water Treatment Plant (RWTP); Stage 2</i> (reference: IMS-OPER-C-1690-SW) (Revision 1.2), 17 December 2020.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Operator’s Manual; Distribution System Networks; Stage 2</i> (reference: IMS-OPER-C-8298-SW) (Revision 2.2), 17 February 2021.</li> <li>▪ Solo, <i>Water Quality Monitoring Procedure</i> (reference: IMS-OPER-D-8305-SW) (Issue No: 1.3), July 2020.</li> <li>▪ Solo, <i>CHB - Water Quality Sampling Procedure</i> (reference: IMS-OPER-D-8376-SW) (Issue No: 1.0), March 2021.</li> <li>▪ <i>Chain of Custody</i> records for sampling/testing Work Order Nos: WN2100415 and WN2111518 [40+ records were sighted/reviewed, but not specifically referenced].</li> <li>▪ <i>Certificate of Analysis</i> records for sampling/testing Work Order Nos: WN2100415 and WN2111518 [40+ records were sighted/reviewed, but not specifically referenced].</li> <li>▪ MS Excel workbook, <i>IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx</i>.</li> </ul>		

---

## Summary of reasons for grade

Catherine Hill Bay Water demonstrated that the required records are kept in respect of water quality samples taken for monitoring purposes. All requisite information is included on *Chain of Custody* records prepared by both Catherine Hill Bay Water personnel (weekly samples) and ALS (monthly and 6-monthly samples) personnel as applicable. Review of corresponding *Certificates of Analysis* confirmed that sample details are consistent with those provided on the *Chain of Custody* records.

Accordingly, Catherine Hill Bay Water was assessed to have demonstrated compliance with this obligation.

---

## Discussion and notes

Sampling procedures for water quality analysis are referenced in the *Drinking Water Quality Management Plan*,<sup>41</sup> the *Recycled Water Quality Management Plan*,<sup>42</sup> and the *Operator's Manuals*.<sup>43,44</sup> In each case, reference is made to the *Water Quality Monitoring Procedure*,<sup>45</sup> which in turn references the *CHB - Water Quality Sampling Procedure*,<sup>46</sup> both of which detail the records that are to be kept in respect of water quality samples, as follows:

- The *Water Quality Monitoring Procedure*, which sets out overall requirements for samples taken by both Catherine Hill Bay Water personnel and external service providers, indicates that:

*“For each sample collected the sampler is to record the date, time, location and any other observations relevant to the sampling event.”*
- The *CHB - Water Quality Sampling Procedure*, which provides more detail for sampling undertaken by Catherine Hill Bay Water personnel, indicates that the sampler is required to:

*“Complete the relevant ALS Chain of Custody (COC) form for the samples taken and including details on the Sampler name, contact details, date and time for each sample and analysis required and retain with the sample. ... Remember to take a photo or photocopy of the COC before it leaves for our records and make sure the COC is secured in a plastic sleeve and secured to the esky with tape so it cannot be lost during transit.”*

In both cases, the identified sample records are consistent with those required to be kept under the provisions of the Licence.

The auditor sought to confirm that sampling records had been maintained in accordance with these requirements. Catherine Hill Bay Water provided a large sample (40+) of *Chain of Custody* records and corresponding *Certificates of Analysis*. Review of these samples revealed that:

- All requisite information was included on *Chain of Custody* records prepared by both Catherine Hill Bay Water personnel (weekly samples) and ALS (monthly and 6-monthly samples) personnel.
- Sampling details shown on the *Certificates of Analysis* were consistent with the information captured on the corresponding *Chain of Custody* records.

For example:

- Work Order No: WN2100415 – *Chain of Custody* indicates that samples were taken by Ron Paine (Catherine Hill Bay Water) on 14 January 2021 at 9:40am (SP6), 10:00am (SP1) and 10:05am (SP2); a description of the sample location for each identifier was also included. Container information was recorded together with the analysis requirements. The record further indicated that the
- 

<sup>41</sup> *Drinking Water Quality Management Plan*, section 2.5.1.

<sup>42</sup> *Recycled Water Quality Management Plan*, section 2.5.3.

<sup>43</sup> *Operator's Manual; Recycled Water Treatment Plant*, section 4.3.3.

<sup>44</sup> *Operator's Manual; Distribution System Networks*, section 4.3.3.

<sup>45</sup> Solo, *Water Quality Monitoring Procedure* (reference: IMS-OPER-D-8305-SW) (Issue No: 1.3), July 2020.

<sup>46</sup> Solo, *CHB - Water Quality Sampling Procedure* (reference: IMS-OPER-D-8376-SW) (Issue No: 1.0), March 2021

---

samples had been relinquished by the sampler at 11:30am; had been received at 11:40am and subsequently relinquished by Toll (transport provider) at 12:35pm; and had been received on behalf of the ALS laboratory at 12:37pm.

The corresponding *Certificate of Analysis* indicates that samples taken by Ron Paine had been received by ALS at 12:37pm on 14 January 2021. Sample IDs (including location description) and date and time of sample and the test results reported were consistent with the details shown on the *Chain of Custody* record.

- Work Order No: WN2111518 – *Chain of Custody* indicates that samples were taken by RS (Rebecca Stead of ALS) on 7 October 2021 at 8:00am, 8:15am, 9:30am, 8:30am, 8:40am and 8:50am at locations SP1, SP2, SP6, SP7, SP8 and SP9 respectively; a description of the sample location for each identifier was also included. Container information and analysis requirements (including field analysis undertaken by ALS) were also recorded. The record further indicated that the samples had been relinquished by the ALS sampler on 7 October 2021.

The corresponding *Certificate of Analysis* indicates that samples taken by Rebecca Stead (ALS) had been received by the ALS laboratory at 13:21 hours (1:21pm) on 7 October 2021. Sample IDs (including location description) and date and time of sample and the test results reported were consistent with the details shown on the *Chain of Custody* record.

It was noted that the time at which samples are relinquished to the laboratory is not always included on *Chain of Custody* records for sampling undertaken by ALS personnel; however, the time at which the sample is received (effectively the same time) is consistently recorded on the *Certificates of Analysis*. On this basis, it is considered that the chain of custody of the samples is effectively recorded. Nonetheless, as an opportunity for improvement (**OFI-CHB-2021.02**) it is suggested that Catherine Hill Bay Water endeavours to ensure that the time of sample relinquishment is recorded on all *Chain of Custody* records, including those prepared by its service providers.

Catherine Hill Bay Water captures all test results from its field and laboratory verification monitoring in the *CHB Water Quality Monitoring Register*.<sup>47</sup> The data captured includes records of the “Sampler” (effectively the sampling entity) for each sample and parameter tested. It is, however noted that for weekly samples taken by Catherine Hill Bay Water personnel for laboratory testing, the “Sampler” field in the consistently shows “ALS” instead of “SW”.

It is understood that this minor discrepancy has occurred following changes to sampling/testing arrangements. Whilst this is not considered to be a compliance issue, as an opportunity for improvement (**OFI-CHB-2021.03**) it is suggested that Catherine Hill Bay Water takes action to ensure that the correct sampler/sampling entity is recorded in the *CHB Water Quality Monitoring Register*.

---

## Recommendations

There are no recommendations in respect of this obligation.

---

## Opportunities for improvement

The following opportunities for improvement have been identified in respect of this obligation:

- **OFI-CHB-2021.02:** It is suggested that Catherine Hill Bay Water endeavours to ensure that the time of sample relinquishment is recorded on all *Chain of Custody* records, including those prepared by its service providers.
- **OFI-CHB-2021.03:** It is suggested that Catherine Hill Bay Water takes action to ensure that the correct sampler/sampling entity is recorded in the *CHB Water Quality Monitoring Register*.

---

<sup>47</sup> MS Excel workbook, *IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx*.

Table A.4 Water Quality and Sewage Management – Network Operator’s Licence Sch B cl.7.3

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence Sch B cl.7.3</b>	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 that is acceptable to NSW Health, such as the National Association of Testing Authorities or an equivalent body.	 <b>Compliant</b>

Risk	Target for Full Compliance
This requirement reflects a high operational risk. It is essential that testing is undertaken by an accredited laboratory to ensure credibility of results.	Evidence that sample analysis has been undertaken by a laboratory accredited by NATA for the specific testing that has been carried out (or equivalent).

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- *Certificate of Analysis* for Work Order WN2103552 dated 26 March 2021 for samples collected on 25 March 2021.
- *Certificate of Analysis* for Work Order WN2111518 dated 14 October 2021 for samples collected on 7 October 2021.
- *Certificate of Analysis* for Work Order WN2106248 dated 23 June 2021 for samples collected on 3 June 2021.
- NATA website – scope of accreditation for ALS Newcastle Chemistry Laboratory: <https://nata.com.au/accredited-organisation/newcastle-chemistry-laboratory-als-life-sciences-environmental-825-1656/?highlight=825>.
- NATA website – scope of accreditation for ALS Newcastle Biology Laboratory: <https://nata.com.au/accredited-organisation/newcastle-biology-laboratory-als-life-sciences-environmental-825-9847/?highlight=825>.
- NATA website – scope of accreditation for ALS Scoresby Biology Laboratory: <https://nata.com.au/accredited-organisation/scoresby-biology-laboratory-992-989/?highlight=992>.
- NATA website – scope of accreditation for ALS Sydney Laboratories: <https://nata.com.au/accredited-organisation/sydney-chemistry-laboratory-als-life-sciences-environmental-825-10911/?highlight=825> and <https://nata.com.au/accredited-organisation/sydney-biology-laboratory-als-life-sciences-environmental-825-14913/?highlight=825>.

---

## Summary of reasons for grade

Catherine Hill Bay Water demonstrated that samples taken for the purposes of Verification Monitoring are analysed in NATA (National Association of Testing Authorities) accredited laboratories, the scope of accreditation for which collectively cover the tests undertaken. Reports of analyses undertaken for the purposes of verification monitoring demonstrated that the tests were undertaken in compliance with that NATA accreditation.

Accordingly, Catherine Hill Bay Water was assessed to have demonstrated compliance with this obligation.

---

## Discussion and notes

Catherine Hill Bay Water engages ALS Environmental to undertake analyses of samples taken for the purposes of verification monitoring. As indicated on its test certificates (*Certificates of Analysis*),<sup>48</sup> ALS Environmental holds NATA Accreditation No: 825 for compliance with ISO/IEC 17025 – Testing.

Testing is undertaken predominantly at the ALS Newcastle Chemistry (site number: 1656) and Biology (site number: 9847) Laboratories; however, notes on relevant test certificates<sup>49</sup> indicate that monthly testing for somatic coliphage and *Clostridium perfringens* is undertaken at the ALS Scoresby Biology (site number: 989) Laboratory under NATA Accreditation No: 992. Furthermore, test certificates indicate (by nomination of signatories) that testing of some parameters completed 6-monthly is undertaken at the ALS Sydney Chemistry (site number: 10911) and Biology (site number: 14913) Laboratories, both of which are included under NATA Accreditation No: 825.<sup>50</sup>

Reference to the NATA website confirmed that:

- ALS Newcastle Chemical Laboratory is accredited to undertake testing in respect of Solids - Dissolved, Solids - Suspended, Nitrogen - Ammonia, Nitrogen - Nitrite, Nitrogen - Nitrate, Nitrogen - Oxidised (Nitrite + Nitrate), Nitrogen - Total Kjeldahl, Nitrogen - Total, Phosphorus - Total, Phosphorus - Ortho ((Reactive), and Biological oxygen demand (BOD).<sup>51</sup>
- ALS Newcastle Biology Laboratory is accredited to undertake testing in respect of Coliforms and *Escherichia coli* (*E. coli*).<sup>52</sup>
- ALS Scoresby Biology Laboratory is accredited to undertake testing for somatic coliphage (Bacteriophage – Somatic) and *Clostridium perfringens*.<sup>53</sup>
- Whilst accreditation was not confirmed for all the extensive list of additional parameters tested 6-monthly, a sample check confirmed that either the ALS Sydney Chemistry or Biology Laboratories are accredited to undertake testing in respect of (for example) Organochlorine pesticides, Organophosphate pesticides and Metals.<sup>54</sup>

On this basis, it is apparent that samples taken for the purposes of verification monitoring are analysed in NATA (National Association of Testing Authorities) accredited laboratories.

---

<sup>48</sup> For example, *Certificate of Analysis* for Work Order WN2103552 dated 26 March 2021 for samples collected on 25 March 2021.

<sup>49</sup> For example, *Certificate of Analysis* for Work Order WN2111518 dated 14 October 2021 for samples collected on 7 October 2021.

<sup>50</sup> For example, *Certificate of Analysis* for Work Order WN2106248 dated 23 June 2021 for samples collected on 3 June 2021.

<sup>51</sup> NATA website – scope of accreditation for ALS Newcastle Chemistry Laboratory: <https://nata.com.au/accredited-organisation/newcastle-chemistry-laboratory-als-life-sciences-environmental-825-1656/?highlight=825>.

<sup>52</sup> NATA website – scope of accreditation for ALS Newcastle Biology Laboratory: <https://nata.com.au/accredited-organisation/newcastle-biology-laboratory-als-life-sciences-environmental-825-9847/?highlight=825>.

<sup>53</sup> NATA website – scope of accreditation for ALS Scoresby Biology Laboratory: <https://nata.com.au/accredited-organisation/scoresby-biology-laboratory-992-989/?highlight=992>.

