SYDNEY METRO - WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

Biannual Groundwater Monitoring Report

June 2024 to December 2024

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

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A.01	First draft issue for review by CPBG
A.02	Updated based on review by Sydney Metro, WSI and CPBG

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Definitions and Abbreviations

Acronym/ Abbreviation	Definition
ANZG (2018)	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene
CEMP	Construction Environmental Management Plan
CoC	Chain of Custody
CPBG	CPB Contractors Gella Joint Venture
DQO	Data Quality Objective
EC	Electrical conductivity
EIS	Sydney Metro Western Sydney Airport – Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
FRP	Formwork, Reinforcement and Pour
GDEs	Groundwater Dependent Ecosystems
GMP	Groundwater Monitoring Program
GWQ	Groundwater Quality
HHERA	Human Health and Ecological Risk Assessment
LOR	Limit of Reporting
mAHD	Elevation in metres with respect to the Australian Height Datum
mBGL	Metres Below Ground Level
mBTOC	Metres Below Top of Casing
NATA	National Association of Testing Authorities
PAH	Polycyclic Aromatic Hydrocarbons
PCE	Tetrachloroethene
PFAS	Per- and Polyfluoroalkyl Substances
PFOS	Perfluorooctane-Sulfonic Acid
PLM	ParkLife Metro (SSTOM D&C)
QA	Quality assurance
QC	Quality control
RPD	Relative Percent Difference
SBT Works	Station Box and Tunnelling Works-
SF	Service Facility

Acronym/ Abbreviation	Definition
SSTOM	Station System Trains Operations and Maintenance
SVOC	Semi-Volatile Organic Compounds
TBM	Tunnel boring machine
TCE	Trichloroethene
TDS	Total Dissolved Solids
TfNSW	Transport for NSW
TOC	Total Organic Carbon
TRH	Total Recoverable Hydrocarbons
Tetra Tech	Tetra Tech Major Projects Pty Ltd
µS/cm	Micro-Siemens per centimetre
VOC	Volatile Organic Compounds
VWP	Vibrating Wire Piezometers
XP	Cross Passage
WSA	Western Sydney Airport
WSI	Western Sydney International

1 Introduction

Sydney Metro has engaged CPB Ghella Joint Venture (CPBG) for the design and construction of Station Boxes and Tunnelling Works (SBT Works) for the Western Sydney Airport (WSA) project (the Project). The Project forms part of the broader Sydney Metro network and involves the construction and operation of a new 23 km metro rail line from the existing Sydney Trains suburban T1 Western Line (at St Marys) in the north and the Aerotropolis (at Bringelly) in the south. The alignment includes tunnels and civil structures, including a viaduct, bridges, and surface and open-cut troughs between the two tunnel sections (Figure 1-1 below).

This Biannual Groundwater Monitoring Report has been prepared by Tetra Tech Major Projects Pty Ltd (Tetra Tech) on behalf of CPBG to report on the third round of groundwater monitoring and compare it to results from the previous two biannual monitoring events undertaken in 2023 (Document Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040410) and the first half of 2024 (Document Ref: SMWSASBT_CPG-SWD-SW000-GE-RPT-040419), and to baseline groundwater conditions as well as the adopted performance criteria, as outlined in the Groundwater Monitoring Plan (Document Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT040404, Rev 4).

This report summarises the groundwater level and groundwater quality monitoring undertaken as detailed in the Groundwater Monitoring Plan (GMP) for the third biannual reporting period. The report includes groundwater level and monitoring data collected between 29th June 2024 and 31st December 2024. Groundwater level and quality data is compared to results from the previous monitoring periods and trigger levels as outlined in the GMP.

1.1 Project background and location

The Project is being delivered through several work packages, with SBT works package including the design and construction of:

- Northern Tunnels (between Orchard Hills and St Marys)
- Southern Tunnels (between Western Sydney International (WSI) and the new Aerotropolis station)

As well as excavation works including:

- Four station boxes with temporary ground support at St Mary's, Orchard Hills, Airport Terminal and Aerotropolis
- Two intermediate service facilities, one for each tunnel sections at Claremont and Bringelly
- Turn back excavations and stub tunnels for future extensions to the network

An overview of SBT works, including the tunnels and excavation areas, is shown in Figure 1-1.

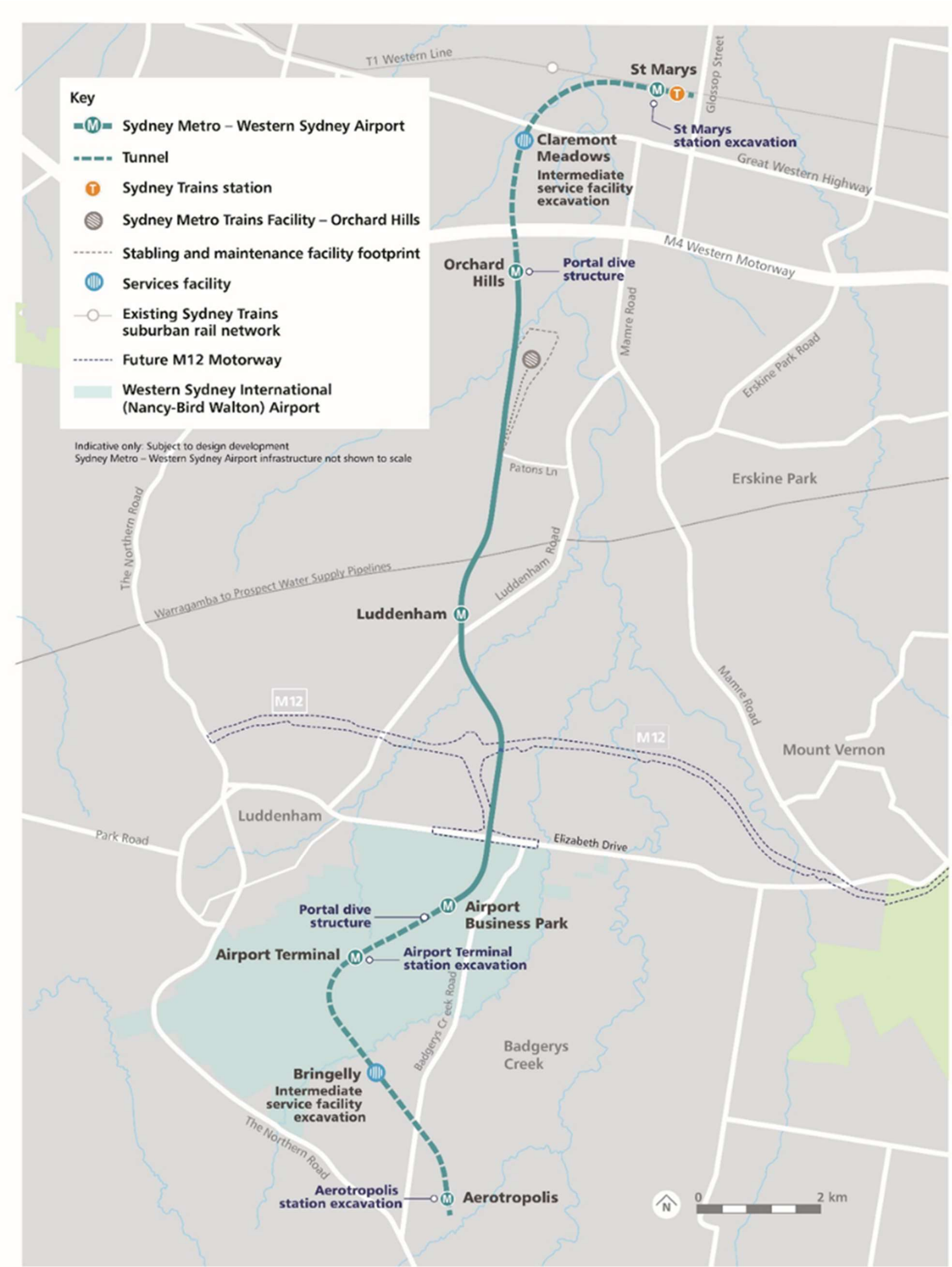

Figure 1-1: Overview of SBT works

1.2 Construction status

A summary of the construction status and works completed, as provided by CPBG, is provided in Table 1-1 for excavations and Table 1-2 for cross passages. Tables also identify areas that have been handed over by CPBG to the Stations. Systems, Trains, Operation and Maintenance (SSTOM) contractor Parklife Metro (PLM) who are now responsible for groundwater management in those areas. Work areas discussed in Table 1-1 are shown in Figure 1-2 to Figure 1-7.

All excavations were either handed over to PLM at the end of the current monitoring period, or in January 2025.

Tunnel boring machine (TBM) progress in 2024 is shown on Figure 1-8. Breakthrough and TBM completion dates are shown in Figure 1-9, and were all in May and June 2024.

Cross passage (XP) construction dates are listed in Table 1-2, with XPs completed before this monitoring period shaded grey. All XPs were completed by October 2024.

With the exception of the excavations that were handed over to PLM in January 2025, all SBT works and associated monitoring were completed by the end of the monitoring period covered by this report.

Table 1-1: Construction status - Excavations

Excavation	Start	Finish	Additional Information
St Marys Station Box Excavation	13-Jan-23	7-Sep-2023 Station Box handed over to PLM (SSTOM) 15 November 2023	Remaining SBT activities TBM RETRIEVAL -TBM 1 Breakthrough 16 May 2024 -TBM 2 Breakthrough 20 June 2024 Handover of tunnels to PLM - 9 December 2024
Claremont Meadows shaft Excavation	16-Dec-22	12-Sep-23	Site handover to PLM 15 January 2025 (Figure 1-2)
Orchard Hills Station Box Excavation	13-Jan-23	17-Jul-23	Site Handover to PLM 3 December 2024 (Figure 1-3)
Airport Business Park Station Box Excavation	13-Sep-22	24-Apr-23	Handed over 4 April 2024 (Figure 1-4)
Airport Terminal Station box excavation	13-Feb-23	21-Nov-23	Site handover to PLM 7 October 2024 (Figure 1-5)
Airport Terminal Temporary Shaft Excavation	17-Apr-23	24-Aug-23	Site handover to PLM 11 January 2025
Bringelly Shaft Excavation	22-Dec-22	5-Sep-23	Site handover to PLM 22 January 2025 (Figure 1-7)
Aerotropolis Station Box Excavation	16-Feb-23	22-Sep-23 Station Box Handed over to PLM (SSTOM) 11 October 2023	Site handover to PLM 30 August 2024

Table 1-2: Cross Passages (XP)

Cross Passage	Start	Finish	Additional Information
Northern Tunnel			
XP N2	29/05/2024	30/10/2024	Formwork, Reinforcement and Pour (FRP) Finish Date (Arch Pour) 30 October 2024
XP N3	11/05/2024	18/10/2024	FRP Finish Date (Arch Pour) 18 October 2024
XP N4	29/05/2024	25/10/2024	FRP Finish Date (Arch Pour) 25 October 2024
XP N5	29/05/2024	20/09/2024	FRP Finish Date (Arch Pour) 20 September 2024
XP N6 (Sump)	11/05/2024	23/10/2024	FRP Finish Date (Arch Pour) 23 October 2024
XP N7	06/07/2024	30/08/2024	FRP Finish Date (Arch Pour) 30 August 2024
XP N8	22/05/2024	30/07/2024	FRP Finish Date (Arch Pour) 30 July 2024
XP N9	17/05/2024	13/08/2024	FRP Finish Date (Arch Pour) 13 August 2024
XP N10	25/04/2024	17/07/2024	FRP Finish Date (Arch Pour) 17 July 2024
XP N11	03/05/2024	08/07/2024	FRP Finish Date (Arch Pour) 8 July 2024
XP N12	*Claremont Meadows Service Facility*		
XP N13	08/04/2024	27/06/2024	Excavation start date 08 April 2024 Excavation completed date 10 June 2024 Waterproofing and FRP (Arch Pour) completed 27 June 2024
XP N14	24/03/2024	17/06/2024	Excavation start date 24 March 2024 Excavation completed date 05 May 2024 Waterproofing and FRP Finish Date Arch Pour and 17June 2024
XP N15	18/03/2024	05/06/2024	Excavation start date 18 March 2024 Excavation completed date 02 May 2024 Waterproofing, FRP (Arch Pour) finish date 05 June 2024
XP N16	21/12/2023	08/06/2024	Excavation start date 21 December 2023 Waterproofing, FRP (Arch Pour) finish date 08 May 2024
XP N17	04/03/2024	27/05/2024	Excavation start date 04 March 2024 Excavation completed date 17 April 2024 Waterproofing, FRP (Arch Pour) finish date 27 May 2024
XP N18	01/02/2024	14/05/2024	Excavation start date 01 February 2024 Excavation completed date 21 March 2024 Waterproofing, FRP (Arch Pour) finish date 14 May 2024
XP N19	19/01/2024	23/04/2024	Excavation start date 19 January 2024 Excavation completed date 21 March 2024 Waterproofing, FRP (Arch Pour) finish date 23 April 2024
XP N20	04/11/2023	06/03/2024	Excavation start date 04 November 2023 Excavation completed date 04 January 2024 Waterproofing, FRP (Arch Pour) finish date 06 March 2024

Cross Passage	Start	Finish	Additional Information
XP N21	06/12/2023	20/03/2024	Excavation start date 16 December 2023 Excavation completed date 25 January 2024 Waterproofing, FRP (Arch Pour) finish date 20 March 2024
Southern Tunnel			
XP S2	20/07/2023	03/08/2023	FRP Finish Date (Arch Pour) 16 January 2024
XP S3	25/07/2023	1/12/2023	FRP Finish Date (Arch Pour) 20 February 2024
XP S4	21/08/2023	6/2/2024	FRP Finish Date (Arch Pour) 13 December 2024
XP S5	22/08/2023	6/02/2024	FRP Finish Date (Arch Pour) 03 January 2024
XP S6	4/09/2023	21/02/2024	FRP Finish Date (Arch Pour) 24 January 2024
XP S7	*Airport Terminal Shaft*		
XP S8	29/05/2024	13/06/2024	FRP Finish Date (Arch Pour) 05 March 2024
XP S9	15/05/2024	21/06/2024	FRP Finish Date (Arch Pour) 28 May 2024
XP S10	08/05/2024	06/07/2024	FRP Finish Date (Arch Pour) 6 June 2024
XP S11	06/05/2024	20/07/2024	FRP Finish Date (Arch Pour) 20 June 2024
XP S12	29/04/2024	27/07/2024	FRP Finish Date (Arch Pour) 27 June 2024
XP S13	11/05/2024	05/07/2024	FRP Finish Date (Arch Pour) 5 July 2024
XP S14	18/04/2024	24/07/2024	FRP Finish Date (Arch Pour) 24 July 2024
XP S15	03/05/2024	12/07/2024	FRP Finish Date (Arch Pour) 12 July 2024
XP S16	*Bringelly Service Facility*		
XP S17	30/04/2024	18/07/2024	FRP Finish Date (Arch Pour) 18 July 2024
XP S18	09/05/2024	30/08/2024	FRP Finish Date (Arch Pour) 30 July 2024
XP S19	16/05/2024	0708/2024	FRP Finish Date (Arch Pour) 7 August 2024
XP S20	24/05/2024	20/08/2024	FRP Finish Date (Arch Pour) 20 August 2024
XP S21	20/06/2024	02/10/2024	FRP Finish Date (Arch Pour) 2 September 2024
XP S22	11/06/2024	26/08/2024	FRP Finish Date (Arch Pour) 26 August 2024
XP S23	29/06/2024	09/09/2024	FRP Finish Date (Arch Pour) 9 September 2024

