WestConnex
Rozelle Interchange
Water Monitoring Report

June 2024

Document Control

Revision History

Version	Issue Date	By	Comments
1	1/8/2024	C. Gazi	Final
2	16/8/2024	C. Gazi	Updated in response to comments. Final.
3	22/8/2024	C. Gazi	Updated in response to comments. Final.

References

Document Name	Version	Abbreviation
Operational Groundwater Monitoring Program	01	OpGWMP
Operational Surface Water Quality Monitoring Program	01	OpSWMP
Groundwater Predictive Modelling and Sensitivity Analyses: Annexure G of the Hydrological Interpretation Report	01	GPMSA

Table of Contents

1. Introduction

1.1 Overview

Operational groundwater and surface water monitoring is undertaken at the WestConnex Rozelle Interchange (the Asset) to understand potential impacts to the local water environment and allow for the implementation of appropriate management measures where required.

This Water Monitoring Report (this report) has been prepared by Fulton Hogan Egis Operations & Maintenance Pty Ltd (FHE) to address the reporting requirements of the following approvals documents associated with the Asset:

- Condition D17 of the Conditions of Approval (CoA) for State Significant Infrastructure (SSI) 7485;
- Rozelle Interchange Operational Groundwater Monitoring Program (OpGWMP); and
- Rozelle Interchange Operational Surface Water Quality Monitoring Program (OpSWMP).

This report covers the initial reporting period 26 November 2023 to 30 June 2024. Subsequent reports will be prepared 6-monthly to cover the periods 1 July to 31 December and 1 January to 30 June each year. In accordance with Condition D12 of the CoA, monitoring will continue for at least five years from the commencement of operation of the mainline tunnels. One month prior to the end of the five year period, a review will be undertaken of future monitoring requirements in consultation with DCCEEW – Water (formerly known as DPI Water).

As required by the OpGWMP, each Water Monitoring Report will be made available for submission to the Department of Planning, Housing and Infrastructure (DPHI), DCCEEW – Water, Sydney Water and Port Authority of NSW within 60 days of the reporting period, unless otherwise agreed to by DPHI.

Table 1 provides the regulatory reporting requirements that are addressed by this report.

Table 1 Regulatory Reporting Requirements

Section of Relevant Document	Requirement	Addressed in This Report
CoA		
Condition D17	The results of the Operational Monitoring Programs must be submitted to the Secretary, and relevant regulatory authorities, for information in the form of an Operational Monitoring Report at the frequency identified in the relevant Operational Monitoring Program.	**Section 1.1**
OpGWMP		
Section 5.1.2.1	Data analysis is described in Section 5.1.2 and water monitoring reports will be produced every six months to assess this which will include data summary reports presenting tabulated groundwater monitoring data collected during the reporting period.	**Sections 2.3 – 2.4;** **Sections 3.3 – 3.4**
	If drawdown is identified outside of model predictions, management actions will be initiated including (but not limited to) a review of baseline groundwater level and quality data in the relevant and surrounding monitoring bores as well as a review of groundwater inflow rates into the tunnel.	**Section 2.5**

Section 5.1.4	A simple water balance approach will be used to estimate groundwater inflows to the tunnel during operations: Groundwater inflow = WTP discharge – Project water inputs	**Section 4**
Section 5.2.2.2	(Water Treatment Plant (WTP)) Water quality results will be analysed monthly, and along with an overview of corrective actions will be reported in the six-monthly water monitoring report.	**Sections 5.3 – 5.5**
Section 6.1.1	Water quality results from the WTP will be analysed monthly, and along with an overview of corrective actions will be reported in the six-monthly water monitoring report. The monitoring results will be compared against the requirements for discharge in the operational EPL.	**Sections 5.3 – 5.5**
	Monitoring results for EC will be compared against SSTVs bi-monthly and reported in the water monitoring reports. If results trigger a response, management actions will be implemented, as required, should an initial review determine a potential impact outside of approved predictions.	**Sections 5.3 – 5.5**
Section 6.1.3	Monitoring reports will be submitted to DPE[1], DPI Water[2], Sydney Water and Port Authority of NSW within 60 days of the reporting period unless otherwise agreed with DPI.	**Section 1.1**
	Data summary reports presenting tabulated groundwater monitoring data collected during the reporting period.	**Sections 2.3, 3.3 and 5.3**
	Groundwater level hydrographs (including rainfall) and water quality (EC) results will be presented and SSTV exceedances will be highlighted.	**Section 2.3**
OpSWMP		
Section 6.3	The Water Monitoring Report surface water data is to be distributed to the following recipients: ● EPA ● DPE[1] ● DPE Water[3] ● Sydney Water	**Section 1.1**
	Data summary reports presenting tabulated surface water monitoring data collected during the reporting period. Surface water quality results will be presented and performance criteria exceedances will be highlighted.	**Section 6.3**
	Applicable management responses will be documented.	**Section 6.5**
Section 8	Alterations to SSTV, monitoring locations, analytical suites, or frequencies will be reported in the Water Monitoring Reports.	**Section 6.1**

Note 1: Department of Planning and Environment (DPE) is now known as Department of Planning, Housing and Infrastructure (DPHI).
Note 2: Department of Planning and Infrastructure – Water (DPI Water) is now known as Department of Climate Change, Energy the Environment and Water – Water Group (DCCEEW – Water).
Note 3: Department of Planning and Environment – Water (DPE Water) is now known as Department of Climate Change, Energy the Environment and Water – Water Group (DCCEEW – Water).

1.2 Rainfall

Rainfall data is collected at the Bureau of Meteorology (BoM) weather station at Observatory Hill, which is considered representative of meteorological conditions at the Asset.