<sup>54</sup> NATA website – scope of accreditation for ALS Sydney Laboratories: <https://nata.com.au/accredited-organisation/sydney-chemistry-laboratory-als-life-sciences-environmental-825-10911/?highlight=825> and <https://nata.com.au/accredited-organisation/sydney-biology-laboratory-als-life-sciences-environmental-825-14913/?highlight=825>.

---

### **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.

---

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

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



Table B.1 Infrastructure – WIC Reg Sch 1 cl.6(2)(a)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.6(2)(a)</b>	The Licensee must ensure that its infrastructure operating plan is fully implemented and kept under regular review and, in particular, that all of its activities are carried out in accordance with the plan.	 <b>Compliant</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. Regular review ensures that the *Plan* remains current and reflects the current circumstances of the scheme.

**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 sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- Solo Water, Catherine Hill Bay Water Utility; Infrastructure Operating Plan; Stage 2 (reference: IMS-OPER-B-8297-SW), including:
  - Revision 2.3, 14 September 2020; and
  - Revision 2.4, 13 October 2021.
- Solo Water, Catherine Hill Bay Water Utility; Drinking Water Quality Management Plan; Stage 2 (reference: IMS-ENVM-B-3727-SW), including: Revision 2.1, 20 September 2019; and Revision 2.2, 28 June 2021.
- Solo Water, Catherine Hill Bay Water Utility; Recycled Water Quality Management Plan; Stage 2 (reference: IMS-ENVM-B-3727-SW), including: Revision 1.3, 17 September 2020; and Revision 1.4, 13 October 2021.
- Solo Water, Catherine Hill Bay Water Utility; Operator's Manual; Recycled Water Treatment Plan (RWTP); Stage 2 (reference: IMS-OPER-C-1690-SW) (Revision 1.2), 17 December 2020.
- Solo Water, Catherine Hill Bay Water Utility; Operator's Manual; Distribution System Networks; Stage 2 (IMS-OPER-B-8298-SW) (Revision 2.2), 17 February 2021.
- Document (standard form): IMS-CONT-F-1693-SW - CHB Daily Log Sheet.pdf.
- Document (standard form): IMS-CONT-F-1692-SW - CHB Operations Workflow Checklist.pdf.
- Solo Water, CHB Asset Inspection Checklist (RWTP) (IMS-CONT-D-1691-SW) (Issue No: 1.3), December 2021.
- Solo Water, Asset Inspection Checklist Procedure - Network (IMS-OPER-D-8303-SW) (Issue No: 1.3), September 2020.
- Document: PM Summary Report.pdf.
- Document: WO Maintenance Records List 112020-102021.pdf.
- Document: Calibration Forms\_Example 202112.pdf.

- 
- Document: *20210114 Water Quality Sampling Results.pdf*.
  - Document (standard form): *IMS-CONT-F-1695-SW - Process Equipment Calibration Register.pdf*.
  - MS Excel workbook: *IMS-CONT-G-1671-SW - CHB Calibration Register.xlsx*.
  - Document: *Calibration Forms\_Example 202112.pdf*.
  - Document: *DITA Management System - Compliance Record.pdf* [in respect of the Catherine Hill Bay Site – Solo Water].
  - For example, internal email dated 6 July 2021 (re: *Training near due date - July 6, 2021*), including attached report.
  - Document: *User\_competencies\_Ronnie Paine.pdf* and *User\_competencies\_Tim Szadnanoff.pdf*.
  - Internal emails re: *Monthly IMS Documents Update - February 2021* (9 March 2021), *Monthly IMS Documents Update - March 2021* (8 April 2021) and *Monthly IMS Documents Update - September 2021* (30 September 2021).
  - Document: *Solo Water - Emergency Evacuation and Fire Drill\_07092021.pdf*.
  - Documents: *Toolbox Meeting – 202103.pdf*, *Toolbox Meeting – 202106.pdf*, and *Toolbox Meeting – 202107.pdf*.
  - Documents: *Contractor Compliance\_ALS.png* and *Contractor Compliance\_Essential Power Solutions.png*.
  - Documents: *Newcastle Fire Services Subcontractor Checklist.pdf* and *Subcontractor Monitoring Checklist - Example 202109.pdf* [Xylem].
  - MS Excel workbook, *IMS-CONT-G-1698-SW - Continuous Improvement Request Register.xlsx*.
  - MS Excel workbook, *IMS-CONT-G-1683-SW - Change Request Register – Maximo.xlsx*.
  - MS Excel workbook, *Solo Water Customer Feedback - Complaints Register.xlsx*.
  - Document: *IMS-DOCC-G-2414 - Master Register – SW.pdf*.
- 

### Summary of reasons for grade

Catherine Hill Bay Water demonstrated that, during the audit period, it had fully implemented and carried out its activities in accordance with the arrangements detailed in the *Infrastructure Operating Plan*. This was evident from the operational and maintenance activities that had been implemented; the actions taken to ensure that operators maintained, and contractors possessed appropriate competencies; and the focus on continual improvement.

Catherine Hill Bay Water also demonstrated that it has kept the *Infrastructure Operating Plan* under regular review.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

---

### Discussion and notes

#### Note:

*Although the scope of the audit only requires an assessment of the implementation of the Infrastructure Operating Plan as it relates to water supply infrastructure (WIC Reg Sched 1 cl.6(2)(a)), this assessment considers implementation of the Infrastructure Operating Plan as it related to both water supply (WIC Reg Sched 1 cl.6(2)(a)) and sewerage (WIC Reg Sched 1 cl.13(2)(a)) infrastructure.*

#### **Overview:**

The auditor 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*.

---

---

### ***Design and Construction:***

No new infrastructure was brought into commercial operation during the audit period. Extensions to the reticulation networks (non-potable water, sewerage and drinking water) that were designed and constructed during the previous audit period were brought into operation with some property connections being made during the current audit period; these extensions did not, however, constitute 'new infrastructure' as defined under the *WIC Regulation*.

Observations made during the previous (2020) Operational Audit<sup>55</sup> revealed (to the extent possible) that the extension works had been designed and constructed in accordance with the arrangements set out in the *Infrastructure Operating Plan*. Furthermore, visible components of the infrastructure appeared to be compliant with relevant standards and codes and industry practice.

Inspections made during the current audit confirmed those observations, including (for example):

- Valve covers and hydrants are appropriately colour coded;
- Property connection installations have lilac sleeved risers on recycled water connections; valves remain sealed and tagged until connection is authorised (refer Figure D.1.1); and
- Meter installations are consistent with standards (refer Figure D.1.1).

On this basis it is assessed that design and construction of extensions to the reticulation networks that were brought into operation during the audit period had been designed and constructed in accordance with the *Infrastructure Operating Plan*.

### ***Operation and Maintenance:***

Operation and maintenance of the infrastructure is undertaken in accordance with the general principles/strategy outlined in the *Infrastructure Operating Plan*, as well as the *Drinking Water Quality Management Plan* and *Recycled Water Quality Management Plan*. More specific guidance is provided in the *Operator's Manuals (Recycled Water Treatment Plant<sup>56</sup> and Distribution Networks<sup>57</sup>)* and other documented procedures.

The adopted operation and maintenance regime involves monitoring of system performance via the SCADA system; daily inspections and minor maintenance; and preventative, corrective, breakdown and major periodic maintenance as required. Evidence that this regime was implemented during the audit period included (for example):

- The SCADA system was reviewed during the audit site inspection. Observations made in respect of critical control point monitoring are detailed in Table A.1 and Table C.1.

As previously noted, Catherine Hill Bay Water maintains a *Daily Log Sheet*<sup>58</sup> on which all SCADA readings are recorded daily (Monday to Friday). Completed forms for January 2021 and September 2021 were sighted during the site audit; both were complete with annotations when any variance from normal was observed.

- *Operations Workflow Checklists*, which record inspections undertaken each day during a working week. These checklists record inspections made on either a daily, weekly or monthly basis in respect of the:<sup>59</sup>
  - Recycled Water Treatment Plant (RWTP), including RWTP General, Biological Feed System, Biological System, MBR, Aeration Blowers, Permeate tanks and Discharge Pumps, UV Disinfection, Chlorine Contact Tanks, Potable and Recycled Water Reservoirs, Potable and

---

<sup>55</sup> Cobbitty Consulting, *Catherine Hill Bay Water Utility; Operational Audit (Version 2.1)*, 22 March 2021, table D.1

<sup>56</sup> Solo Water, *Catherine Hill Bay Water Utility; Operator's Manual; Recycled Water Treatment Plan (RWTP); Stage 2* (reference: IMS-OPER-C-1690-SW) (Revision 1.2), 17 December 2020.

<sup>57</sup> Solo Water, *Catherine Hill Bay Water Utility; Operator's Manual; Distribution System Networks; Stage 2* (IMS-OPER-B-8298-SW) (Revision 2.2), 17 February 2021.

<sup>58</sup> Document (standard form): *IMS-CONT-F-1693-SW - CHB Daily Log Sheet.pdf*.

<sup>59</sup> Document (standard form): *IMS-CONT-F-1692-SW - CHB Operations Workflow Checklist.pdf*.

---

Recycled Water Pump Stations, Chemical Dosing System, and Common Process Storage Tanks; and

- Network, including Potable Water/Recycled Water Network, Pressure Sewer Network, Bulk Water Pump Station Bulk Water Main and Interim Site/Chlorine Skid.

Completed checklists for the weeks 23-27 November 2020, 4-8 January 2020 and 1-5 March 2021 were sighted; review of these samples confirmed that they had been appropriately completed; it is noted that there are a total of approximately 80 tasks (checks) to be undertaken.

Daily checks are undertaken in accordance with the *CHB Asset Inspection Checklist (RWTP)*<sup>60</sup> and Asset Inspection Checklist Procedure – Network<sup>61</sup> as appropriate. These procedures detail the specific inspection activities to be undertaken.

All maintenance activities are managed through a Maximo CMMS (computerised maintenance management system), which has been tailored for Catherine Hill Bay Water's use. The online system was viewed briefly; the following records were provided to demonstrate implementation:

- *Preventative Maintenance Register – Summary*<sup>62</sup> – this provides a listing of all preventative maintenance tasks. Details include task location, priority, frequency at which it is to be undertaken, the relevant Job Plan and the 'estimated next due date' and 'last completion date' at the time the report was generated.

Review of the register reveals the listed tasks to be appropriate for the Catherine Hill Bay Water schemes. For example, inspections of pressure sewer units (including separate electrical inspections) and dosing pumps; servicing of gas detectors; exercising of generators; and instrument calibrations are included.

- *Maintenance Records List*<sup>63</sup> – this record lists all work orders completed during the audit period, i.e. from November 2020 to October 2021. The relative PM (preventative maintenance task number) and Job Plan number are recorded together with the date upon which the work order was completed.

Records are reflective of details observed whilst reviewing Maximo online. For example:

- WO1012553 involved unplanned service repairs (corrective maintenance) to pumps in PSU73 on 18 November 2020. Pumps were jammed due to rags and paper towel; pumps were removed, cleared and reinstalled. Details of the labour and materials used are captured in Maximo.
- WO1018285 involved repair (corrective maintenance) to the meter riser at Lot 4083 on 6 September 2021. A kinked pipe was replaced following damage by a builder or plumber. Catherine Hill Bay Water advised that it has commenced assigning failure classifications for corrective and breakdown activities. The failure class had been recorded in this case.
- WO1016777 involved replacement (breakdown maintenance) of Mixer No: 2030 in one of the anaerobic /anoxic tanks due to an electrical problem (bearing and windings). The mixer was replaced on 16 July 2021.
- WO1012684 involved the monthly calibration (preventative maintenance) of MBR permeate turbidity meter on 27 November 2020. The Maximo record includes details of the completion date and the calibration readings, which are consistent with the separately documented calibration records.<sup>64</sup>

During the audit site inspection, the potable (drinking) water storage was inspected and its operation and maintenance discussed. The following observations are made:

---

<sup>60</sup> Solo Water, *CHB Asset Inspection Checklist (RWTP)* (IMS-CONT-D-1691-SW) (Issue No: 1.3), December 2021.

<sup>61</sup> Solo Water, *Asset Inspection Checklist Procedure - Network* (IMS-OPER-D-8303-SW) (Issue No: 1.3), September 2020.

<sup>62</sup> Document: *PM Summary Report.pdf*.

<sup>63</sup> Document: *WO Maintenance Records List 112020-102021.pdf*.

<sup>64</sup> Document: *Calibration Forms\_Example 202112.pdf*.

- 
- The tank roof was inspected. Sealant around the perimeter appeared to be intact; however, due to inaccessibility, it was difficult to confirm that ridge capping was effectively sealed. The roof hatch and ventilator were both well sealed.
  - A bi-annual internal inspection is due and will be undertaken after the summer. Inspection may be undertaken using an ROV (remotely operated underwater vehicle), or the tank may be removed from service to facilitate in person inspection; this is yet to be confirmed.
  - If the tank is bypassed to facilitate its removal from service, chlorine residual in the potable water is monitored and maintained using a separate skid-mounted (original equipment) chlorinator as water does not pass through the normal chlorination facilities during bypass.
  - The auditor noted that low chlorine levels had been recorded at the Kanangra Drive Bulk Water Pumping Station on one occasion (14 January 2021)<sup>65</sup> and queried what (if any) action would have been taken. Catherine Hill Bay Water advised that it notifies Central Coast Council if chlorine drops below normal levels; in response, Council typically doses chlorine at the supply point (Kanangra Reservoir) to restore levels. It is noted that residual chlorine levels are continuously maintained by Catherine Hill Bay Water, thereby ensuring the quality of potable water delivered into supply.
  - Review of Maximo revealed that the maintenance regime for the potable water storage comprises:
    - monthly inspections (PM100353) – Job plan JP100070, which involves a general inspection of each of the seven tanks;
    - annual inspections – Job plan JP100071, which involves the completion of 17 tasks, including inspection of the vermin proofing; and
    - bi-annual inspections – Job plan JP100072, which involves internal inspection, initially by ROV and then by in-person inspection if necessary.