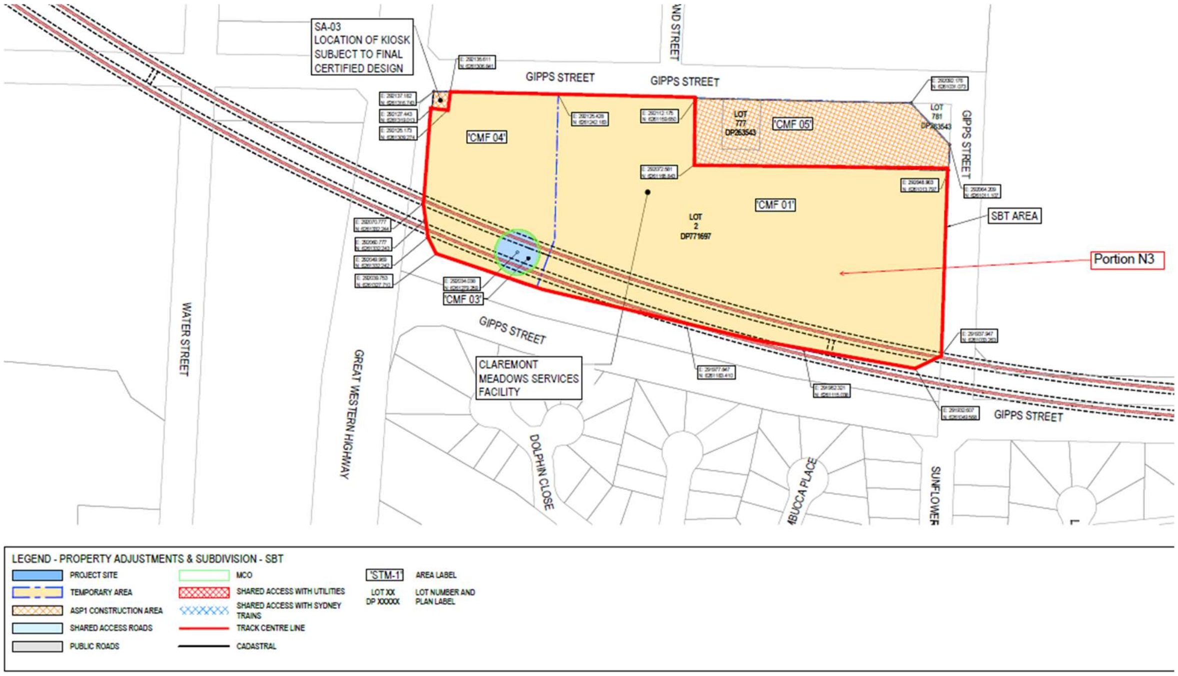

Figure 1-2: Portion N3 Claremont Meadows Facility

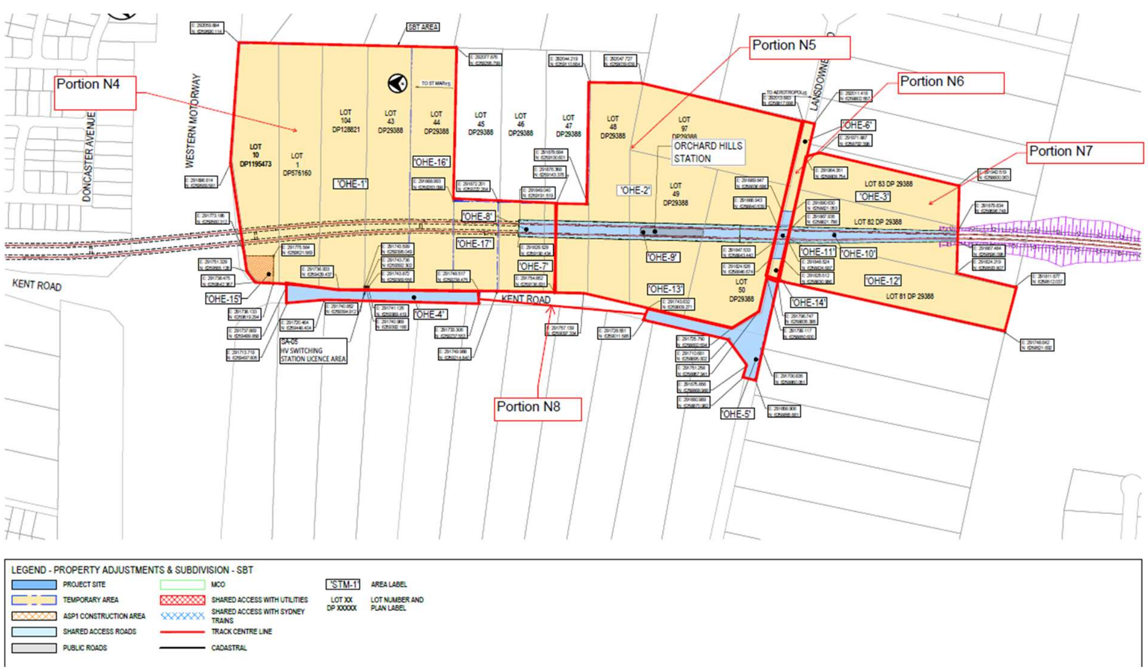

Figure 1-3: Portions N4 to N8, Orchard Hills Area

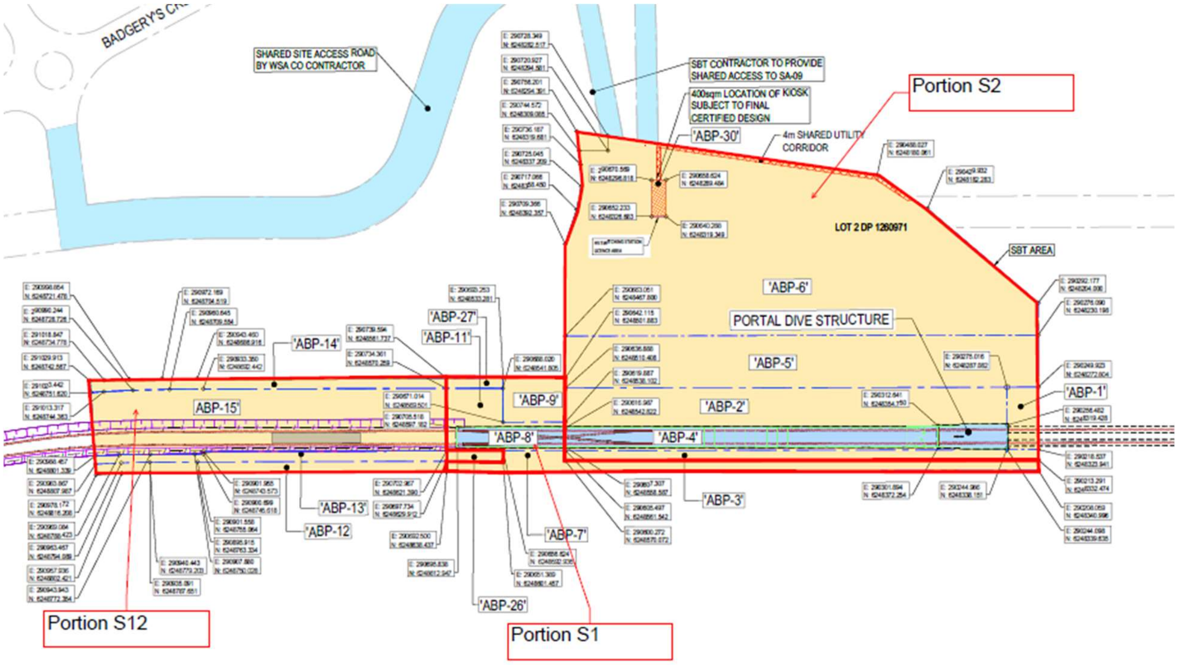

Figure 1-4: Portions S1, S2 and S12, Airport Station

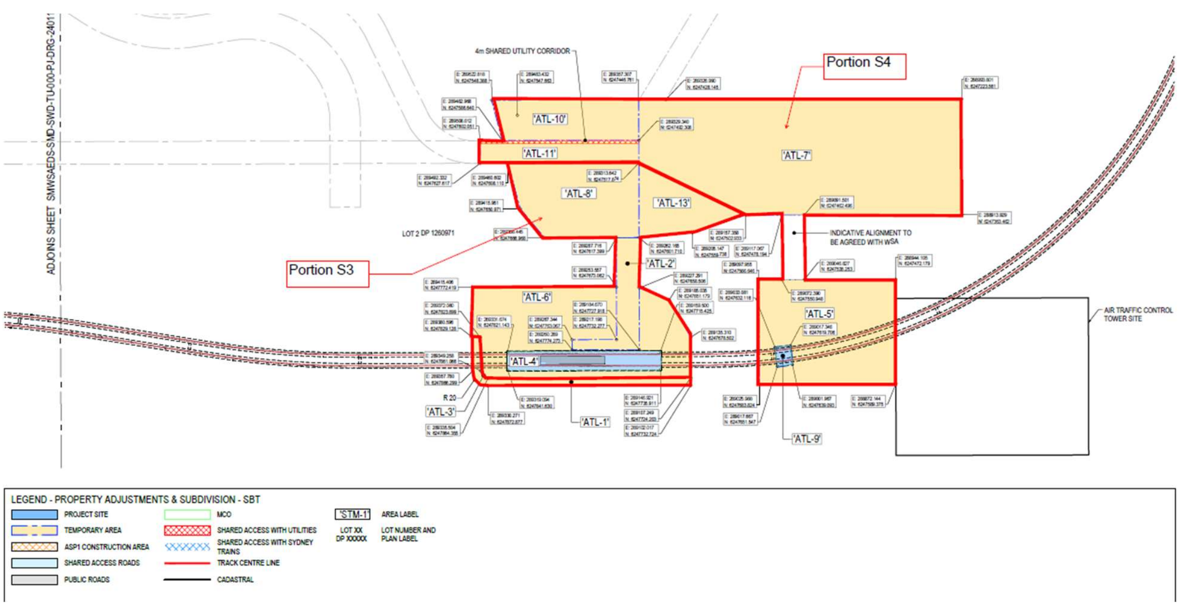

Figure 1-5: Portions S3 and S4, Airport Terminal

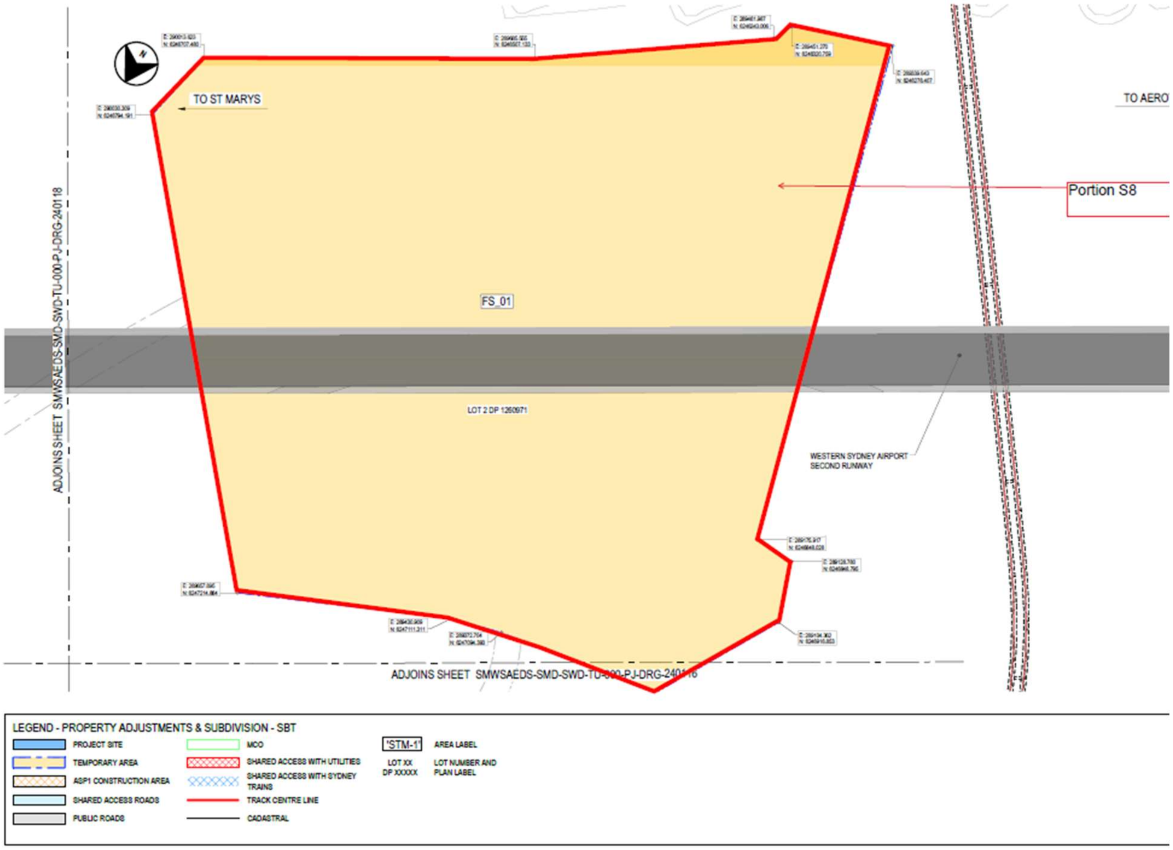

Figure 1-6: Portion S8, SBT Areas Primary Spoil Site

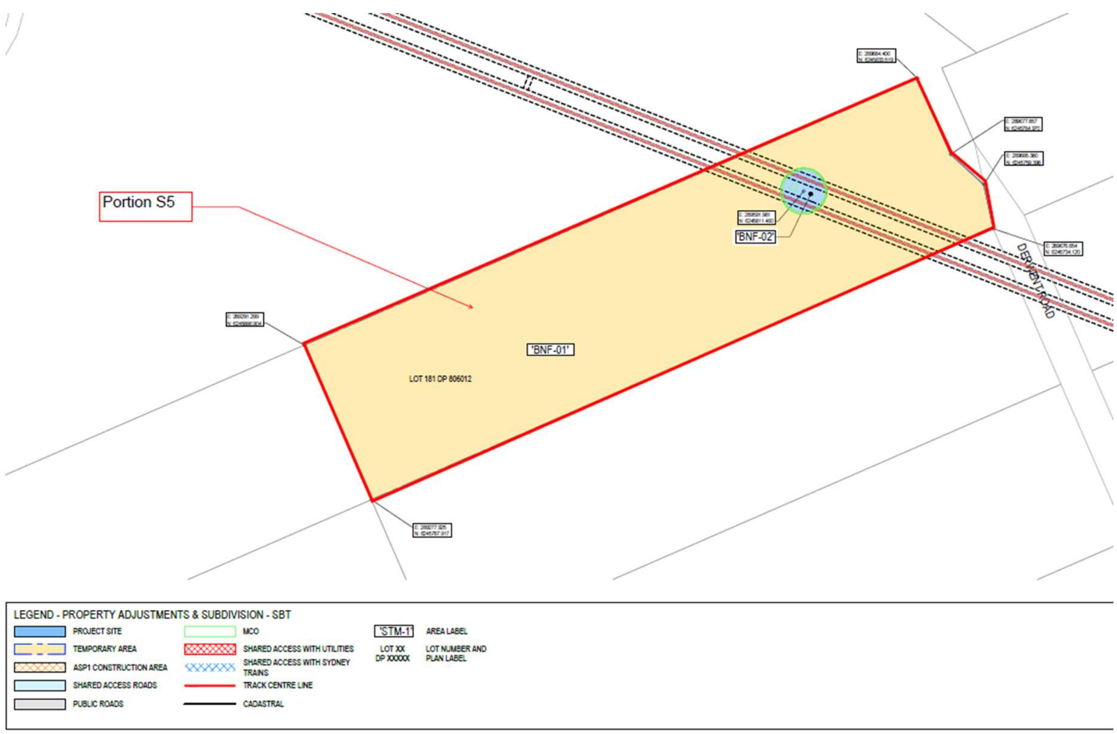

Figure 1-7: Portion S5, Bringelly.

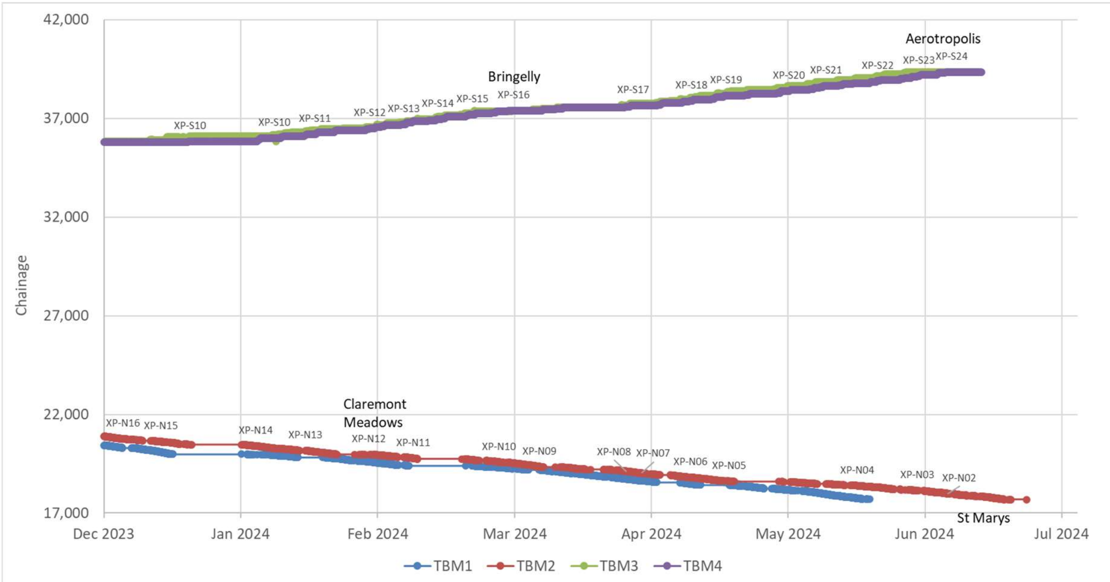

Figure 1-8: TBM progress – December 2023 to June 2024

North
TBM1 Catherine
completed 20/5/24

South
TBM3 Eileen
completed 29/5/24

North
TBM2 Marlene
completed 21/6/24

South
TBM4 Peggy
completed 7/6/24

Figure 1-9: TMB breakthrough photos and completion dates

2 Groundwater Monitoring Program Requirements

2.1 Monitoring Program

A GMP has been developed to meet the requirement for a groundwater construction monitoring program (requirement C13 of the Conditions of Approval for Sydney Metro – Western Sydney Airport (SSI 10051)).

The GMP describes how CPBG will monitor the extent and nature of potential impacts to groundwater levels and quality during the SBT Works, which will allow for implementation of appropriate management measures to address construction impacts. By the end of this reporting period, the majority of sites and the associated groundwater monitoring network were handed over to the SSTOM Contractor, PLM. The three remaining excavations (Claremont Meadows, Airport Terminal Temporary Shaft and Bringelley Shaft) were handed over to PLM in January 2025, with main construction activities completed in late 2024 or earlier (refer Table 1-1).

The complete monitoring program for SBT works is detailed in the GMP and summarised in the sections below, with all previous and current monitoring locations shown on Figures 2-1 to 2-4. A summary of the groundwater monitoring network associated with the SBT Works for this reporting period is provided in Table 2-1 and Table 2-2. Monitoring locations that have been handed over to PLM prior to this reporting period are not addressed within this report. The requirements of the CPBG GMP are no longer applicable at these locations.

The current monitoring period includes monitoring undertaken as part of the mitigation and management measures associated with groundwater contaminated with chlorinated hydrocarbons from a former dry cleaner located at 1-7 Queen St, St Marys, approximately 200m west of the St Marys Station Box. Mitigation monitoring results until the responsibility was handed over to PLM on 9 December 2024 is discussed in detail in Section 2.5.

The monitoring program and this report also meets the monitoring requirements of the on-airport Soil and Water Construction Environmental Management Plan (CEMP), including:

- Section 6.4.2.5 for potential impacts to GDEs – addressed in Sections 2.3.3, 4.2 and Section 5.2 of this report
- Section 6.4.2.10 for potential impacts to groundwater quality – addressed in Sections 2.4, 4.3 and 5.3 of this report
- Section 10.3.2.1 for monitoring – addressed by the GMP and this report, and
- Section 10.4 for groundwater monitoring program – addressed by the GMP.

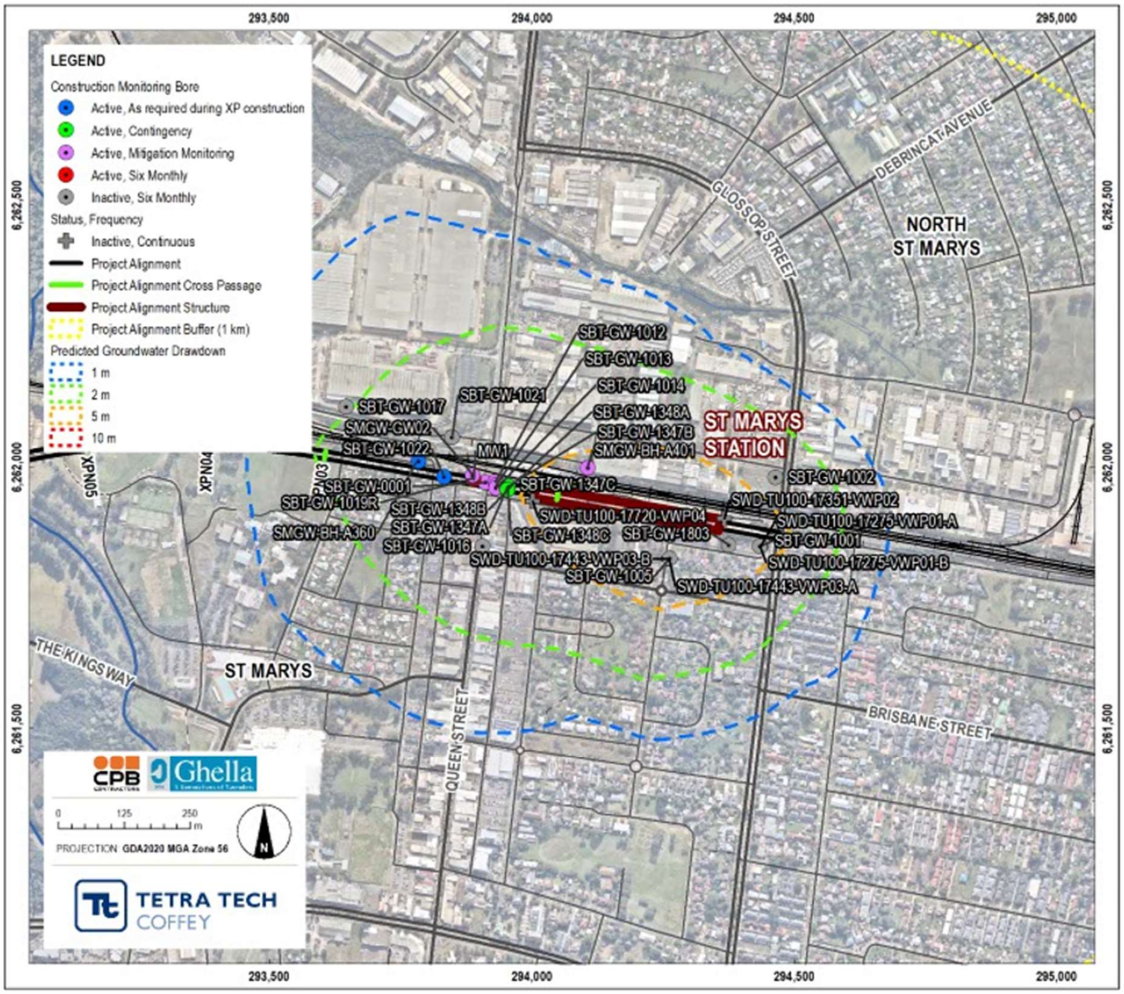

Figure 2-1: Construction groundwater monitoring program – St Marys Station

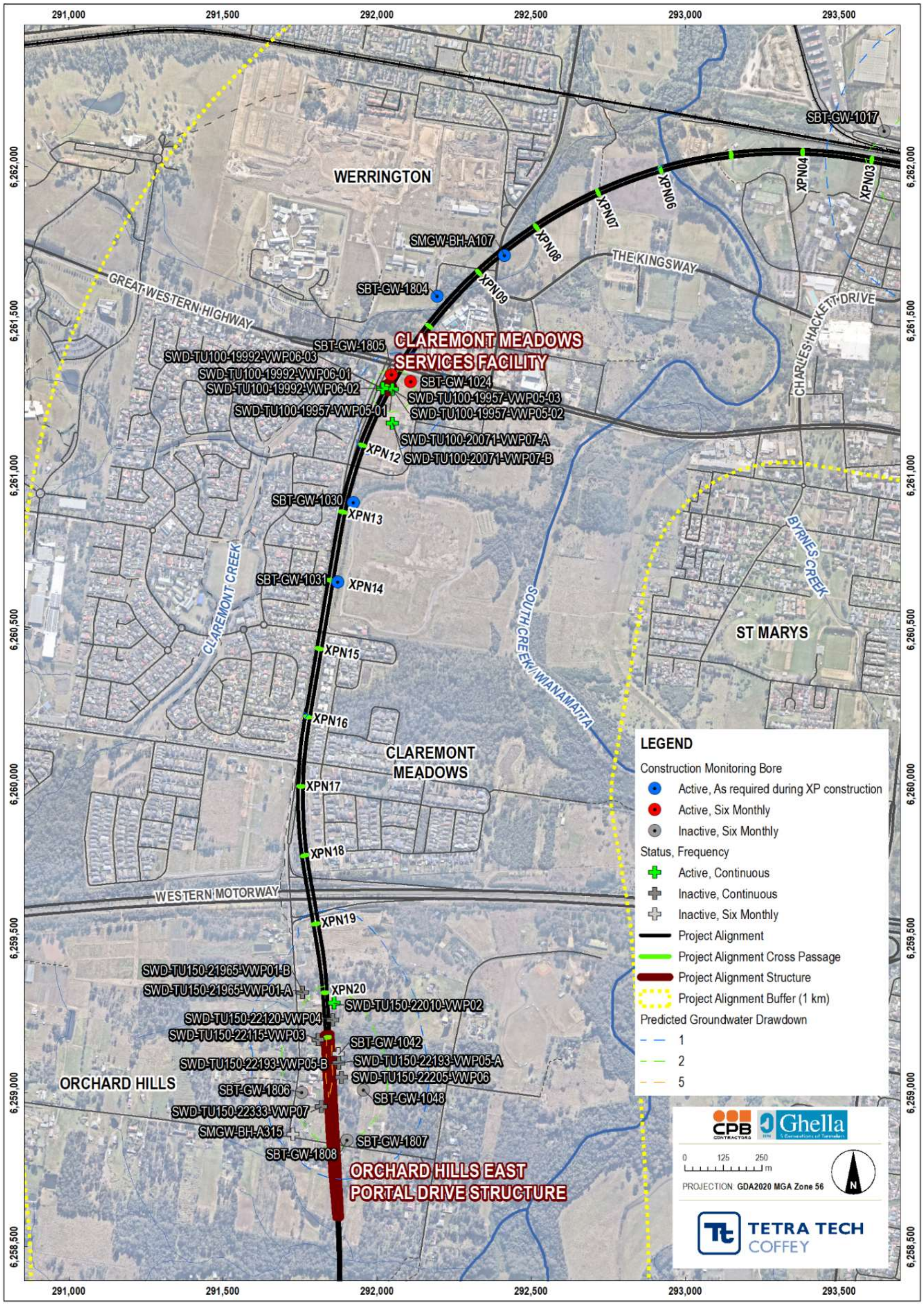

Figure 2-2 Construction groundwater monitoring program – South Creek to Orchard Hills Station

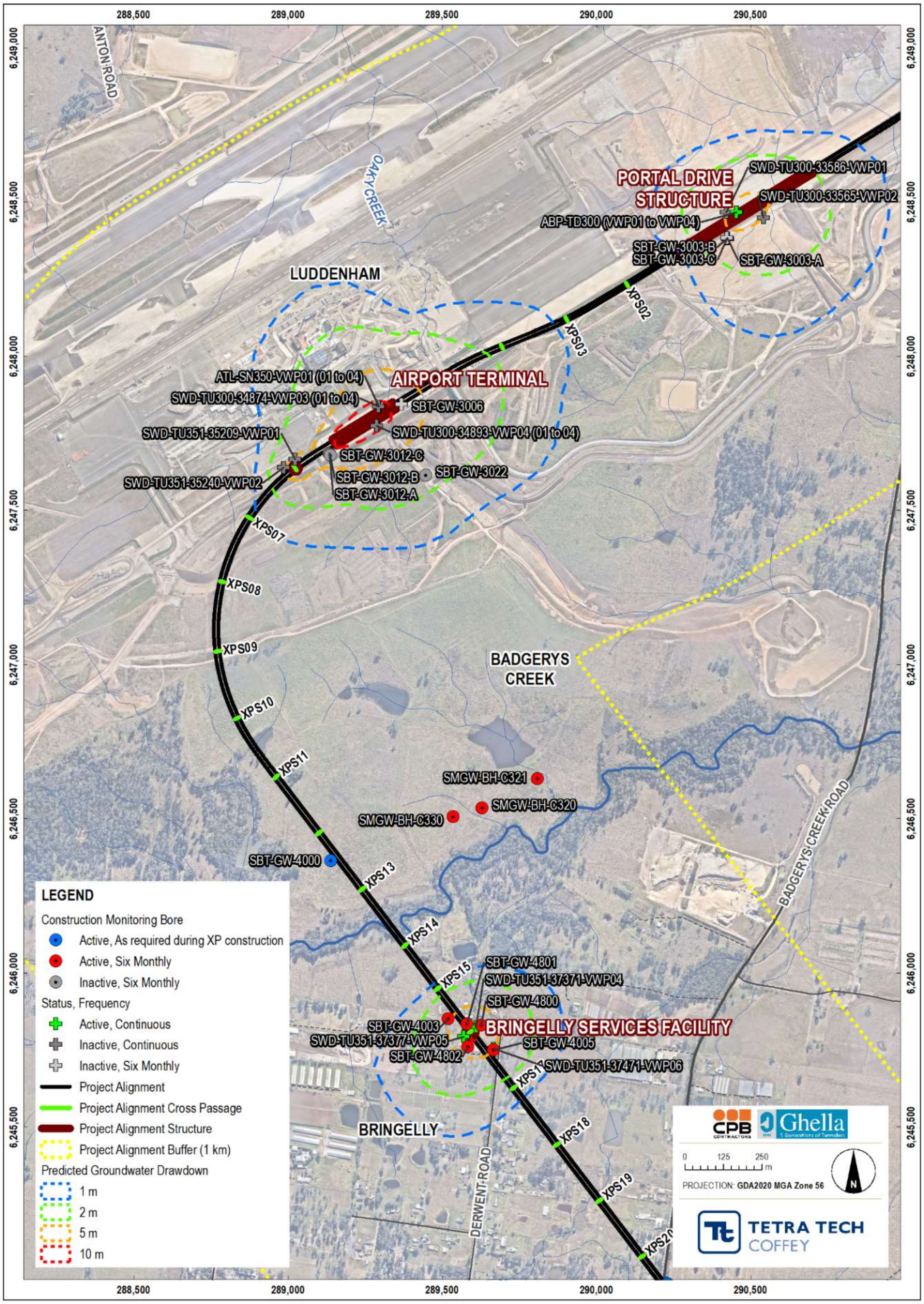

Figure 2-3: Construction groundwater monitoring program – WSI and Bringelly Services Facility

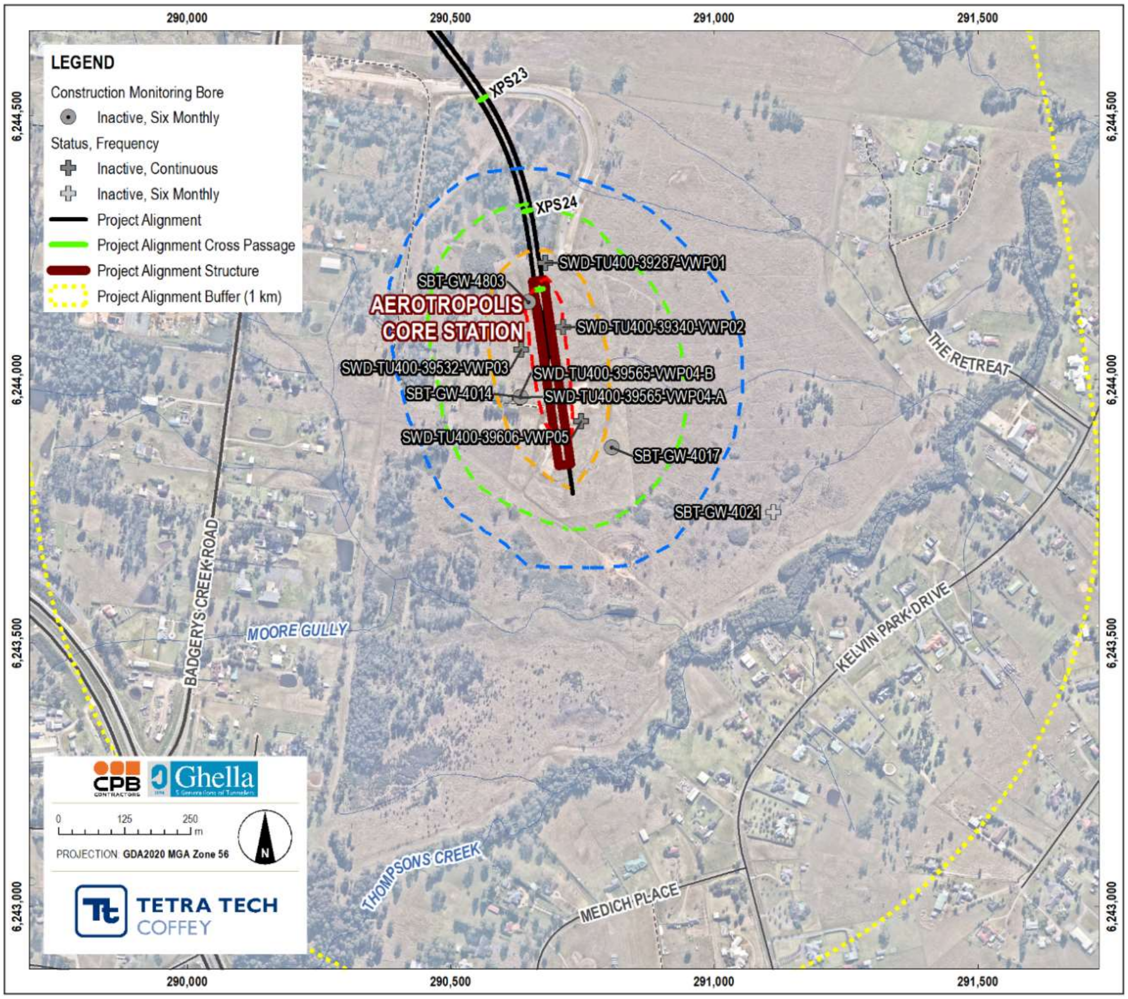

Figure 2-4: Construction groundwater monitoring program – Aerotropolis Core Station

2.2 Methodology

The groundwater monitoring methodology implemented during the SBT Works is detailed in the GMP and summarised below. Specifically, this methodology provides an approach for collection and assessment of:

- Groundwater level as metres below the top of casing (mBTOC) groundwater and Australian Height Datum (mAHD) (as manual measurements and automated datalogger download)
- Groundwater salinity as electrical conductivity (EC) (field measurement and EC datalogger download)
- Groundwater quality at key locations (field measurement and sample collection for laboratory analysis)

The methodology also provides quality assurance/quality control procedures for collecting and managing environmental datasets.

The groundwater sampling methodology has been developed for compliance with the following Australian and International Standards and Guidance:

- AS/NZS 5667.11:1998: Water Quality – Sampling Part 11: Guidance on Sampling of Groundwaters (Reconfirmed 2016)
- AS/NZS 5667.1:1998: Water Quality – Sampling Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples (Reconfirmed 2016)
- Sundaram et al (2009) Groundwater Sampling and Analysis – A Field Guide. Geoscience Australia.

With the exception of mitigation monitoring (as outlined in Section 2.5) all groundwater monitoring was undertaken by CPBG personnel. Data portal access, or a summary of field and laboratory data, was provided to Tetra Tech for reporting and comparison with triggers.

2.3 Groundwater Levels

2.3.1 Grouted Vibrating Wire Piezometers (VWPs)

Grouted VWPs were installed at 45 locations by CPBG as shown in Figures 2-1 to 2-4, and summarised in Table 2-1. The majority of VWPs have been handed over to PLM (shown in grey in Table 2-1), with 17 instruments monitored by CPBG during a portion of the current monitoring period. Key VWPs with level triggers are summarised in Table 4-2, noting that some locations monitored for design purposes do not have triggers.

Telemetered monitoring of groundwater level data for VWPs was hosted on CPBG's SensGrid portal, which has now been closed down as no further monitoring by CPBG is required.

Three on-airport locations were to be monitored for levels by SBT during the monitoring period; SWD-TU351-35209-VWP01, SWD-TU351-35240-VWP02 and SBT-GW-4000.

Groundwater level results from 29th June to 31st December 2024 are summarised and compared to triggers in Section 5.1, and graphically shown in Annexure C.

2.3.2 Continuous electrical conductivity/groundwater level monitoring

Continuous EC and groundwater level data was initially logged at six locations during the construction phase to assess potential risks to groundwater dependent ecosystems (GDEs). Two of the six locations listed in the GMP remained under CPBG control for the current monitoring period; SBT-GW-1805 and SBT-GW-1028, with PLM now responsible for monitoring at the other four locations. Note that SBT-GW-1028 was only accessed once for sampling in the current monitoring round as it is in asbestos exclusion zone, with levels monitored using co-located VWPs (SWD-TU100-20071-VWP07-A).