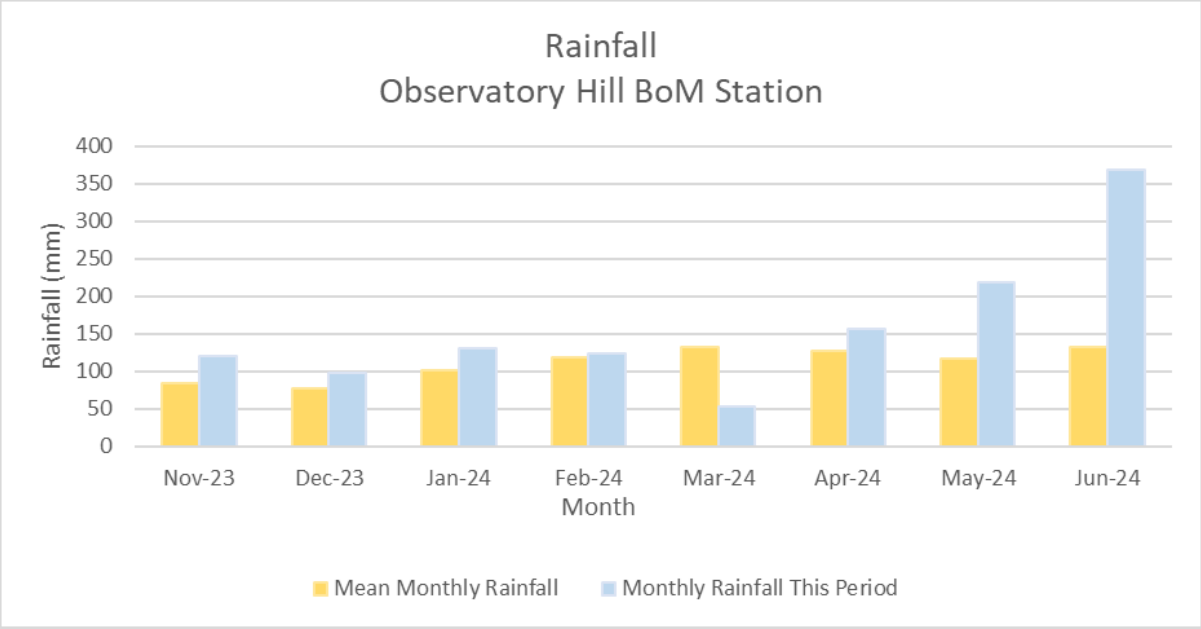
Total rainfall was high for the reporting period, with 1266.8mm received, compared to the mean rainfall for November to June of 890mm (refer to **Table 2** and **Figure 1**).

Rainfall decreased in March before increasing considerably in May and June.

Table 2 Rainfall (Observatory Hill BoM Station)

Month	Monthly Mean Rainfall (mm)	Rainfall This Period (mm)
Nov-23	83.8	120.0
Dec-23	77.1	98.2
Jan-24	101.2	129.8
Feb-24	119.3	123.2
Mar-24	131.6	52.4
Apr-24	126.5	155.8
May-24	117.4	219.0
Jun-24	133.1	368.4
Total	**890.0**	**1266.8**

Figure 1 Rainfall (Observatory Hill BoM Station)



2. Groundwater Levels

2.1 Overview

Groundwater levels (GWLs) are monitored by continuously operating loggers that provide data to a remote telemetry system. There is no logger download frequency specified in the OpGWMP. Manual measurements are collected every 2 months, pending access, to validate logger data.

GWL data is compared to local rainfall records to assess trends and assist with determining whether any potential impacts may be attributable to the Asset.

Table 3 outlines the operational bores that form the GWL monitoring program. Since operations have commenced, operational identification (ID) numbers have been developed to streamline naming conventions across the Asset.

Table 3 Operational Groundwater Level Monitoring Bores

Operational ID	Bore ID	Location	TOC Elevation (mAHD)	Approximated Predicted Drawdown (m)[2]
RG01	IC_BH01	46 Waterloo St, Rozelle - gutter	26.77	-15
RG04	RIC_JHCPB_VWP06 (01-05)	21 National St, Rozelle – nature strip	Requested[1]	-17
RG05	RIC_JHCPB_VWP10 (01-05)	6 Fred St, Lilyfield – on road	Requested[1]	-35
RG06	RIC_JHCPB_VWP8 (01-05)	433 Balmain Rd, Lilyfield – edge of road	Requested[1]	-23
RG07	RIC_PSM_BH008_VMP (011, 021, 031)	4 Lamb St, Lilyfield – on road	Requested[1]	-40
RG09	TC_BH06	Railway Pde, Annandale (opp. White St) – nature strip	2.65	-5
RG10	TC_BH01s	Railway Pde, Annandale – pedestrian island (closer to path)	2.55	-3
RG11	TC_BH01d	Railway Pde, Annandale – pedestrian island (further from path)	2.54	-3

RG12	TC_BH08	Railway Pde, Annandale – reserve (opp. 42 Railway Pde)	2.24	-2

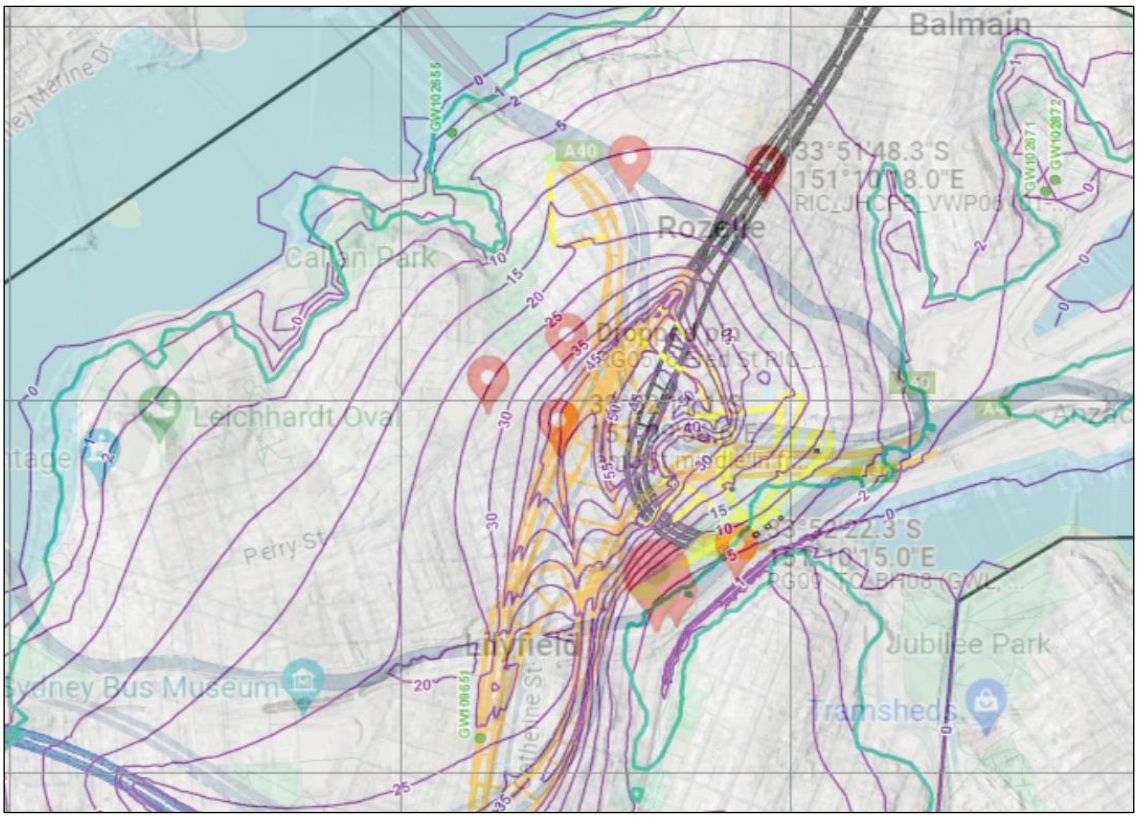
Note 1: Elevation was not provided in the OpGWMP and has been requested.
Note 2: The predicted drawdown levels for operational monitoring bores were approximated due to insufficient information in the OpGWMP and Groundwater Predictive Modelling and Sensitivity Analyses (GPMSA). Refer to **Section 2.1** and **Figure 2** below for further information.