Review of the *Maintenance Records List* revealed that monthly inspections had been undertaken in all except May 2021 under (for example) WO1012700 on 27 November 2020 and WO101479 on 31 March 2021.

Based on the above assessment and observations made during the audit site inspection, it was apparent that the infrastructure had been/was being operated and maintained in accordance with the arrangements documented in the *Infrastructure Operating Plan*.

### ***Instrument Calibrations:***

Catherine Hill Bay Water calibrates instruments in accordance with manufacturers' recommendations and standards. Records of calibration are recorded on the *Process Equipment Calibration Register*<sup>66</sup> forms, which include details of the instrument, the person who undertook the calibration, the readings of both the reference standard and instrument, the variation between the readings, whether calibration has passed (is within accuracy limits) and any comments. Records are also collated into the *CHB Calibration Register*,<sup>67</sup> which provides a summary record of all calibrations that have been undertaken.

Review of *Process Equipment Calibration Register*<sup>68</sup> revealed that (for example) the inline MBR turbidity meters for both process trains (Instruments AIT-1051 and AIT-2051), the UV Transmissivity Analyser (AIT-8010), and the handheld Conductivity Analyser, Turbidity Analyser, Free Chlorine Meter and pH Analyser had all been calibrated monthly during the audit period. This is consistent with records in the *CHB Calibration Register*.

Ensuring that instrument calibrations are undertaken is managed via Maximo. This reflected in both the *Preventative Maintenance Register – Summary* and *Maintenance Records List*, both of which are discussed above.

---

<sup>65</sup> Document: *20210114 Water Quality Sampling Results.pdf*.

<sup>66</sup> Document (standard form): *IMS-CONT-F-1695-SW - Process Equipment Calibration Register.pdf*.

<sup>67</sup> MS Excel workbook: *IMS-CONT-G-1671-SW - CHB Calibration Register.xlsx*.

<sup>68</sup> Document: *Calibration Forms\_Example 202112.pdf*.

---

As reported in Table A.1, the ‘use-by’ dates of reference standards used for instrument calibration were checked for currency. It was noted (for example) that:

- Expiry dates for pH buffer standards were May 2022 for pH10.0 and January 2022 (i.e. just expired) for pH7.0; and
- Expiry date for Chlorine standard was August 2022.

Catherine Hill Bay Water advised that replacement standards had been ordered, but not yet received. It further advised that out of date standards had not been used.

In summary, it is assessed that instrument calibration had been maintained, consistent with the requirement of the *Infrastructure Operating Plan*, during the audit period.

### ***Capability and Training:***

Catherine Hill Bay Water demonstrated that appropriate training of personnel engaged in operation and maintenance of the schemes had been maintained during the audit period.

QSE training/competency is managed using a DITA compliance management system, which is also used in respect of QSE compliance obligations. All training/competency requirements are identified, and records maintained for each staff member; compliance requirements are also identified and records maintained for the Catherine Hill Bay Water site.<sup>69</sup>

Automated monthly emails are used to issue “Training near due date” notices to relevant managers; selected activities such as toolbox meetings, instrument calibrations and safety related maintenance activities are also identified.<sup>70</sup> The July 2021 notification indicated (for example) that both Ronnie Paine and Tim Sazdanoff were due to undertake Fire Warden Training V2.0 and Tim Sazdanoff was due to undertake Confined Space Training, and that Safety Shower maintenance was also due.

User competency records for both Ronnie Paine and Tim Sazdanoff,<sup>71</sup> the Catherine Hill Bay Water scheme operators, were provided. These records indicated that both were fully compliant in respect of training requirements; renewal dates were identified where applicable. More specifically, the records indicated that (for example) Ronnie Paine and Tim Sazdanoff had undertaken the required Fire Warden Training on 14 July 2021 and 20 July 2021 respectively; Tim Sazdanoff had also completed Confined Space training on 15 July 2021.

Other training records provided included:

- Email notification of changes to IMS documents;<sup>72</sup> it is noted that the February 2021 update identified changes to (for example) the *CHB Free Chlorine Sampling Form*, the *Quarterly Site Monitoring Checklist* and the *Free Chlorine Field Verification Monitoring Procedure*;
- Record of an Emergency Evacuation Drill (Fire) undertaken on 7 September 2021;<sup>73</sup> and
- Records of Toolbox Meetings held on 12 March 2021, 10 June 2021 and 14 July 2021.<sup>74</sup>

Catherine Hill Bay Water also maintains a contractor compliance register, which is used to record whether contractors hold required certification/accreditation, insurance cover, etc.; screenshots of the online records for ALS Water and Essential Power systems were provided as examples.<sup>75</sup> All contractors are inducted before commencing work on site, and Catherine Hill Bay Water checks to ensure that all compliance and safety requirements are in place.<sup>76</sup>

---

<sup>69</sup> Document: *DITA Management System - Compliance Record.pdf* [in respect of the Catherine Hill Bay Site – Solo Water].

<sup>70</sup> For example, internal email dated 6 July 2021 (re: *Training near due date - July 6, 2021*), including attached report.

<sup>71</sup> Documents: *User\_competencies\_Ronnie Paine.pdf* and *User\_competencies\_Tim Sazdanoff.pdf*.

<sup>72</sup> Internal emails re: *Monthly IMS Documents Update - February 2021* (9 March 2021), *Monthly IMS Documents Update - March 2021* (8 April 2021) and *Monthly IMS Documents Update - September 2021* (30 September 2021).

<sup>73</sup> Document: *Solo Water - Emergency Evacuation and Fire Drill\_07092021.pdf*.

<sup>74</sup> Documents: *Toolbox Meeting – 202103.pdf*, *Toolbox Meeting – 202106.pdf*, and *Toolbox Meeting – 202107.pdf*.

<sup>75</sup> Documents: *Contractor Compliance\_ALS.png* and *Contractor Compliance\_Essential Power Solutions.png*.

<sup>76</sup> Documents: *Newcastle Fire Services Subcontractor Checklist.pdf* and *Subcontractor Monitoring Checklist - Example 202109.pdf* [Xylem].

---

### ***Continual Improvement:***

To demonstrate its commitment to continuous improvement, Catherine Hill Bay Water provided copies of:

- *Continuous Improvement Request Register*<sup>77</sup> – this register is used to capture non-critical continuous improvement measures in relation to system documentation for future implementation at the next standard document review cycle. Some fifteen improvement actions were identified during the audit period, with two remaining open at the time of the audit.

The improvements related principally to update of documentation (procedures and forms) to reflect proposed or already implemented operational improvements. For example, CIR#25 was raised in response to an opportunity for improvement identified during the last Operational Audit; update of the *CHB Field Water Quality Sampling Form* (IMS-COMP-F-0884-SW) to include details of the hand-held instruments used for the field tests (e.g. model/Serial Number) was proposed. Evidence sighted during the audit confirmed that this has now being implemented.

- *Change Request Register – Maximo*<sup>78</sup> – this register is to raise and capture non-critical continuous improvement measures and change requests for review and implementation in the Maximo Asset Management System. Ten (10) change requests were recorded during the audit period; all change requests, including for example: “*Incorporate new forklift bin lifting attachment into Maximo and Lifting equipment inspection PM/Route*” had been addressed at the time of the audit.

Catherine Hill Bay Water also provided a copy of its *Complaints Register*,<sup>79</sup> in which details of all complaints and the action taken in response are recorded. A total of nine (9) complaints and enquiries were received during the audit period. Of these, three (3) related to retail/billing matters; the remainder required some (generally minor) level of operational or maintenance intervention such as (for example) water main flushing in response to a dirty water compliant.

### ***Regular Review of Infrastructure Operating Plan:***

Catherine Hill Bay Water demonstrated that the *Infrastructure Operating Plan* has been kept under regular review. The “Document Status” table indicates that the document has undergone several revisions during its development phase and subsequently.

The *Infrastructure Operating Plan* was most recently updated to Version 2.4 in October 2021, i.e. towards the end of the audit period. This revision was primarily to incorporate details of Stages 6 and 7 of the “Beaches” estate, which is serviced by the scheme.

Review of the *Document Control Register*<sup>80</sup> indicates that the current version of the *Infrastructure Operating Plan* is Version 2.4, which was issued following review in October 2021; this is consistent with the “Document Status” record in the *Plan*. The *Document Control Register* also indicates that the next regular review of the *Plan* is due in June 2023 (i.e. after two years); however, this is likely to change to an annual review based on advice from Catherine Hill Bay Water as reported in Table A.1.

On this basis, it is apparent that the *Infrastructure Operating Plan* has been kept under regular review.

---

## **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.

---

<sup>77</sup> MS Excel workbook, *IMS-CONT-G-1698-SW - Continuous Improvement Request Register.xlsx*.

<sup>78</sup> MS Excel workbook, *IMS-CONT-G-1683-SW - Change Request Register – Maximo.xlsx*.

<sup>79</sup> MS Excel workbook, *Solo Water Customer Feedback - Complaints Register.xlsx*.

<sup>80</sup> Document: *IMS-DOCC-G-2414 - Master Register – SW.pdf*.



**Figure D.1.1 Property connection installations with lilac sleeved risers and meter on recycled water connections. Note that valves are sealed and tagged to prevent use until authorised by Catherine Hill Bay Water.**

Table B.2 Infrastructure – WIC Reg Sch 1 cl.8(1)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sch 1 cl.8(1)</b>	A water meter connected to a licensee’s water main must comply with the requirements of the document entitled the <i>Plumbing Code of Australia</i> , produced for all State governments by the Australian Building Codes Board, as in force from time to time.	 <b>Compliant</b>

**Risk**

This represents medium business risk. Non-compliant and/or inaccurate water meters may result in incorrect water consumption readings which are then reflected in customer billing.

**Target for Full Compliance**

Evidence that meters are compliant with the requirements of the *Plumbing Code of Australia*.

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- Solo Water, *Catherine Hill Bay Water Utility; Infrastructure Operating Plan; Stage 2* (reference: IMS-OPER-B-8297-SW), including:
  - Revision 2.3, 14 September 2020; and
  - Revision 2.4, 13 October 2021.
- Solo Water, *Catherine Hill Bay Water Utility; Operator’s Manual; Distribution System Networks; Stage 2* (reference: IMS-OPER-C-8298-SW) (Revision 2.2), 17 February 2021.
- Document: *V100\_PSM\_T\_SML001\_SpecSheet.pdf*.
- ABCB, *National Construction Code; Volume 3 Plumbing Code of Australia*, 2019.

**Summary of reasons for grade**

Catherine Hill Bay Water demonstrated that water meters connected to its recycled water mains comply with the *Plumbing Code of Australia*. Meters are “deemed to comply” on the basis that they NMI rated, and standard marked as being compliant with AS/NZS 3565.1 *Meters for water supply – Cold water meters* and have characteristics consistent with the requirements of AS.NZS 3500.1 *Plumbing and drainage –Water services*.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

**Discussion and notes**

Catherine Hill Bay Water advised that meters to be installed to both drinking water and recycled water property services are Elster V100 DCV meters, which is confirmed by reference to the *Operator’s Manual*.<sup>81</sup> Recycled water meters are to be coloured lilac.<sup>82</sup>

The *Operator’s Manual* further indicates that:<sup>83</sup>

<sup>81</sup> *Operator’s Manual – Distribution System Networks*, sections 3.1.5 (drinking water) and 3.1.6 (recycled water).

<sup>82</sup> *Operator’s Manual – Distribution System Networks*, sections 3.1.3 and 3.1.6.

<sup>83</sup> *Operator’s Manual*, section 4.5.9.

---

*“All meters in the V100 (PSM-T) range meet the Metrological and Technical requirements of NMI R 49-1: Water Meters Intended for the Metering of Cold Potable Water and Hot Water and are Standards Mark certified to AS 3565.1 by SAI Global under Licence No: SMKP20052.”*

Samples of both a drinking water and recycled water meter were sighted during the audit, both in store (refer Figure A.7.1) and installed in service (refer Figure A.1.1). Marks indicate compliance with AS 3565.1 *Meters for water supply – Cold water meters*. Meter characteristics, including compliance with AS 3565, are detailed in a brochure/specification sheet produced by Elster (manufacturer).<sup>84</sup>

The specific requirements of the *Plumbing Code of Australia* in respect of meters are difficult to identify and are typically expressed as “deemed to satisfy”. More specifically, the general requirements in respect of cold water services<sup>85</sup> refer to the provisions of AS/NZS 3500.1 *Plumbing and drainage – Water services*.