GDE monitoring well details and triggers, including their current monitoring status for this reporting period are provided in Section 4.2, with results and comparison to triggers in Section 5.1 and Section 5.2.

Graphs displaying all results and triggers for the two GDE monitoring locations are provided in Annexure D.

2.3.3 Manual Groundwater Levels

Manual gauging to measure groundwater levels was undertaken on groundwater monitoring bores prior to sampling for groundwater quality.

Gauging was conducted using an electronic groundwater level interface meter from a known (surveyed) point at the top of the bore casing. Measurements were recorded to the nearest millimetre (mm) and recorded as mBTOC. Where survey data is available, the groundwater level data has been corrected to mAHD.

A summary of all available manual gauging data to date for the selected monitoring wells can be found with the groundwater quality results in the tables in Annexure A.

Table 2-1: Groundwater level monitoring network summary

Area	Location ID	Status June 2024 - Dec 2024
St Marys	SWD-TU100-17275-VWP01-A	Handed over to PLM
St Marys	SWD-TU100-17275-VWP01-B	Handed over to PLM
St Marys	SWD-TU100-17443-VWP03-A	Handed over to PLM
St Marys	SWD-TU100-17443-VWP03-B	Handed over to PLM
St Marys	SWD-TU100-17720-VWP04	Handed over to PLM
TBM Tunnel - South Creek	SMGW-BH-A105S	CPBG (data to September 2024)
TBM Tunnel – South Creek	SMGW-BH-A107	CPBG (data to September 2024) To monitor construction of XP N9 - completed 13 August 2024
TBM Tunnel – South Creek	SBT-GW-1804	CPBG (data to September 2024) To monitor construction of XP N10 - completed 17 July 2024
Claremont Meadows	SBT-GW-1805	CPBG (data to September 2024, with construction completed in September 2023)
Claremont Meadows	SWD-TU100-19957-VWP05-01	CPBG
Claremont Meadows	SWD-TU100-19957-VWP05-02	CPBG
Claremont Meadows	SWD-TU100-19957-VWP05-03	CPBG
Claremont Meadows	SWD-TU100-19992-VWP06-01	CPBG
Claremont Meadows	SWD-TU100-19992-VWP06-02	CPBG
Claremont Meadows	SWD-TU100-19992-VWP06-03	CPBG
Claremont Meadows	SWD-TU100-20071-VWP07-A	CPBG (co-located with SBT-GW-1028)
Claremont Meadows	SWD-TU100-20071-VWP07-B	CPBG (co-located with SBT-GW-1028)
Orchard Hills	SWD-TU150-21965-VWP01-A	CPBG (potentially lost)
Orchard Hills	SWD-TU150-21965-VWP01-B	CPBG (potentially lost)
Orchard Hills	SWD-TU150-22010-VWP02	CPBG
Orchard Hills	SWD-TU150-22115-VWP03	CPBG
Orchard Hills	SWD-TU150-22193-VWP05-A	Handed over to PLM
Orchard Hills	SWD-TU150-22193-VWP05-B	Handed over to PLM
Orchard Hills	SWD-TU150-22205-VWP06	Handed over to PLM
Orchard Hills	SWD-TU150-22333-VWP07	Handed over to PLM

Area	Location ID	Status June 2024 - Dec 2024
Airport Portal	SWD-TU300-33565-VWP02	Handed over to PLM
Airport Terminal	ABP-TD300-VWP03	Handed over to PLM
Airport Terminal	ABP-TD300-VWP02	Handed over to PLM
Airport Terminal	ABP-TD300-VWP01	Handed over to PLM
Airport Terminal	ABP-TD300-VWP04	Handed over to PLM
Portal / Cross passage XPS01	SBT-GW-3003-A	Handed over to PLM
Portal / Cross passage XPS01	SBT-GW-3003-B	Handed over to PLM
Portal / Cross passage XPS01	SBT-GW-3003-C	Handed over to PLM
Airport Terminal	SBT-GW-3006	Handed over to PLM
Airport Terminal	ATL-SN350-VWP01-01	Handed over to PLM
Airport Terminal	ATL-SN350-VWP01-02	Handed over to PLM
Airport Terminal	ATL-SN350-VWP01-03	Handed over to PLM
Airport Terminal	ATL-SN350-VWP01-04	Handed over to PLM
Airport Terminal	SWD-TU300-34874-VWP03-01	Handed over to PLM
Airport Terminal	SWD-TU300-34874-VWP03-02	Handed over to PLM
Airport Terminal	SWD-TU300-34874-VWP03-03	Handed over to PLM
Airport Terminal	SWD-TU300-34874-VWP03-04	Handed over to PLM
Airport Terminal	SWD-TU300-34893-VWP04-04	Handed over to PLM
Airport Terminal	SWD-TU300-34893-VWP04-03	Handed over to PLM
Airport Terminal	SWD-TU300-34893-VWP04-02	Handed over to PLM
Airport Terminal	SWD-TU300-34893-VWP04-01	Handed over to PLM
Airport Terminal Temp Shaft	SWD-TU351-35209-VWP01 [1]	CPBG
Airport Terminal Temp Shaft	SWD-TU351-35240-VWP02 [1]	CPBG
Western Sydney Airport	SBT-GW-4000	CPBG (data to September 2024) To monitor construction of XP S13 - completed 3 July 2024
Bringelly SF	SWD-TU351-37371-VWP04	CPBG
Bringelly SF	SWD-TU351-37377-VWP05	CPBG
Bringelly SF	SWD-TU351-37471-VWP06	CPBG
Aerotropolis	SBT-GW-4008	CPBG To monitor construction of XP S20 - completed by 20 August 2024
Aerotropolis	SBT-GW-4010	CPBG

Area	Location ID	Status June 2024 - Dec 2024
		To monitor construction of XP S21 and XP S22 – completed by 2 September 2024
Aerotropolis	SWD-TU400-39287-VWP01	Handed over to PLM
Aerotropolis	SWD-TU400-39340-VWP02	Handed over to PLM
Aerotropolis	SBT-GW-4021	Handed over to PLM

1. Purpose of monitoring asses is wall design where drawdown is not the critical design case

2.4 Groundwater Quality

A summary of the groundwater monitoring well network is provided in Table 2-2, detailing the location, required monitoring frequency and laboratory analytical suite. Generally, the frequency of water quality monitoring along the alignment has been six monthly. The frequency has changed to monthly at some locations prior to, during and after cross passage construction.

A summary of the well status for this current monitoring period is included in the table below, including wells that are no longer controlled by CPBG as responsibility for the areas have been handed over to the SSTOM contractor (PLM) as outlined Section 1.2. Monitoring locations handed over to PLM are shaded in grey. The status also includes if wells still within CPBGs control were damaged, destroyed or inaccessible.

Four on-airport locations were to be monitored for water quality in the current monitoring period: SBT-GW-4000 (during XP-S13 construction, SMGW-BH-C320, SMGW-BH-C321, SMGW-BH-C330.

The analysis for construction monitoring in addition to the basic analytical suite for groundwater quality are also provided in Table 2-2.

Table 2-2: Construction water quality monitoring Wells – frequency, water quality analysis and level/EC monitoring

Location ID	Monitoring Zone	Status for Jul 2024 – Dec 2024 Monitoring Period	Aquifer	TOC mAHD	Water quality sampling frequency	Base analytical Suite	Additional analytes
MW1	St Marys	CPBG	Residual	*NK*	Six Monthly (monthly for VOCs when TBM beneath area, refer Section 2.5)	✓	VOCs, PFAS
SBT-GW-1001	St Marys	Handed to PLM	Residual/ Bedrock	48.8	Six Monthly	✓	
SBT-GW-1002	St Marys	Handed to PLM	Residual/ Bedrock	42.6	Six Monthly	✓	
SBT-GW-1005	St Marys	Handed to PLM	Residual/ Bedrock	44.2	Six Monthly	✓	
SBT-GW-1016	St Marys	Handed to PLM	Residual/ Bedrock	36.1	Six Monthly	✓	TPH/BTEXN, PFAS
SBT-GW-1017	St Marys	Handed to PLM	Residual/ Bedrock	32.5	Six Monthly	✓	TPH/BTEXN, PFAS
SBT-GW-1019R	St Marys	Decommissioned [2]	Bedrock	35.2	Six Monthly	✓	VOCs, PFAS
SBT-GW-1021	St Marys	Handed to PLM	Residual/ Bedrock	33.9	Six Monthly	✓	Phenols
SMGW-BH-A360	St Marys (XP-N2)	CPBG	Bedrock	33.3	As required [1,2,3]	✓	VOCs, PFAS
SBT-GW-1803	St Marys	Handed to PLM	Bedrock	47.6	Six Monthly	✓	
SMGW-BH-A401	St Marys	Handed to PLM	Residual/Bedrock	36.5	Six Monthly	✓	TPH/BTEXN, PFAS
SMGW-GW02	St Marys	Handed to PLM	Residual	35.4	Six monthly	-	VOC, PFAS
SBT-GW-1804	TBM Tunnel (XP-N10) - South Creek	CPBG	Residual	21	As required [1]	✓	
SMGW-BH-A107	TBM Tunnel (XP-N9) - South Creek	CPBG	Bedrock	22.5	As required [1]	✓	
SBT-GW-1030	Cross passage / Tunnel (XPN13)	CPBG - XPN13 completed 27 June 2024	Residual/Bedrock	36.8	As required [1]	✓	PFAS
SBT-GW-1031	Cross passage / Tunnel (XPN14)	CPBG- XPN14 completed 17 June 2024	Bedrock	40.8	As required [1]	✓	
SBT-GW-1024	Claremont Meadows SF	CPBG	Alluvium/Bedrock	28.5	Six Monthly	✓	TPH/BTEXN, PFAS
SBT-GW-1805	Claremont Meadows SF	CPBG	Residual	27.3	Six Monthly	✓	

Location ID	Monitoring Zone	Status for Jul 2024 – Dec 2024 Monitoring Period	Aquifer	TOC mAHD	Water quality sampling frequency	Base analytical Suite	Additional analytes
SBT-GW-1806	Orchard Hills	Handed to PLM	Bedrock	43	Six Monthly	✓	TPH/BTEXN
SBT-GW-1807	Orchard Hills	Handed to PLM	Bedrock	37.5	Six Monthly	✓	
SBT-GW-1808	Orchard Hills	Handed to PLM	Residual	37.5	Six Monthly	✓	
SMGW-BH-A315	Orchard Hills	Handed to PLM	Residual/Bedrock	42.3	Six Monthly	✓	TPH/BTEXN, PFAS
SBT-GW-1042	Orchard Hills	Handed to PLM	Alluvium	40.1	Six Monthly	✓	
SBT-GW-1048	Orchard Hills	Handed to PLM	Alluvium/Bedrock	39.6	Six Monthly	✓	
SBT-GW-3003-A	Portal / Cross passage XPS01	Handed to PLM	Bedrock	67.7	Six Monthly	✓	
SBT-GW-3003-B	Portal / Cross passage XPS01	Handed to PLM	Bedrock	67.4	Six Monthly	✓	
SBT-GW-3003-C[3]	Portal / Cross passage XPS01	Handed to PLM	Bedrock	67.3	Six Monthly	✓	
SBT-GW-3006	Airport Terminal	Handed to PLM	Bedrock	84.3	Six monthly	✓	
SBT-GW-3012-A	Airport Terminal	Handed to PLM	Bedrock	84	Six Monthly	✓	
SBT-GW-3012-B	Airport Terminal	Handed to PLM	Bedrock	83.9	Six Monthly	✓	TPH
SBT-GW-3012-C	Airport Terminal	Handed to PLM	Bedrock	83.8	Six Monthly	✓	
SBT-GW-3022	Airport Terminal	Handed to PLM	Bedrock	77.8	Six Monthly	✓	TPH
SBT-GW-4000	Western Sydney Airport (XP-S13)	CPBG	Bedrock	72.2	As required [1]	✓	TPH/BTEXN
SMGW-BH-C320	Western Sydney Airport	CPBG	Residual/Bedrock	66.5	Six Monthly	✓	TPH/BTEXN, PFAS
SMGW-BH-C321	Western Sydney Airport	CPBG	Residual/Bedrock	63.5	Six Monthly	✓	
SMGW-BH-C330	Western Sydney Airport	CPBG	Bedrock	69.4	Six Monthly	✓	
SBT-GW-4003	Bringelly SF	CPBG	Residual/Bedrock	71.9	Six Monthly	✓	TPH/BTEXN, PFAS
SBT-GW-4005	Bringelly SF	CPBG. Dry well, no sample collected.	Bedrock	73.6	Six Monthly	✓	

Location ID	Monitoring Zone	Status for Jul 2024 – Dec 2024 Monitoring Period	Aquifer	TOC mAHD	Water quality sampling frequency	Base analytical Suite	Additional analytes
SBT-GW-4800	Bringelly SF	CPBG	Residual/ Bedrock	71.432	Six Monthly	✓	
SBT-GW-4801	Bringelly SF	CPBG	Residual/ Bedrock	71.372	Six Monthly	✓	
SBT-GW-4802	Bringelly SF	CPBG	Bedrock	74.348	Six Monthly	✓	
SBT-GW-4008	Aerotropolis (XP-S20)	CPBG	Bedrock	78.3	As required [1]	✓	
SBT-GW-4010	Aerotropolis (XP-S21 and XP-S22)	CPBG. Dry well, no sample collected. Site handed over 30 August 2024	Bedrock	78.8	As required [1]	✓	
SBT-GW-4014	Aerotropolis	Handed to PLM	Residual/Bedrock	73.9	Six Monthly	✓	PFAS
SBT-GW-4017	Aerotropolis	Handed to PLM	Residual	71.3	Six Monthly	✓	TPH/BTEXN, PFAS
SBT-GW-4021	Aerotropolis	Handed to PLM	Alluvium/Bedrock	62.8	Six Monthly	✓	
SBT-GW-4803	Aerotropolis	Handed to PLM	Bedrock	72.7	Six Monthly	✓	

Note: *Italic* denotes bore detail unknown as not installed by CPBG
Grey denotes monitoring locations handed over to PLM

1. Monthly sampling during cross passage construction
2. Well decommissioned April 2024 due to being located within 3m of the northern tunnel alignment
3. Existing well SMGW-BH-A360 replaced SBT-GW-1022 for monitoring during XP 2N construction. No baseline water quality data, first sampled on 1 May 2024 prior to XP construction commencing.

2.4.1 Sampling procedure

All groundwater quality monitoring was undertaken by CPBG trained personnel, and is understood to have been completed in accordance with the methodology detailed in Section 7.4 of the GMP.

Prior to collecting groundwater samples for water quality analysis, groundwater levels were manually gauged (data included in Table 2, Annexure A).

Groundwater samples were collected using the Hydrasleeve™ method. A Hydrasleeve captures a core of water, typically 1 litre, from the screened interval of the well. The Hydrasleeve™ is deployed to a target depth based on screened interval and the rationale for sampling, and is left until conditions within the well are considered likely to have stabilised. The time to stabilisation depends on the transmissivity of the aquifer, with more transmissive aquifer stabilising more rapidly. It is understood that the methodology provided in the GMP was followed by CPBG, with the hydrasleeves allowed a minimum of five days to stabilise given most of the wells are screened within the bedrock aquifer that would have a relatively low transmissivity.

The Hydrasleeve™ remains empty in the well until the time of sample collection when it is pulled up through the sampling interval, opening the sleeve to collect the column of water, and seals once full. Therefore, only groundwater from the target depth interval is sampled.

Groundwater field testing, sampling and analysis was carried out at monitoring wells as specified in Appendix A of the GMP and Table 2-2 of this report, where sampling locations were accessible and not dry.

Groundwater samples were collected from the Hydrasleeve™ in appropriate laboratory-supplied bottles and sent to a National Association of Testing Authorities (NATA) accredited laboratory for analysis under Chain of Custody (COC) procedures. The laboratory analytical suites are outlined in Table 2-3 below.

Table 2-3: Analytical schedule for monitoring bores

Program	Analysis suites
Construction Monitoring - Base Analytical Suite	General indicators (pH, EC, TDS)
	TOC
	Major cations (calcium, magnesium, sodium, potassium)
	Major anions (chloride, sulphate) and speciated alkalinity (bicarbonate, carbonate, hydroxide)
	Dissolved metals (aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, zinc) and Total metals (aluminium, cobalt, iron, manganese)
	Nutrients (ammonia, nitrate, nitrite, total kjeldahl nitrogen, total nitrogen, total phosphorous, reactive phosphorous)
Additional analytes – included for select wells where compounds were detected and/or exceeded adopted criteria in the Baseline Assessment (refer Table 2-2 for relevant wells)	Total Recoverable Hydrocarbons (TRH)
	Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene (BTEXN)
	Volatile Organic Compounds (VOCs)
	Phenols
	Per- and Polyfluoroalkyl Substances (PFAS) (short suite)

2.4.2 Quality assurance and quality control

Quality assurance (QA) and quality control (QC) measures implemented during sampling and field data collection to ensure data integrity are detailed in Section 7 of the GMP. The measures outlined in the GMP included:

- Using NATA accredited laboratories for sample analysis;
- Using Chain of Custody (CoC) procedures between sample collection in the field and subsequent reception of the sample by the laboratory. CoC documentation included the sample type and code, analysis required, collection data, sampler and sample receiver(s);
- Implementing appropriate sample handling and storage protocols, including using laboratory supplied containers, keeping samples chilled during storage and transport, and ensuring samples are received in good condition within specified holding times by the laboratory;
- Adopting a consistent program of quality control sampling for fieldwork, including:
    - Collection of duplicate and triplicate samples at an average frequency of one sample per twenty primary samples (an overall ratio of 1:10 where PFAS sampled in accordance with NEMP 2.0);
    - Collection of rinsate blanks to measure the effectiveness of decontamination procedures; and
    - Collection of trip blanks to assess the adequacy of sample storage and transport procedures in preventing cross contamination.

As detailed in Section 7.10 of the GMP, a data validation assessment was completed for samples collected during groundwater monitoring up to 31st December 2024, and is provided in Annexure F.

2.4.3 Documentation of field results

CPBG protocols were applied during field works. Field forms are reported by CPBG to have included the following detail:

- Bore location and condition;
- Summary of climatic setting including weather;
- Type of equipment used and equipment serial numbers/calibration certificates;
- Method of sampling (Hydrasleeve deployment and retrieval dates);
- Details of the sampler;
- Field parameters, groundwater level, odour, colour and any other observations made during sampling; and
- Date and time of sampling.

A summary of field monitoring and sampling results provided by CPBG is included in Table 2, Annexure A. Field forms provided by CPBG are attached in Annexure H.

2.5 Mitigation monitoring – St Marys

Groundwater contaminated with chlorinated hydrocarbons from a former dry cleaner located at 1-7 Queen St, St Marys has been identified approximately 200m west of the St Marys Station Box. Construction related dewatering during station box construction was predicted to draw down groundwater in the vicinity, reversing the existing westerly groundwater flow direction, potentially drawing the contamination toward the excavation (Tetra Tech 2023b).

A permeable reactive barrier (PRB) was installed in May 2023 to intercept potential migration of chlorinated hydrocarbons in groundwater due to construction associated drawdown. Given the potential for unacceptable vapour inhalation or direct contact risk, mitigation monitoring has been implemented to assess conditions, and identify if contingency mitigations need to be implemented before an unacceptable risk occurs.

In addition to monitoring for potential contaminant mobilisation due to station construction, a weekly monitoring program was implemented on behalf of Sydney Metro until TBM breakthrough at St Marys Station Box to assess conditions in the vicinity of the source area as TBMs passed through the area.

The TBM monitoring included weekly sampling of groundwater in the vicinity of the former dry cleaner at 1-7 Queen Street from April 2024 (reported in Tetra Tech 2024a) until four weeks after TBM-2 passed through the area, with the final sampling event on 12 July 2024.

The TBMs are pressurised, therefore PRB mitigation monitoring wells within 3m of the tunnels were decommissioned prior to the TBMs passing through the area, as the wells potentially provided a pathway to the surface which would result in depressurisation. The mitigation monitoring program was revised as many monitoring wells were decommissioned (Tetra Tech 2024a).

The purpose of the mitigation monitoring is to:

- Monitor the effectiveness of the PRB;
- Identify if an adverse change in risk profile is likely which requires contingency mitigation measures to be implemented as outlined in the Remediation Action Plan (RAP, Tetra Tech 2023c). This was to be assessed if detectable concentrations of chlorinated ethenes were reported between the station and the PRB, and concentrations exceeding the trigger values are predicted to reach the excavation before sealing occurs; and
- Assess potential impacts of tunnelling beneath the suspected source area on chlorinated hydrocarbon concentrations and trends in groundwater at the rear of the former dry cleaner.

Details of the mitigation monitoring program are provided in Section 6.3.1 of the GMP, with amendments made to the program between December 2023 and July 2024 included in the Monthly Mitigation Monitoring Report for July 2024 (provided as Annexure G).

As detailed in Section 1.2, the TBMs broke through at St Marys Station Box in May (TBM-1) and 20 June 2024 (TBM-2), with the final TBM monitoring event on 12 July 2024, which is reported in the July 2024 monitoring report.

Monitoring wells included in the mitigation monitoring network both before and after well decommissioning in April 2024 are shown on Figure 2-5, with details in Table 2-4 (PRB Monitoring) and Table 2-5 (Source/TBM Monitoring). Sampling was undertaken by Tetra Tech as detailed in Annexure G.

The final PRB Monthly Mitigation Report for December 2024, which details conditions when the monitoring program was handed over to PLM on 6th December 2024, is also provided in Annexure G.

Table 2-1: PRB mitigation monitoring – July 2024 to December 2024

Monitoring Well	Monitoring frequency	Analytes	Trigger Value and Contingency Plan
SBT-GW-0001 **SBT-GW-0001b**	Fortnightly	Volatile chlorinated hydro-carbons	**Trigger Values:** PCE 0.3mg/L TCE 0.055mg/L cis 1,2 DCE 0.25mg/L VC 0.2mg/L Refer HHRA (Tetra Tech 2023b) for determination of trigger values **Contingency Plan**: Refer to Section 11.6 of the RAP (Tetra Tech 2023c)
SBT-GW-1012 [1] SBT-GW-1013 [1] SBT-GW-1014 [1]	Fortnightly		
SBT-GW-1347a [2] SBT-GW-1347b [2] **SBT-GW-1347c [2]** SBT-GW-1348a [2] SBT-GW-1348b [2] SBT-GW-1348c [2]	Fortnightly for 'c' interval wells (at ~18mAHD) *If contingency mitigation implemented, then all multi-level wells monitored weekly*		

1. SBT-GW-1012, SBT-GW-1013 and SBT-GW-1014 were screened from the pre-construction water table to 20mAHD with a saturated interval of 12m. Three hydrasleeves placed in each well at 30mAHD, 27mAHD and 24mAHD.

2. SBT-GW-1347a, SBT-GW-1347b, SBT-GW-1347c, SBT-GW-1348a, SBT-GW-1348b, SBT-GW-1348c are multi-level groundwater wells, with details provided in Table A1 of Annexure G.

Bold indicates well sampled from April 2024 onward when other wells decommissioned. All other monitoring wells were decommissioned prior to TBMs passing through area, and were not sampled in the current monitoring period

Table 2-2: Source Area/TBM monitoring – March 2024 to 12 July 2024

Monitoring Well	Monitoring frequency	Analytes	Assessment
MW1 **MW2** SBT-GW-1019_R SBT-GW-1020 **SMGW-GW02**	Weekly from mid-March to four weeks after TBM-2 reaches St Marys Station	Volatile chlorinated hydro-carbons	Comparison to previous concentration ranges for PCE, TCE, cis 1,2 DCE and vinyl chloride, and trends over TBM monitoring period

Bold indicates wells to be sampled from March 2024 to 12 July 2024. Other monitoring wells were decommissioned prior to TBM passing through area.

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Ongoing mitigation monitoring
- PRB monitoring well - To be decommissioned
- TBM monitoring well - To be decommissioned
- PRB injection well - To be decomissioned
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Railway
- Minor Road
- Path
- STM Site Boundary
- Cadastral Boundary

NOTE
SBT-GW-1347b has been decommissioned.

SOURCE
Mitigation Monitoring Wells, PRB Wells and boundary from Tetra Tech Coffey.
Existing investigations, site layout, station box and alignment supplied by CPBG.
Cadastre from DFSI.
Aerial imagery from Nearmap (capture date 30-03-2023).

N

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CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 2

Ongoing Mitigation Monitoring Wells – St Marys

TETRA TECH COFFEY

DATE: 01.07.24 PROJECT: 754-SYDGE292575 FILE: 292575_RAP_F002_GIS

SAVED BY: MATTHEW.GOLJANIN 01.07.24 10:44 AM

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3 Compliance review

A review of groundwater monitoring activities completed between 29th June 2024 and 31st December 2024 indicated that monitoring was generally in line with the requirements of construction monitoring as outlined in the GMP. During the current reporting period, a number of SBT work areas were handed over to the SSTOM contractor (PLM). Monitoring locations sampled by CPBG to monitor the extent and nature of potential impacts to groundwater during the SBT works are detailed in Section 2 above. Deviations from the GMP are summarised in Table 3-1.

3.1 Groundwater levels and GDE

Table 3-1: Variation from Water Quality Sampling Plan and Groundwater Level and EC monitoring plan in GMP

Location ID [1]	Monitoring Zone	Reason for being not monitored	Action to be taken
Groundwater Quality Monitoring Well			
SMGW-BH-A360	St Marys (XPN 02)	MW01 instead mistakenly sampled	Well gauged and field water quality parameters collected on 25 March 2025. Sample to be collected for lab analysis on 11 April 2025 to confirm conditions post cross passage construction.
SBT-GW-1030	Cross passage / Tunnel (XPN13)	Well destroyed	None. Cross passage completed by June 2024
SMGW-BH-C321	Western Sydney Airport	Not sampled	
SBT-GW-4005	Bringelly SF	Dry well at time of sampling, no sample able to be collected.	Data from VWP SWD-TU351-37471-VWP06 nearby instead used to assess water levels. SBT-GW-4005 also gauged on 21 January 2025, confirming water present but unable to be sampled as hydrasleeve torn.
SBT-GW-4010	Aerotropolis - Bringelly	Well dry at time of sampling	Sample collected in August 2024 as water in hydrasleeve.
GDE Monitoring Well – EC and GW Levels			
SBT-GW-1028	Claremont Meadows	Continuous data not able to be collected as logger was damaged.	Manually gauged water levels and field readings of EC were collected in September 2024. Data from nearby VWP SWD-TU100-20071-VWP07-A and B was also used to assess groundwater levels.
Vibrating Wire Piezometers (VWPs)			
SWD-TU351-35209-VWP01	Airport Terminal	Destroyed	For wall design with excavation finished in August 2023
SWD-TU351-35240-VWP02	Airport Terminal	Destroyed	For wall design with excavation finished in August 2023
SWD-TU150-21965-VWP01-A	Orchard Hills	Destroyed	
SWD-TU150-22010-VWP02	Orchard Hills	No data in current monitoring period	Risk to GDEs assessed via ecological survey (discussed in Section 5.1.1.2 with report provided in Annexure I.)