The OpGWMP does not provide predicted drawdown levels for operational monitoring bores, and refers to *Annexure G of the Hydrological Interpretation Report - Groundwater Predictive Modelling and Sensitivity Analyses* (GPMSA) for model predictions. Predictions in the GPMSA are not specific to the operational monitoring bores, and the document provides detailed discussion on the limitations of GWL predictions relating to the Asset.

To approximate predicted drawdown for the purpose of this report (refer to **Table 3**)**,** Figure G 1-8 from the GPMSA has been overlaid onto Google Maps, with the operational GWL monitoring bores marked by red balloons (refer to **Figure 2**). Figure G 1-8 provides the predicted drawdown (metres) based on a total project, steady state, calibrated design case.

It is noted that measurements of the actual GWL are taken as metres below top of case (mbTOC) and converted to metres Australian Height Datum (mAHD) (where possible), so an accurate comparison to predicted drawdown measured in metres is not possible. Until predicted drawdown is provided in mAHD or mbTOC for each operational monitoring bore, the drawdown will be calculated using the first manual GWL measurement for the bore and compared to the approximate predicted drawdown provided in **Table 3**.

Figure 2 Predicted Drawdown – Total Project, Design Case, Calibrated, Steady State (Figure G 1-8 from the GPMSA) overlaid by GWL Bore Locations



2.2 Observations

Manual GWL monitoring was conducted on 23rd February and 16th- 20th May 2024. The schedule variation was attributed to challenges locating the bores during the first monitoring round, relating to limited or conflicting information in the OpGWMP. Additional time was required to locate all bores for the second monitoring round, which resulted in a delay. As all bores have now been located, it is expected that 2-monthly manual GWL monitoring will be achievable for future reporting periods.

In certain circumstances, a bore may be considered inaccessible for groundwater monitoring. This may be due to being unable to be located, access being unsafe or blocked, unable to retrieve logger data, or another reason preventing monitoring from occurring.

Table 4 provides the observations relating to groundwater levels during the reporting period.

Table 4 Observations Relating to Groundwater Levels During Period

#	Observation	Actions	Outcome
1	Geomotion, the logger provider, advised that logger data was to be accessed through a remote telemetry system and that the D&C Contractor was required to provide permission for FHE to access the data.	The Operator has been notified that remote access must be granted from the D&C Contractor. It is understood access has been requested, but not yet granted.	Logger data will be accessed as soon as possible via the remote telemetry system (when the D&C Contractor grants access). Operator will continue to request that the D&C Contractor action this item.
2	Locating some bores was challenging due to limited accurate information in the OpGWMP. During the February monitoring round, RG04, RG05, RG06 and RG07 could not be located.	All required bores were located by the May monitoring round.	All bore locations have been identified and will continue to be manually monitored in accordance with the OpGWMP.
3	Loose (unplugged) logger cables were observed at bores RG10 and RG11 (refer to **Figure 3** and **Figure 4**). Although remote telemetry is not currently accessible, it has been assumed that both loggers are not recording data.	Geomotion has been engaged to replace the loggers at RG10 and RG11.	In progress. Anticipated for completion during the next monitoring period. Manual measurements have been unaffected.
4	RG06 was discovered to be permanently inaccessible. The outline of two bores were visible at the site, both of which are sealed over by road pavement (see **Figure 5**). It was unclear which bore was RG06.	No monitoring at RG06 occurred during the period. The Operator has been notified that the bores are sealed by road pavement. Contact was made with Inner West Council who advised that the relevant section of Balmain Road is a state road under the responsibility of Transport for NSW (TfNSW).	Monitoring is unable to be undertaken at RG06 until further notice due to inaccessibility. Due to the nature of being on a busy road (frequent parked cars over the bore and traffic safety concerns), FHE recommends to pursue decommissioning the bore from the groundwater monitoring program. During the next reporting period, FHE will liaise with the Operator to explore appropriate actions relating to RG06.

			Any proposed change to the groundwater monitoring program should be in consultation with relevant government agencies.
5	A bore believed to be RG07 was located during the May monitoring round. Due to being positioned in the middle of the road (see **Figure 6**), the bore could not be safely accessed at the time due to traffic control requirements.	No monitoring occurred during the period. During July monitoring (the next reporting period), RG07 was accessed and found to be blocked by clay. Manual monitoring was not possible and the bore is considered inaccessible.	Manual monitoring is unable to be conducted until access is restored. During the next reporting period, FHE and the Operator will liaise to determine the requirements to clear the blockage.
6	RG01 was unable to be accessed during the May monitoring round due to a parked car (three separate occasions).	The sampler attempted to monitor three times, encountering parked cars each time.	Manual monitoring did not occur in May. Monitoring will be attempted during future monitoring rounds.

Figure 3 Bore RG10 (TC_BH01s) – loose cables

Figure 4 Bore RG11 (TC_BH01d) – loose cables

Figure 5 RG06 – Unable to access two bores sealed with road pavement. If access is restored, monitoring is likely to be affected by parked cars and traffic control requirements.

Figure 6 RG07 - on-road position requiring traffic control for safe access

2.3 Monitoring Results

Manual GWLs were recorded as mbTOC and converted to mAHD where possible.

Whilst all locatable and accessible bores were manually monitored, the Top of Casing (TOC) elevations of bores RG04, RG05, RG06 and RG07 were not provided in the OpGWMP, meaning the GWL in mAHD could not be calculated. The outstanding TOC elevations have been requested.

Table 5 and **Table 6** provide the tabulated groundwater levels for the reporting period in mbTOC and mAHD respectively. **Table 7** compares the maximum measured drawdown against the approximated predicted drawdown.

Table 5 Manual Groundwater Levels (mbTOC)

Operational ID	RG01	RG04	RG05	RG06	RG07	RG09	RG10	RG11	RG12
TOC RL (mAHD)	26.77	TBA[1]	TBA[1]	TBA[1]	TBA[1]	2.65	2.55	2.54	2.24
Feb-24	dry	unlocatable	unlocatable	blocked	unlocatable	-2.60	-2.10	-10.60	-1.80
May-24	car	-72.28	-14.14	blocked	unsafe	-1.79	-1.89	-10.29	-1.75

Note 1: TOC RL has been requested.

Table 6 Manual Groundwater Levels (mAHD)

Operational ID	RG01	RG04	RG05	RG06	RG07	RG09	RG10	RG11	RG12
TOC RL (mAHD)	26.77	TBA[1]	TBA[1]	TBA[1]	TBA[1]	2.65	2.55	2.54	2.24
Feb-24	dry	unlocatable	unlocatable	blocked	unlocatable	0.05	0.45	-8.06	0.44
May-24	car	TBA[2]	TBA[2]	blocked	unsafe	0.86	0.66	-7.75	0.49

Note 1: TOC RL has been requested.
Note 2: To be advised. Unable to calculate due to unknown TOC RL (requested).