Compliance with AS/NZS 3500.1 includes (for example):

- the connection thread is opposite handed for the drinking and recycled water meters, thereby preventing inadvertent installation on the wrong service;
- recycled water meters are purple (lilac) in colour; and
- both drinking water and recycled water meters include dual integral check valves to prevent backflow, as identified in the *Infrastructure Operating Plan*.<sup>86</sup>

Based on these observations, it is apparent that the water meters connected to a Licensee’s water main can be deemed to comply with the requirements of the *Plumbing Code of Australia*.

---

## 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.

---

---

<sup>84</sup> Document: *V100\_PSM\_T\_SML001\_SpecSheet.pdf*.

<sup>85</sup> ABCB, *National Construction Code; Volume 3 Plumbing Code of Australia*, 2019, clause B1.4.

<sup>86</sup> *Infrastructure Operating Plan*, sections 3.12. (drinking water) and 3.1.3 (recycled water).



Figure B.2.1 Potable water meter; Australian Standard and NMI compliance embossed on body of meter.

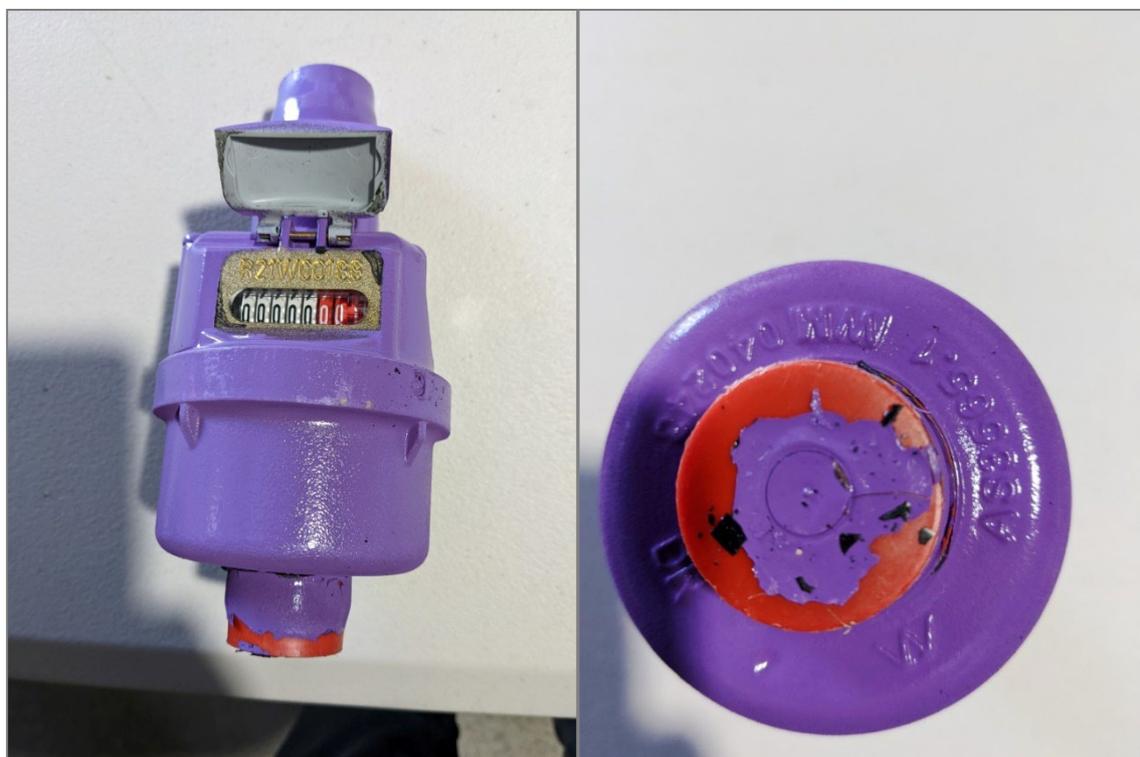


Figure B.2.2 Recycled water meter; Australian Standard compliance embossed on body of meter.

**Table B.3 Infrastructure – WIC Reg Sch 1 cl.8(2)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sch 1 cl.8(2)</b>	While water is being supplied to premises for which a water meter has been installed, the licensee must ensure: <ul style="list-style-type: none"> <li>(a) the water meter is properly maintained and periodically tested, and</li> <li>(b) the water meter is read at intervals of no more than 4 months, and</li> <li>(c) written notice of each meter reading is sent to the relevant licensed retail supplier.</li> </ul>	 <b>Compliant</b>

**Risk**

This represents medium business risk. Failure to maintain water meters may result in incorrect water consumption readings. Failure to read meters regularly and provide written notice of readings may result in issues in respect of customer billing.

**Target for Full Compliance**

Evidence that there are documented procedures for the management of the meter fleet; that meters are read at the required interval; and that readings are passed on to the relevant retail supplier.

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- Solo Water, *Catherine Hill Bay Water Utility; Infrastructure Operating Plan; Stage 2* (reference: IMS-OPER-B-8297-SW), including:
  - Revision 2.3, 14 September 2020; and
  - Revision 2.4, 13 October 2021.
- Solo Water, *Catherine Hill Bay Water Utility; Operator’s Manual; Distribution System Networks; Stage 2* (reference: IMS-OPER-C-8298-SW) (Revision 2.2), 17 February 2021.
- Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021.
- Solo, *GIS Meter Procedure* (IMS-OPER-D-8315-SW) (Issue No: 1.0), June 2017.
- Documents (meter read records): *20210430 Meter Read.pdf*, *20210730 Meter read.pdf* and *20211101 Meter Read.pdf*.
- Documents (customer invoices): *26403 – 202105.pdf* and *27069 – 202108.pdf*.

**Summary of reasons for grade**

Catherine Hill Bay Water demonstrated that it has documented its approach to water meter maintenance, testing and renewal, which is generally consistent with industry practice. The requirement for testing (or replacement) had not been triggered during the audit period, and there were no customer requests for meter testing.

Catherine Hill Bay Water’s documentation (*Operator’s Manual* and *Customer Contract*) indicate that water meters are to be read at least 4-monthly (as required by the Licence) and that in most cases meter reads will be undertaken on a quarterly basis at the end of July, October, January and April. Records of meter reads were provided to demonstrate that meters were read quarterly during the audit period.

---

As Catherine Hill Bay Water (Network Operator) and Solo Water (parent company and Retail Supplier) are essentially the same company, notification of meter readings is, in practice, not required. Nonetheless, review of sample customer invoices confirmed that readings had been appropriately passed on for billing purposes.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with these obligations.

---

## Discussion and notes

### ***Maintenance and Testing (clause 8(2)(a)):***

Arrangements adopted by Catherine Hill Bay Water in respect of the maintenance and testing of water meters are outlined in the *Operator's Manual* indicates that:<sup>87</sup>

*“The Operators are to ensure that the water meters are to be periodically tested in accordance with AS3565.4 Meters for cold and heated drinking and non-drinking water supplies, Part 4: In-service compliance testing.*

*The installed and verified meters have an initial compliance testing period of 1,920 KL or 8 years (whichever comes first). The meters age and usage are to be monitored as part of the meter reading activities and meters tested in accordance with AS3565.4 once the initial compliance testing procedure is exceeded.”*

Furthermore, the *Customer Contract* outlines:

- the arrangements in respect of testing of a meter (at the customer's request);<sup>88</sup> and
- situations in which a meter will be replaced, which include the meter being found to be defective; the meter can no longer be reasonably maintained; or the meter is replaced as part of a meter replacement program.<sup>89</sup>

Catherine Hill Bay Water advised that no meters had met the compliance testing threshold during the audit period. Given that commercial operation of the scheme (drinking water and recycled water charged with drinking water) only commenced on 30 October 2017, the 8-year trigger has not yet been reached. Review of meter reading records as of 1 November 2021 (one day after the end of the audit period)<sup>90</sup> indicated that one recycled water meter had marginally exceeded the volumetric trigger (2,079 kL versus 1,920 kL); all other readings were well below (maximum 1,179 kL for drinking water and 1,088 kL for recycled water).

The auditor is of the view that the guidance in respect of periodic testing is not intended to be applied on a single meter basis, and notes that Catherine Hill Bay Water confirmed that there has been no request from customers for meter testing as provided for in the *Customer Contract*. Therefore, for the purposes of this assessment, it is considered that maintenance and testing of meters has been consistent with the documented arrangements, i.e. none has been required to date.

It is noted that Catherine Hill Bay Water's approach to water meter maintenance and testing is generally consistent with the approach typically adopted by Australian water utilities.

### ***Meter Reading (clause 8(2)(b)):***

The *Operator's Manual* indicates that:<sup>91</sup>

*“The Operators are to ensure that the water meters are read at least every 4 months in consultation with the Solo Water retail team. In most cases meter reads at CHB are undertaken on a quarterly basis at the end of July, October, January and April.”*

---

<sup>87</sup> *Operator's Manual – Distribution System Networks*, section 4.5.9.

<sup>88</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021, section 10.3.

<sup>89</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021, section 10.5.

<sup>90</sup> Document: 20211101 Meter Read.pdf.

<sup>91</sup> *Operator's Manual – Distribution System Networks*, section 4.5.9.

---

The *GIS Meter Procedure*<sup>92</sup> provides instructions in relation to the performance of meter readings and the management of meter read data. It also indicates the action to be taken if a meter cannot be read; some twenty (20) potential situations (“trouble reads”) are identified and response actions specified.

The *Customer Contract* indicates that:<sup>93</sup>

*“We will endeavour to provide an actual meter reading once every 3 months, inclusive of meter readings taken by you on our behalf.”*

These references indicate that meters are to be read at least 4-monthly (as required by the Licence) and that Catherine Hill Bay Water/Solo Water will endeavour to read them every 3 months, i.e. more regularly than the minimum requirement.

Records of meter readings taken at the end of April 2021, July 2021 and October 2021 confirm that meter readings were taken at 3-monthly intervals during the audit period.<sup>94</sup>

***Notification to Retail Supplier (clause 8(2)(c)):***

Solo Water Pty Ltd (Catherine Hill Bay Water’s parent company) holds the Retail Suppliers Licence in respect of the Catherine Hill Bay drinking water and recycled water infrastructure; accordingly, notification of meter readings is, in practice, not required as the Network Operator and Retail Supplier are, for purposes of this requirement, the same entity.

To demonstrate that meter readings had been correctly carried through the billing process, Customer No: 920292013 water use invoices for the supply periods ending 30 April 2021 and 31 July 2021 were provided.<sup>95</sup> A check against the above referenced meter read records confirmed that readings had been appropriately passed on for billing purposes, thereby demonstrating that the intent of this obligation had been met.

---

**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.

---

---

<sup>92</sup> Solo, *GIS Meter Procedure* (IMS-OPER-D-8315-SW) (Issue No: 1.0), June 2017.

<sup>93</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021, section 10.1.

<sup>94</sup> Documents (meter read records): *20210430 Meter Read.pdf*, *20210730 Meter read.pdf* and *20211101 Meter Read.pdf*.

<sup>95</sup> Documents (customer invoices): *26403 – 202105.pdf* and *27069 – 202108.pdf*.

Table B.4 Infrastructure – WIC Reg Sch 1 cl.11

Clause	Requirement	Compliance Grade
<b>WIC Reg Sch 1 cl.11</b>	The licensee must not allow a customer's installation to be connected to the licensee's water main unless the installation is code compliant, within the meaning of the <i>Plumbing and Drainage Act 2011</i> .	 <b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
This requirement represents high operational risk. Compliance of customer installation with appropriate standards is essential to ensuring safe and reliable service delivery.	Evidence of customer installations being assessed to be code compliant within the meaning of the <i>Plumbing and Drainage Act 2011</i> .	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 10 February 2022.</li> <li>▪ Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.</li> <li>▪ <i>Plumbing and Drainage Act 2011</i> (NSW): <a href="http://www.classic.austlii.edu.au/au/legis/nsw/consol_act/pada2011174/s7.html">http://www.classic.austlii.edu.au/au/legis/nsw/consol_act/pada2011174/s7.html</a> accessed on 3 March 2022.</li> <li>▪ <i>Plumbing and Drainage Regulation 2012</i>: <a href="http://classic.austlii.edu.au/au/legis/nsw/consol_reg/padr2017265/">http://classic.austlii.edu.au/au/legis/nsw/consol_reg/padr2017265/</a> accessed on 3 March 2022.</li> <li>▪ ABCB, <i>National Construction Code; Volume 3 Plumbing Code of Australia</i>, 2019.</li> <li>▪ Solo Water, <i>Catherine Hill Bay Water Utility; Operator's Manual; Distribution System Networks; Stage 2</i> (reference: IMS-OPER-C-8298-SW) (Revision 2.2), 17 February 2021.</li> <li>▪ Solo Water, <i>Building and Connection Process Guide</i> (IMS-OPER-G-8352-SW) (Issue No: 2.1), September 2020.</li> <li>▪ Solo Water, <i>Building Plans Stamping Checklist</i> (IMS-OPER-F-8317-SW) (Issue No: 1.2), August 2021.</li> <li>▪ Solo Water, <i>Standard Conditions for Approval of Building Plans</i> (IMS-OPER-G-8351-SW) (Issue No: 2.3), August 2021.</li> <li>▪ Solo Water, <i>Builders Induction Checklist</i> (IMS-OPER-F-8316-SW) (Issue No: 1.1), December 2020.</li> <li>▪ Solo Water, <i>New Connection Checklist</i> (IMS-OPER-F-8336-SW) (Issue No: 1.1), October 2017.</li> <li>▪ Solo Water, <i>Solo Water Retail – Change of Ownership Checklist</i> (IMS-OPER-F-8371-SW) (Issue No: 1.2), October 2020.</li> <li>▪ Solo Water, <i>Customer Contract</i> (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021.</li> <li>▪ NSW Fair Trading Standard Form, <i>Notice of Work and Certificate of Compliance; for Plumbing and Drainage Work</i> completed in respect of work undertaken at 2 Quinn Street Catherine Hill Bay, dated (work completed) 10 May 2021.</li> <li>▪ Letter dated 26 May 2021 from Lake Macquarie Council to property owner (re: <i>Plumbing &amp; Drainage Work Satisfactory Completion</i>).</li> <li>▪ Document: <i>SSD – 2 Quinn St, Catherine Hill Bay 10052021.pdf</i>.</li> <li>▪ Document: <i>Stormwater Diagram – 2 Quinn St, Catherine Hill Bay 10052021.pdf</i></li> <li>▪ Document: <i>Final Lot 1018.pdf</i>.</li> </ul>		