During the previous and current reporting period the logger in SBT-GW-1028, which automatically monitors groundwater level and EC, had been damaged. The level when manually gauged on 17 September 2024, in conjunction with level data from nearby VWP SWD-TU100-20071-VWP07-A and B, has been used to assess groundwater levels in the area (refer to Annexure C).

As noted in Section 6.4.1 of the GMP, preliminary SSTVs were developed following completion of baseline groundwater level and quality monitoring. No baseline EC or preliminary EC SSTV were able to be established at SBT-GW-1028 as the well was unable to be located during baseline monitoring. The well was subsequently located and field readings of EC collected, with EC SSTV established based on a rolling mean following the collection of three samples in early 2024. Further discussion provided in Section 5.2.

SBT-GW-4005 and SBT-GW-4010 were dry and unable to be sampled. Groundwater level data obtained from nearby SWD-TU351-37471-VWP06 was used to assess groundwater levels in the vicinity of SBT-GW-4005 (refer to Annexure C). SBT-GW-4005 was able to be gauged in January 2025 with a depth to water of 13.89m (59.7 mAHD), indicating that groundwater levels had recovered at least ~6m, but were still ~8m below preconstruction levels.

Data was not available from a number of VWP for the current monitoring period. Dates for which data was available for review are summarised in Table 4-2.

3.2 Groundwater quality

The groundwater sampling compliance and quality control assessment is presented in the Quality Assurance Report in Annexure F. Recommendations from the assessment are included in section 7.2.
Overall, the percentage of issues identified in the quality assessment (2.9%) indicates that the dataset is acceptable, and of appropriate quality for use.

4 Performance Criteria

4.1 Groundwater Level Triggers

Groundwater trigger levels developed to manage potential impacts associated with drawdown propagation during construction are summarised in Table 4-2.

The trigger levels were based on the modelled response (Project-wide groundwater modelling report, Tetra Tech (2023a) Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040402) to identify where there were exceedances of the predicted drawdown.

Groundwater level during construction were compared to trigger values, with the triggers assessed and revised as the groundwater response to excavation and construction activities was better understood.

Groundwater level monitoring locations handed over to PLM before the current monitoring period commenced are shown in grey in Table 2-5 and are not included in this report as they are now the responsibility of PLM.

A traffic light system has been adopted based on baseline groundwater conditions, and anticipated groundwater level drawdown from the works, with Table 4-1 summarising proposed actions when the specific trigger level is activated for wells remaining under SBT's control.

Table 4-1: Traffic light trigger level system

Trigger level	Action
Green	Groundwater levels observed are within the target / green trigger level range and require no additional action.
Amber	• Investigation to the possible reason for the drawdown or drawdown trend. • Possible increase in monitoring frequency to confirm trend. • Checks on instrumentation / monitoring equipment. • Consideration for need of application of mitigation (i.e. targeted recharge) where drawdown is not found to be a seasonal variation, and is identified to be due to Project activities.
Red	• Investigation to the possible reason for the drawdown or drawdown trend. • Increase in monitoring frequency to confirm trend. • Changes to groundwater level management where trend is deemed to be a function of the Project activities. May include implementation of localised recharge or other hydraulic control.

Table 4-2: Groundwater trigger levels in wells monitored by SBT

Area	Location ID	Status for July to December 2024 Monitoring Period	Monitoring bore screen / VWP sensor elevation (m AHD)	Pre-development groundwater level range (mAHD)	Trigger levels based on anticipated groundwater level at completion of excavation and tunnelling		
					Green Trigger (m AHD)	Amber Trigger (m AHD)	Red Trigger (m AHD)
TBM Tunnel - South Creek	SMGW-BH-A105S	Data available to 17 September 2024	14.6 to 20.6	19 to 19.8	18.9	18.4	17.9
TBM Tunnel - South Creek	SMGW-BH-A107	Data available to 17 September 2024	-4.44 to 3.46	20.9 to 21.6	20.8	20.3	19.8
TBM Tunnel - South Creek	SBT-GW-1804	Data available to 17 September 2024	16.0 to 19.0	18.7 to 19	18.5	18.0	17.5
Claremont Meadows SF	SBT-GW-1805	Data available to 17 September 2024	18.3 to 24.3	24.7 to 25.6	21.5	21.0	20.5
Claremont Meadows	SWD-TU100-19992-VWP06-01	Data available to 30 July 2024	5.998	20.2 to 25	Note 1		
Claremont Meadows	SWD-TU100-19992-VWP06-02	Data available to 30 July 2024	11	20.2 to 25	Note 1		
Claremont Meadows	SWD-TU100-19992-VWP06-03	Data available to 30 July 2024	17.5	20.6 to 25	Note 1		
Claremont Meadows	SWD-TU100-20071-VWP07-A	Data available to 1 November 2024	2.813	26.9 to 27	25.4	24.9	24.4
Claremont Meadows	SWD-TU100-20071-VWP07-B	Data available to 25 July 2024	7.813	27.1 to 27.3	25.6	25.1	24.6
Claremont Meadows	SBT-GW-1028	Logger not functional, levels in area assessed using SWD-TU100-20071-VWP07-A and B	22.5 to 27.5	26.7 to 26.5	25.2	24.7	24.2
Orchard Hills	SWD-TU150-22010-VWP02	Data available to 26 June 2024	22.81	33.8 to 35.3	31.5	31.0	30.5
Orchard Hills	SWD-TU150-22115-VWP03	No data since October 2023 when levels were stable at 28mAHD	23.582	35.2 to 37.6	Note 1		
Western Sydney Airport	SBT-GW-4000	Data available to 17 September 2024	59.2 to 69.7	70.5 to 70.9	70.5	70.0	69.5
Bringelly SF	SWD-TU351-37371-VWP04	Data available to May 2024	50.313	62.5 to 67.1	50.6	50.1	49.6
Bringelly SF	SWD-TU351-37377-VWP05	Data available to 28 May 2024	52.53	64.5 to 67.2	56.0	55.5	55.0
Bringelly SF	SWD-TU351-37471-VWP06	Data available to 7 February 2024	52.516	67.6 to 68	62.5	62.0	61.5
Aerotropolis	SBT-GW-4008	Manual gauging on 23-08-24 and 16-09-24	50.3 to 56.3	72 to 72.2	71.8	71.3	70.8
Aerotropolis	SBT-GW-4010	Data available to 17 September 2024	62 to 68	73.3 to 73.8	73.0	72.5	72.0

Note 1: Purpose of monitoring asset is wall design where drawdown is not the critical design case.

4.2 GDE Trigger Values

Site specific trigger values (SSTVs) were established using baseline data in key wells in the vicinity of GDEs to identify potential changes in risks to GDE health by altered groundwater quality and levels.

SSTVs for EC and groundwater level, as detailed in the GMP, are listed in Table 4-3 and 4-4 below. Groundwater level related SSTVs are equivalent to the amber trigger level values (refer Table 4-2).

Four of the six alignment wide GDE monitoring wells, as listed in Table 6-10 of the GMP, were handed over to PLM prior to this monitoring period.

Table 4-3: SSTVs for continuous EC monitoring of GDEs

Area	Bore ID	Screened unit	Screen depth (mbgl)	Baseline EC range (µS/cm)	Preliminary EC SSTV (µS/cm)
Claremont Meadows	SBT-GW-1805	Residual	3 - 9	2,480 – 3,100	3,650
Claremont Meadows	SBT-GW-1028	Residual	3 - 6	No baseline assessment. EC in previous monitoring period ranged from 21,400 µS/cm to 27,600 µS/cm indicating groundwater is saline. EC of 26,200 µS/cm when sampled in current round.	

Table 4-4: Level SSTVs for continuous level monitoring of GDEs

Area	Bore ID	Screened unit	Screen/sensor depth (mbgl)	Baseline level range (mAHD)	Preliminary Level SSTV (mAHD) *
Claremont Meadows	SBT-GW-1805	Residual	3 - 9	24.7 - 25.6	21.5
Claremont Meadows	SBT-GW-1028[1]	Residual	3 - 6	26.5 – 26.7	24.7
Orchard Hills	SWD-TU150-22010-VWP02	Bedrock	16 (VWP)	33.8 – 35.3	31.0

* Based on Amber Trigger Level as presented in Table 4-2

1. Based on assessment of levels in nearby VWP SWD-TU100-20071-VWP07-A and B

The GMP requires that EC and groundwater level data be downloaded monthly and assessed against the SSTVs to identify where conditions are not as expected and where they may pose a risk to GDEs.

The SSTVs will provide an indication of a potential change in salinity, with a management response to be initiated if any of the following occurs:

- EC data continuously exceeds the SSTV over a period of three months and displays a rising trend; or
- EC data exceeds the SSTV at any time by more than 150%.

If one or both of the above EC triggers are observed, a review will be initiated to determine the significance of the exceedance(s) and possible causes, including a review to assess the historical and surrounding monitoring bore data, and modelling predictions (refer to Section 7.2 of the SWMP). Where high saline areas are identified, measures such as planting, regenerating and maintaining native vegetation and good ground cover in recharge, transmission and discharge zones would be implemented where possible.

As noted in Section 6.4.1 of the GMP, a review of the monitoring program has been completed (refer Section 5.2.1) to determine the efficiency of the monitoring program for GDEs and whether any require changes.

The EC SSTVs have been refined over time as additional data has become available, and existing variability including seasonal trends and vertical stratification has been assessed.

Where groundwater levels fall below the SSTVs listed in Table 4-4 as a result of the SBT Works, the GDE mitigation measures detailed in Table 4-1 will be implemented.

The requirement for ongoing monitoring is now the responsibility of PLM.

4.3 Groundwater Quality Triggers

Site-specific groundwater quality action triggers have been developed for locations where the baseline assessment identified that groundwater contamination may be within the area predicted to be influenced by construction related drawdown. Triggers were based on where concentrations were:

- Above detect for TPH or PFAS, or
- 10 x the Environment Protection Licence (EPL) criteria for compounds of potential concern (COPCs) which typically exceed the EPL along the alignment (i.e aluminium, cadmium, copper, zinc, total nitrogen and total phosphorus)

Site specific triggers are outlined in the GMP and summarised below in Table 4-5. Triggers are based on detection of a COPC at a concentration above the baseline maximum, with action triggers set for filtered metal concentrations.

This approach acknowledges that existing groundwater conditions exceed EPL limits for a number of parameters in groundwater along the alignment. An adverse change in risk is likely to be at locations where high concentrations already exist (as reported in the baseline assessment), with the intent of the triggers to identify where conditions have significantly changed.

At select sentinel wells, and for analytes where baseline concentrations are less than 10 x the EPL but exceed the initial screening criteria (based on ANZG 2018, 95% species protection), a potential adverse change in conditions is identified by statistical trend assessment (Mann Kendall Statistic), rather than via specific action triggers. As trend analysis requires a minimum of four values, and some construction sampling locations have three or less baseline values, the analysis has been undertaken using the two most recent baseline values combined with the construction monitoring phase data.

Where a statistically increasing trend is reported, the baseline data range will be reviewed, and a trigger exceedance reported if the construction monitoring concentration is greater than 250% of the maximum historical concentration.

Where a trigger is exceeded, or a statistically increasing trend is identified for select analytes (see Table 4-5) and concentrations exceed the initial screening criteria, then an investigation will be carried out which may include:

- Further monitoring to confirm groundwater conditions (increased frequency).
- Assessment to identify if the exceedance represents an adverse change in risk profile and a remedial response is required (refer to Section 7.9.1 of the SWMP), or if the action trigger should be revised or implemented in a sentinel well or for the COPC triggered.

Where trigger exceedances are identified, and concentrations are outside the background range for groundwater along the alignment, the monitoring program will also be reviewed and updated as required (now the responsibility of PLM).

Table 4-5: Groundwater Quality Triggers relevant to current monitoring period (refer Table 2-2)

Location ID [1]	Monitoring Zone	Aluminium	Copper	Zinc	pH	Total N	Total P	Total PFAS	TRH/BTEXN	Other	COPC Trends
MW1 *	St Marys							PFOS >1.07ug/L		cis 1,2 DCE >4.7mg/L PCE >0.98mg/L VC > 0.32mg/L	✓
SBT-GW-0001 *	St Marys										✓
SBT-GW-0001B *	St Marys										✓
SMGW-BH-A360	St Marys (XP-N2)										✓
SBT-GW-1347A*	St Marys										✓
SBT-GW-1347C*	St Marys										✓
SMGW-GW02 *	St Marys							>0.2ug/L		PCE >1,900ug/L cis1,2 DCE>17ug/L	✓
SBT-GW-1804	TBM Tunnel - South Creek										✓
SMGW-BH-A107	TBM Tunnel - South Creek										✓
SBT-GW-1024	Claremont Meadows SF							>0.09ug/L	TPH C6-C9 > 2,100ug/L		
SBT-GW-1805	Claremont Meadows SF					>19.9mg/L	>6.6mg/L				
SMGW-BH-C320	Western Sydney Airport							> 0.5ug/L	Toluene > 34ug/L		
SMGW-BH-C321	Western Sydney Airport							> 0.046ug/L			
SMGW-BH-C330	Western Sydney Airport	>5,310ug/L		>1,090ug/L	pH <4.9						
SBT-GW-4000	Western Sydney Airport						>5.4mg/L		TPH >C_{10} >1,620ug/L Toluene > 46ug/L		
SBT-GW-4003	Bringelly SF								TPH C6-C9 > 20ug/L		
SBT-GW-4005	Bringelly SF							>0.01ug/L			
SBT-GW-4800	Bringelly SF						2.2mg/L				
SBT-GW-4801	Bringelly SF										✓
SBT-GW-4802	Bringelly SF										✓

Location ID [1]	Monitoring Zone	Aluminium	Copper	Zinc	pH	Total N	Total P	Total PFAS	TRH/BTEXN	Other	COPC Trends
SBT-GW-4008	Aerotropolis										✓
SBT-GW-4010	Aerotropolis										✓

* Monitored under the St Marys RAP, and reported separately in Monthly Mitigation Reports. The reports for July 2024 (end of TBM monitoring) and December 2024 (prior to handover to PLM) are provided in Annexure G.

1.Included in both Construction Monitoring Program (assessed by Triggers) and St Marys Mitigation Monitoring Program (assessed by trends)

5 Groundwater Monitoring Results

The sampling and monitoring results from the six months of construction monitoring to the 31st December 2024 are included in the following Annexures:

- Annexure A – Summary of Groundwater quality results, with full laboratory reports as provided by CPBG in Annexure B
- Annexure C – VWP hydrographs showing groundwater levels and triggers for each location
- Annexure D – Groundwater level and EC for continuous monitoring wells, with SSTVs shown for GDE monitoring locations
- Annexure E – Statistical analysis of groundwater COPC concentrations for wells with triggers based on trend analysis

All trigger exceedances identified are discussed in the following sections.

5.1 Groundwater Levels

Groundwater levels were listed for monitoring by continual telemetry at 10 grouted VWP locations during this monitoring period with six of these locations having established groundwater trigger levels. Seven standpipe bore locations also have established groundwater trigger levels, and all seven of these locations also monitoring EC concentrations. Hydrographs of groundwater levels and EC (where monitored) are provided in in Annexure C and Annexure D.

Groundwater level triggers were exceeded during the monitoring period at eight locations; four of the VWPs and four of the seven standpipes, which are discussed in Table 5-1, and graphs of levels provided in Annexure C and D.

Groundwater levels also show some decrease at most other VWP locations which do not have trigger levels (graphs also provided in Annexure C). Most locations generally showing some stabilisation of levels over time.

Table 5-1: GW Level Trigger Exceedances – current and previous monitoring period

Area	Location ID	Green Trigger Level (m AHD)	Amber Trigger Level (m AHD)	Red Trigger Level (m AHD)	Latest Reading Date	Latest Reading (m AHD)	Comments/Recommendation
Groundwater Wells monitored for EC and level during construction							
TBM Tunnel - South Creek	SMGW-BH-A105S	18.9 Minimum of 18.5	18.4	17.9	17-9-24	19.4	Exceedance of green trigger level with decreasing trend from July 2023 to mid-December 2023 and then stabilisation of levels with some fluctuation until early April 2024. Levels then increased in April 2024 above green trigger and continue to fluctuate and possibly increased to end of current monitoring period. Both TBMs advanced through the area in around mid to late April 2024 with construction of XP-N05 commencing on 29 May 2024. As such, the exceedance of the green trigger cannot be attributed to construction activities as it occurred prior to tunnelling activities commencing near this location. Groundwater levels demonstrate no clear response to the construction of XPN05 and remained above the trigger values from May 2024 to the end of the available data (September 2024). Previous exceedance not due to construction activities, XP-N05 complete. Recommendation: No further monitoring required.
TBM Tunnel - South Creek	SMGW-BH-A107	20.8	20.3	19.8	17-09-24	12.38	Groundwater levels show gradual decline from August 2023 to 31 January 2024, over which time they decreased to below the green and then amber trigger levels. On approximately 31st January 2024, groundwater levels sharply declined by around 8 meters and exceeded the red trigger level. This corresponds a period when the TBMs that were advancing through the area and were stationary and may have allowed groundwater to drain to the tunnel. Groundwater levels continued to fluctuate and showed some recovery between February 2024 to April 2024 as the TBMs progressed and the tunnel was sealed but remained below and exceeding the red trigger level. Groundwater levels from April to end of June 2024 decreased again in response to local cross passage construction, with level in September, one month after XP-N9 was completed, remaining approximately 8 meters below the red trigger level. Discussed further below.
Western Sydney Airport	SBT-GW-4000	70.5	70	69.5 Minimum of 69	16-9-24	68.5	Green trigger level has been exceeded at this location since monitoring started in June 2023 and levels show a fluctuating slow decline from June 2023 to February 2024, decreasing and exceeding the amber trigger in August 2023. Note that limited groundwater level data was available to set triggers. In February 2024 levels decreased by approximately 1 meters and exceeded the red trigger. Levels then generally stabilised at ~69 m AHD until mid June 2024 three weeks before construction of XP S13 finished. In mid-June levels decreased by 1m and gradually recovered to 68.5mAHD by mid September 2024, over two months after the cross passage was completed. Changes in levels did not correspond to construction of XP S13 with levels now appearing to recover.

Area	Location ID	Green Trigger Level (m AHD)	Amber Trigger Level (m AHD)	Red Trigger Level (m AHD)	Latest Reading Date	Latest Reading (m AHD)	Comments/Recommendation
							Further discussion and recommendation provided in section 5.1.3 below.
Aerotropolis	SBT-GW-4008	71.8	71.3	70.8	16-9-2024	56.7	Well reported to be dry from 8 May 2024, with levels pulsing in August 2024 and at 56.7mAHD when last gauged in September 2024. Continuous level or EC data was not available in this monitoring period as the logging equipment has been stuck in well or damaged. Refer to section 5.1.3 for further discussion and recommendations.
Aerotropolis	SBT-GW-4010	73	72.5	72	16-6-24 16-9-24	65.93 <50.8 (manual gauge)	Groundwater levels show a very gradual decrease over time from the start of monitoring in May 2023 until October 2023 where an abrupt decrease of 16.8 meters in groundwater levels was recorded and all trigger levels were exceeded. Datalogged levels are questionable from mid-October 2023 until early June 2024 as the telemetered levels do not align with the available manually gauged water levels (see graph in Annexure D). Water levels recorded from 7 June to end of July 2024 were more reliable and show stabilisation of water level at around 66 mAHD which exceeded the red trigger level by approximately 6.2 meters. The well was dry when sampling was attempted in both August and September 2024, indicating levels were <50.8mAHD. Refer to section 5.1.3 for further discussion.
Exceedances in VWPs							
Claremont meadows	SWD-TU100-20071-VWP07-A	25.4	24.9	24.4	1-11-24	25.1	Groundwater levels fluctuated up and down by approximately 1 meter since January 2023 to December 2023 then rapidly decreased by approximately 2 meters, exceeding the green trigger value. The groundwater level further decreased by approximately 1 metre, exceeding the red trigger value in mid-January 2024. The groundwater levels fluctuated up and down by approximately 1 metre between January 2024 to July 2024, while exceeding the red trigger value. Since late July 2024, the groundwater level has increased by approximately 1 metre and stabilised until the latest reading date, exceeding the green, but not the amber trigger value. No VWP data available since 1 November 2024. As the EC in adjacent monitoring well SBT-GW-1028 was within the previous range, no action is required, with ongoing monitoring recommended.
Claremont meadows	SWD-TU100-20071-VWP07-B	25.6	25.1	24.6	25-7-24	23.8	Changes in groundwater levels over time were similar to SWD-TU100-20071-VWP07-A, which is co-located and has a sensor 5m deeper. Amber and red triggers were exceeded from the beginning of January 2024. Based on data to November 2024 in SWD-TU100-

Area	Location ID	Green Trigger Level (m AHD)	Amber Trigger Level (m AHD)	Red Trigger Level (m AHD)	Latest Reading Date	Latest Reading (m AHD)	Comments/Recommendation
							20071-VWP07-A, indicating there has been an increase of over 1m since July 2024, the current level is inferred to be similar to the amber trigger. As the EC in adjacent monitoring well SBT-GW-1028 was within the previous range, no action is required, with ongoing monitoring recommended.
Orchard Hills	SWD-TU150-22010-VWP02	**30.5**	**30.0**	**29.5**	26-6-24	**29.41**	Red trigger level first exceeded in early April 2024 following on from an earlier rapid decrease in levels from ~35mAHD to 30 mAHD in August 2023 which exceeded the green and amber trigger levels in October and November 2023 respectively. Initial decrease in August 2023 appears to coincide with when TBM2 was advancing in the area. Construction of the nearest cross passage (XP-N21) commenced in December 2023 and was completed in March 2024. Levels have fluctuated but show a continual gradual decrease, continuing to exceed the amber trigger until the red trigger was consistently exceeded from late May 2024. No VWP data available since 26 June 2024. Risk assessed via ecological survey and discussed in Section 5.1.2 below.
Bringelly SF	SWD-TU351-37371-VWP04	**50.6**	**50.1**	**49.6**	28-5-24	**50.23**	Exceedance of green trigger level after a decrease of ~17m from January 2023 to June 2023, with groundwater levels showing a gradual continual decrease over time. This is likely associated with shaft excavation which commenced in December 2022 and was completed in September 2023. Groundwater levels appear to have stabilised since June 2023 and remain above the amber trigger value. No VWP data available since 28 May 2024.

5.1.1 Discussion of trigger exceedances

Triggers exceedances requiring further review than detailed in Table 5-1 are discussed in the section below.

5.1.1.1 SMGW-BH-A107

SMGW-BH-A107 was installed to monitor the effect of construction of XP N9, which was completed by 13 August 2024.

In response to the trigger exceedance at SMGW-BH-A107 in the previous monitoring round, CPBG initiated a combined hydrogeological and ecological assessment of Claremont Creek and the surrounding area to assess whether impacts to aquatic and terrestrial GDEs may occur, and to implement a mitigation response as may be required. Claremont Creek is a tributary of South Creek and is located around 50m from SMGW-BH-A107.

Site inspections and ecological surveys concluded that previously isolated pools within Claremont Creek in the areas predicted to be experiencing groundwater drawdown were full and flow observed along the creek channel (AEI, 2024, provided in Annexure I). If groundwater drawdown had altered the baseflow contribution to Claremont Creek, heavy rainfall within the catchment in the first half of 2024 appears to have mitigated any changes to water levels and the availability of aquatic habitat within the creek. The ecological survey concluded that ecosystem conditions were similar to previous surveys completed prior to drawdown occurring and no impact has been observed (AEI, 2024).

Groundwater levels when the survey was complete on 5 June 2024 were ~12mAHD, with levels from July to 17 September 2024 (a month after XP N9 was completed) ranging from 12mAHD to 13.8mAHD, indicating conditions were similar or better.

Ongoing monitoring of levels is recommended to confirm that groundwater levels have recovered.

5.1.1.2 SWD-TU150-22010-VWP02

SWD-TU150-22010-VWP02 is located in the SBT Orchard Hills site, with both groundwater level triggers (Table 6-4 of the GMP) and GDE level triggers (Table 6-11 of the GMP). Along with SBT-GW-1042, the VWP monitors the impact of construction on nearby terrestrial GDEs, with drawdown predicted to be greater than 2m (Figure 5-1).

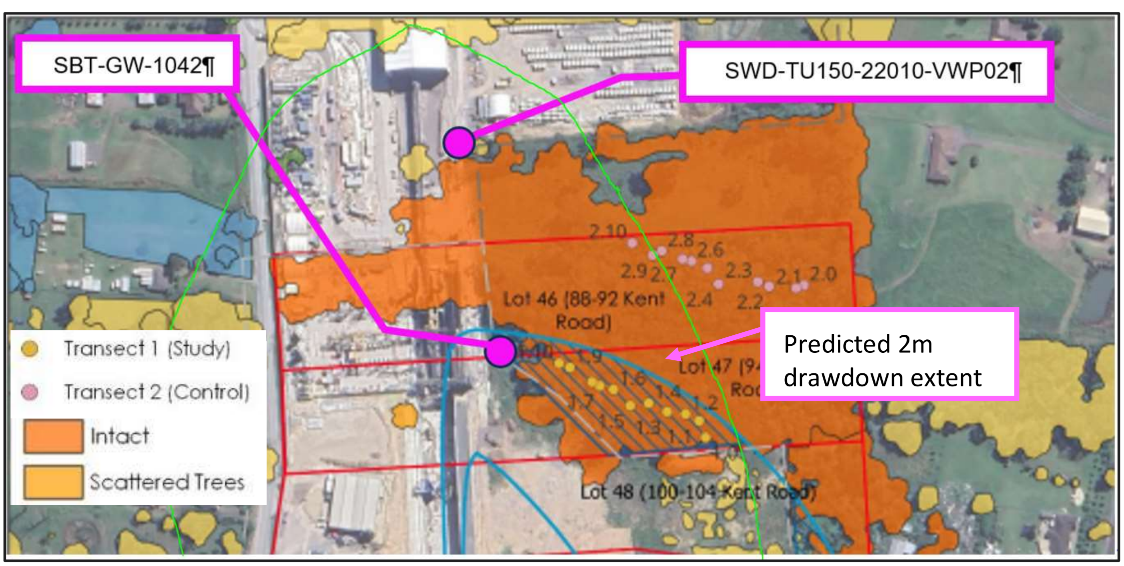

Figure 5-1:Predicted extent of greater than 2m drawdown (green line) and vegetation monitoring locations (Adapted from AMBS (2024). Orchard Hills Metro Station Vegetation Monitoring, Year 2: 4th Survey)

SBT-GW-1042 has been handed over to PLM, however when last recorded in late January 2024 levels were at 36.5 mAHD, approximately 3.5m below top of casing. Levels were 1.2m lower than adopted baseline levels, but 3m above the green trigger level of 33.5mAHD, with no significant decrease as was observed in SWD-TU150-22010-VWP02 in August 2023.