Table 7 Actual Maximum Drawdown Compared to Approximate Predicted Drawdown

Operational ID	RG01	RG04	RG05	RG06	RG07	RG09	RG10	RG11	RG12
Baseline[1] GWL (mbTOC)	NA	-72.28	-14.14	NA	NA	-2.60	-2.10	-10.60	-1.80
Predicted Drawdown Level[2] (mbTOC)	-15.00	-17.00	-35.00	-23.00	-40.00	-5.00	-3.00	-3.00	-2.00
Maximum Measured Drawdown[3] (mbTOC)	No measurements	0.00	0.00	No measurements	No measurements	0.00	0.00	0.00	0.00

Note 1: Until additional information is provided, the baseline GWL is the first operational manual GWL measurement (mbTOC). Bores RG01 – RG07 do not have any measurements available yet.
Note 2: Predicted drawdown level (mbTOC) has been calculated as the sum of the approximated predicted drawdown (m) (refer to **Table 3**) and the baseline GWL.
Note 3: Until further information is provided, the maximum measured drawdown has been calculated as the minimum manual GWL during operational monitoring minus the baseline GWL (first manual GWL reading).

For the four bores where TOC elevations and monitoring data were available, hydrographs presenting the manual GWL results along with monthly rainfall for the reporting period are provided as **Figures 7** to **10.**

Figure 7 RG09 Groundwater Levels (mAHD)

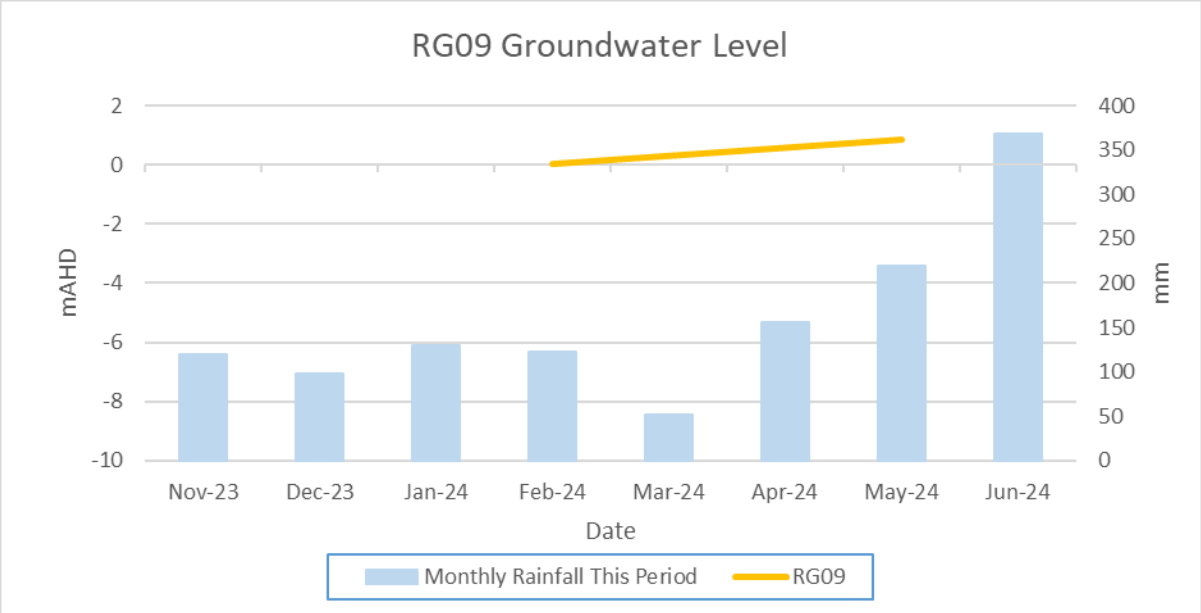


Figure 8 RG10 Groundwater Levels (mAHD)

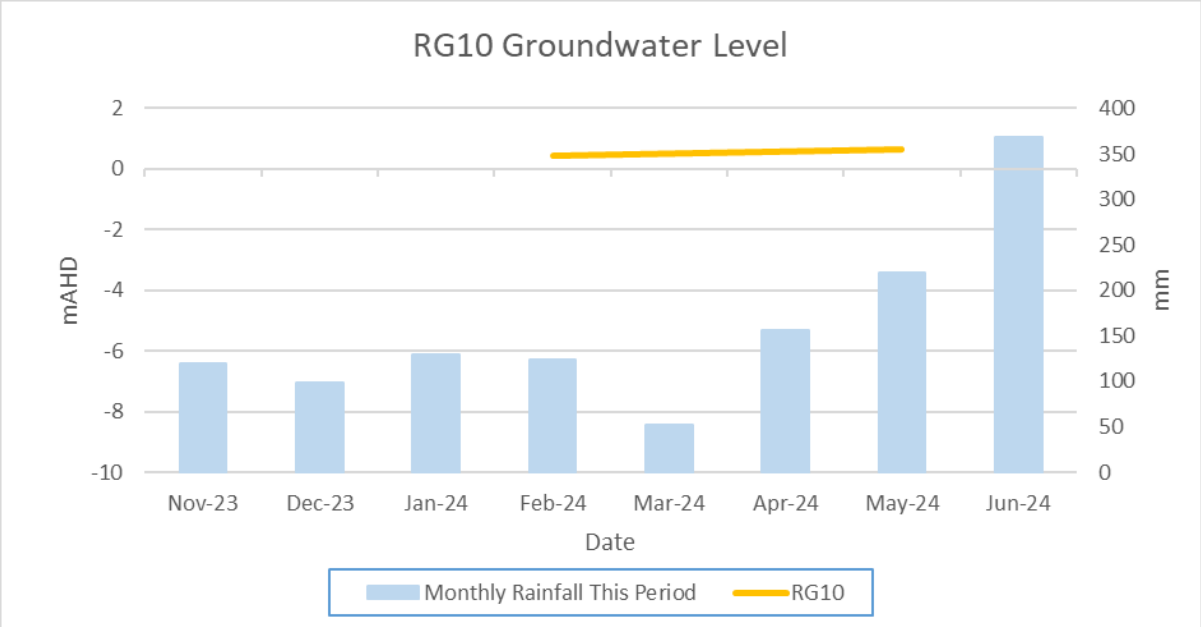


Figure 9 RG11 Groundwater Levels (mAHD)