- 
- Document: *Lot 1018 Connection Certificate.pdf*.
  - Email dated 10 June 2021 from Solo Water/Catherine Hill Bay Water to Lot 1018 property owner (re: *Lot 1018 Solo Water Connection Certificate*), including attachments.
  - Document: *208287 Solo connection ap.pdf*.
  - Email dated 4 November 2020 from Solo Water/Catherine Hill Bay Water to Lot 5026 builder (re: *Lot 5026 Building Induction*), including attachments.
  - Email dated 31 August 2021 from Solo Water/Catherine Hill Bay Water to Lot 5026 builder (re: *[SW] 208287-Lot 5026, 18 Rockpool Road, Catherine Hill Bay NSW 2281*).
  - Document: *New Connection Checklist-completed.pdf*.
  - Document: *Lot 5026 Connection Certificate.pdf*.
  - Email dated 29 September 2021 from Solo Water/Catherine Hill Bay Water to Lot 5026 builder (re: *Lot 5026 Solo Water Connection Certificate*), including attachment.
  - Document: *CHB\_Lot 1064\_RN2\_210928 - RPZ Test.pdf*.
  - Document: *Jennifer\_Chen\_28\_Surfside\_dr,\_Backflow\_test.pdf*.
  - Email correspondence between Catherine Hill Bay Water and Lot 1064 property owner with entries on 28 September 2021 and 19 October 2021 (re: *Rectification Notice - RPZ Test Certificate - 28 Surfside Dr, CHB*).
- 

### Summary of reasons for grade

Catherine Hill Bay Water demonstrated that it has procedures in place to ensure that customer installations comply with the *Plumbing and Drainage Act 2011* (NSW) prior to connection to its water mains; these procedures, which include inspection by Catherine Hill Bay Water personnel as well as the provision of compliance certification, are considered robust. Through the provision of a sample of records, Catherine Hill Bay Water also demonstrated that these procedures have been implemented effectively.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

---

### Discussion and notes

Under the provisions of Section 7(1) of the *Plumbing and Drainage Act 2011* (NSW),<sup>96</sup> plumbing and drainage works must comply with the *Plumbing Code of Australia* and any other standards or requirements prescribed by the regulations. The *Plumbing and Drainage Regulation 2012*<sup>97</sup> does not prescribe any other standards or requirements.

The *Plumbing Code of Australia*<sup>98</sup> indicates that: “*The design, construction, installation, replacement, repair, alteration and maintenance of cold water services must be in accordance with AS/NZS 3500.1*” (i.e. the *Plumbing and drainage – Water services* code).

Catherine Hill Bay Water demonstrated that pursuant to its internal procedures (specifically its *Operator’s Manual*),<sup>99</sup> it requires: “... a certificate of compliance from the licensed plumber to demonstrate compliance with AS3500 before a recycled water meter will be issued for connection.” It is noted that the potable water meter is issued at an early stage to facilitate property development/building.

---

<sup>96</sup> *Plumbing and Drainage Act 2011* (NSW): [http://www.classic.austlii.edu.au/au/legis/nsw/consol\\_act/pada2011174/s7.html](http://www.classic.austlii.edu.au/au/legis/nsw/consol_act/pada2011174/s7.html) accessed on 3 March 2022.

<sup>97</sup> *Plumbing and Drainage Regulation 2012*: [http://classic.austlii.edu.au/au/legis/nsw/consol\\_reg/padr2017265/](http://classic.austlii.edu.au/au/legis/nsw/consol_reg/padr2017265/) accessed on 3 March 2022.

<sup>98</sup> ABCB, *National Construction Code; Volume 3 Plumbing Code of Australia*, 2019, clause B1.4.

<sup>99</sup> *Operator’s Manual*, sections 3.1.5 (drinking water) and 3.1.6 (recycled water).

---

The requirement for certified plumbing compliance is more specifically detailed in documentation related to the service connection process, including:

- *Building and Connection Process Guide*<sup>100</sup> – this document outlines the process to be followed /requirements to be met in respect of water and wastewater servicing of properties in the Catherine Hill Bay “Beaches” estate. These include, but are not limited to:
  - The requirement for building plans to be submitted to Catherine Hill Bay Water for approval; a *Building Plans Stamping Checklist*<sup>101</sup> is used as the basis of the assessment process. Plans are approved subject to the *Standard Conditions for Approval of Building Plans*,<sup>102</sup> which include details of the requirements in respect of plumbing compliance; certification of compliance with the *National Building Code* and AS 3500 are principal amongst these.
  - The requirement for builders to undertake induction by Catherine Hill Bay Water prior to commencing work; the *Builders Induction Checklist*,<sup>103</sup> which addresses both process and compliance requirements, provides the basis for these inductions. It is noted that drinking water meters are typically issued at the induction session, thereby enabling the supply of water for building purposes.
  - The requirement for builders to liaise directly with Lake Macquarie Council, which is the authority with delegated responsibility for all plumbing inspections under the *Plumbing and Drainage Act*.
  - The requirement for engagement with Catherine Hill Bay Water and for Catherine Hill Bay Water to undertake inspections of plumbing and related work during construction.
  - The requirements to be met before Catherine Hill Bay Water will issue a *Connection Certificate* and provide a recycled water meter to enable connection of the recycled water service. The *New Connection Checklist*<sup>104</sup> is used as the basis of assessing that all process steps, including the provision of copies of Certificates of Compliance for all plumbing work to Solo Water /Catherine Hill Bay Water, have been completed prior to issue of a *Connection Certificate*.
- *Change of Ownership Checklist*<sup>105</sup> – this checklist is used when processing a change of ownership for a property serviced by the Catherine Hill Bay Water schemes. Amongst the requirements prior to processing the change of ownership are:
  - The requirement for the Purchaser to engage a licenced plumber to undertake a AS 3500 compliance assessment and issue a certificate of compliance to AS 3500 (if the property is an existing house).
  - The requirement for provision of a cross connection compliance certificate.

The requirement for compliant plumbing is reiterated in the *Customer Contract*, which indicates that:<sup>106</sup>

*“Connection to our water, wastewater or system must be approved by us in writing and you must comply with the conditions we set to ensure the safe and reliable supply of services. The connection must be undertaken by an accredited installer, licensed plumber or drainer and in accordance with plumbing, drainage or other regulations or standards that may apply.”*

and similarly:<sup>107</sup>

*“Connections to our water or wastewater systems are to be made using the services of an installer, licensed plumber or drainer who is accredited by us and in accordance with plumbing, drainage or other regulations or standards that may apply.”*

---

<sup>100</sup> Solo Water, *Building and Connection Process Guide* (IMS-OPER-G-8352-SW) (Issue No: 2.1), September 2020.

<sup>101</sup> Solo Water, *Building Plans Stamping Checklist* (IMS-OPER-F-8317-SW) (Issue No: 1.2), August 2021.

<sup>102</sup> Solo Water, *Standard Conditions for Approval of Building Plans* (IMS-OPER-G-8351-SW) (Issue No: 2.3), August 2021.

<sup>103</sup> Solo Water, *Builders Induction Checklist* (IMS-OPER-F-8316-SW) (Issue No: 1.1), December 2020.

<sup>104</sup> Solo Water, *New Connection Checklist* (IMS-OPER-F-8336-SW) (Issue No: 1.1), October 2017.

<sup>105</sup> Solo Water, *Solo Water Retail – Change of Ownership Checklist* (IMS-OPER-F-8371-SW) (Issue No: 1.2), October 2020.

<sup>106</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021, section 4.9.2.

<sup>107</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.2), January 2021, section 8.8.

---

As evidence that the documented processes are being implemented, Catherine Hill Bay Water provided sample records in respect of connections to two properties, as follows:

- Lot 1018 (2 Quinn Street, Catherine Hill Bay) – documentation including:
  - *Notice of Work/Certificate of Compliance; for Plumbing and Drainage Work*,<sup>108</sup> which indicated that water supply, including recycled water supply, sanitary plumbing/drainage work had been completed to AS/NZS 3500;
  - Lake Macquarie Council advice to property owner regarding satisfactory completion of plumbing and drainage work;<sup>109</sup>
  - *Sewer Service Diagram*;<sup>110</sup>
  - *Stormwater Diagram* (marked up copy of the *Sewer Service Diagram*);<sup>111</sup>
  - Completed *New Connection Checklist*;<sup>112</sup>
  - *Connection Certificate*;<sup>113</sup> and
  - Email correspondence to property owner including copies of the *Connection Certificate*, *Solo Water Home Owners Manual*, *Customer Contract*, *Disclosure Notice* and *Pricing Schedule* as attachments.<sup>114</sup>
- Lot 5016 (18 Rockpool Road, Catherine Hill Bay) – documentation including:
  - Completed *Drinking Water, Recycled Water & Sewerage Connection Application Form*;<sup>115</sup>
  - Email correspondence to builder including copies of completed *Builders Induction Checklist*, a sample completed *Fair Trading Certificate of Compliance* and details for construction of a temporary bypass from the potable to recycled water service (on property).<sup>116</sup>
  - Request to builder to provide a copy of the “*Lake Macquarie City Council Plumbing and Drainage Work Satisfactory Completion letter*”;<sup>117</sup>
  - Completed *New Connection Checklist*;<sup>118</sup>
  - *Connection Certificate*;<sup>119</sup> and
  - Email correspondence to builder including a copy of the *Connection Certificate*.<sup>120</sup>

Catherine Hill Bay Water also provided evidence in respect of maintaining compliance of testable backflow prevention devices. In this case it had proactively notified the Lot 1064 property owner, through the issue of a *Rectification Notice*<sup>121</sup> via email on 28 September 2021, that testing of a RPZD backflow prevention device was due by 2 November 2021. A copy of a *Backflow Prevention Device*;

---

---

<sup>108</sup> NSW Fair Trading Standard Form, *Notice of Work and Certificate of Compliance; for Plumbing and Drainage Work* completed in respect of work undertaken at 2 Quinn Street Catherine Hill Bay, dated (work completed) 10 May 2021.

<sup>109</sup> Letter dated 26 May 2021 from Lake Macquarie Council to property owner (re: *Plumbing & Drainage Work Satisfactory Completion*).

<sup>110</sup> Document: *SSD – 2 Quinn St, Catherine Hill Bay 10052021.pdf*.

<sup>111</sup> Document: *Stormwater Diagram – 2 Quinn St, Catherine Hill Bay 10052021.pdf*

<sup>112</sup> Document: *Final Lot 1018.pdf*.

<sup>113</sup> Document: *Lot 1018 Connection Certificate.pdf*.

<sup>114</sup> Email dated 10 June 2021 from Solo Water/Catherine Hill Bay Water to Lot 1018 property owner (re: *Lot 1018 Solo Water Connection Certificate*), including attachments.

<sup>115</sup> Document: *208287 Solo connection ap.pdf*.

<sup>116</sup> Email dated 4 November 2020 from Solo Water/Catherine Hill Bay Water to Lot 5026 builder (re: *Lot 5026 Building Induction*), including attachments.

<sup>117</sup> Email dated 31 August 2021 from Solo Water/Catherine Hill Bay Water to Lot 5026 builder (re: *[SW] 208287-Lot 5026, 18 Rockpool Road, Catherine Hill Bay NSW 2281*).

<sup>118</sup> Document: *New Connection Checklist-completed.pdf*.

<sup>119</sup> Document: *Lot 5026 Connection Certificate.pdf*.

<sup>120</sup> Email dated 29 September 2021 from Solo Water/Catherine Hill Bay Water to Lot 5026 builder (re: *Lot 5026 Solo Water Connection Certificate*), including attachment.

<sup>121</sup> Document: *CHB\_Lot 1064\_RN2\_210928 - RPZ Test.pdf*.

---

*Inspection and Maintenance Report* dated 19 October 2021<sup>122</sup> was subsequently returned by the property owner.<sup>123</sup>

Based on the preceding discussion, it is apparent that Catherine Hill Bay Water has in place and implements procedures to ensure that customer's installation connected to its water mains are compliant with AS/NZS 3500 *Plumbing and drainage*, i.e. they are code compliant within the meaning of the *Plumbing and Drainage Act 2011*.

---

### **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.

---

---

<sup>122</sup> Document: *Jennifer\_Chen\_28\_Surfside\_dr\_Backflow\_test.pdf*.

<sup>123</sup> Email correspondence between Catherine Hill Bay Water and Lot 1064 property owner with entries on 28 September 2021 and 19 October 2021 (re: *Rectification Notice - RPZ Test Certificate - 28 Surfside Dr, CHB*).