This indicates that drawdown was less than predicted in the southern section of the GDE area where vegetation is monitored by Transect 1, which was adopted to assess project impacts (Figure 5-1). Conversely, the western edge of Transect 2, which was adopted as a control, is likely to better represent impacts to the northern portion of the GDE area where levels in SWD-TU150-22010-VWP02 indicate drawdown has been greater.

Four vegetation surveys of these transects have been undertaken; May/June 2023 (before groundwater levels decreased), October 2023 after levels in SWD-TU150-22010-VWP02 decreased, and in June and October 2024, with results summarised in Table 5-4.

Table 5-2: Mean percent canopy cover (AMBS, 2024)

Survey Transect	Canopy Cover (%)			
	Survey 1 31 May & 21 June 2023	Survey 2 17 & 18 October 2023	Survey 3 5 June 2024	Survey 4 2 October 2024
Transect 1	77	62	75	73
Transect 2	70	63	74	71

A decrease in canopy cover was reported in Survey 2 at both transects, with the canopy recovered by Survey 3 and similar in Survey 4. The report, which is included in full as Annexure I, concluded that the changes were likely to be within natural variation of the climate, and unlikely to be due to groundwater drawdown. This conclusion is consistent the lack of impact reported in Transect 2 in June 2024 when sustained groundwater drawdown had been reported nearby in SWD-TU150-22010-VWP02 for nine months (August 2023 to June 2024).

Groundwater levels in SBT-GW-1042 at the end of January 2024, and vegetation monitoring in June and October 2024 indicate that the main woodlands area to the east of the Orchard Hills site has not been impacted by construction related drawdown. It is not clear however if there has been impact to the isolated trees closer to SWD-TU150-22010-VWP02, where the red trigger exceedance has been reported and levels were possibly decreasing in June 2024. Nonetheless, the use of the monitoring data to support the conclusion is valid in this situation. This is because there is no significant deviation between the data in the two transects, and the metrics used to assess impacts of groundwater drawdown to vegetation health improved between survey 2, and surveys 3 and 4.

The AMBS Survey 4 report recommended that GDE vegetation monitoring continue at Orchard Hills until the end of 2028, which along with level monitoring at SWD-TU150-22010-VWP02 and SBT-GW-1042, will be the responsibility of PLM. It is understood that Sydney Metro will make this a contractual obligation for PLM.

5.1.2 SBT-GW-4008 and SBT-GW-4010

Level data for SBT-GW-4008 in this monitoring period is limited to one measurement in September 2024 as loggers are unable to be downloaded as connections are damaged.

The well was dry when first manually gauged on 8 May 2024, after the TBMs had passed through the area, indicating that groundwater has drawn down at least 16m. Manual gauging confirmed drawdown, with the well dry when gauged May 2024 and June 2024 after cross passage (XPS 20) construction commenced on 24 May 2024. In August 2024 groundwater levels were reported to be moving due to XP S20 construction. In September 2024, approximately one month after the cross passage was completed, manual gauging indicated that levels had slightly recovered to 56.7mAHD.

Groundwater levels at SBT-GW-4010 showed a very gradual decrease over time from the start of monitoring in May 2023 until October 2023. The water level data logger failed from mid-October 2023 until early June 2024. Levels from 7 June 2024 until 30 July were around 66 mAHD, exceeding the red trigger level by approximately 6.2 meters. SBT-GW-4010 was to monitor construction of XP-S21 and XP S22, which commenced construction on 11 June 2024 (XP-S22), with both XPs completed by 2 September 2024. Water levels therefore did not appear to be affected by the first seven weeks of XP construction. The well was however dry when gauged on 13 August and 16 September, indicating groundwater levels were below 50.8mAHD (base of screen interval).

As the lateral extent and duration of drawdown is unknown, impacts on groundwater receptors are unclear, and as detailed in the previous GME report (Tetra Tech 2024b), investigation was undertaken to determine the potential impacts of the decrease in water levels.

Based on the pre-construction depth to groundwater measured at SBT-GW-4008 and SBT-GW-4010 and the geological log for these borehole, the water table was positioned approximately 6 and 5m bgl respectively, placing it 3 m and 1.5m below the top of the weathered siltstone rock. While the root depths of individual tree species can vary significantly, the average maximum root depth of mature trees is around 5 m, with the vast majority of the root mass occurring within the first 0.5 m of the soil profile (Canadell et al., 1996). The likelihood that deep roots would penetrate several metres into siltstone rock to access the watertable is relatively low outside of arid climate settings, as shallow sources of rainfall recharge would be more readily available. The available data, whilst limited, suggests that it is unlikely that local vegetation would access and rely on groundwater.

Furthermore, it was noted that SBT-GW-4008 and SBT-GW-4010 are in an area subject to precinct planning requirements of the Order to confer biodiversity certification on the State Environmental Planning Policy (Sydney Region Growth Centres) 2006. This SEPP has been superseded by the State Environmental Planning Policy (Precincts—Western Parkland City) 2021.

Section 3.28 of the Precincts – Western Parkland City SEPP stipulates when approval to clear native vegetation is required. This includes land zoned for Environmental and Recreation, land identified as a High Biodiversity Value Area, Flood Prone and Major Creeks land and Transitional Land. This well is not located in or near any of these areas.

Given that there is limited evidence to indicate that the vegetation in this area is groundwater dependent, as well as the fact that these wells are located within a biodiversity certified area, no further action is recommended other than ongoing monitoring to confirm recovery of groundwater levels.

5.2 EC Results

Groundwater ECs recorded in GDE trigger wells when sampled in this monitoring period are shown with pre-construction data in charts in Annexure D, with results summarised in Table 5-3.

Field readings during water quality sampling were reviewed for SBT-GW-1805 as the EC logger data continues to show erroneous readings constant at around 23,124 µS/cm. The field reading in September 2024 showed that the EC SSTV trigger had been minorly exceeded, which was confirmed by the EC reported by the laboratory. Groundwater levels in SBT-GW-1805 were within the historical range, and did not breach any triggers, therefore the minor exceedance of the EC SSTV is attributed to seasonal variability rather than a change in groundwater salinity. Ongoing monitoring is required to confirm trends, and potentially support an increase in the EC SSTV at this location. EC logger maintenance or replacement is required.

Table 5-3 : EC results in GDE trigger wells

Area	Bore ID	Preliminary EC SSTV (µS/cm)	Latest EC	Comments
Claremont Meadows	SBT-GW-1805	3,650	Logger reading consistently: ~23,124 µS/cm Field EC of 4,190 (lab EC 4,130) µS/cm when sampled in September 2024	Attempt to reset error with EC logger instrument in 2023 was unsuccessful. Field readings and lab EC in September 2024 identified minor breach of EC trigger, however water level were stable and within baseline range.
Claremont Meadows	SBT-GW-1028	Inaccessible during baseline assessment. Field measured EC ranged between 21,400 to 27,600 µS/cm during previous morning period.	Field EC of 26,200 µS/cm when sampled in September 2024.	Field EC in September 2024 within previous range. No action required.

5.3 Groundwater Quality Results

5.3.1 Cross Passage Construction

Six locations were sampled in the current monitoring round to assess the impact of cross passage construction on groundwater quality, with sampling dates and changes in groundwater chemistry summarised in Table 5-9.

Where four or more sample results are available groundwater quality trends have been statistically assessed (summary provided in Annexure E). Where three or less data points are available, the results have been reviewed qualitatively for significant changes in response to construction.

Where changes in groundwater quality during construction were identified, the range of concentrations reported during the baseline assessment (Tetra Tech 2023d) have been reviewed to assess whether quality results reported during construction were outside of the baseline range.

Recommendations are provided where additional sampling is required to confirm post construction conditions.

Table 5-4: Groundwater quality monitoring for cross passage construction

Location	Cross Passage	Construction Period	Groundwater sampling	Changes in groundwater quality during construction	Recommendation
SMGW-BH-A360	XP-N2	29 May to 30 October 2024	1 May, 12 June, 28 June, **25 March 2025 (gauging and field water quality parameters only)**	TDS and major cations and anions showed no trend in samples taken in May and June 2024, with depth to water and EC in March 2025 consistent with pre-construction conditions. No samples collected for laboratory analysis in current monitoring period due to incorrect location being mistakenly sampled in October 2024	Groundwater to be sampled on 11 April 2025 for laboratory analysis to confirm conditions post cross passage construction.
SMGW-BH-A107	XP-N09	17 May to 13 August 2024	1 May, 15 May, 4 June, 28 June, **17 September, 21 October 2024**	Statistically significant increase in pH – discussed in Section 5.3.2. In previous round an increase in total nitrogen from 2.4mg/L to 7.9mg/L (mostly organic N) was identified. Concentration in September and October 2024 were 6.7 and 3.5mg/L confirming return to baseline range of 2mg/L to 6.6mg/L.	Groundwater quality consistent with baseline conditions. No further sampling required.
SBT-GW-1804	XP-N10	25 April to 17 July 2024	15 May, 4 June, 28 June, **17 September, 21 October 2024**	Groundwater quality in October 2024 consistent with baseline conditions with no change in conditions based on trends.	Groundwater quality consistent with baseline conditions. No further sampling required.
SBT-GW-4000 (on-airport well)	XP-S13	11 May to 5 July 2024	9 February, 14 April, 10 May, 18 June, **16 September 2024** (primary sample and duplicate and triplicate QC samples)	Decrease in TDS during construction from baseline range 11,500 to 10,700mg/L to 1,000mg/L, with TDS in September 2024 increasing up to 9,130mg/L (in triplicate). Decrease in filtered metals (iron, manganese), total nitrogen and phosphorus during construction, with concentrations similar to baseline when sampled in September 2024. Increase in TOC during construction to 21mg/L from baseline of 2mg/L to 4mg/L, decreasing to 6mg/L to 8mg/L in September 2024. Detectable TPH C10 – C36 (250ug/L to 600ug/L during construction, and up to 900ug/L in September 2024), within historical range (140ug/L to 1,620ug/L).	Groundwater quality consistent with baseline conditions. No further sampling required.
SBT-GW-4008	XP-S20	24 May to 20 August 2024	Not previously sampled as well dry due to drawdown. Only sampled on **16 September 2024**	No baseline data for comparison to groundwater quality post construction in September 2024. Exceedances of screening criteria used for baseline assessment and/or EPL include: • Ammonia as N: 8,630ug/L (EPL criteria 900ug/L) • Total Nitrogen: 11,500ug/L (EPL criteria 1,720ug/L)	Additional sampling event recommended when groundwater levels recover.

Location	Cross Passage	Construction Period	Groundwater sampling	Changes in groundwater quality during construction	Recommendation
				• Elevated total iron and aluminium (3,960ug/L and 1,690ug/L). Filtered concentrations below criteria	
SBT-GW-4010	XP-S21 XP-S22	20 June to 2 October 2024 11 June to 26 August 2024	4 May, 27 May, 19 June 2024	Insufficient construction data points to assess impact as well dry when sampling attempted in August and September 2024	Collect sample to assess conditions post construction when groundwater level recovers.

BOLD indicates samples taken in this monitoring round

5.3.2 Trigger exceedances and increasing trends

Groundwater quality data collected during the monitoring period from GMP wells was compared to the groundwater quality triggers detailed in Table 4-5. No exceedances were identified.

Mann-Kendall statistical analysis was used to assess trends for selected COPC as detailed in Table 4-5. COPCs with increasing, probably increasing, or decreasing trends are summarised in Table 5-6, and presented alongside the previous highest concentration.

Trends for all COPCs for all wells are summarised in Annexure E.

Table 5-5: Triggers based on increasing COPC trends

Location Code	Monitoring Zone	COPC	Latest Concentration	Previous Highest result	Trend
MW1	St Marys	Tetrachloroethene	1.58mg/L	6.35mg/L 21 June 2024	Increasing
MW1	St Marys	Total nitrogen	2.1mg/L	31mg/L 5 October 2023	Probably increasing
SMGW-BH-A107	Northern Tunnels	pH	8.3	9.1 28 June 2024	Increasing
SBT-GW-4801	Bringelly	Total nitrogen	20.7 mg/L	19.7 mg/L 7 June 2024	Probably increasing
SBT-GW-4801	Bringelly	Total phosphorus	1.09 mg/L	0.99 mg/L 7 June 2024	Probably increasing
SBT-GW-4005	Bringelly	Total phosphorus	0.92mg/L	0.34mg/L	Probably increasing
SBT-GW-1024	Claremont Meadows	Copper	3 ug/L	3 ug/L 24 April 2024	Probably increasing

The pH was observed to be statistically increasing at SMGW-BH-A107, with the highest pH of 9.1 reported in June 2024 (Figure 5-2), corresponding to construction of XP N09 and significant drawdown of groundwater levels as discussed in Sections 5.1. Post construction of XP N09 the pH has now decreased compared to June 2024, and is at the higher end of the baseline range.

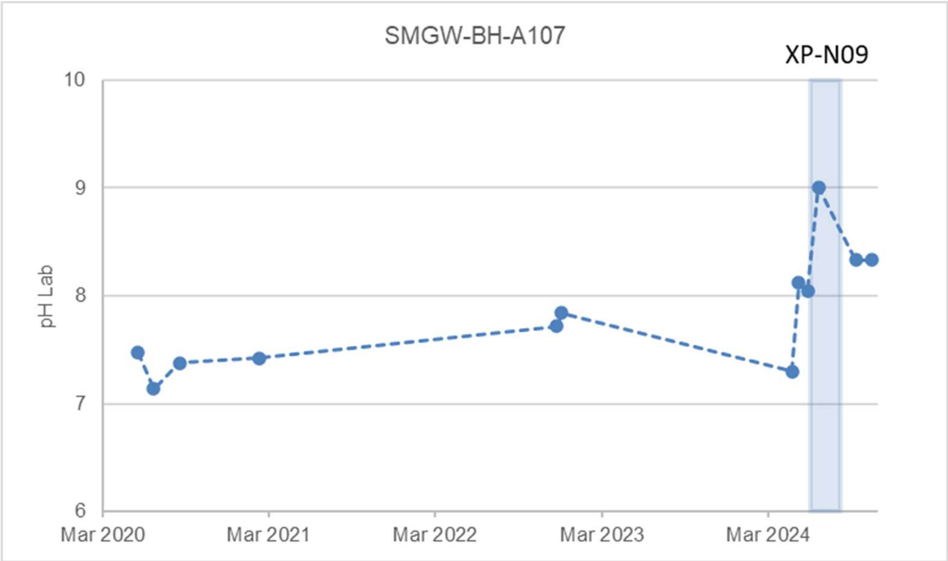

Figure 5-2: Groundwater pH over time in SMGW-BH-A107

The statistically increasing trend for PCE in MW1 is due to the transient increase in concentrations reported when the TBM passed through the area in May/June 2024. Concentrations in October 2024 were consistent with the pre-TBM range.

The probably increasing concentration of copper in SBT-GW-1024 is not considered to be significant as the concentration reported in April and September 2024 (3 ug/L) is close to the level of reporting (1 ug/L).

The increase in nutrients in SBT-GW-4801 at Bringelly (Figure 5-3) appears to corelate with a decrease in water level from 10.3 - 10.7m BTOC in early 2023 to 13mBTOC in June 2024 and 12.6mBTOC in September 2024. A similar trend was observed in SBT-GW-4005 where gauging in January 2025 indicates that groundwater levels have started to recovery.

Additional monitoring is required to confirm the trends, and assess whether there is a return to baseline conditions when groundwater levels recover.

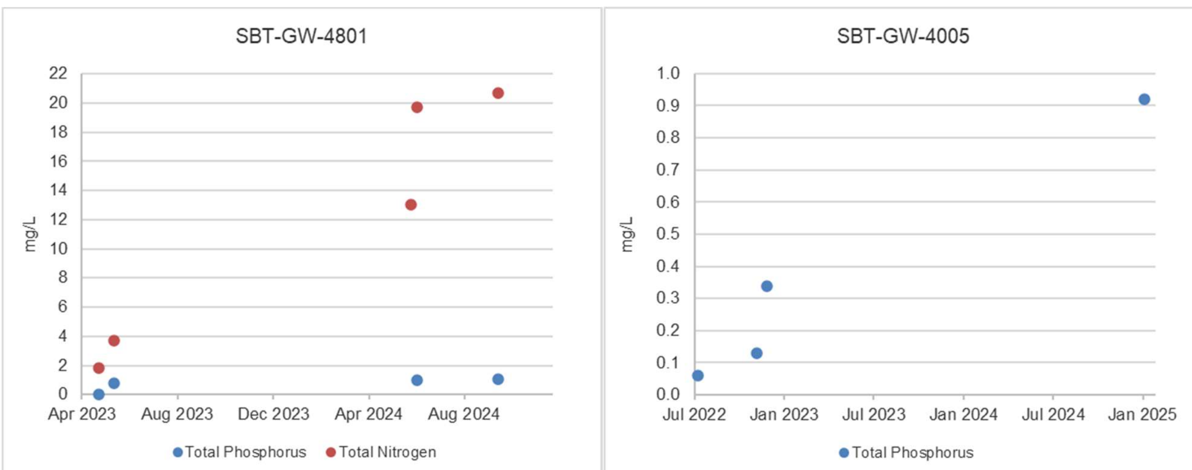

Figure 5-3: Groundwater total nitrogen and phosphorus over time in SBT-GW-4801 and SBT-GW-4005

Note that the responsibility for construction monitoring has now been passed to PLM for the following locations where trigger exceedances were identified in the previous Biannual reports:

- SBT-GW-1002 (for aluminium)
- SMGW-BH-A401 (for total phosphorus)
- SBT-GW-1042 (for pH)
- SBT-GW-1017 (for zinc)
- SBT-GW-1001 (for cadmium)
- MW1 (for zinc)

5.4 Mitigation Monitoring – St Marys

Groundwater mitigation monitoring has been conducted at St Marys in accordance with the mitigation monitoring program as detailed in Section 2.5. The full monthly mitigation reports for both July 2024 and December 2024 are provided in Annexure G.

The July 2024 report presents the final sampling results for locations sampled to assess the impacts due to tunnelling. In summary, the results to the end of July 2024 for TBM sampling indicate:

- Statistical analysis of the full data set from March to July 2024 indicates that concentrations of cis 1,2 DCE are statistically increasing and TCE is statistically probably increasing in MW2 in the assumed source area. Concentrations of all other key chlorinated hydrocarbons in source area wells are decreasing, stable, or show no trend, and are broadly consistent with previously reported concentrations.
- Maximum concentrations of TCE and cis 1,2 DCE in MW2 were reported in early May, and corresponded with TBM-1 passing beneath the source area. Lower concentrations within the historical range were reported in all monitoring events in June and July 2024, with statistically decreasing trends for these compounds in MW2 based on data from May to July 2024.
- Changes in chlorinated hydrocarbon concentrations beneath the source area were temporary, and there has been a return to pre-existing conditions.
- No further groundwater monitoring is required to assess impacts due to tunnelling beneath the source area.

The December 2024 report present the final sampling results for PRB mitigation monitoring up to 6 December 2024, when the responsibility for PRB monitoring was handed over to PLM. In summary, the results indicate:

- Concentrations of chlorinated hydrocarbons in groundwater samples between the PRB and the station box were below the LOR and the trigger values.
- Groundwater levels close to the Station excavation have been drawn down by excavation, with levels beginning to recover at depth.
- Station construction activities do not appear to have changed the groundwater flow regime and gradient in the vicinity of the PRB.
- No additional assessment or contingency measures have been required as a result of station box excavation or tunnelling works.

To meet the requirements of the RAP the PRB mitigation monitoring program will continue until the St Marys station box is tanked, and groundwater levels have returned to the pre-construction range. The December 2024 report is the final PRB monthly monitoring report to be issued to SBT as responsibility for the PRB mitigation system and monitoring program was transferred to the SSTOM contractor (PLM) from 9 December 2024.

6 Construction Groundwater Inflow monitoring

A summary of inferred groundwater inflows and wastewater treatment plant (WTP) discharges is provided below, consistent with the reporting schedule as outlined in Table 8-1 of the GMP.

The WTPs at Aerotropolis and St Marys were handed over to PLM in October and November 2023 respectively, and therefore are not discussed in this report.

The WTP effluent, reuse and disposal associated with the project is summarised in Table 6-1 along with reporting completed.

Table 6-1: Summary of waste water treatment, reuse and disposal, and reporting

Water Treatment Plant	WTP Effluent Reuse / Disposal during Reporting Period	Reporting
Claremont Meadows	Discharge to Sydney Water asset under Trade Waste Agreement 52828. Flows at Claremont Meadow are measured at two locations; the offsite tanks which collect water from the site (see Figure 6-1), and the tradewaste flow, which includes water from the site and also water transferred from other sites (see Figure 6-3).	Samples at Trade Waste discharge point have been collected every 8 days since 3 June 2023 Results provided directly to Sydney Water within 21 days of sampling event.
Orchard Hills	Transported to Claremont Meadows for Discharge to Sydney Water asset under Trade Waste Agreement 52828. Reuse as dust suppression on spoil conveyor.	Samples at Trade Waste discharge point have been collected every 8 days since 3 June 2023 Results provided directly to Sydney Water within 21 days of sampling event.
Airport Business Park	Disposal at licensed waste facility. Note: Airport Business Park site handed over to SSTOM Contractor on 4 June 2024. All discharges thereafter are managed by the SSTOM Contractor.	N/A
Airport Terminal	Disposal at licensed waste facility, with some water used for dust suppression.	Results provided to Sydney Metro with monthly on-airport reports
Bringelly	Transport to Claremont Meadows for Discharge to Sydney Water asset under Trade Waste Agreement 52828. Disposal at licensed waste facility. Note: Bringelly WTP decommissioned in March 2024 after TBM breakthrough and water sent to Airport Terminal WTP.	Samples at Trade Waste discharge point have been collected every 8 days since 3 June 2023 Results provided directly to Sydney Water within 21 days of sampling event.

WTP daily and cumulative volumes have been used as a surrogate measure of groundwater inflows, noting that the volumes may also capture additional inflows from rainfall over the excavation footprints, and any water generated by construction and washdown activities.

In general, the timing of inflows matches well to when excavations began extending below the water table, consistent with groundwater contributing the majority of the total volume. The EC of inflow has also been assessed and compared to groundwater EC ranges reported for each area during the Baseline Groundwater Assessment (Tetra Tech, 2023d).

6.1 Claremont Meadows

Claremont Meadows (CLM) shaft excavation started 16th December 2022 and finished 12th September 2023.

Flow into the excavation at CLM were negligible until April 2023. The average daily inflow has been ~ 32 kL/day up to a maximum of 533 kL/day. Previous EC data indicated that excavation inflows were initially fresh (<1 mS/cm), increased over time to >20 mS/cm (assumed to be the maximum range for the sensor based on flatline), and then decreased to between 5 to 10 mS/cm in the current reporting period. The EC trends were consistent with fresher water from the alluvium flowing in while the excavation was shallow, with increasing contribution from groundwater in the residual and bedrock aquifer as the excavation deepened (Table 6-2). Note that no EC data from this monitoring period has been provided for review.

Table 6-2: Claremont Meadows groundwater EC baseline groundwater values

CLM Alluvium EC (mS/cm)			CLM Residual EC (mS/cm)			CLM Bedrock EC (mS/cm)		
Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
5.9	8.8	7.7	0.9	34.1	12.1	1.8	26.1	16.4

(from Baseline Groundwater Assessment, Tetra Tech 2023d)

The flows provided below are understood to be from the site, noting that trade waste discharge from Claremont Meadows also includes water from Orchard Hills and Bringelly as this is transported in trucks to the Claremont Treatment Plant (refer Table 6-1). Trade waste flows are shown on Figure 6-3.

In total there has been approximately 42 ML of inflow to the Claremont Meadow shaft.