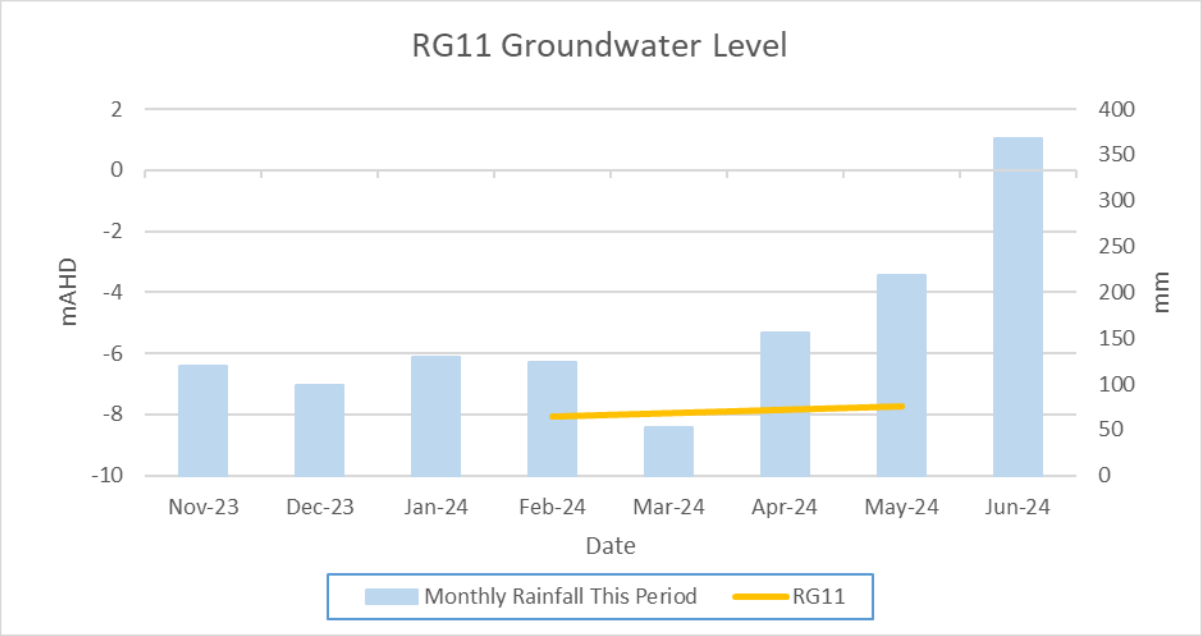
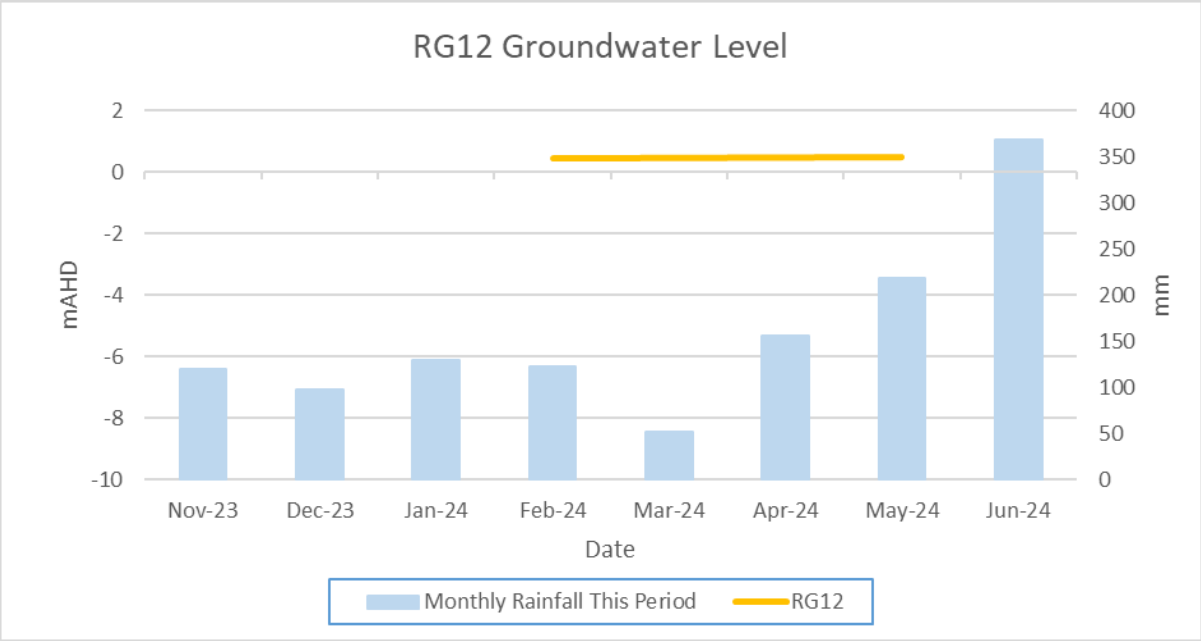


Figure 12 RG12 Groundwater Levels (mAHD)



2.4 Discussion

Four bores were accessible for groundwater level monitoring during both sampling rounds in the reporting period (RG09, RG10, RG11 and RG12), and an additional three bores were accessible once (RG01, RG04, RG05).

RG01 was dry during the single round of monitoring, so the groundwater level could not be determined.

As discussed in **Section 2.3,** RG04 and RG05 were monitored once as mbTOC, but the TOC elevation was unknown, so the GWL in mAHD could not be calculated.

This groundwater analysis aims to compare actual drawdown against the predicted drawdown limits. As discussed in **Section 1.1**, specific predicted drawdown limits for operational monitoring bores have not been provided in the OpGWMP or GPMSA, but have been approximated for the purpose of this report using the information available.

All bores that were monitored twice (RG09, RG10, RG11, RG12) remained stable during the period (refer to **Figures 7** to **10**) and no bores were identified as exceeding the approximate predicted drawdown level.

2.5 Management Actions

No exceedances of approximate predicted drawdown levels were identified (refer to **Section 2.4**) and no management actions were required.

3. Groundwater Salinity

3.1 Overview

Loggers monitoring electrical conductivity (EC) have been installed at the monitoring bores between the tunnel alignment and saline water bodies. The loggers have been programmed to record data on an hourly basis.

Logger data will be downloaded every two months. Electrical conductivity (EC) results will be assessed to detect changes in water salinity that may indicate the intrusion of saline water towards the tunnel.

Table 8 outlines the operational bores that form the groundwater salinity monitoring program. Since operations have commenced, operational identification (ID) numbers have been developed to streamline naming conventions across the Asset.

Table 8 Operational Groundwater Salinity Monitoring Bores

Operational ID	Bore ID	Location	SSTV (µS/cm)
RG01	IC_BH01	46 Waterloo St, Rozelle - gutter	2,100
RG02	IC_BH03	4 Clubb St, Rozelle – garden area	710
RG03	IC_BH04	18 Clubb St, Rozelle – gutter	590
RG08	LR_BH01	55 Lilyfield Rd, Lilyfield – middle of westbound lane	Requested[1]
RG09	TC_BH06	Railway Pde, Annandale (opp. White St) – nature strip	2,400
RG10	TC_BH01s	Railway Pde, Annandale – pedestrian island (closer to path)	30,100
RG11	TC_BH01d	Railway Pde, Annandale – pedestrian island (further from path)	3,900
RG12	TC_BH08	Railway Pde, Annandale – reserve (opp. 42 Railway Pde)	13,500

Note 1: RG08 SSTV was not provided in the OpGWMP and has been requested.