**Table B.5 Infrastructure – Network Operator’s Licence Sch B cl.11**

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence Sch B cl.11</b>	If the Licensee becomes aware that a customer’s Plumbing is not Code Compliant, the Licensee must, within 10 days: <ul style="list-style-type: none"> <li>(a) notify the customer of that fact, in writing, and</li> <li>(b) where the Plumbing that is not Code Compliant threatens, or could threaten, water quality, public health or safety, also notify the Plumbing Regulator of that fact, in writing.</li> </ul>	 <b>Compliant</b>

**Risk**

This requirement represents high operational risk. Compliance of customer installation with appropriate standards is essential to ensuring safe and reliable service delivery. Notification of the customer, and where appropriate the Plumbing Regulator, will prompt action to address a non-complaint installation.

**Target for Full Compliance**

Evidence that the Licensee has notified the customer, and where appropriate the Plumbing Regulator, if it becomes aware that the customer’s Plumbing is not code compliant.

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- Solo Water, *Rectification Notice* (No: CHB\_Lot 1007\_RN1\_210715 – ORG), dated 15 July 2021.
- Email correspondence between Catherine Hill Bay Water and Lot 1007 property owner with entries on 15, 16, 19 & 20 July 2021 and 16, 21 & 22 September 2021 (re: *Lot 1007 CHB – Rectification Notice – ORG*).
- Email dated 4 June 2021 from Catherine Hill Bay Water to Lot 2057 property owner (re: *Lot 2057 CHB – Rectification Notice – General Infiltration*).
- Rectification notices and associated email correspondence in respect of Lots 1019, 1094, 2009, 2018 and 2057.
- Letter (reference: D21/19165) dated 23 August 2021 from IPART to Catherine Hill Bay Water (re: *Variation of network operator’s licence condition - Notification of non-compliant plumbing*).
- Letter (reference D20/31339) dated 18 December 2020 from IPART to Catherine Hill Bay Water (re: *Consultation for amended licence condition - Notification of non-compliant plumbing*).

**Summary of reasons for grade**

Catherine Hill Bay Water demonstrated that it had notified (issued rectification notices to) some twenty-one customers of non-compliant, or potentially non-compliant plumbing during the audit period. Most of these notices related to stormwater infiltration into property sewers, some of which was found to be due to non-compliant plumbing. There were, however, no cases of non-compliant plumbing that threatened, or could have threatened, water quality, public health or safety, so there was no requirement to notify the Plumbing Regulator pursuant to this obligation.

Accordingly, Catherine Hill Bay Water was assessed to have demonstrated compliance with this obligation.

---

## Discussion and notes

Catherine Hill Bay Water advised that it had identified several instances of non-compliant, or potentially non-compliant plumbing during the audit period; however, it had not identified any non-compliant plumbing that had threatened, or could have threatened, water quality, public health or safety. Accordingly, whilst rectification notices were issued to customer as appropriate, there was no need to notify the Plumbing Regulator.

Review of the *Rectification Notice Register*<sup>124</sup> revealed that twenty-one rectification notices had been issued during the audit period. Of these:

- One was a proactive notification that the due date for testing of a RPZD backflow device was approaching. As reported in Table B.4, testing was undertaken prior to the required date; accordingly, this rectification notice was not reflective of non-compliant plumbing.
- One specifically identified a non-compliant ORG (overflow relief grate). *Rectification Notice No: CHB\_Lot 1007\_RN1\_210715 – ORG*<sup>125</sup> indicated that a non-compliant ORG was allowing stormwater infiltration into the sewerage system. Related email correspondence indicates that, in addition to the non-compliant ORG, further inspection identified an outdoor shower which also facilitated stormwater entry to the property sewer.<sup>126</sup>

Following effective liaison between Catherine Hill Bay Water and the property owner, surface grading around the non-compliant ORG was adjusted to ensure code compliant level differences. Furthermore, a roof was installed over the outdoor shower and a perimeter 'hob' constructed around its perimeter, thereby eliminating (for all intents) the entry of stormwater flows into the sewer.

- The remainder, several of which had not been fully addressed by the end of the audit period, indicated that significant stormwater infiltration had been identified and suggested potential causes including non-compliant stormwater drains with connections to property sewers; cracked and/or broken sewer pipes that allow stormwater infiltration; non-compliant ORGs; and non-compliant connection of pools to property sewers. Excessive infiltration had been identified by monitoring of PSUs (pressure sewer units) for increases in flow during rainfall events; this is demonstrated by PSU water level profiles prior to and during wet weather, as provided (for example) to one property owner to which a rectification notice had been issued.<sup>127</sup>

Review of notes recorded in the *Rectification Notice Register*, and a sample of rectification notices and associated email correspondence provided by Catherine Hill Bay Water,<sup>128</sup> reveals that (for example):

- In one case a drain illegally connected to the property sewer had been disconnected and capped; this was a case of non-complaint plumbing.
- Outdoor showers were connected to the property sewer in several cases. Whilst the connection itself is considered compliant, the unimpeded entry of stormwater via these connections is not. Shower drains have been capped in response to the rectification notice in some cases; another case is yet to be resolved.
- Broken/damaged property sewers have been identified in several cases, some of which had been repaired by the end of the audit period and some remained outstanding. Whilst these cases need to be addressed, they are not reflective of non-compliant plumbing.

---

<sup>124</sup> MS Excel workbook: *IMS-MAIN-G-7467-SW – Rectification Notices Register.xlsx*.

<sup>125</sup> Solo Water, *Rectification Notice* (No: CHB\_Lot 1007\_RN1\_210715 – ORG), dated 15 July 2021.

<sup>126</sup> Email correspondence between Catherine Hill Bay Water and Lot 1007 property owner with entries on 15, 16, 19 & 20 July 2021 and 16, 21 & 22 September 2021 (re: *Lot 1007 CHB – Rectification Notice – ORG*).

<sup>127</sup> Email dated 4 June 2021 from Catherine Hill Bay Water to Lot 2057 property owner (re: *Lot 2057 CHB – Rectification Notice – General Infiltration*).

<sup>128</sup> Rectification notices and associated email correspondence in respect of Lots 1019, 1094, 2009, 2018 and 2057.

---

It is apparent, based on both the audit discussions and the above referenced sample documentation, that Catherine Hill Bay Water maintains close liaison with its customers in respect of servicing and compliance issues. As a further example, as discussed in respect of Incident No: 102-20 (refer Table C.1) which involved overflow from a PSU (pressure sewer unit), Catherine Hill Bay Water liaised with property owners in respect of inadequate property drainage that resulted in stormwater entering the sewerage system via an ORG, notwithstanding that the ORG was code compliant.

It is noted that most of the rectification notices issued by Catherine Hill Bay Water during the audit period were issued prior to a Licence amendment removing the requirement to notify the Plumbing Regulator (Department of Fair Trading or delegate) of all non-compliant plumbing;<sup>129</sup> the Licence Variation was issued in July 2021. Catherine Hill Bay Water advised that, given IPART had notified Licensees of the proposed/impending change to its Licence in December 2020,<sup>130</sup> with the explanation that:

*“This is because the NSW plumbing regulator (NSW Fair Trading) has advised that it can only accept notifications of cross-connections by WIC Act network operators.”*

it had chosen not to notify the Plumbing Regulator unless the plumbing had been confirmed to be non-compliant and that it was high risk in that it threatened, or could have threatened, water quality, public health or safety, thereby complying with NSW Fair Trading’s stated position. There were no such cases during the audit period.

The auditor considers this approach appropriate in view of IPART’s advice in respect of the impending Licence variation. Whilst Catherine Hill Bay Water may have been technically non-compliant with Network Operator’s Licence Sch B cl.11 as it stood during the first part of the audit period, it has clearly demonstrated compliance with the obligation as it stood during the latter part of the audit period. Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance for the purposes of this audit.

---

## **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.

---

---

<sup>129</sup> Letter (reference: D21/19165) dated 23 August 2021 from IPART to Catherine Hill Bay Water (re: *Variation of network operator’s licence condition - Notification of non-compliant plumbing*).

<sup>130</sup> Letter (reference D20/31339) dated 18 December 2020 from IPART to Catherine Hill Bay Water (re: *Consultation for amended licence condition - Notification of non-compliant plumbing*).

## **Appendix C** Detailed Audit Findings – Incident Notification

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



**Table C.1 Incident Notification – WIC Reg Sch 1 cl.1(2)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sch 1 cl.1(2)</b>	<p>The licensee must immediately notify the following persons of an incident in the conduct of the licensee’s activities that threatens, or could threaten, water quality, public health or safety:</p> <ul style="list-style-type: none"> <li>(a) IPART,</li> <li>(b) the Minister administering the <i>Public Health Act 2010</i>,</li> <li>(c) the Minister administering the Act, Part 2,</li> <li>(d) a licensed retail supplier supplying water or provides sewerage services by means of the licensee’s infrastructure,</li> <li>(e) any other licensed network operator or public water utility whose infrastructure is connected to the licensee’s infrastructure.</li> </ul> <p><i>Note: Audit of paragraph (d) is not required as the same parent company manages both the network and retail operations.</i></p>	 <b>No Requirement</b>

Risk	Target for Full Compliance
<p>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.</p>	<p>In the event that a notifiable incident has occurred, evidence that the Licensee provided the required notifications.</p>

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 10 February 2022.
- Site inspection of infrastructure at Catherine Hill Bay on 10 February 2022.
- Solo Water, *Catherine Hill Bay Water Utility; Drinking Water Quality Management Plan; Stage 2* (reference: IMS-ENVM-B-3727-SW), including:
  - Revision 2.1, 20 September 2019; and
  - Revision 2.2, 28 June 2021.
- Solo Water, *Catherine Hill Bay Water Utility; Recycled Water Quality Management Plan; Stage 2* (reference: IMS-ENVM-B-3727-SW), including:
  - Revision 1.3, 17 September 2020; and
  - Revision 1.4, 13 October 2021.
- Document: *Environmental Incident Report\_completed.pdf* [in relation to Incident No: 013-21].
- Document: *Environmental Incident Assessment Template\_Complete.pdf* [in relation to Incident No: 013-21].
- Catherine Hill Bay Water/Solo Water internal email with multiple entries dated 23 March 2021 (re: *Recycle irrigation sample*).
- Email dated 22 March 2021 from Catherine Hill Bay Water to EPA (re: *Controlled Release of Recycled Water*).
- Email dated 23 March 2021 from Catherine Hill Bay Water to IPART and DPIE (re: *Incident - Catherine Hill Bay Water Utility Pty Ltd*) [including attached Incident Notification Form A].

- 
- Email dated 23 March 2021 from Catherine Hill Bay Water to IPART and DPIE (re: *Incident - Catherine Hill Bay Water Utility Pty Ltd*) [including attached Incident Notification Form B].
  - Email correspondence dated 30 March 2021 between Catherine Hill Bay Water and IPART (re: *You have a new Request from IPART Relating to a Notification*).
  - Document: *PSU 68 Environmental Incident report\_signed.pdf*.
  - Catherine Hill Bay Water/Solo Water internal email with entries dated 22 December 2020, 24 December 2020, 21 January 2021 and 5 February 2021 (re: *PSU68 Surcharge*).
  - Solo Water internal email dated 5 February 2021 (re: *PSU68 Surcharge*), including attached photographs.
  - Solo Water, *Sewage Spill Procedure* (reference: IMS-AIIR-D-0037-SW) (Issue No: 1.1), June 2021.
  - Document: *Environmental Incident Report - PSU9\_Signed.pdf*.
  - Solo Water, *RWTP CCP1 – MBR UF Membranes Management* (reference: IMS-GNRL-D-4411-SW) (Issue No: 1.1), July 2020.
  - Solo Water, *RWTP CCP3 – Chlorine Contact Tank Management* (reference: IMS-GNRL-D-4413-SW) (Issue No: 1.1), July 2020.
  - Solo Water, *CCP Residual Chlorination Management Procedure* (reference: IMS-GNRL-D-4414-SW) (Issue No: 1.3), August 2021.
  - Solo Water, *CCP Residual Chlorination Management Procedure* (reference: IMS-GNRL-D-4414-SW) (Issue No: 1.3), August 2021.
  - MS Excel workbook, *IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx*.
  - *Field Water Quality Sampling Forms* dated 14 January 2021, 29 April 2021, 24 June 2021 and 30 September 2021 [30+ records were sighted/reviewed, but not specifically referenced].
  - MS Excel workbook: *IMS-CONT-G-1675-SW - CHB Free Chlorine Field Verification.xlsx*.
  - *Certificates of Analysis* for Work Orders WN2011338 (samples collected on 7 January 2021), WN2101708 (4 March 2021), WN2109732 (2 September 2021) and WN2111518 (7 October 2021) [40+ records were sighted/reviewed, but not specifically referenced].
  - Solo Water, *Free Chlorine Field Verification Monitoring Procedure* (reference: IMS-OPER-D-8301-SW) (Issue No: 1.1), October 2018.
  - Solo Water, *Incident Response and Notification Management Plan* (reference: IMS-AIIR-B-0041-SW) (Issue No: 3.5), July 2021.
  - MS Excel workbook, *IMS-CONT-G-1679-SW - CHB Stakeholder Register.xlsx*.
- 

### Summary of reasons for grade

Catherine Hill Bay Water advised that no notifiable water quality incidents had occurred during the audit period. Review of a sample of SCADA trend data and test results from ongoing operational and verification monitoring samples taken from both the drinking water and recycled water networks revealed no evidence to the contrary.