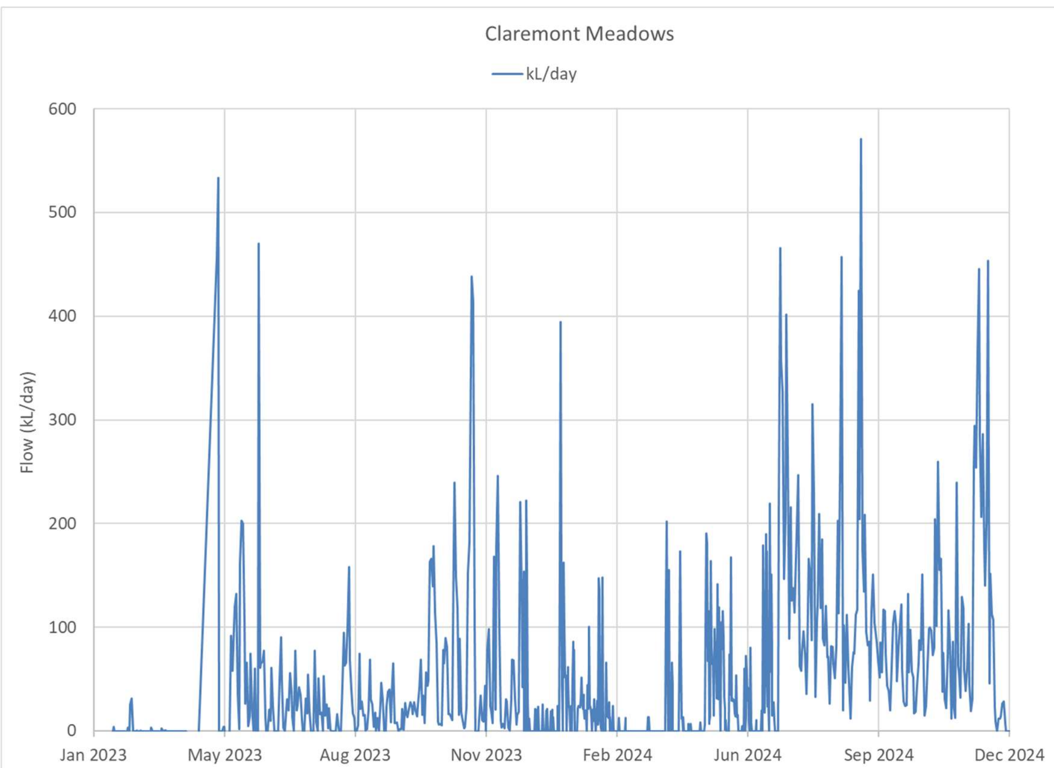

Figure 6-1: Daily inflows at Claremont Meadows Offsite Tanks

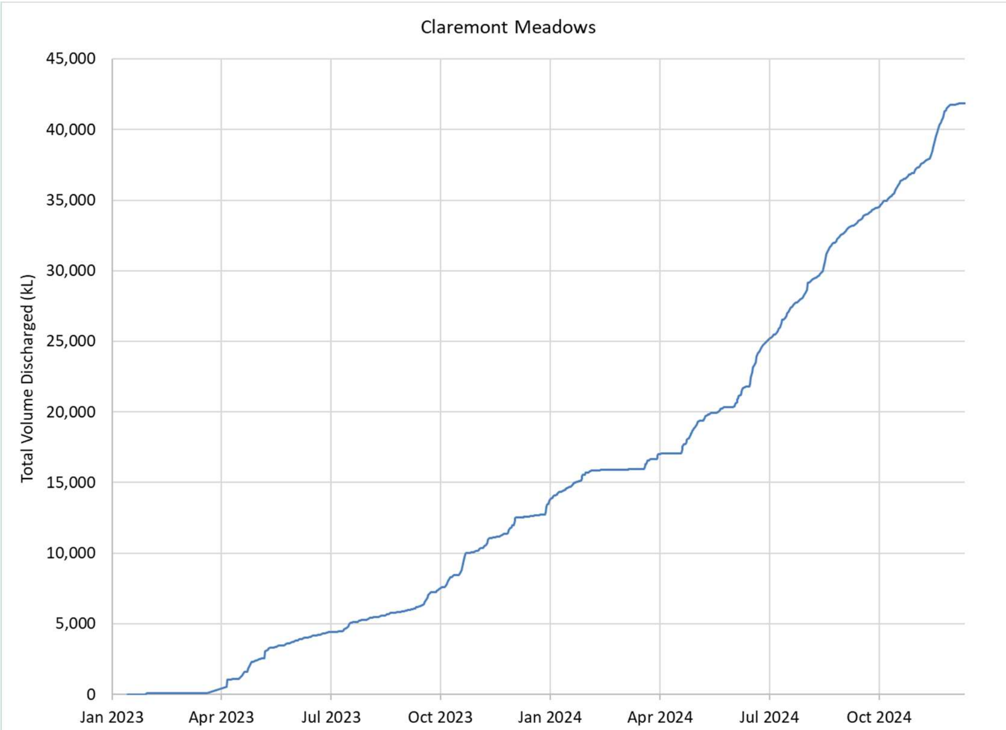

Figure 6-2: Cumulative volumes to Offsite Tanks at Claremont Meadows

Daily trade waste discharge from Claremont since the beginning of December 2023 has ranged up to 680 KL on 28th February 2024, with no effective discharge between 10 May and 8 August 2024 (Figure 6-3, note flows shown as KL/12hr period).

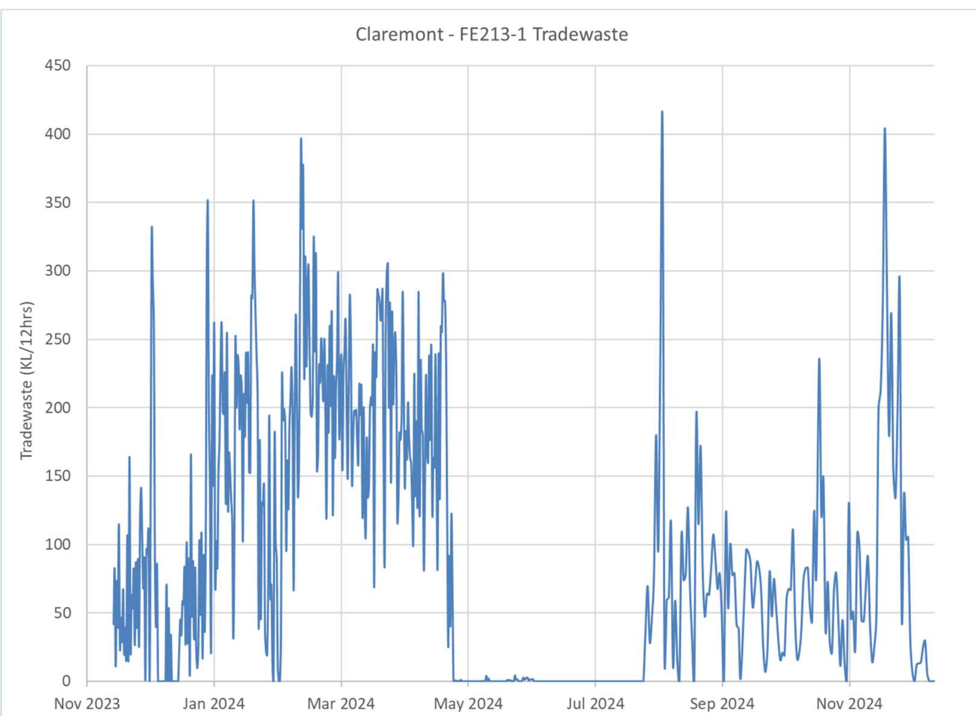

Figure 6-3: Tradewaste from Claremont Meadows - 3 December 2023 to 30 December 2024

6.2 Orchard Hills

Flow into the excavation at Orchard Hills commenced early April 2023, although volumes were minor until mid-June 2023.

There are two WTP at Orchard Hills; Orchard Hills 1 and Orchard Hills 2.

Water from Orchard Hills 1 is either transported to Claremont Meadows or the recycle tank which is used for dust suppression. The average measured daily flow at Orchard Hills 1 was 92 kL/day at the measurement point, with sporadic maximums of around 600 kL/day reported in June 2023, December 2023 and May 2024. In the past six months, daily flows have significantly reduced with negligible flow since the beginning of August 2024 (Figure 6-4).

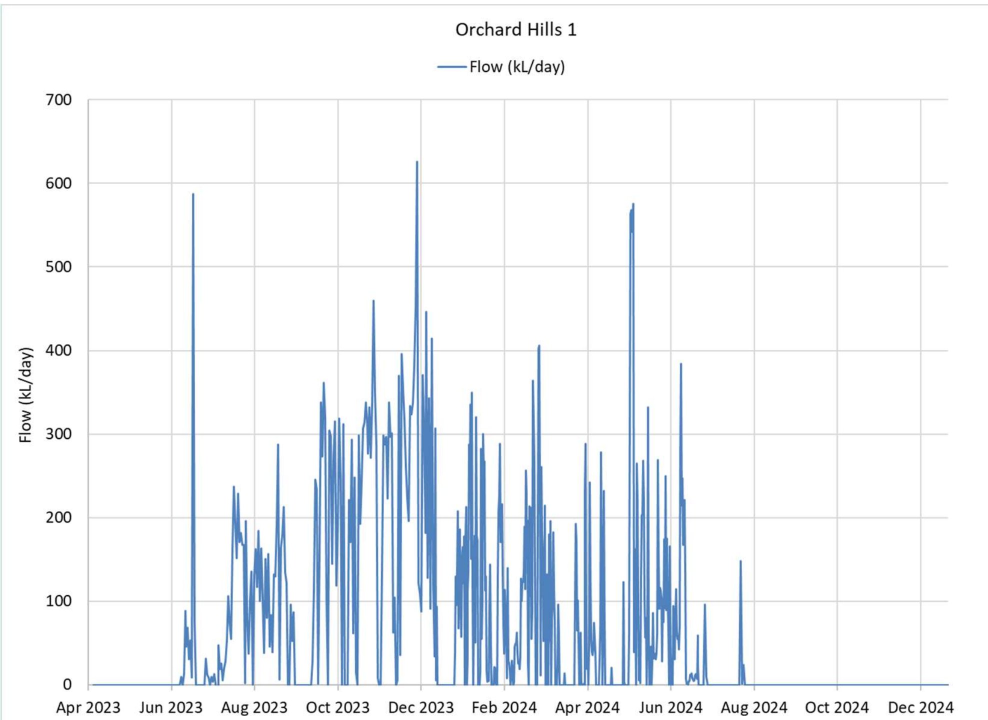

Figure 6-4: Daily plant feed flows at Orchard Hills 1

Water from Orchard Hills 2 is fed into the plant (included in OH1) of offsite tanks at Airport Dive to be used for dust suppression (Figure 6-5). The highest flows were reported in September and October 2023 of over 2,400 KL/day. The daily flows have significantly reduced, and have averaged around 90 KL/day since December 2023, with negligible flow since the beginning of September 2024, similar to OH1.

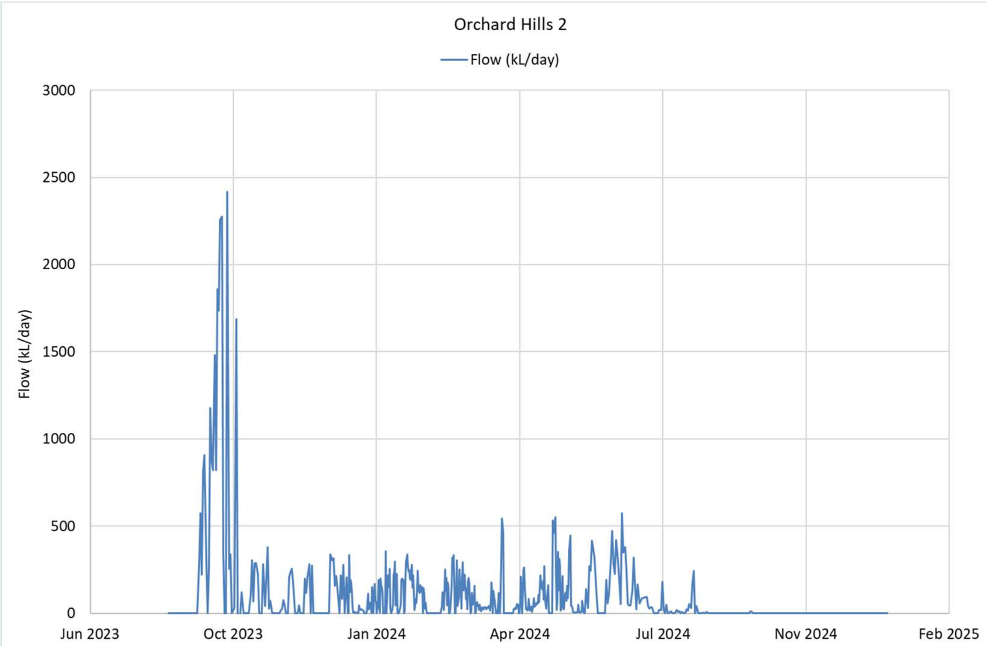

Figure 6-5: Daily inflows at WTP feed for Orchard Hills 2

Previous EC data indicated that excavation inflows were relatively fresh (~2 mS/cm) and increased slightly over time to around 5 mS/cm, which is lower than expected based on average groundwater EC in all aquifers (Table 6-3). EC has been variable in 2024, with relatively fresh (~3 mS/cm) inflows reported at both OH1 and OH2 until May 2024. The EC at both OH1 and OH2 in June 2024 had been the highest reported, indicating increasingly saline water was being drawn into the excavation. No EC data from this monitoring period was available for review.

Table 6-3: Orchard Hills groundwater EC baseline values

OHE Alluvium EC (mS/cm)			OHE Residual EC (mS/cm)			OHE Bedrock EC (mS/cm)		
Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
8.3	37.0	18.0	11.5	31.9	23.5	1.8	32.7	24.3

(from Baseline Groundwater Assessment, Tetra Tech 2023d)

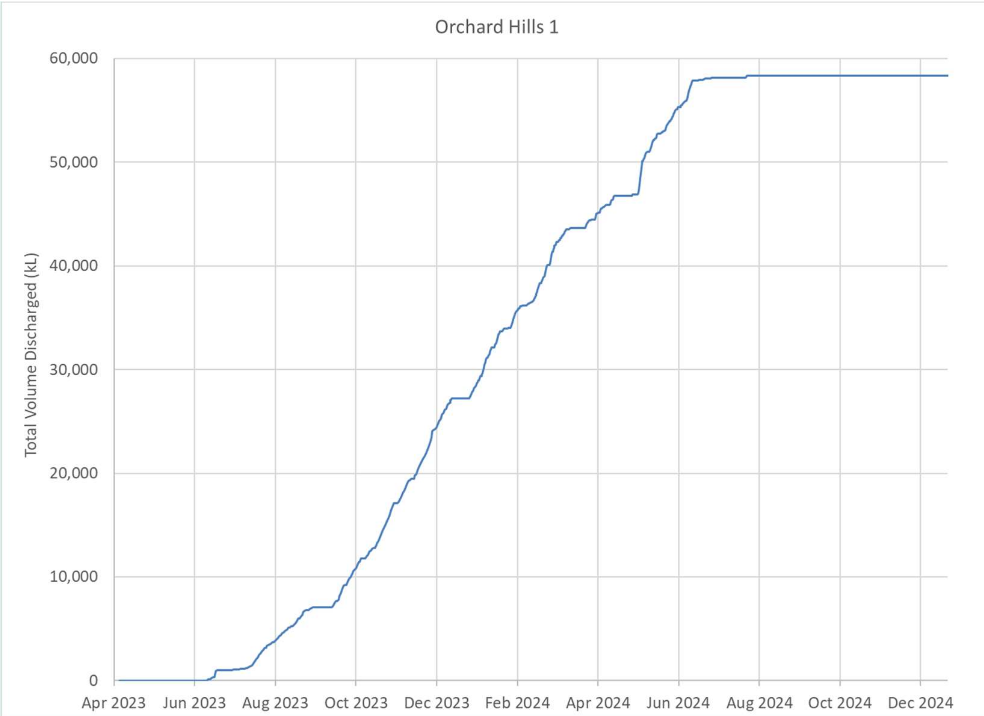

Figure 6-6: Cumulative inflows at WTP feed at Orchard Hills 1

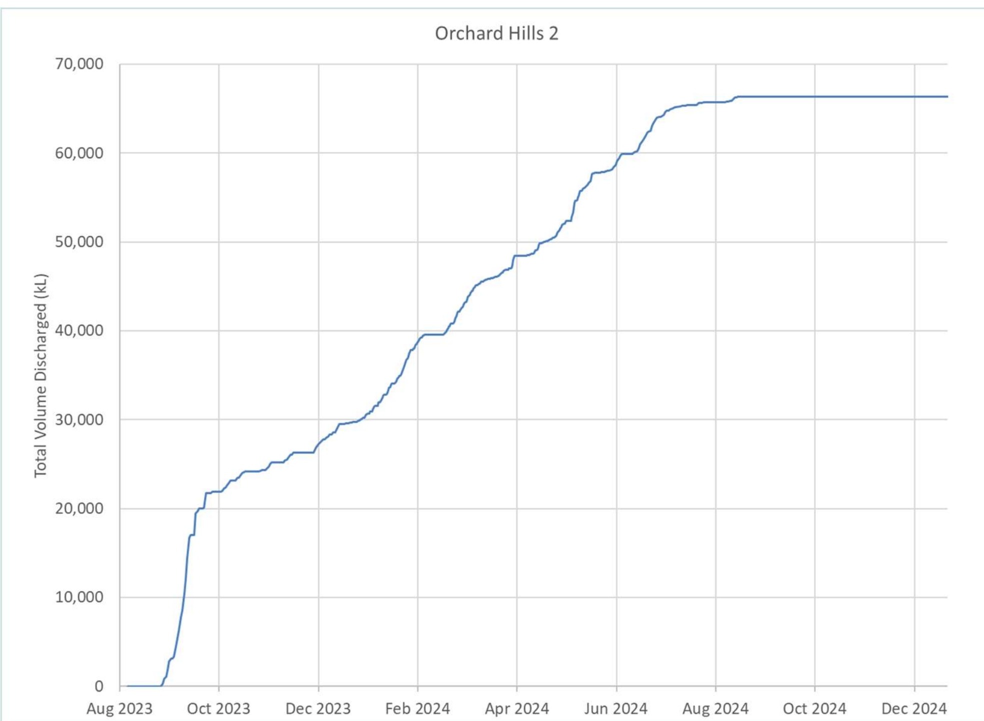

Figure 6-7: Cumulative plant feed volumes to Orchard Hills 2

A total of nearly 58 ML has been recorded at Orchard Hills 1, with flow relatively constant from mid-June 2023 to June 2024 (Figure 6-7). Total volumes at Orchard Hills 2 have been slightly higher (~66 ML), with the majority of flow occurring between September 2023 and June 2024 (Figure 6-7).

6.3 Airport Business Park

Excavation at the Airport Business Park started 13th September 2022 and finished 24 April 2023. The area was handed over to PLM on 4 April 2024.

Flow into the WTP at Airport Business Park commenced in December 2023. The average measured daily inflow was 40 kL/day, however rates have been variable, ranging from <1 KL/day up to a maximum of 365 kL/day in April 2024 (Figure 6-8).

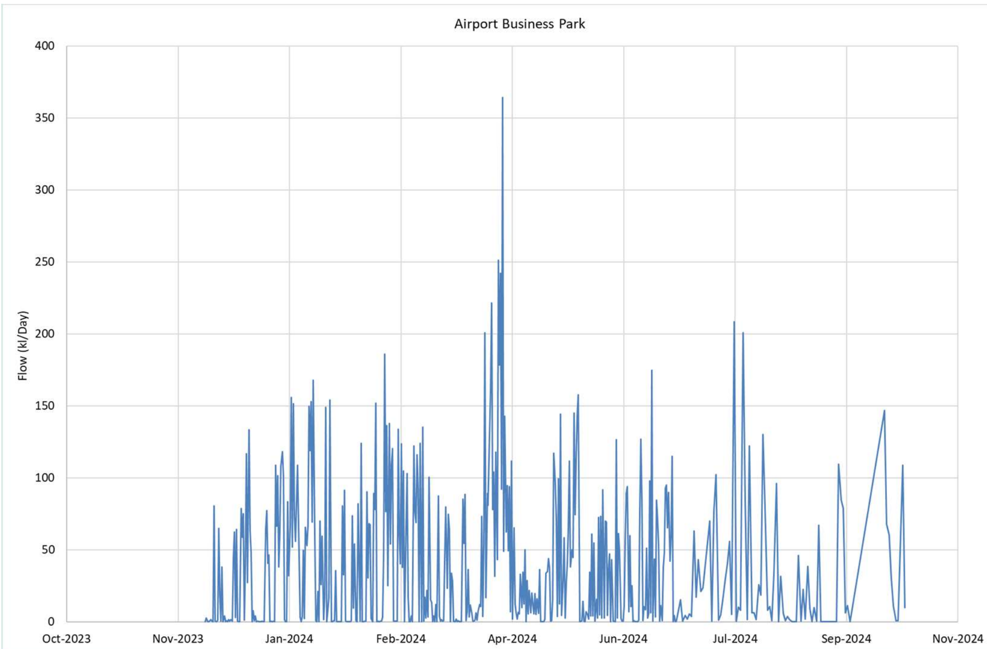

Figure 6-8: Daily inflows at Airport Business Park WTP

Previous EC data indicated that flows to the WTP had been variable but were initially high (>10 mS/cm) and had decreased over time, with the flows in June 2024 much fresher and mostly <2 mS/cm. Both the initial and previously reported EC were fresher than the mean EC reported in all groundwater on Airport Land (Table 6-2). Noting that no EC data from this monitoring period has been provided for review.

Table 6-4: Airport Land EC Baseline Values

Airport Alluvium EC (mS/cm)			Airport Residual EC (mS/cm)			Airport Bedrock EC (mS/cm)		
Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
0.83	26.7	18.2	4.7	32.0	22.1	2.3	37.2	22.5

(from Baseline Groundwater Assessment, Tetra Tech 2023d)

In total, flow at Airport Business Park WTP has been approximately 20ML since December 2023 (Figure 6-9).

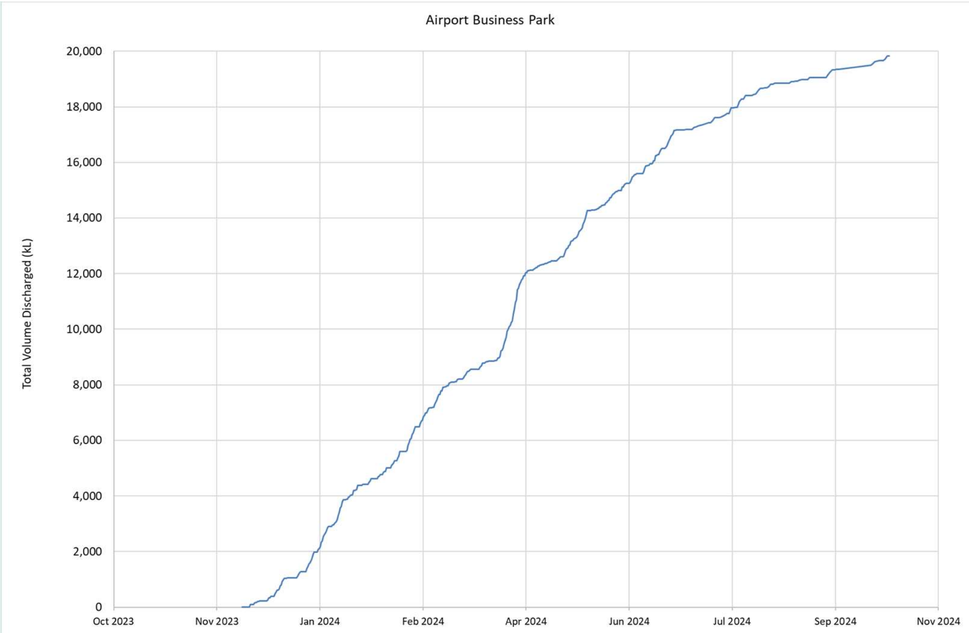

Figure 6-9: Cumulative WTP volumes at Airport Business Park

6.1 Airport Terminal

Airport Terminal Station Excavation started 13th February 2023 and finished 21st November 2023.

Flow into the Airport Terminal Station WTP commenced on 1st December 2023, with an average measured daily inflow of 150 kL/day and a maximum of 546 kL/day recorded May 2024. Inflows volumes have been variable, but generally increased from December to the end of May, with a decrease from mid-July 2024 (Figure 6-10).

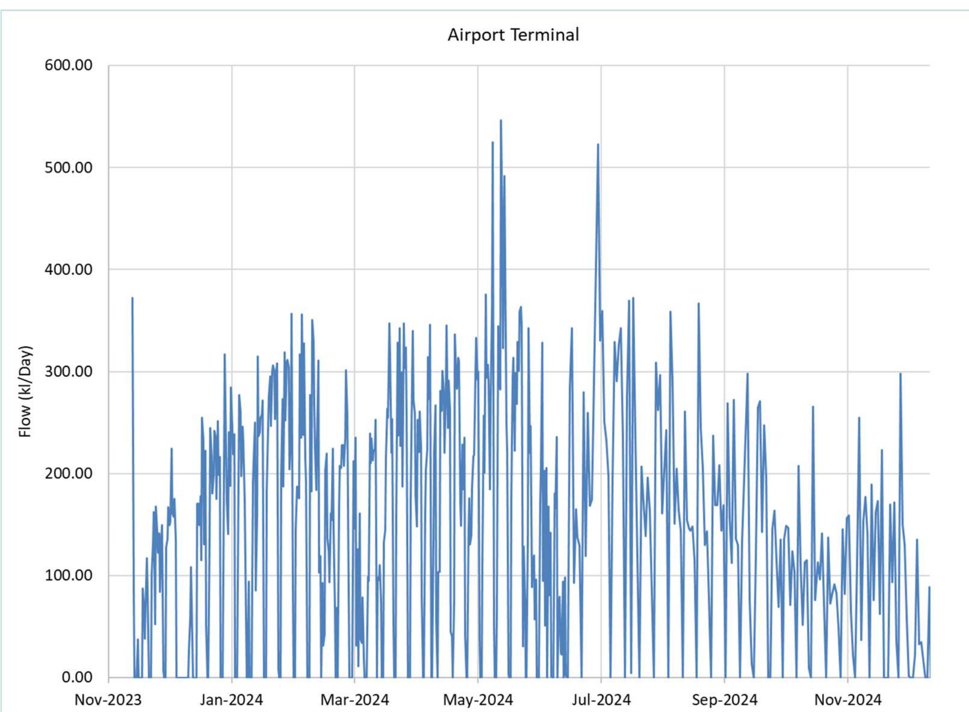

Figure 6-10: Inflows (per 12 hrs) at Airport Terminal WTP

Previous EC data indicated that flows to the WTP had increased over time from 5 mS/cm or less from mid December 2023 to early February 2024, up to between 15 to 20 mS/cm in the second half of June 2024.

The ECs of inflow to the WTP were initially much less than the mean EC reported in all aquifers for the baseline groundwater assessment on Airport Land (Table 6-4), but by June 2024 were similar to what is expected from groundwater inflows. Total discharge volumes at Airport Terminal since December 2023 have been approximately 90 ML (Figure 6-11). No EC data from this monitoring round has been provided for review.

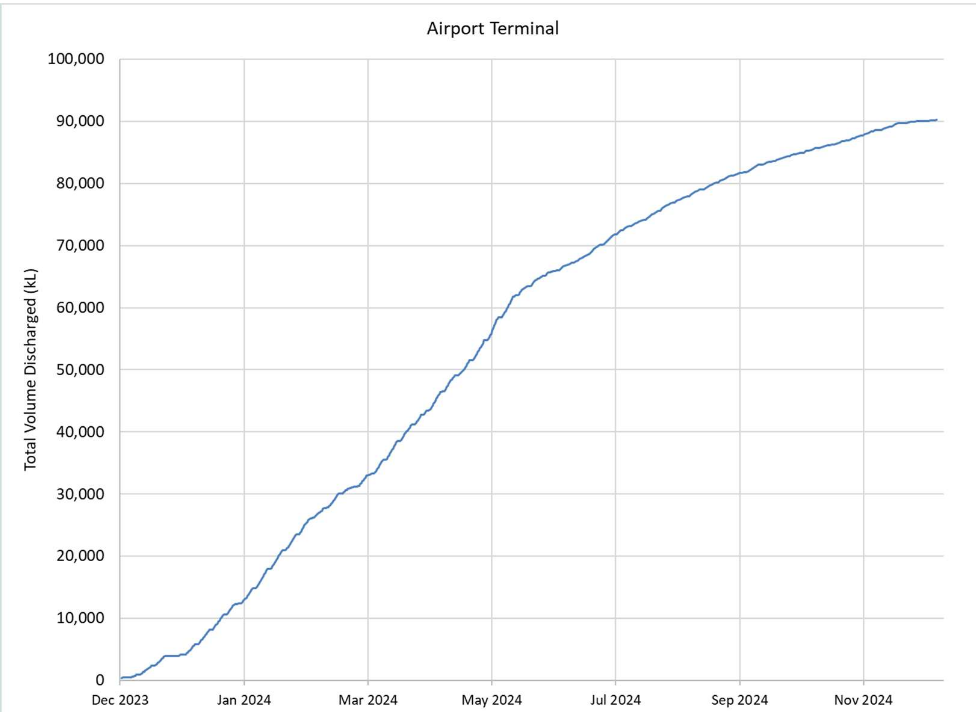

Figure 6-11: Cumulative discharge volume at Airport Terminal

6.2 Bringelly

Bringelly Shaft excavation started 22nd December 2022 and finished 5th September 2023.