3.2 Observations

In certain circumstances, a bore may be considered inaccessible for groundwater monitoring. This may be due to being unable to be located, access being unsafe or blocked, unable to retrieve logger data, or another reason preventing monitoring from occurring.

Observations relating to EC is provided in **Table 9**.

Table 9 Observations Relating to EC

#	Observation	Actions	Outcome
1	Geomotion has advised that logger data is to be accessed via a remote telemetry system. The D&C Contractor must grant access to FHE to conduct monitoring.	The Operator has requested access from the D&C Contractor, but the request has not been actioned.	The availability of monitoring data for analysis is dependent on the D&C Contractor granting FHE access to the remote telemetry system. Data will be analysed as soon as possible after the request is actioned by the D&C Contractor.
2	The OpGWMP indicates that bore RG02 is in a public area around 4 Clubb St, Rozelle. However, upon inspection of the site, it is believed that the recent construction of footpaths and a public garden have covered the bore.	The site was thoroughly searched and the bore could not be located. The Operator has been notified.	It could not be confirmed if a logger is operating at RG02. Confirmation will be sought as soon as possible after access to the remote telemetry system is granted by the D&C Contractor.
3	The OpGWMP did not provide an SSTV for RG08.	An SSTV for RG08 has been requested from the Operator.	Comparison to SSTV cannot be undertaken until the SSTV is provided.

3.3 Monitoring Results

As access to the remote telemetry system was not available, salinity monitoring data could not be downloaded during the reporting period. As outlined in **Table 9**, the Operator has been notified of the inability to access data in the remote telemetry system, and it is understood they have requested that the D&C Contractor grant access. When access is granted, monitoring data will be downloaded and analysed against the Site Specific Trigger Values (SSTVs) provided by the OpGWMP (see **Table 8**).

3.4 Discussion

As discussed in **Section 3.3** Monitoring Results, no data was available for analysis during the reporting period. When monitoring results become available (after the D&C grants to the remote telemetry system), this section will review any trends and outline investigations as required.

3.5 Management Actions

As no SSTVs have been identified as exceeded, no management actions have been taken during the reporting period.

4. Tunnel Inflows

4.1 Overview

During operations, groundwater will be intersected and managed by capturing the water that enters the tunnels through drainage and sumps.

Operational tunnel inflow is estimated by a simple calculation stipulated by the OpGWMP:

Groundwater Inflow = WTP Discharge – Project Water Input

"Project water inputs" typically only includes water use associated with the fire deluge system.

4.2 Observations

The fire deluge system was not utilised during the reporting period, and the project water input was 0 kL.

4.3 Monitoring Results

Utilising the calculation noted in **Section 4.1** groundwater inflow has been calculated as follows:

Groundwater inflow *= 133,068 kL – 0 kL*
= 133,068 kL

4.4 Discussion

As there were no project water inputs during the reporting period, the groundwater inflow was the same as the WTP discharge, which was 133,968 kL.

4.5 Management Actions

There were no management actions required during the reporting period.

5. Water Treatment Plant Discharge Quality

5.1 Overview

Groundwater captured during operation of the Asset is treated at one WTP at the operational maintenance yard. The water from the WTP will be tested and either reused where possible or discharged in accordance with the OpGWMP and MCoA.

Water quality results are analysed monthly and assessed against the ANZECC (2000) Guidelines for Fresh and Marine Water Quality. The parameters and performance criteria stipulated by the OpGWMP are provided in **Table 10**.

Table 10 WTP Discharge Criteria

Parameter	Unit	WTP Performance Criteria
pH	pH	6.5 – 8.5
Total Suspended Solids (TSS)	mg/L	50
Cadmium	mg/L	0.0007
Chromium (hexavalent)	mg/L	0.0044
Chromium (trivalent)	mg/L	0.0274
Copper	mg/L	0.0013
Iron	mg/L	0.3
Lead	mg/L	0.0044
Mercury	mg/L	0.0001
Nickel	mg/L	0.07
Zinc	mg/L	0.015

Monthly WTP discharge sampling commenced in January 2024 and is conducted by a suitably qualified water sampler.

5.2 Observations

There were no observations of note relating to WTP monitoring.

5.3 Monitoring Results

The WTP discharge monitoring results are presented in **Table 11**.

Table 11 WTP Monitoring Results

Compound	Limit of Recording	Criteria	Prefix	Unit	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24
General Parameters										
pH	0.01	6.5 - 8.5		pH Units	7.26	7.49	7.32	7.63	7.85	7.67
Electrical Conductivity	0.1		EC	mS/cm	4.71	4.299	5.131	5.137	4.843	5.129
Temperature	0.1			°C	25.68	24.3	26.5	24.2	19.3	16.8
Dissolved Oxygen	0.01		DO	mg/L	15.35	5.88	6.58	6.58	4843	-[1]
Oxygen Reduction Potential	1		Redox	mV	299	229	346	343	165	234
Total Suspended Solids	5	50	TSS	mg/L	5	5	5	5	5	13
Total Dissolved Solids	0.1		TDS	mg/L	3100	3275	3955	3874	3757	4075
Turbidity	1			NTU	2.1	4.5	2.62	0.9	0.4	0.5
Odour and colour (observed)	Yes or No	No	O/C	n/a	No	No	No	No	No	No
Dissolved Metals										
Hexavalent Chromium	0.001	0.0044	Cr(VI)	mg/L	0.002	0.002	0.001	0.001	0.001	0.001
Trivalent Chromium	0.001	0.0274	Cr(III)	mg/L	0.003	0.001	0.006	0.01	0.01	0.004
Cadmium	0.001	0.0007	Cd	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Copper	0.001	0.0013	Cu	mg/L	0.001	0.001	0.001	0.0001	0.001	0.001
Lead	0.001	0.0044	Pb	mg/L	0.001	0.001	0.001	0.001	0.001	0.001
Manganese	0.001	1.9	Mn	mg/L	0.012	0.007	0.001	0.026	0.037	0.023
Nickel	0.005	0.07	Ni	mg/L	0.006	0.005	0.016	0.027	0.004	0.006
Zinc	0.005	0.015	Zn	mg/L	0.016	0.005	0.005	0.006	0.005	0.005
Iron	0.05	0.3	Fe	mg/L	0.05	0.05	0.05	0.05	0.08	0.05
Mercury	0.00004	0.0001	Hg	mg/L	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004

Note 1: Dissolved oxygen sensor experienced a technical error in June. No result was available.