Catherine Hill Bay Water advised (and demonstrated) that it had notified the relevant stakeholders of an incident involving the controlled release of recycled water during an extreme wet weather event, although it was not considered to have threatened, or have the potential to threaten, water quality, public health or safety. This release was made to ensure that all incoming sewage was treated during a period that excess recycled water could not otherwise be disposed of due to the unavailability of tankers.

---

---

Catherine Hill Bay Water also advised of a number of other storm related overflow events that it considered not to be reportable as they had not threatened, or have the potential to threaten, water quality, public health or safety.

Although it is assessed that there was technically “No Requirement” in respect of these obligations during the audit period, it is considered appropriate that Catherine Hill Bay Water reported the recycled release incident. Such notification was undertaken in accordance with the required reporting protocols.

---

## Discussion and notes

### **Overview:**

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)*, 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.

Catherine Hill Bay Water advised that there had been no incidents that threatened, or could have threatened, water quality, public health or safety during the audit period; accordingly, such notification was not required. However, in the interests of transparency, it had notified relevant stakeholders of an incident which involved the controlled release of recycled water following extreme heavy rainfall and flooding that extended across NSW.

Catherine Hill Bay Water also provided details of events that it had assessed were not reportable on the basis that they had not threatened, or have the potential to threaten, water quality, public health or safety. These were related to overflow from PSUs (pressure sewer units) due to high levels of stormwater ingress.

Details of both the reported event and those deemed not reportable are presented below. A review of water quality data has also been undertaken to confirm Catherine Hill Bay Water’s advice that there were no incidents that threatened, or could have threatened water quality, public health or safety.

### **Reported Event:**

During an extreme wet weather event (estimated to have a recurrence interval of 50-100 years) on 22 March 2021, Catherine Hill Bay Water made a controlled release of recycled water into the site drainage system at the treatment plant. Available storage for the fully treated recycled water was exhausted and, due to storm impacts across NSW, there was limited tanker availability to transport the excess water off site.

As detailed in the *Environmental Incident Report*,<sup>131</sup> *Environmental Incident Assessment*<sup>132</sup> and related correspondence, recycled water was discharged into a grassed swale drain within the treatment plant site at a rate of approximately 2-3 litres per second. From here it flowed through the Catherine Hill Bay “Beaches” estate drainage system, which incorporates a series of bio-basins; this resulted in the recycled water being thoroughly mixed with the large volumes of stormwater, which was of significantly poorer quality than the recycled water. High turbidity levels in the receiving environment were confirmed by testing; this resulted in any residual chlorine being quickly consumed.<sup>133</sup>

Treatment of all incoming sewage flows, which included wet weather infiltration, was maintained throughout the event, thereby ensuring no discharge of raw or partially treated sewage.

As indicated in the *Environmental Incident Report*, Catherine Hill Bay Water notified IPART and DPIE (Department of Planning and Environment) via telephone and the EPA (Environment Protection Authority) via email<sup>134</sup> on the day of the incident. An *Incident Notification Form A* was completed and submitted to and acknowledged by both IPART and DPIE on 23 March 2021 (i.e. within 24 hours of

---

<sup>131</sup> Document: *Environmental Incident Report\_completed.pdf* [in relation to Incident No: 013-21].

<sup>132</sup> Document: *Environmental Incident Assessment Template\_Complete.pdf* [in relation to Incident No: 013-21].

<sup>133</sup> Catherine Hill Bay Water/Solo Water internal email with multiple entries dated 23 March 2021 (re: *Recycle irrigation sample*).

<sup>134</sup> Email dated 22 March 2021 from Catherine Hill Bay Water to EPA (re: *Controlled Release of Recycled Water*).

---

verbal notification the incident),<sup>135</sup> and an *Incident Notification Form B* was submitted to both parties on 25 March 2021<sup>136</sup> (and subsequently to IPART’s WILMA portal on 30 March 2021).<sup>137</sup>

It is apparent that Catherine Hill Bay Water had fully implemented the required incident reporting protocols in respect of this incident even though it assessed that the incident did “... *not threaten or potentially threaten the water quality, public health and safety given the high quality of the recycled water released especially in comparison to the quality of the receiving stormwater water quality basin during this major storm event*”.

***Events deemed Not Reportable:***

The events identified by Catherine Hill Bay Water that were considered not to be notifiable included the following:

▪ ***Pressure Sewer Unit Overflow Event (Incident Report No: 102-20):***

A severe storm event on 22 December 2020 resulted in a pressure sewer unit (PSU 68) surcharging and discharging diluted sewage. The *Environmental Incident Report* and *Environmental Incident Assessment*<sup>138</sup> indicate that a small volume (estimated to be less than 5 kilolitres) of diluted sewage (predominantly stormwater with no evidence of contaminants) was discharged over two properties and the adjacent nature strip and entered stormwater drains. The incident was identified by a SCADA alarm; records indicated rapid rise of level within the PSU as a result of stormwater entering the system.

Given the rainfall event, the spilt material was predominantly (if not entirely) stormwater. Investigation revealed that stormwater had entered the sewerage system via an overflow relief gully (ORG) on one of the properties serviced by the PSU. Although the ORG was considered compliant with plumbing requirements, inadequate site drainage resulted in stormwater entering the property sewers. Following discussion with the property owner (and previously with the plumber), additional drainage has been installed with an entry point adjacent to the ORG.<sup>139,140</sup>

The *Environmental Incident Report* indicated that external authorities had not been notified of the incident. This is consistent with guidance provided in the *Sewage Spill Procedure*,<sup>141</sup> which identifies the type of events for which notification is required. As this event was: “... *minor in nature and results in either no or limited environmental impact ...*”, notification was not required.<sup>142</sup> More specifically, for the purposes of assessing compliance with this obligation, the event did not threaten, or have the potential to have threatened, public health or safety.

▪ ***Pressure Sewer Unit Overflow Event (Incident Report No: 031-21):***

On 20 June 2021 a pressure sewer unit (PSU) surcharged and discharged stormwater that had entered the unit via open drains in an unfinished house slab. No finished properties were connected to the PSU at the time; accordingly, no sewage was discharged. The *Environmental Incident Report*<sup>143</sup> indicates that the discharged stormwater flowed over the nature strip/sidewalk and into the stormwater drainage system. The incident was identified by a SCADA alarm; records indicated rapid rise of level within the PSU as a result of stormwater entering the system.

---

---

<sup>135</sup> Email dated 23 March 2021 from Catherine Hill Bay Water to IPART and DPIE (re: *Incident - Catherine Hill Bay Water Utility Pty Ltd*) [including attached Incident Notification Form A].

<sup>136</sup> Email dated 23 March 2021 from Catherine Hill Bay Water to IPART and DPIE (re: *Incident - Catherine Hill Bay Water Utility Pty Ltd*) [including attached Incident Notification Form B].

<sup>137</sup> Email correspondence dated 30 March 2021 between Catherine Hill Bay Water and IPART (re: *You have a new Request from IPART Relating to a Notification*).

<sup>138</sup> Document: *PSU 68 Environmental Incident report\_signed.pdf*.

<sup>139</sup> Catherine Hill Bay Water/Solo Water internal email with entries dated 22 December 2020, 24 December 2020, 21 January 2021 and 5 February 2021 (re: *PSU68 SurchARGE*).

<sup>140</sup> Solo Water internal email dated 5 February 2021 (re: *PSU68 SurchARGE*), including attached photographs.

<sup>141</sup> Solo Water, *Sewage Spill Procedure* (reference: IMS-AIIR-D-0037-SW) (Issue No: 1.1), June 2021.

<sup>142</sup> All stormwater drains within the Catherine Hill Bay “Beaches” estate discharge via a series of bio-basins, which provide additional environmental protection.

<sup>143</sup> Document: *Environmental Incident Report - PSU9\_Signed.pdf*.

---

The *Environmental Incident Report* indicated that external authorities had not been notified of the incident. This is again consistent with guidance provided in the *Sewage Spill Procedure*. For the purposes of assessing compliance with this obligation, the event did not threaten, or have the potential to have threatened, public health or safety.

Based on the explanations and evidence provided by Catherine Hill Bay Water, the auditor is satisfied that neither of these events constituted reportable incidents for the purposes of this obligation. Notwithstanding, as an opportunity for improvement (**OFI-CHB-2021.04**) it is suggested that Catherine Hill Bay Water considers verbally reporting such events to IPART, thereby providing IPART the opportunity to request further detail/formal reporting if considered appropriate. Discussion with IPART has identified a preference for this approach.

### ***Review of Water Quality Monitoring:***

#### *Monitoring Regime:*

Water quality monitoring undertaken in respect of the Catherine Hill Bay Water drinking and recycled water networks includes the following:

- Operational monitoring comprising online monitoring (via the SCADA system) of recycled water CCP parameters, and free chlorine in both recycled and drinking water at the booster pumping stations (point of discharge into supply); and
- Verification monitoring comprising:
  - Weekly, monthly, six-monthly and annual laboratory testing of samples from both the recycled water and drinking water schemes for *E. coli* and total coliforms, and a range of other parameters depending on the sample interval; and
  - Weekly and monthly field monitoring (using calibrated hand-held equipment) of samples from both the recycled water and drinking water networks for pH, Turbidity, Electrical Conductivity, Water Temperature, Free Chlorine and Total Chlorine.

#### *Operational (SCADA) Monitoring of Critical Control Points – Recycled Water:*

To assess whether there had been any incidents that had threatened or could have threatened recycled water quality during the audit period, the auditor reviewed a sample of SCADA data trends for critical control point (CCP) parameters for selected periods during the audit period. Review of these trends revealed the following:

- CCP1: MBR Permeate Turbidity – the trend for August 2021 showed that turbidity remained less than the operational limit (>0.3 NTU for >5 minutes)<sup>144</sup> throughout the month. The trend showed instantaneous readings in excess of the limit periodically throughout the month; these readings correlated to MBR start-ups. Review of the turbidity trend in conjunction with MBR outflow valve status confirmed that flow did not progress for further treatment during these periods.
- CCP3: Chlorine Contact (free chlorine) – the trend for June 2021 showed that free chlorine residual in water delivered to the treated water storage remained within the upper bound (>4 mg/L for >10 minutes) and lower bound (<0.9 mg/L for >10 minutes) operational limits<sup>145</sup> throughout the month during periods that the plant was operating. Review of flow (valve status) records in conjunction with the chlorine trend indicate that water was diverted to waste whilst free chlorine residual recovered during plant restarts.
- Chlorination prior to reticulation (recycled water supply) – the trend for the period 1 May 2021 to 1 November 2021 showed a free chlorine residual consistently in the order of 2 mg/L, which is within the operational limits (<1 mg/L or >3 mg/L for >10 minutes).<sup>146</sup>

---

<sup>144</sup> Solo Water, *RWTP CCP1 – MBR UF Membranes Management* (reference: IMS-GNRL-D-4411-SW) (Issue No: 1.1), July 2020.

<sup>145</sup> Solo Water, *RWTP CCP3 – Chlorine Contact Tank Management* (reference: IMS-GNRL-D-4413-SW) (Issue No: 1.1), July 2020.

<sup>146</sup> Solo Water, *CCP Residual Chlorination Management Procedure* (reference: IMS-GNRL-D-4414-SW) (Issue No: 1.3), August 2021.

---

Review of the CCP SCADA data trends and associated information for recycled water did not reveal any water quality incidents that threatened or could have threatened the quality of water delivered into supply.

Operational (SCADA) Monitoring of Critical Control Point – Potable Water:

The SCADA trend for chlorine levels in the potable water prior to reticulation for the period 7 July 2021 to 1 November 2021 showed a free chlorine residual consistently in the order of 1.3 mg/L, which is within the operational limits (<1 mg/L or >3 mg/L for >10 minutes).<sup>147</sup> On this basis it is assessed that the SCADA data trend did not reveal any water quality incidents that threatened or could have threatened the quality of potable water delivered into supply.

Field Verification Monitoring – Recycled Water and Drinking Water:

All results of operational field monitoring (hand-held instrument tests) undertaken by Catherine Hill Bay Water personnel are collated in the *CHB Water Quality Monitoring Register*<sup>148</sup> from *Field Water Quality Sampling Forms*,<sup>149</sup> on which test results in respect of free chlorine, pH, turbidity, conductivity and water temperature are recorded. Test results are conducted on samples of both recycled water and drinking water. Free chlorine test results are also collated in the *CHB Free Chlorine Field Verification Register*.<sup>150</sup> The results of field tests undertaken by ALS Environmental in conjunction with monthly water sampling are reported in relevant *Certificates of Analysis*;<sup>151</sup> these are also collated into the *CHB Water Quality Monitoring Register* and *CHB Free Chlorine Field Verification Register* (as appropriate).

Cross checking of test results recorded in both the *CHB Water Quality Monitoring Register* and the *CHB Free Chlorine Field Verification Register* confirmed that they had in most cases been correctly transposed from both the *Field Water Quality Sampling Forms* and *Certificates of Analysis*. There was one occasion (22 April 2021) on which total chlorine rather than free chlorine readings had been entered into the *CHB Free Chlorine Field Verification Register*; however, given that this is a secondary register, and all relevant readings were within the applicable limits, no further comment is made beyond this observation. There were also some minor errors in the transposition of results from *Certificate of Analysis* WN2111518; however, all readings were within the applicable limits and again no further comment is made beyond this observation.