Flow into the excavation at Bringelly commenced May 2023, with an average measured daily inflow of 9.5 kL/day and a maximum of 146 kL/day on the 16th April 2024. With the exception of the spike around mid-April 2024, there has been limited flow to the WTP since mid-March 2024.

Previous EC data indicated that excavation inflows rapidly increased to >20 mS/cm (assumed to be the maximum range for the sensor), decreasing slightly after excavation finished in September to around 17 mS/cm, similar to the baseline EC range for the area (Table 6-5). In January and February 2024, the water quality changed significantly from an EC of close to 20 mS/cm at the start of the year, decreasing to ~2.5 mS/cm at the start of March.

As with Orchard Hills, the flow from Bringelly is now transported to CLM. Total volumes discharged from Bringelly to May 2024 were approximately 4.19ML (Figure 6-13).

Noting that no flow or EC data from this monitoring period has been provided for review.

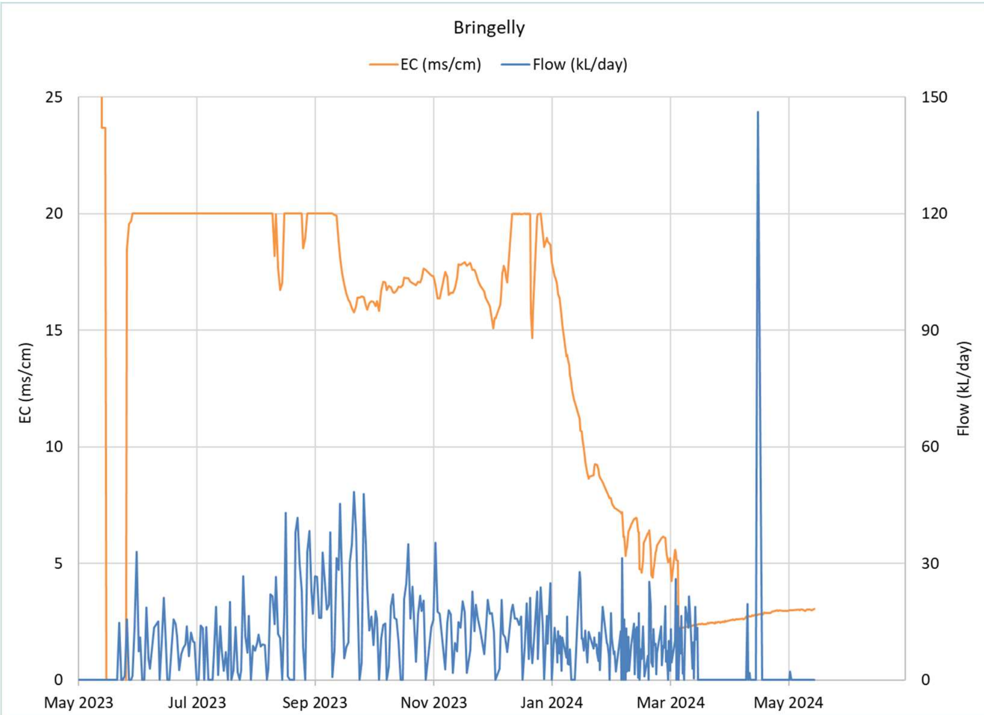

Figure 6-12: Daily inflows and EC at Bringelly WTP feed (GWMR December to May 2024)

Table 6-5: Bringelly groundwater EC baseline values

Bringelly Alluvium EC (mS/cm)			Bringelly Residual EC (mS/cm)			Bringelly Bedrock EC (mS/cm)		
Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
21.0	21.0	21.0	23.4	23.9	23.6	21.0	26.0	22.5

(from Baseline Groundwater Assessment, Tetra Tech 2023d)

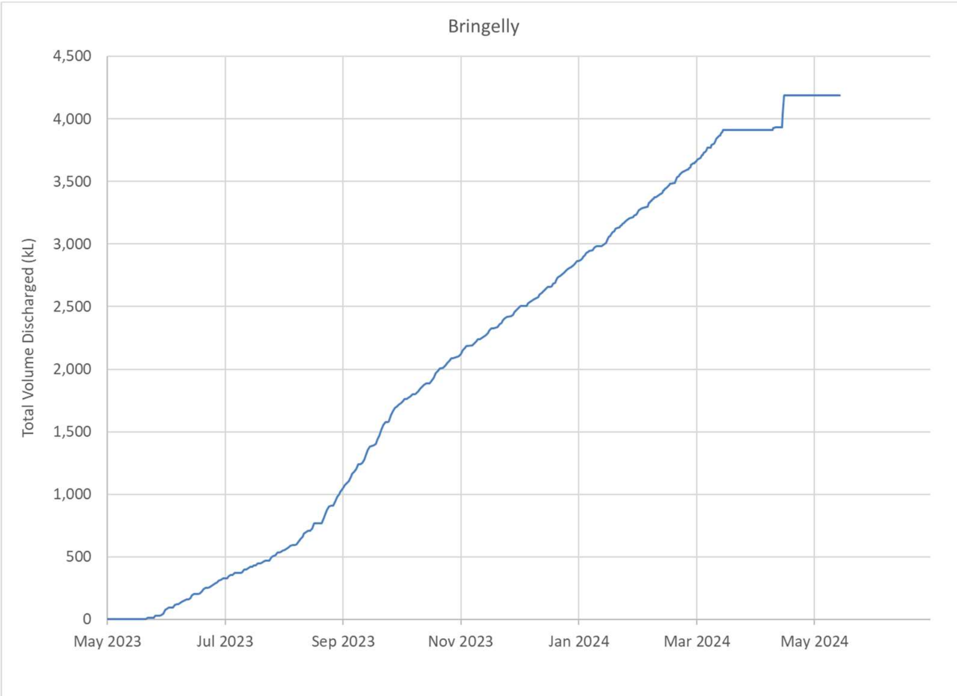

Figure 6-13: Cumulative volume at Bringelly WTP feed

7 Conclusions and recommendations

7.1 Conclusions

Due to the progression of works, by July 2024 28 wells and 34 VWPs had been handed over to PLM since the beginning of the program as they monitor areas no longer controlled by CPBG.

Of the wells and VWPs remaining within CPBG's control during this monitoring period, an additional 13 monitoring wells and 15 VWPs were either damaged, destroyed or decommissioned prior to TBMs passing through the area. Monitoring locations lost between July and December 2024 include:

- Three VWPs that were destroyed:
    - SWD-TU351-35209-VWP01 (Airport Terminal)
    - SWD-TU351-35240-VWP02 (Airport Terminal)
    - SWD-TU150-21965-VWP01-A (Orchard Hills)
- Destroyed VWP locations should be assessed by PLM to determine if potential risks to groundwater receptors based on construction activities indicate replacement is warranted.
- SBT-GW-1030, which was installed to monitor construction of XP N13 was reported as destroyed. XP N13 was completed by 27 June 2024, therefore reinstallation is not required.

Six locations had exceedances of groundwater level triggers in the current monitoring period:

- SMGW-BH-A107 which monitored construction of XP N09 showed drawdown aligning with TBMs passing through the area and construction of the cross passage, with minor recovery reported by September 2024. Ongoing monitoring of levels is recommended to confirm that groundwater levels have recovered.
- SBT-GW-4000 which monitored construction of XP S13 showed drawdown exceeding the red trigger in early 2024, and sustained drawdown during construction in mid 2024 exceeding amber triggers. Monitoring data to September 2024 indicates groundwater levels were recovering in the two months after the cross passage was completed.
- SBT-GW-4008 which monitors cross passage construction at XP S20, and SBT-GW-4010 which monitors XP S21 and XP S22, both show drawdown aligned with the start of construction activities in that area. Both wells were dry in the current monitoring period, indicating significant drawdown below red triggers. Both SBT-GW-4008 and SBTGW-4010 are located in a biodiversity certified area and there is limited evidence to indicate that vegetation located near these wells are groundwater dependent. No further action is recommended other than ongoing monitoring to confirm recovery of groundwater levels.
- SWD-TU150-22010-VWP02 in Orchard Hills has levels exceeding the red trigger level and continued to show a gradual decreasing trend based on data up to June 2024. No VWP data is available since 26 June 2024. Groundwater levels in nearby SBT-GW-1042 at the end of January 2024 when this location was handed over to PLM, and vegetation monitoring in June 2024 and October 2024 indicate that the main woodlands area to the east of the Orchard Hills site has not been impacted by construction related drawdown.
- The EC logger at GDE monitoring well SBT-GW-1805 is malfunctioning. Based on available lab and field EC data there was a minor EC trigger level in September 2024. Continued to monitor at this location is required to confirm that the exceedance was due to seasonal variability rather than a change in groundwater salinity, and to potentially support an increase in the EC SSTV at this location. EC logger maintenance or replacement is required.

No groundwater quality trigger exceedances reported during this reporting period.

Mann-Kendall statistical analysis used to assess trends for selected COPCs indicated the following trends:

- pH was observed to be statistically increasing at SMGW-BH-A107, however concentrations appear to have peaked at pH 9.1 during construction XP N09, and are now returning to the baseline range, with no further action required.
- Total nitrogen and phosphorus are probably increasing in SBT-GW-4801 and SBT-GW-4005 and appear to be related to a decrease in groundwater levels. Additional monitoring is required to confirm the trends, and assess whether there is a return to baseline conditions as groundwater levels recover.

Where some changes in groundwater quality were reported during cross passage construction at on-airport well SBT-GW-4000, post construction groundwater quality is now consistent with baseline conditions.

Assessment of water quality is relevant for the project, as outlined in the NSW Aquifer Interference Policy (AIP). Table 1 of *Minimal Impact Consideration for Aquifer Interference Activities* for fractured rock water sources indicates the relevant consideration with respect to water quality consists of: “Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity.”

Based on the results of the third six monthly monitoring event there has been no adverse change in groundwater conditions or the beneficial use of groundwater, including in on-airport wells monitored during this period.

7.2 Recommendations

The following is recommended in relation to observed groundwater water quality trends:

- Post construction cross passage monitoring at SMGW-BH-A360 in April 2025 to confirm the field water quality parameter and gauging data that indicates that conditions are consistent with those reported pre-construction. The information will be provided to PLM for inclusion in the next biannual GME report.
- Post construction cross passage monitoring at SBT-GW-4008 and SBT-GW-4010 when levels recover.

The groundwater sampling compliance and quality control assessment is presented in the Quality Assurance Report in Annexure F. Recommendations from the assessment include:

- Sample turbidity should be considered when interpreting total metal and heavy end hydrocarbon concentrations as the presence of particulates may result in higher total concentrations being reported.
- The number of trip and field blanks was less than required, however this is not considered to affect the useability of the dataset as volatile hydrocarbons are only COPCs at St Marys, where an appropriate number of blanks have been analysed (refer Annexure G).

No further monitoring will be completed by CPBG for WSA SBT works as responsibility for groundwater monitoring along the alignment has been handed over to PLM.

Recommendations for PLM for the future monitoring include:

- Inspections of Claremont Creek stream flow and water level should be conducted periodically (monthly) until groundwater levels at SMGW-BH-A107 return to above trigger levels, to identify whether remaining pools are at risk of drying out.

- GDE vegetation monitoring continue at Orchard Hills until the end of 2028, along with level monitoring at SWD-TU150-22010-VWP02 and SBT-GW-1042.
- The EC logger in SBT-GW-1805 is malfunctioning. Maintenance to repair the logger is recommended, with monthly manual gauging and EC measurements in the interim.
- Attempts to repair SBT-GW-4008 should continue to allow for monitoring of recovery now that construction of XP-S20 is complete. Monitoring is required to provide data to assess the potential for construction related drawdown to have longer term effects on GDEs, i.e greater than 6 months, and other potential secondary impacts.
- To meet the requirements of the RAP the PRB mitigation monitoring program should continue until the St Marys station box is tanked, and groundwater levels have returned to the pre-construction range.

8 References

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- Tetra Tech Major Projects (2023a) Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works Project-wide Groundwater Modelling Report Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040402
- Tetra Tech Major Projects (2023b) Former Dry Cleaner, 1-7 Queen St – Assessment of Human Health Risk and Mitigation Options report (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040540)
- Tetra Tech (2023c); St Marys Station Remedial Action Plan (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040521, RevA08 22/05/2023)
- Tetra Tech Major Projects (2023d) Baseline Groundwater Report (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040405, Rev B, 29 August 2023)
- Tetra Tech Major Projects (2023d) Groundwater Monitoring Plan (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040404, Rev 2.01, 30 August 2023)
- Tetra Tech Major Projects (2023e); Biannual Groundwater Monitoring Report - July to November 2023. (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040410_A.02, 27 December 2023).
- Tetra Tech Major Projects (2024a); St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater monitoring network (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040403_A.01Rev A, 26/03/2024).
- Tetra Tech Major Projects (2024b); Biannual Groundwater Monitoring Report – December 2023 to June 2024. (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040419_A.02, 30 August 2024).

Annexure A Water quality data summary July 2024 to December 2024

Monitoring Zone	Location Code	Sample Code	Date	Lab Report Number	Magnesium (filtered)	Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron	Iron (filtered)	Lead (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Aluminium	Aluminium (filtered)	Cobalt	Manganese	Manganese (filtered)	Benzene	Toluene
					Metals																	
					mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					1	1	0.1	1	1	50	50	1	0.1	1	5	10	10	1	1	1	1	2
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							0.2		1.4			3.4	0.6	11	8	55	55		1,900	1,900	950	180
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							0.2		1.4			3.4	0.6	11	8	55	55		1,900	1,900	950	180
Airport Regulations - Water pollution - accepted limits - fresh water						50	0.2	10	2	1,000	1,000	1	0.1	15	5	100	100				300	300
PFAS NEMP 2020 Freshwater 99%																						
WSA - STM PRB Monitoring																						
WSA SBT - EPL 21672 (amended 10 May 2023)								1	1.4						15	80	80					
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	279	5	<0.1	<1	7	3,960	560	<1	<0.1	<1	<5	1,690	<10	8	200	171		
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	260	3	<0.1	<1	<1	6,120	830	<1	<0.1	4	15	2,580	10	10	2,090	2,050	<1	<2
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	725	2	<0.1	<1	<1	4,100	840	<1	<0.1	2	<5	2,440	<10	2	95	61	<1	<2
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	912	<10	<1.0	<10	<10	6,370	<100	<10	<0.1	55	<50	4,520	<100	49	254	140		
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	589	1	<0.1	<1	<1	26,800	2,130	<1	<0.1	2	7	7,620	<10	9	995	305		
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	489	<1	0.2	<1	3	34,900	<50	<1	<0.1	19	15	14,400	<10	37	1,120	346		
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	738	<1	<0.1	<1	<1	6,300	<50	<1	<0.1	9	9	2,520	<10	17	844	700		
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	12	2	<0.1	16	3	1,080	<50	<1	<0.1	3	16	800	20	2	58	27	<1	<2
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	858	11	<0.1	<1	1	3,270	1,430	<1	<0.1	10	30	1,450	90	15	3,270	3,060		
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	116	<1	<0.1	<1	<1	12,800	<50	<1	<0.1	16	32	8,080	<10	48	1,540	471		
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	266	2	<0.1	<1	2	81,800	420	<1	<0.1	3	<5	40,100	20	45	588	170		
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	630	2	<0.1	<1	<1	8,780	1,180	<1	<0.1	2	<5	2,680	<10	8	314	290		
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	24	<1	<0.1	<1	2	3,160	<50	<1	<0.1	2	<5	2,070	<10	4	173	136		
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	5	12	<0.1	3	<1	200	130	<1	<0.1	5	<5	70	50	1	162	147		
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	4	10	<0.1	3	<1	750	100	<1	<0.1	5	<5	790	30	1	168	148		
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	6	<1	<0.1	<1	<1	3,450	110	<1	<0.1	<1	5	2,210	30	2	20	8	<5	<5
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	805	<1	<0.1	1	<1	4,570	640	<1	<0.1	15	22	2,510	<10	16	1,770	1,770	<1	<2
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	1,000	<1	1.0	<1	14	4,070	<50	<1	<0.1	238	473	5,350	200	303	3,300	3,910		

TETRA TECH COFFEY

					BTEX						TPH											
					Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (VOC)	Total BTEX	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36 (Sum of total)	C10 - C40 (Sum of total)	F1 (C6 - C10)	F1 (C6 - C10) less BTEX	F2 (C10 - C16)	F2 C10 - C16 (minus Naphthalene)	F3 (C16 - C34)	F4 (C34 - C40)
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					2	2	2	2	5	1	20	50	100	50	50	100	20	20	100	100	100	100
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					80	350																
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					80	350																
Airport Regulations - Water pollution - accepted limits - fresh water					140						150				600							
PFAS NEMP 2020 Freshwater 99%																						
WSA - STM PRB Monitoring																						
WSA SBT - EPL 21672 (amended 10 May 2023)																						
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun																		
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	<2	<2	<2	<2	<5	<1	<20	<50	<100	<50	<50	<100	<20	<20	<100	<100	<100	<100
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	<2	<2	<2	<2	<5	<1	<20	<50	<100	<50	<50	<100	<20	<20	<100	<100	<100	<100
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	<2	<2	<2	<2	<5	<1	<20	-	-		-	-	<20	<20	-	-		
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	<5	<5	<5	<2	<5	<2	1,740	-	-		-	-	1,720	1,720	-	-		
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	<2	<2	<2	<2	<5	<1	<20	<50	<100	<50	<50	<100	<20	<20	<100	<100	<100	<100
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		

					Alkalinity				NA	Ions										pH	Physical Parameters		
					Alkalinity (total as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric (filtered)	Calcium (filtered)	Chloride	Bromine	Bromine (filtered)	Potassium (filtered)	Sodium (filtered)	Ionic Balance	Anions Total	Cations Total	pH (lab)	Electrical Conductivity @ 25C (lab)	Total Dissolved Solids (TDS)	TOC
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	meq/L	meq/L	pH_unit	µS/cm	µg/L	mg/L
EQL					1	1	1	1	1	1	1	0.1	0.1	1	1	0.01	0.01	0.01	0.01	1	10,000	1
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																						
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																						
Airport Regulations - Water pollution - accepted limits - fresh water																						
PFAS NEMP 2020 Freshwater 99%																						
WSA - STM PRB Monitoring																						
WSA SBT - EPL 21672 (amended 10 May 2023)																				7,000		
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun																		
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	327	<1	327	<1	177	492	7,820	-	-	65	4,740	5.05	231	255	7.66	23,400	15,500,000	5
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	965	<1	965	<1	423	148	3,190	-	-	19	1,880	3.07	118	111	7.52	11,300	6,780,000	8
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	1,080	<1	1,080	<1	934	243	6,640	-	-	29	3,500	0.78	228	225	7.48	21,400	14,000,000	4
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	887	<1	887	<1	1,380	454	8,540	-	-	45	4,790	3.34	287	307	7.39	26,200	18,800,000	3
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	1,210	<1	1,210	<1	675	210	5,320	-	-	27	2,860	1.14	188	184	7.49	17,500	11,300,000	2
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	713	<1	713	<1	1,160	281	5,240	-	-	29	2,890	1.50	186	181	7.71	17,500	11,300,000	8
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	689	<1	689	<1	422	479	9,320	-	-	45	4,480	0.85	285	281	7.33	27,300	18,800,000	1
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	63	<1	63	<1	330	410	1,800	4.4	4.3	39	744	3.60	58.9	54.8	6.58	6,590	3,760,000	8
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	380	<1	380	<1	1,220	133	8,380	32.7	27.7	13	4,070	2.82	269	255	7.14	28,300	16,600,000	4
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	48	<1	48	<1	413	170	968	2.6	2.4	7	415	0.82	36.9	36.3	6.54	4,130	2,400,000	3
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	392	<1	392	<1	178	155	3,440	9.9	9.0	4	1,660	3.15	108	102	7.72	11,600	7,010,000	7
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	536	<1	536	<1	385	337	7,080	-	-	5	3,620	1.76	218	226	7.81	21,000	13,300,000	5
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	350	<1	350	<1	91	17	310	3.0	2.4	1	298	5.44	17.6	15.8	7.40	1,750	900,000	4
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	613	<1	592	22	225	137	388	2.0	1.5	7	436	2.74	27.9	26.4	8.33	2,660	1,520,000	54
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	605	<1	589	16	213	184	475	-	-	7	467	0.14	29.9	30.0	8.33	2,900	1,550,000	53
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	108	<1	108	<1	19	20	54	-	-	4	60	1.54	4.08	4.20	7.52	429	289,000	8
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	872	<1	872	<1	777	278	8,810	-	-	10	4,660	0.17	282	283	7.48	26,700	18,100,000	<1
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	101	<1	101	<1	1,250	103	8,840	-	-	10	5,070	5.26	277	308	6.38	26,400	18,500,000	6

					Halogenated Benzenes									Halogenated Hydrocarbons								
					1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Iodomethane	Trichlorofluoromethane	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					5	5	5	5	5	5	5	5	5	5	50	50	5	50	5	5	5	5
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					10	170	160	260	60				55							270	400	6,500
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					10	170	160	260	60				55							270	400	6,500
Airport Regulations - Water pollution - accepted limits - fresh water					0.9	0.5	2.5	2.5	4				15									
PFAS NEMP 2020 Freshwater 99%																						
WSA - STM PRB Monitoring																						
WSA SBT - EPL 21672 (amended 10 May 2023)																						
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun																		
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<5	<50	<5	<5	<5	<5
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		

					Chlorinated Hydrocarbons																	
					1,1-dichloropropene	1,1-dichloroethane	1,1-dichloroethene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					5	5	5	5	5	5	5	5	5	5	5	5	5	50	5	50	5	5
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							700			1,900	900	1,100				240			770			
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							700			1,900	900	1,100				240			770			
Airport Regulations - Water pollution - accepted limits - fresh water																						
PFAS NEMP 2020 Freshwater 99%																						
WSA - STM PRB Monitoring																					250	
WSA SBT - EPL 21672 (amended 10 May 2023)																						
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun																		
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	<5	<5	<5	<5	<5	<5	<5	<5	<5	7	<5	<5	<5	<50	41	<50	266	<5
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		

												Inorganics	Nutrients									
					Dibromomethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride	Reactive Phosphorus as P (Orthophosphate as P)	Ammonia as N	Nitrite + Nitrate as N	Nitrate (as NO3-N)	Nitrite (as NO2-N)	Nitrogen (Total)	Total Kjeldahl Nitrogen (TKN)	Phosphorus total	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					5	5	5	5	5	5	50	10	10	10	10	10	100	100	10	5	5	5
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							330	70			100		900									30
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							330	70			100		900									30
Airport Regulations - Water pollution - accepted limits - fresh water						0.1											100					
PFAS NEMP 2020 Freshwater 99%																						
WSA - STM PRB Monitoring							55	300			200											
WSA SBT - EPL 21672 (amended 10 May 2023)													900				1,720					
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun																		
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	-	-	-		-	-	-	20	8,630	160	120	40	11,500	11,300	390	-		
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	-	-	-		-	-	-	10	220	7,720	7,720	<10	10,300	2,600	460	-		
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	-	-	-		-	-	-	<10	2,110	20	20	<10	3,200	3,200	230	-		
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	-	-	-		-	-	-	<10	980	2,610	2,430	180	6,200	3,600	920	-		
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	-	-	-		-	-	-	<10	320	60	60	<10	5,500	5,400	1,480	-		
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	-	-	-		-	-	-	<10	140	16,300	16,300	40	20,700	4,400	1,090	-		
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	-	-	-		-	-	-	<10	1,000	6,940	6,920	20	9,100	2,200	350	-		
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	-	-	-		-	-	-	10	100	1,720	1,720	<10	2,200	500	30	-		
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	-	-	-		-	-	-	<10	220	50	50	<10	400	400	70	-		
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	-	-	-		-	-	-	<10	140	310	310	<10	4,300	4,000	1,020	-		
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	-	-	-		-	-	-	40	90	<10	<10	<10	4,600	4,600	2,290	-		
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	-	-	-		-	-	-	<10	50	160	160	<10	800	600	180	-		
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	-	-	-		-	-	-	50	60	430	430	<10	800	400	80	-		
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	-	-	-		-	-	-	10	740	<10	<10	<10	6,700	6,700	740	-		
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	-	-	-		-	-	-	340	700	<10	<10	<10	3,500	3,500	510	-		
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	<5	<5	300	1,580	<5	<5	<50	20	50	830	830	<10	2,100	1,300	270	<5	<5	<5
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	-	-	-		-	-	-	<10	60	320	320	<10	800	500	320	-		
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	-	-	-		-	-	-	20	140	500	500	<10	1,800	1,300	300	-		

					Monocylic aromatic hydrocarbons						Per and polyfluoroalkyl substances											
					Styrene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	tert-butylbenzene	Perfluorobutane sulfonic acid (PFBS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					5	5	5	5	5	5	0.02	0.01	0.01	0.1	0.02	0.02	0.02	0.01	0.05	0.05	0.05	0.05
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																						
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																						
Airport Regulations - Water pollution - accepted limits - fresh water																						
PFAS NEMP 2020 Freshwater 99%													0.00023					19				
WSA - STM PRB Monitoring																						
WSA SBT - EPL 21672 (amended 10 May 2023)																						
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun																		
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	-	-	-		-	-	<0.02	<0.01	<0.01	<0.1	<0.02	<0.02	<0.02	<0.01	<0.05	<0.05	<0.05	<0.05
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	-	-	-		-	-	<0.02	<0.01	<0.01	<0.1	0.02	<0.02	<0.02	<0.01	<0.05	<0.05	<0.05	<0.05
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	-	-	-		-	-	-	-	-		-	-	-	-	-	-		
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	<5	<5	<5	<5	<5	<5	<0.02	<0.01	0.18	<0.1	<0.02	<0.02	<0.02	0.02	<0.05	<0.05	<0.05	<0.05
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	-	-	-		-	-	<0.02	<0.01	<0.01	<0.1	<0.02	<0.02	<0.02	<0.01	<0.05	<0.05	<0.05	<0.05
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	-	-	-		-	-	-	-	-		-	-	-	-	-	-		