5.4 Discussion

The first monthly sample (January 2024) recorded a minor exceedance of the OpGWMP zinc criteria (result of 0.016mg/L compared to the criteria of 0.015mg/L) (refer to **Table 11**). Routine maintenance and chemical checks found no abnormalities, and results from all subsequent samples were well below the criteria.

Throughout the reporting period, all other WTP parameters remained compliant with the OpGWMP (refer to **Table 10**).

5.5 Management Actions

In response to an algal bloom at the Rozelle Wetland (the Wetland), monthly nutrient testing of the WTP discharge commenced in April 2024 for information purposes. No concerns were raised with the WTP discharge quality. Management actions relating to the Wetland are discussed further in **Section 7.5**.

No WTP management actions were required during the reporting period.

6. Surface Water Quality

6.1 Overview

Surface water quality is monitored across the Asset area to assess the mobilisation of sediments and pollutants during operation. The surface water monitoring locations are outlined in **Table 12**.

Table 12 Surface Water Monitoring Locations

Monitoring ID	Location	Upstream/ Downstream of Asset
SW01	Rozelle Bay - Western corner	Downstream
SW02	Whites Creek - Brenan St Bridge	Upstream
SW07	Sub-surface stormwater drain - Rozelle Parkland	Upstream
SW11	Parramatta River - Iron Cove, beneath Iron Cove Bridge	Downstream
SW12	Parramatta River - Iron Cove, King George Park Pontoon	Downstream

The required surface water monitoring parameters specified by the OpSWMP are provided in **Table 13**. Field testing is conducted monthly using a calibrated multi-probe water quality meter.

Table 13 Surface Water Quality Monitoring Parameters

Parameter	Units
Temperature	°C
Dissolved oxygen	mg/L
Electrical conductivity	µS/cm
Reduction-oxidation potential (Redox)	mV
pH	pH units
Total dissolved solids	TDS
Turbidity	NTU
Visible oil and grease	yes/no

SSTVs have been nominated for pH, electrical conductivity and turbidity, which are provided in **Table 14**.

Table 14 Surface Water Quality Site Specific Trigger Values

Parameter	Units	ANZECC Guidelines	SW01	SW02	SW07	SW11	SW12
pH	pH	7.0 – 8.5	7.0 – 8.5	7.0 – 8.5	7.0 – 8.5	7.0 – 8.5	7.0 – 8.5
Electrical conductivity	µS /cm	125 – 2,200	49,812	23,348	18,190	51,914	51,947
Turbidity	NTU	0.5 - 10	8.66	12,98	12.14	28.44	7.44

6.2 Observations

Monitoring was conducted monthly between December 2023 and June 2024.

Site SW07 was unable to be accessed during the monitoring period. Between December and April it was fenced off due to asbestos contamination in the area. Once available in May, SW07 was identified as covered by a heavy drain plate that requires civil equipment to remove.

The Operator has been notified that monitoring of SW07 will be dependent on the availability of the civil works crew to assist with removal of the plate, and suitably qualified personnel to access the drain. The FHE environmental team has liaised with the civil works crew to provide a range of tools and methods to obtain samples at SW07 as suitable options may vary depending on the amount of water in the drain at the time. In addition, a monthly work order has been generated to ensure sampling is undertaken in accordance with the OpSWMP for future monitoring periods.

6.3 Monitoring Results

The surface water monitoring results are provided in **Table 15**.

Table 15 Surface Water Monitoring Results

Legend					General Parameters						
					pH	Electrical Conductivity	Temperature	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential	Total Dissolved Solids	Turbidity
Exceedance				Prefix		EC		DO	ORP	TDS	
Exceedance is upstream related				Unit	pH Units	uS/cm	°C	mg/L	mV	mg/L g/L from May 2024	NTU
Upstream				LOR	0.1		0.1	0.01	1	0.1	1
Downstream											
					7.0 - 8.5						
			ANZECC SSTV	SW01	7.0 - 8.5	49812					8.66
				SW02	7.0 - 8.5	23348					12.98
				SW07	7.0 - 8.5	18190					12.14
				SW11	7.0 - 8.5	51914					28.44
				SW12	7.0 - 8.5	51947					7.44
Surface Water					Surface Water						
RAIN EVENT Monitoring	Site	Date	Time	Comments	Dec-23						
	SW01	28/12/2023	12:00	plastics, clear water no odour	8.09	33793	26.2	20	225	22000	2
	SW02	28/12/2023	12:30	not flowing, water level too low to sample							
	SW07	28/12/2023	12:50	inaccessbile - pit lid							
	SW11	28/12/2023	13:10	clear no odours	7.85	45853	25.3	14.88	258	29800	4.2
	SW12	28/12/2023	13:20	clear no odours	7.32	43406	25.1	15.87	251	28000	3.5
					Jan-24						
	SW01	24/1/2023	09:48	plastic, leaf debris, clear no odour	6.71	44212	24.7	5	80.2	28738	1.53
	SW02	24/1/2023	10:09	flowing, no odours, clear	7.00	21976	23.4	8	106.8	14284	7.17
	SW07	24/1/2023	10:30	inaccessible (Asbestos, Rozelle Bay Closed)							
	SW11	24/1/2023	09:12	clear no odours	6.67	41779	24	7.1	106.5	27156	33.71
	SW12	24/1/2023	08:49	plastic bags, leaf litter, no odours, clear	6.87	41097	23.5	7.2	123.2	26713	0.66
					Feb-24						
	SW01	9/2/2024	09:45	plastic, leaf debris, clear no odour	7.50	50550	23.5	3.9	154.8	32858	14.6
	SW02	9/2/2024	09:20	plastic bags, leaf litter, no odours, clear	7.47	51341	22.9	3.8	164.4	33370	0.22
	SW07	9/2/2024		inaccessible (asbestos Rozelle Parkland closed)							
	SW11	9/2/2024	10:18	clear no odours	7.79	52132	23.2	6.3	150..5	33886	0
	SW12	9/2/2024	10:11	clear no odours	7.79	51965	23.5	6.2	144.2	33777	0
					Mar-24						
	SW01	5/3/2024	12:53	plastic, leaf debris, clear no odour	7.57	47620	26.5	5.8	137.4	30953	0
	SW02	5/3/2024	13:05	plastic bags, leaf litter, no odours, clear	8.30	21025	29	12	102.3	13660	0
	SW07	5/3/2024		inaccessible (asbestos Rozelle Parkland closed)							
	SW11	5/3/2024	12:31	clear no odours	7.76	49519	25.6	6.5	129.6	32188	0
	SW12	5/3/2024	12:27	clear no odours	7.75	49348	26.8	6.6	136.1	32076	0
					Apr-24						
18mm rain day prior	SW01	10/4/2024	11:55	clear, no odours, leaf debris	7.68	39380	22.4	4.43	514	25600	0
	SW02	10/4/2024	11:40	clear, no odours, fast flowing	7.97	2780	19.9	10.5	477	1800	6
	SW07	10/4/2024		inaccessible (fenced off for asbestos)							
	SW11	10/4/2024	12:22	clear, no odours	7.89	35690	20.22	5.52	487	23200	0
	SW12	10/4/2024	12:15	clear, no odours, leaf debris	7.70	33580	21.14	5.21	490	21800	0
					May-24						
Heavy rain on day of and preceding	SW01	9/5/2024	10:52	bit murky, no odour	7.9	34000	20.0	5.44	514	22.1	0.1
	SW02	9/5/2024	10:34	slightly brown, no odour	8.3	5000	19.1	9.55	459	0.3	9
	SW07	9/5/2024	-	inaccessible - drain cover requiring civil tools							
	SW11	9/5/2024	09:57	clear, no odour	8.0	4600	19.6	5.94	504	30.1	0.1
	SW12	9/5/2024	09:48	clear, no odour	7.9	3700	19.0	6.82	502	24.6	0.1
					Jun-24						
Heavy rain in June	SW01	25/6/2024	12:05	cloudy. pH sensor out of service		33582	15.43	7.37	383	21.8	8
	SW02	25/6/2024	12:20	clear, no odour, pH sensor out of service		1043	16.32	12.36	369	0.7	5.5
	SW07	25/6/2024	-	inaccessible - drain cover requiring civil tools							
	SW11	25/6/2024	12:48	clear, no odour, pH sensor out of service		46864	16.98	8.15	402	30.5	13.7
	SW12	25/6/2024	12:40	clear, no odour, pH sensor out of service		38574	16.53	7.97	401	25.1	8