Review of results presented in the *CHB Free Chlorine Field Verification Register* revealed (for example) that:

- All test results conducted in both the recycled water and drinking water networks returned free chlorine residuals within the target limits (0.2 mg/L to 4.5 mg/l).<sup>152</sup> Concentrations varied from a minimum of 0.53 mg/L to a maximum of 2.65 mg/L in the recycled network and from a minimum of 0.42 mg/L to a maximum of 1.83 mg/L in the drinking water network during the audit period.
- All tests conducted at the recycled water storage returned free chlorine residuals within the target limits (1.0 mg/L to 4.5 mg/l). Concentrations varied from a minimum of 1.24 mg/L to a maximum of 3.28 mg/L during the audit period.
- All except one test conducted at the drinking water storage returned free chlorine residuals within the target limits (1.0 mg/L to 4.5 mg/l).<sup>152</sup> One reading of 0.94 mg/L was returned on 3 June 2021; all other readings varied from a minimum of 1.07 mg/L to a maximum of 2.18 mg/L. All network readings on 3 June 2021 were greater than 1.0 mg/L, which indicates that adequate additional chlorine was dosed prior to discharge into supply.

---

<sup>147</sup> Solo Water, *CCP Residual Chlorination Management Procedure* (reference: IMS-GNRL-D-4414-SW) (Issue No: 1.3), August 2021.

<sup>148</sup> MS Excel workbook, *IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx*.

<sup>149</sup> For example, *Field Water Quality Sampling Forms* dated 14 January 2021, 29 April 2021, 24 June 2021 and 30 September 2021.

<sup>150</sup> MS Excel workbook: *IMS-CONT-G-1675-SW - CHB Free Chlorine Field Verification.xlsx*.

<sup>151</sup> For example, *Certificates of Analysis* for Work Orders WN2011338 (samples collected on 7 January 2021), WN2101708 (4 March 2021), WN2109732 (2 September 2021) and WN2111518 (7 October 2021).

<sup>152</sup> Solo Water, *Free Chlorine Field Verification Monitoring Procedure* (reference: IMS-OPER-D-8301-SW) (Issue No: 1.4), February 2021.

Review of the field verification monitoring test results for both recycled water and drinking water did not reveal any water quality incidents that threatened or could have threatened the quality of water delivered into supply.

Laboratory Verification Monitoring – Recycled Water:

All verification monitoring test results (both recycled water and drinking water) are summarised in the *CHB Water Quality Monitoring Register*. The results of all laboratory testing undertaken by ALS are collated from the *Certificates of Analysis* provided by the laboratory.

Records of routine (weekly and monthly) laboratory test results for verification monitoring of recycled water produced by the treatment plant, sampled at two locations within the reticulation network (SP2 and SP4) and the recycled water tank (delivery side of the recycled water booster pumps), were reviewed to assess compliance with documented target limits.

The following table shows the range of recorded results for each parameter throughout the audit period; where a single value is shown, this result was recorded for all tests. Review of the results revealed that all results were below the limits as documented in the *CHB Water Quality Monitoring Register*,<sup>153</sup> i.e. they did not reveal any water quality incidents that threatened or could have threatened the quality of recycled water delivered into supply.

Parameter	Unit	Max <sup>m</sup> Value	Sample Location/Test Results During Audit Period		
			SP2	SP4	SP9
Total coliforms	MPN/100 mL	<1	<1	<1	<1
<i>E. coli</i>	MPN/100 mL	<1	<1	<1	<1
Total Dissolved Solids (TDS)	mg/L	1,000			467 to 603
Suspended Solids	mg/L	10			<5
Ammonia as N	mg/L	1			<0.05
Nitrite as N	mg/L	8.5			<0.05
Nitrate as N	mg/L	2			3.07 to 15.6
Nitrite + Nitrate as N	mg/L	-			3.07 to 15.6
Total Kjeldahl Nitrogen as N	mg/L	-			<0.1 to 2.1
Total Nitrogen as N	mg/L	20			3.2 to 14.8
Total Phosphorus	mg/L	2			<0.05 to 0.11
Reactive Phosphorus	mg/L	-			<0.05 to 0.12
Biological oxygen demand (BOD)	mg/L	10			<2
<i>Clostridium perfringens</i> spores	CFU/100 mL	<1			<1
Somatic coliphage	PFU/100 mL	<1			<1

Laboratory Verification Monitoring – Drinking Water:

As noted above, all verification monitoring test results (both recycled water and drinking water) are summarised in the *CHB Water Quality Monitoring Register*.

Records of routine (weekly and monthly) laboratory test results for verification monitoring of potable (drinking) water, again sampled at two locations within the reticulation network (SP1 and SP3) and the drinking water tank (delivery side of the drinking water booster pumps), were reviewed to assess compliance with documented target limits.

<sup>153</sup> MS Excel workbook, *IMS-CONT-G-1680-SW - CHB Water Quality Monitoring.xlsx*.

---

Routine laboratory testing for drinking water is limited to Total coliforms and *E. coli*. All tests throughout the audit period returned results of <1 MPN/100mL (i.e. none detected); i.e. they did not reveal any water quality incidents that threatened or could have threatened the quality of drinking water delivered into supply.

*Water Quality Review Summary:*

The above review of water quality monitoring results for both recycled water and drinking water confirms Catherine Hill Bay Water's advice that there were no water quality incidents that warranted notification pursuant to this obligation during the audit period.

***Incident Notification Arrangements:***

Catherine Hill Bay Water's incident management procedures are documented primarily in its *Incident Response and Notification Management Plan*,<sup>154</sup> which is referenced in both the *Recycled Water Quality Management Plan*<sup>155</sup> and *Drinking Water Quality Management Plan*.<sup>156</sup> The *Incident Response and Notification Management Plan*<sup>157</sup> identifies incidents that would be notifiable in respect of each of the recycled water, drinking water and sewerage schemes.

Contact details for relevant stakeholders are documented in the *Incident Response and Notification Management Plan*,<sup>158</sup> they are also maintained in the *CHB Stakeholder Register*.<sup>159</sup> Contact details shown in both documents appear to be up to date; for example, both identify IPART's WILMA online portal for the submission incident reports.

---

**Recommendations**

There are no recommendations in respect of this obligation.

---

**Opportunities for improvement**

The following opportunity for improvement has been identified in respect of this obligation:

- **OFI-CHB-2021.04:** It is suggested that Catherine Hill Bay Water considers verbally reporting all incidents to IPART, including those assessed not to have threatened, or have had the potential to threaten, water quality, public health or safety, thereby providing IPART the opportunity to request further detail/formal reporting if considered appropriate.

---

<sup>154</sup> Solo Water, *Incident Response and Notification Management Plan* (reference: IMS-AIIR-B-0041-SW) (Issue No: 3.5), July 2021.

<sup>155</sup> *Recycled Water Quality Management Plan*, section 2.6.

<sup>156</sup> *Drinking Water Quality Management Plan*, section 2.6.

<sup>157</sup> Solo Water, *Incident Response and Notification Management Plan* (reference: IMS-AIIR-B-0041-SW) (Issue No: 3.5), July 2021, section 2.0.

<sup>158</sup> Solo Water, *Incident Response and Notification Management Plan* (reference: IMS-AIIR-B-0041-SW) (Issue No: 3.5), July 2021, section 4.1.

<sup>159</sup> MS Excel workbook, *IMS-CONT-G-1679-SW - CHB Stakeholder Register.xlsx*.

## **Appendix D** Detailed Audit Findings – Reporting

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



Table D.1 Reporting – Network Operator’s Licence Sch B cl.5

Clause	Requirement	Compliance Grade
<b>Network Operator’s Licence Sch B cl.5</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 Reporting Manual.	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 10 February 2022.</li> <li>▪ IPART, <i>Network Operator Reporting Manual under the Water Industry Competition Act 2006 (NSW)</i> (Issue 11), 1 July 2020.</li> <li>▪ Solo Water, <i>CHBWU Annual Compliance Report 2020-21</i> (letter format), 19 August 2021.</li> <li>▪ Document: <i>Wilma Notification Screenshot 20220225.jpg</i>.</li> <li>▪ IPART, <i>Licence compliance under the Water Industry Competition Act 2006 (NSW); Annual Compliance Report to the Minister – Water</i>, October 2021.</li> <li>▪ Letter (reference: D21/26478) dated 10 November 2021 from IPART to Catherine Hill Bay Water (re: <i>Notification of 2021 operational audit</i>).</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>Catherine Hill Bay Water demonstrated that it had prepared and submitted its <i>Annual Compliance Report</i> in accordance with the <i>Reporting Manual</i>. It also demonstrated that it had immediately reported an incident that could have threatened public health or safety and that it had provided copies of updated Plans to IPART.</p> <p>Accordingly, Catherine Hill Bay Water was assessed to have demonstrated compliance with this obligation.</p>		
<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>160</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); an annual declaration in relation to maintaining appropriate insurance, together with copies of certificates of currency and explanation of any changes to insurance, and a Financial Capacity Statement are also to be provided. The report is to be submitted to IPART no later than 31 August each year; accordingly, submission of an <i>Annual Compliance Report</i> in respect of the 2020/21 financial year was required during the audit period.</p> <p>The <i>Annual Compliance Report</i><sup>161</sup> for the 2020/21 financial year was sighted; the report was dated 19 August 2021 and was signed by two company Directors. A brief review confirmed that the report contained the requisite information; specifically:</p>		

<sup>160</sup> IPART, *Network Operator Reporting Manual under the Water Industry Competition Act 2006 (NSW)* (Issue 11), 1 July 2020.

<sup>161</sup> Solo Water, *CHBWU Annual Compliance Report 2020-21* (letter format), 19 August 2021.

- 
- Schedule A – Non-Compliances: no non-compliances reported. This is consistent with the findings of the previous and current Operational Audits, which together cover the 2020/21 reporting period.
  - Schedule B – Performance Indicators: performance against all indicators reported.
  - Schedule C – Insurance Certificates of Currency: Certificates of currency provided in respect of General Liability; Professional Indemnity; Commercial Motor Insurance; Contract Works Material Damage; and Industrial Special Risks.
  - Schedule D – Changes to Insurance: N/A; no changes reported.
  - Schedule E – Financial Capacity Statement: statement signed by two company Directors included.

All documentation was also found to be consistent with the requirements identified in the *Reporting Manual*.

To demonstrate that the *Annual Compliance Report* had been submitted to IPART as required, Catherine Hill Bay Water provided a screenshot of its WILMA Notifications Dashboard which indicated that the report has been submitted on 20 August 2021.<sup>162</sup> It is further noted that assessment of Catherine Hill Bay Water's performance, which is in part based on information presented in the *Annual Compliance Report*, was included in IPART's 2020/2021 *Annual Compliance Report to the Minister*,<sup>163</sup> thereby providing further evidence that the report had been submitted.

The *Reporting Manual* also requires reporting, including immediate reporting, if specific requirements are triggered; obligations in respect of which such reporting may be required are identified in the *Reporting Manual*.<sup>164</sup> Assessment in respect of a selection of these obligations revealed that (for example):

- Catherine Hill Bay Water had immediately reported an incident that could have threatened public health or safety to the relevant stakeholders. Details are provided in Table C.1.
- Although not assessed in detail as part of this audit, it is apparent that Catherine Hill Bay Water had maintained the ongoing capacity to operate; accordingly, there was no requirement to report the contrary. Some specific actions taken to ensure that capacity was maintained during the audit period are discussed in Table B.1.
- Although changes were not significant, Catherine Hill Bay Water had submitted copies of revised Plans to IPART during the audit period. This was evidenced both by reference to the most recent Plans in IPART's audit initiation letter<sup>165</sup> (this indicates that these versions are held by IPART), and by a screenshot of Catherine Hill Bay Water's WILMA Notifications Dashboard,<sup>166</sup> which indicated (for example) that updated versions of the *Infrastructure Operating Plan* and *Recycled Water Quality Management Plan* were submitted to IPART on 19 October 2021 (these Plans were both updated on 13 October 2021).
- There were no changes in respect of insurance arrangements (as indicated in the *Annual Compliance Report*); it was apparent that there had been no changes to the end-uses for which water is supplied; and there were no changes to the Authorised Person nominated in the Licence. Accordingly, there was no requirement for immediate reporting in respect of any of these matters.
- Catherine Hill Bay Water did not commence commercial operation of any new infrastructure during the audit period; accordingly, there was again no requirement to report.

---

<sup>162</sup> Document: *Wilma Notification Screenshot 20220225.jpg*.

<sup>163</sup> IPART, *Licence compliance under the Water Industry Competition Act 2006 (NSW); Annual Compliance Report to the Minister – Water*, October 2021.

<sup>164</sup> IPART, *Network Operator Reporting Manual under the Water Industry Competition Act 2006 (NSW)* (Issue 11), 1 July 2020, Appendix A (table A.1).

<sup>165</sup> Letter (reference: D21/26478) dated 10 November 2021 from IPART to Catherine Hill Bay Water (re: *Notification of 2021 operational audit*).

<sup>166</sup> Document: *Wilma Notification Screenshot 20220225.jpg*.

---

Based on these observations, it is apparent that Catherine Hill Bay Water complied with its requirements in respect of immediate reporting of incidents, changes or non-compliances.

---

**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.

---