6.4 Discussion

Some exceedances of the OpSWMP SSTVs (refer to **Table 14** and **Table 15**) were detected in the first half of the period.

<u>January 2024</u>

pH was slightly low at all sites in January 2024, including at SW02 (upstream). The low pH downstream has been attributed to low upstream pH, which may have been caused by heavy rainfall a few days prior to sampling. The downstream pH was less than 20% variation from the SSTV. Due to

the minor nature of the exceedance, and that the upstream site was also low, it was determined that monitoring would continue. Low pH has not occurred again.

In the same month, turbidity was slightly high at SW11. This was attributed to the site being adjacent to bushy vegetation and the heavy rain received a few days prior to sampling. It is noted that SW12, which is near SW11 (approximately 200m upstream) and not adjacent to bushy vegetation, did not exceed the SSTV. It was determined that monitoring would continue, and the site has not exceeded the SSTV again.

February 2024

The electrical conductivity (EC) SSTVs were exceeded at all monitored sites, including at SW02 (upstream) in February 2024, with all exceedances expressed as percentages in **Table 16**.

Table 16 EC SSTV Exceedances - February 2024

Monitoring ID	SSTV	February EC	Exceedance
SW01 (downstream)	49,821	50,550	1.46%
SW02 (upstream)	23,348	51,341	119.89%
SW11 (downstream)	51,914	52,132	0.42%
SW12 (downstream)	51,947	51,965	0.03%

It is noted that all downstream sites exceeded the SSTVs by less than 1.5%, whilst the upstream site exceeded by approximately 120%. Therefore the exceedances were attributed to an upstream source and it was determined that monitoring would continue. No further exceedances of EC were detected.

SW01 slightly exceeded the turbidity SSTV in the same month. As this was the first turbidity exceedance for this site, it was determined that monitoring would continue. Turbidity returned to below the SSTV the following month and no further exceedances have occurred.

June 2024

In June 2024 the pH sensor was out of service. No results were available for the month. The matter was resolved by the following week and pH monitoring recommenced in July, with no ongoing issues.

6.5 Management Actions

Beyond continued monitoring, no management actions were required during the reporting period.

7. Rozelle Wetland

7.1 Overview

The Wetland consists of two cells (Pond 1 and Pond 2) receiving flows from the WTP and localised stormwater runoff. A summary of monitoring requirements and maintenance triggers are provided in **Table 17**. It is noted that the embankments and wider Rozelle Parkland do not form part of the Wetland monitoring program.

Table 17 Rozelle Wetland Monitoring Requirements

Parameter	Frequency	Trigger for Maintenance
Vegetation	Monthly (or fortnightly when required)	Loss of vegetation cover
Weeds	Monthly (or fortnightly when required)	Presence of weeds
Mosquitos	Monthly (or fortnightly when required)	Dominant, Abundant or Frequent levels
Water birds	Monthly	Water birds creating nuisance
Flow	Monthly	Flows not well distributed through cells, channelised flows, erosion, or plant damage due to preferential flow paths, water level hiqher or lower than desiqn level
Inlet and outlet inspections	Monthly	Blockages, malfunctions, sediment accumulation
Post-flood inspection	After flood or severe storm event	Damage
Drought management	Weekly or fortnightly during extended droughts	Six weeks of dry surface
Photographic monitoring	Each inspection	NA

7.2 Observations

From the opening of the Asset until April, the Wetland was inaccessible due being fenced off for asbestos contamination. Potentially toxic blue-green algae was identified at the Wetland in April, resulting in fencing remaining in place for the remainder of the period, however limited access for monitoring purposes was permitted.

Monthly inspections were conducted from April to June.

Due to observations of algae, surface water monitoring (lab analysis) was conducted between April and June.

7.3 Monitoring Results and Discussion

Algae was first observed in April 2024 and lab analysis confirmed the presence of potentially toxic blue-green algae species. A wetland specialist was consulted, advising that stagnant water may be a contributing factor. During June, three aerator-fountains were installed (two in Pond 1 and one in Pond 2) which successfully cleared the majority of algae. Limited algae remained in pockets of Pond 1 where dense reeds sheltered the water from fountain activity.

Lab analysis confirmed that presence of blue-green algae was lower in May and June compared to the initial sample taken in April. Monthly nutrient testing of the WTP discharge commenced in April, and no concerns were noted. Monthly inspections and water quality testing will continue.

During April, May and June, rainfall was considerably above the mean, resulting in several inspections recording notable erosion of embankment mulch (from the Rozelle Parkland). The mulch entered the Wetland causing brown discolouration and the presence of tanins (oily appearance) in the water. It is noted that water appearance returned to clean and clear at the July inspection (the next reporting period).

There were no concerns with the remaining parameters identified in **Table 17**.

7.5 Management Actions

Management actions taken during the period include:

- Monthly Wetland water quality analysis from April (ongoing);
- Monthly WTP nutrient testing from April (ongoing); and
- Installation of aerator-fountains in June.

8. Conclusions

All possible monitoring was conducted during the reporting period and no environmental concerns were identified.

Limited information in the OpGWMP and OpSWMP constrained the level of analysis possible. Some aspects have been resolved or improved throughout the period. The provision of the requested information will allow for a more comprehensive evaluation of the environmental impacts of the Asset in the future.