							Solvents					Volatile Organic Compounds		
					Sum of PFAS (WA DER List)	Sum (PFHxS + PFOS)	Methyl Ethyl Ketone	4-Methyl-2-pentanone	Carbon disulfide	2-hexanone (MBK)	Vinyl acetate	cis-1,4-Dichloro-2-butene	trans-1,4-Dichloro-2-butene	Pentachloroethane
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					0.01	0.01	50	50	5	50	50	5	5	5
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs														80
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs														80
Airport Regulations - Water pollution - accepted limits - fresh water														
PFAS NEMP 2020 Freshwater 99%														
WSA - STM PRB Monitoring														
WSA SBT - EPL 21672 (amended 10 May 2023)														
Monitoring Zone	Location Code	Sample Code	Date	Lab Report Nun										
Aerotropolis	SBT-GW-4008	ES2430297004	16 Sep 2024	ES2430297	-	-	-	-	-		-	-	-	
Airport Terminal	SBT-GW-4000	ES2430297001	16 Sep 2024	ES2430297	-	-	-	-	-		-	-	-	
Bringelly	SBT-GW-4003	ES2430297005	16 Sep 2024	ES2430297	<0.01	<0.01	-	-	-		-	-	-	
Bringelly	SBT-GW-4005	ES2501765001	21 Jan 2025	ES2501765	-	-	-	-	-		-	-	-	
Bringelly	SBT-GW-4800	ES2430297006	16 Sep 2024	ES2430297	-	-	-	-	-		-	-	-	
Bringelly	SBT-GW-4801	ES2430297007	16 Sep 2024	ES2430297	-	-	-	-	-		-	-	-	
Bringelly	SBT-GW-4802	ES2430297008	16 Sep 2024	ES2430297	-	-	-	-	-		-	-	-	
Claremont Meadows	SBT-GW-1024	ES2430495001	17 Sep 2024	ES2430495	0.02	<0.01	-	-	-		-	-	-	
Claremont Meadows	SBT-GW-1028	ES2430495005	17 Sep 2024	ES2430495	-	-	-	-	-		-	-	-	
Claremont Meadows	SBT-GW-1805	ES2430495002	17 Sep 2024	ES2430495	-	-	-	-	-		-	-	-	
Northern Tunnels	SBT-GW-1804	ES2430495003	17 Sep 2024	ES2430495	-	-	-	-	-		-	-	-	
Northern Tunnels	SBT-GW-1804	ES2434376001	21 Oct 2024	ES2434376	-	-	-	-	-		-	-	-	
Northern Tunnels	SMGW-BH-A105S	ES2430495006	17 Sep 2024	ES2430495	-	-	-	-	-		-	-	-	
Northern Tunnels	SMGW-BH-A107	ES2430495004	17 Sep 2024	ES2430495	-	-	-	-	-		-	-	-	
Northern Tunnels	SMGW-BH-A107	ES2434376002	21 Oct 2024	ES2434376	-	-	-	-	-		-	-	-	
St Marys	MW01	ES2434376003	21 Oct 2024	ES2434376	0.20	0.18	<50	<50	<5	<50	<50	<5	<5	<5
WSI	SMGW-BH-C320	ES2430297002	16 Sep 2024	ES2430297	<0.01	<0.01	-	-	-		-	-	-	
WSI	SMGW-BH-C330	ES2430297003	16 Sep 2024	ES2430297	-	-	-	-	-		-	-	-	

Table 2
Western Sydney Airport - Station Boxes and Tunnels
Field water quality parameters and gauged water levels
July 2024 to December 2024

								mBTOC	mAHD	NTU	mS/cm	oC	ppt	g/L	mV	% saturation	mg/L			
Location ID	Monitoring Zone	Aquifer Monitored	Easting	Northing	TOC Elevation (mAHD)	Screen Interval (mAHD)	Sampled Date	Depth to Water	SWL	Turbidity	Electrical Conductivity	Temperature	Salinity	Total Dissolved Solids	Redox Potential	Dissolved Oxygen	Dissolved Oxygen	pH field	Odour	Field observations / odour
SMGW-BH-A105S	TBM Tunnel - South Creek	Residual/Alluvium	293100	6261999	22.6	14.6 to 20.6	17-09-24	3.02	19.58	171	1.8	21.46	0.91	1.15	41	33.1	2.91	7.48	methane / Org	Clear
SMGW-BH-A107	TBM Tunnel - South Creek	Bedrock	292413	6261713	22.5	-3.5 to 3.5	23-08-24	8.15	14.35	42.8	0.949	21.61	0.47	0.608	-43	167.9	14.75	6.96	NA	NA
SMGW-BH-A107	TBM Tunnel - South Creek	Bedrock	292413	6261713	22.5	-3.5 to 3.5	17-09-24	9.52	12.98	194	2.77	21.81	1.43	1.77	-165	50.6	4.4	8.37	Organic / Methane	Black sediment
SMGW-BH-A107	TBM Tunnel - South Creek	Bedrock	292413	6261713	22.5	-3.5 to 3.5	21-10-24	8.41	14.09	41.7	2.88	20.97	1.49	1.84	-188	34.3	3.03	7.86	NA	Clear, tanin stains
SBT-GW-1804	TBM Tunnel - South Creek	Residual	292194.9	6261580.1	21.021	16.02 - 19.02	17-09-24	1.6	19.42	>1000	11.5	20.77	6.52	7.11	-1	36.7	3.17	7.31	Organic	Orange / Brown
SBT-GW-1804	TBM Tunnel - South Creek	Residual	292194.9	6261580.1	21.021	16.02 - 19.02	14-08-24	1.35	19.67	566	2.55	17.02	12.9	1.63	155	35.2	3.38	8.03	None	Clear
SBT-GW-1804	TBM Tunnel - South Creek	Residual	292194.9	6261580.1	21.021	16.02 - 19.02	21-10-24	1.7	19.32	566	21.6	21.36	12.92	13.4	-92	38.2	3.14	6.83	NA	Cloudy
SBT-GW-1805	Claremont Meadows SF	Residual	292046.7	6261326.1	27.296	18.3 - 24.3	17-09-24	2.79	24.51	>1000	4.19	17.92	2.21	2.68	194	83.4	7.81	7.65	NA	Brown / Orange
SBT-GW-1024	Claremont Meadows SF	Alluvium/Bedrock	292108.9	6261303	28.506	16.51 - 25.51	17-09-24	6.24	22.27		6.42	17.14	3.48	4.05	153	82.3	7.77	7.78	NA	Clear
SBT-GW-1028	Claremont Meadows	Residual/Alluvium	292050	6261168	31	22.5 to 27.5	17-09-24	3.2	27.8		26.2	20.76	16.04	16.2	50	116.4	9.48	6.84	Mehenel	
SBT-GW-1030	Cross passage / Tunnel (XPN13)	Residual/Bedrock	291923.5	6260911.5	36.807	30.8 - 34.8	19-09-24	4.2	32.61											Well destroyed, rocks fallen in and no Hydrasleeve. Water level reading taken, but indicative only as no casing.
SMGW-BH-C320	Western Sydney Airport	Residual/Bedrock	289629.3	6246534.9	66.47	57.47 - 63.47	16/09/204	4.2	62.27	312	28	15.29	17.01	17.3	-14	51.6	5.21	6.8	NA	Clear
SMGW-BH-C330	Western Sydney Airport	Bedrock	289535.1	6246506.5	69.35	60.35 - 66.35	16-09-24	4.67	64.68	716	27.6	15.35	12	3.51	137	38.9	3.92	5.96	NA	Yellowish
SBT-GW-4003	Bringelly SF	Residual/Bedrock	289518.7	6245851.2	71.932	64.9 - 69.9	16-09-24	11.59	60.34	446	21.7	18.47	12.94	13.4	8	29.9	2.59	7.01	NA	Yellow
SBT-GW-4801	Bringelly SF	Residual/ Bedrock	289580.1	6245835.6	71.372	55.4- 67.4	16-09-24	12.6	58.77	1000	17.7	19.35	10.43	11	99	31	2.38	7.63	organic	Turbid
SBT-GW-4800	Bringelly SF	Residual/ Bedrock	289626.6	6245830	71.432	64.4 - 69.4	16-09-24	11.26	60.17	1000	17.6	19.54	10.35	10.9	-34	20.6	1.78	7.15	organic	Clear / grey
SBT-GW-4802	Bringelly SF	Bedrock	289583.3	6245761.2	74.348	58.4 - 70.4	16-09-24	16.01	58.34	785	27.2	19.52	16.65	16.9	94	25.2	2.09	7.39	NA	Yellowish
SBT-GW-4005	Bringelly SF	Bedrock	289666.8	6245749.6	73.613	53.6 - 53.6	16-09-24	>17.66m												Well Dry. Total well depth 17.66m
SBT-GW-4005	Bringelly SF	Bedrock	289666.8	6245749.6	73.613	53.6 - 53.6	21-01-25	13.89	59.72	1000	26.9	20.27	16.42	16.6	10.7	124.9	10.26	6.52	NA	
SBT-GW-4008	Cross passage / Tunnel	Bedrock	290230	6244991.9	78.269	50.27 - 56.27	23-08-24	variable		421	25	16.44	15.14	15.5	-132	51.5	5.59	7.82	NA	Unable to take water depth due to movement in Groundwater due to TBM
SBT-GW-4008	Cross passage / Tunnel	Bedrock	290230	6244991.9	78.269	50.27 - 56.27	16-09-24	21.55	56.72	122	24.1	19.61	15.56	14.9	-152	19	1.6	7.75	Organic sulfur	Clear / grey
SBT-GW-4010	Aerotropolis - Bringelly	Bedrock	290427.4	6244758.3	78.779	50.78 - 56.78	16-09-24	NA												GW was dry
MW01	St Marys	Bedrock	293889	6261976	35.2	28 - 31	21-10-24	0.67	34.53	123	0.476	20.2	0.23	0.309	-18	37.6	3.4	7.39	NA	Clear (originally incorrectly labelled SMGW-BH-A360)
SMGW-BH-A360	XP-N02	Bedrock	293784.2	6262010.0	33.254	22.3 - 25.3	25-03-25	7.59	25.66	1000	25.4	21.73	15.46		49	39.2	3.14	6.46	Nil	Gauging and field water quality only. To be sampled in April 2025
SBT-GW-4010	Aerotropolis - Bringelly	Bedrock	290427.4	6244758.3	78.779	50.78 - 56.78	13-08-24	NA		120	2.14	18.32	1.09	1.37	24	136.9	12.78	6.85		No water in well, sleeve had water
SBT-GW-4000	Western Sydney Airport	Bedrock	289140.5	6046360.3	72.235	59.24 - 69.74	16-09-24													Primary, duplicate and triplicate samples taken

Annexure B Laboratory Reports

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CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐GLADSTONE 46 Callemondah Drive Gladstone QLD 4680 Ph: 07 4978 7944 E: ALSEnviro.Gladstone@alsglobal.com
☐MACKAY Unit 2/20 Caterpillar Drive Paget QLD 4740 Ph: 07 4952 5795 E: ALSEnviro.Mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 26 Rigali Way Wangara WA 6065 Ph: 08 9406 1301 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 13 Carlton Street Kirwan QLD 4817 Ph: 07 4773 0000 E: ALSEnviro.Townsville@alsglobal.com
☐WOLLONGONG 1/19-21 Ralph Black Drive, Nth Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: CPBG

OFFICE: 14 Great Western Highway, Werrington

PROJECT: WSA SBT Project **PROJECT NO.:**

ORDER NUMBER: **PURCHASE ORDER NO.:**

PROJECT MANAGER: Emma Kline **CONTACT PH:** 0402 044 508

SAMPLER: Alan Hillany (AH) / Christopher Blythe (CB) **SAMPLER MOBILE: 0417 839 845 (CB)**

COC Emailed to ALS? YES / NO **EDD FORMAT:** ESDAT and PDF

Email Reports to: Emily.Fuda@cpbg-sbt.com.au; christopher.blyth@cpbg-sbt.com.au; joshua.cosier@cpbg-sbt.com.au

Email Invoice to: Emily.Fuda@cpbg-sbt.com.au; Reginald.Angelo@cpbg-sbt.com.au

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: ES23CPBGHE0004

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY: CPBG
DATE/TIME: 19/9/2024

RECEIVED BY: ALS Environmental
DATE/TIME: 19/9/24 1702

RELINQUISHED BY:
DATE/TIME:

RECEIVED BY:
DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY | **SAMPLE DETAILS** MATRIX: Solid(S) Water(W) | **CONTAINER INFORMATION** | **ANALYSIS REQUIRED including SUITES** (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required). | **Additional Information**

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA005P - pH	EA010P - Electrical Conductivity	EA015H - Total Dissolved Solids	NT-01 & 02 - Ca, Mg, Na, K, Cl, SO4, Alkalinity	EP005 - Total Organic Carbon (TOC)	NT-08A - Total Nitrogen, NO2, NO3, NH3, Total P, Reactive P	EG020F - Dissolved Metals by ICP/MS (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn)	EG035F - Dissolved Mercury	EG020T - Total Metals by ICP/MS (Al, Co, Fe, Mn)	EP074 - Volatile Organic Compounds	TPH - TRH (C6-C40)	EP080 - BTEXN	W-04 - TRH/BTEXN	EP231 - Per- and Polyfleuralkyl Substances		Additional Information
1	SBT-GW-4000 (TRIPLICATE 1)	19/09/2023 0:00	W		9			X		X	X	X		X				XXXX			
2	SBT-GW-4000 (TRIPLICATE) 2	19/09/2023 0:00	W		9			X		X	X	X		X				XXXX			
3	SMGW-BH-C320	19/09/2023 0:00	W	part of ES2430297	1													X			
4	SBT-GW-4003 (DUPLICATE)	19/09/2023 0:00	W		9			X		X	X	X		X				XXXX			
5	SBT-GW-4003	19/09/2023 0:00	W	part of ES2430297	1													X			
				TOTAL	29																

Environmental Division
Sydney
Work Order Reference
ES2430811

Telephone: +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

6 SBT-GW-4000 19/9/24 → Received Extra sample part of ES2430297

CERTIFICATE OF ANALYSIS

Work Order	: **ES2430811**	Page	: 1 of 7
Client	: **CPB Contractors Pty Ltd & Ghella Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Customer Services ES
Address	: 14 GREAT WESTERN HWY WERRINGTON 2747	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WSA SBT Project	Date Samples Received	: 19-Sep-2024 17:02
Order number	: ----	Date Analysis Commenced	: 19-Sep-2024
C-O-C number	: ----	Issue Date	: 27-Sep-2024 16:04
Sampler	: [redacted] (AH), CHRISTOPHER BLYTH		
Site	:		
Quote number	: Contract ES23CPBGHE0004		
No. of samples received	: 3		
No. of samples analysed	: 3		

NATA

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Samples 3, 5,and 6 logged under is ES2430297
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-4000 (TRIPLICATE) 1	SBT-GW-4000 (TRIPLICATE) 2	SBT-GW-4003 (DUPLICATE)	----	----
			Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
				ES2430811-001	ES2430811-002	ES2430811-004	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.28**	**7.24**	**7.21**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**13900**	**15200**	**22000**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**8310**	**9130**	**13600**	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**1020**	**1060**	**1020**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**1020**	**1060**	**1020**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**437**	**481**	**842**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**4050**	**4480**	**6740**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**170**	**175**	**237**	----	----
Magnesium	7439-95-4	1	mg/L	**334**	**340**	**710**	----	----
Sodium	7440-23-5	1	mg/L	**2380**	**2380**	**3460**	----	----
Potassium	7440-09-7	1	mg/L	**25**	**25**	**32**	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.002**	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	**0.001**	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	**0.006**	**0.007**	**0.002**	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	**0.009**	**0.015**	**0.010**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4000 (TRIPLICATE) 1	SBT-GW-4000 (TRIPLICATE) 2	SBT-GW-4003 (DUPLICATE)	----	----
			Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2430811-001	ES2430811-002	ES2430811-004	--------	--------
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Manganese	7439-96-5	0.001	mg/L	**2.41**	**2.41**	**0.071**	----	----
Iron	7439-89-6	0.05	mg/L	**0.74**	**0.72**	**0.13**	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**5.08**	**5.59**	**9.25**	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.019**	**0.021**	**0.008**	----	----
Manganese	7439-96-5	0.001	mg/L	**2.85**	**3.00**	**0.206**	----	----
Iron	7439-89-6	0.05	mg/L	**12.4**	**13.8**	**17.1**	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.20**	**0.19**	**1.93**	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.01**	**0.04**	**0.07**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.01**	**0.04**	**0.07**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**2.4**	**2.2**	**3.0**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**2.4**	**2.2**	**3.1**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.57**	**0.59**	**0.27**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**144**	**158**	**228**	----	----
ø Total Cations	----	0.01	meq/L	**140**	**141**	**222**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4000 (TRIPLICATE) 1	SBT-GW-4000 (TRIPLICATE) 2	SBT-GW-4003 (DUPLICATE)	----	----
			Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2430811-001	ES2430811-002	ES2430811-004	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance - Continued								
ø Ionic Balance	----	0.01	%	**1.26**	**5.59**	**1.44**	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**7**	**6**	**3**	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	**440**	**690**	<100	----	----
C29 - C36 Fraction	----	50	µg/L	**100**	**210**	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	**540**	**900**	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	**500**	**860**	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	**500**	**860**	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----

Work Order : ES2430811
Client : CPB Contractors Pty Ltd & Ghella Pty Ltd
Project : WSA SBT Project

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4000 (TRIPLICATE) 1	SBT-GW-4000 (TRIPLICATE) 2	SBT-GW-4003 (DUPLICATE)	----	----
			Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	ES2430811-001	ES2430811-002	ES2430811-004	--------	--------
				Result	Result	Result	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**107**	**112**	**119**	----	----
Toluene-D8	2037-26-5	2	%	**104**	**111**	**113**	----	----
4-Bromofluorobenzene	460-00-4	2	%	**110**	**117**	**122**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

CHAIN OF CUSTODY *ALS Laboratory: please tick →*	☐ADELAIDE 3/1 Burma Road Pooraka SA 5095 Ph: 08 8162 5130 E: adelaide@alsglobal.com ☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com ☐GLADSTONE 48 Callemondah Drive Gladstone QLD 4680 Ph: 07 4978 7944 E: ALSEnviro.Gladstone@alsglobal.com	☐MACKAY Unit 2/20 Caterpillar Drive Paget QLD 4740 Ph: 07 4052 5795 E: ALSEnviro.Mackay@alsglobal.com ☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com ☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com	☐NEWCASTLE 6/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com ☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com ☐PERTH 26 Rigali Way Wangara WA 6065 Ph: 08 9406 1301 E: samples.perth@alsglobal.com	☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com ☐TOWNSVILLE 13 Carlton Street Kirwan QLD 4817 Ph: 07 4773 0000 E: ALSEnviro.Townsville@alsglobal.com ☐WOLLONGONG 1/19-21 Ralph Black Drive, Nth Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: CPBG	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: 14 Great Western Highway, Werrington			Custody Seal Intact? Yes No N/A
PROJECT: WSA SBT Project PROJECT NO.:	ALS QUOTE NO.: ES23CPBGHE0004	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Emma Kline	CONTACT PH: 0402 044 508	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Alan Hillany (AH) / Phillip Rowan (PR) SAMPLER MOBILE: 0480 281 198	RELINQUISHED BY: CPBG	RECEIVED BY: ALS Environmental	RELINQUISHED BY:	RECEIVED BY:
COC Emailed to ALS? YES / NO EDD FORMAT: ESDAT and PDF				
Email Reports to: Emily.Fuda@cpbg-sbt.com.au; Joshua.Cosier@cpbg-sbt.com.au; Phillip.Rowan@cpbg-sbt.com.au	DATE/TIME: 17/09/2023	DATE/TIME:	DATE/TIME:	DATE/TIME: 17/9/24 1743
Email Invoice to: Emily.Fuda@cpbg-sbt.com.au; Reginald.Angelo@cpbg-sbt.com.au	[redacted]			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).																	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA005P - pH	EA010P - Electrical Conductivity	EA015H - Total Dissolved Solids	NT-01 & 02 - Ca, Mg, Na, K, Cl, SO4, Alkalinity	EP005 - Total Organic Carbon (TOC)	NT-08A - Total Nitrogen, NO2, NO3, NH3, Total P, Reactive P	EG020F - Dissolved Metals by ICP/MS (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn)	EG035F - Dissolved Mercury	EG020T - Total Metals by ICP/MS (Al, Co, Fe, Mn)	EP074 - Volatile Organic Compounds	TPH - TRH (C6-C40)	EP080 - BTEXN	W-04 - TRH/BTEXN	EP231 - Per- and Polyfluoralkyl Substances				HT
1	SBT-GW-1024	17/09/2023 0:00	W		9	X	X	X	X	X	X	X	X	X				X	X				
2	SBT-GW-1805	17/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X									
3	SBT-GW-1804	17/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X									
4	SMGW-BH-A107	17/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X									
5	SBT-GW-1028	17/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X									
6	SMGW-BH-A105S	17/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X									
				TOTAL	34																		

Environmental Division
Sydney
Work Order Reference
ES2430495

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ES2430495

CERTIFICATE OF ANALYSIS

Work Order	: **ES2430495**	Page	: 1 of 10
Amendment	: **1**		
Client	: **CPB Contractors Pty Ltd & Ghella Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Customer Services ES
Address	: 14 GREAT WESTERN HWY WERRINGTON 2747	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WSA SBT Project	Date Samples Received	: 17-Sep-2024 17:43
Order number	: ----	Date Analysis Commenced	: 18-Sep-2024
C-O-C number	: ----	Issue Date	: 16-Oct-2024 09:58
Sampler	: [redacted], PHILLIP [redacted]		
Site	:		
Quote number	: Contract ES23CPBGHE0004		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.
- Amendment (10/10/2024): This report has been amended and re-released to allow the reporting of additional analytical data, specifically method EG020T and EG020F for samples 001 - 006.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.58**	**6.54**	**7.72**	**8.33**	**7.14**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**6590**	**4130**	**11600**	**2660**	**28300**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**3760**	**2400**	**7010**	**1520**	**16600**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	**22**	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**63**	**48**	**392**	**592**	**380**
Total Alkalinity as CaCO3	----	1	mg/L	**63**	**48**	**392**	**613**	**380**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**330**	**413**	**178**	**225**	**1220**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**1800**	**968**	**3440**	**388**	**8380**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**410**	**170**	**155**	**137**	**133**
Magnesium	7439-95-4	1	mg/L	**12**	**116**	**266**	**5**	**858**
Sodium	7440-23-5	1	mg/L	**744**	**415**	**1660**	**436**	**4070**
Potassium	7440-09-7	1	mg/L	**39**	**7**	**4**	**7**	**13**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.02**	<0.01	**0.02**	**0.05**	**0.09**
Arsenic	7440-38-2	0.001	mg/L	**0.002**	<0.001	**0.002**	**0.012**	**0.011**
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	**0.016**	<0.001	<0.001	**0.003**	<0.001
Copper	7440-50-8	0.001	mg/L	**0.003**	<0.001	**0.002**	<0.001	**0.001**
Nickel	7440-02-0	0.001	mg/L	**0.003**	**0.016**	**0.003**	**0.005**	**0.010**
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	**0.016**	**0.032**	<0.005	<0.005	**0.030**
Manganese	7439-96-5	0.001	mg/L	**0.027**	**0.471**	**0.170**	**0.147**	**3.06**
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	**0.42**	**0.13**	**1.43**
Bromine	7726-95-6	0.1	mg/L	**4.3**	**2.4**	**9.0**	**1.5**	**27.7**
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.80**	**8.08**	**40.1**	**0.07**	**1.45**
Cobalt	7440-48-4	0.001	mg/L	**0.002**	**0.048**	**0.045**	**0.001**	**0.015**
Manganese	7439-96-5	0.001	mg/L	**0.058**	**1.54**	**0.588**	**0.162**	**3.27**
Iron	7439-89-6	0.05	mg/L	**1.08**	**12.8**	**81.8**	**0.20**	**3.27**
Bromine	7726-95-6	0.1	mg/L	**4.4**	**2.6**	**9.9**	**2.0**	**32.7**
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.10**	**0.14**	**0.09**	**0.74**	**0.22**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**1.72**	**0.31**	<0.01	<0.01	**0.05**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**1.72**	**0.31**	<0.01	<0.01	**0.05**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.5**	**4.0**	**4.6**	**6.7**	**0.4**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**2.2**	**4.3**	**4.6**	**6.7**	**0.4**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.03**	**1.02**	**2.29**	**0.74**	**0.07**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	<0.01	**0.04**	**0.01**	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**58.9**	**36.9**	**108**	**27.9**	**269**
ø Total Cations	----	0.01	meq/L	**54.8**	**36.3**	**102**	**26.4**	**255**
ø Ionic Balance	----	0.01	%	**3.60**	**0.82**	**3.15**	**2.74**	**2.82**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**8**	**3**	**7**	**54**	**4**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	**0.02**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.02**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**96.6**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**115**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**107**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**103**	----	----	----	----
13C8-PFOA	----	0.02	%	**101**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SMGW-BH-A1055	----	----	----	----
			Sampling date / time	17-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2430495-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.40**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1750**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**900**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**350**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**350**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**91**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**310**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**17**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**24**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**298**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**1**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	**0.002**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SMGW-BH-A1055	----	----	----	----
			Sampling date / time	17-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2430495-006	--------	--------	--------	--------
				Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.136**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
Bromine	7726-95-6	0.1	mg/L	**2.4**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**2.07**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.004**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.173**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**3.16**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L	**3.0**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.06**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.43**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.43**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.4**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.8**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.08**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.05**	----	----	----	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SMGW-BH-A1055	----	----	----	----
			Sampling date / time	17-Sep-2024 00:00	----	----	----	----
				ES2430495-006	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**17.6**	----	----	----	----
ø Total Cations	----	0.01	meq/L	**15.8**	----	----	----	----
ø Ionic Balance	----	0.01	%	**5.44**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

CERTIFICATE OF ANALYSIS

Work Order	: **ES2430495**	Page	: 1 of 10
Client	: **CPB Contractors Pty Ltd & Ghella Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Customer Services ES
Address	: 14 GREAT WESTERN HWY WERRINGTON 2747	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WSA SBT Project	Date Samples Received	: 17-Sep-2024 17:43
Order number	: ----	Date Analysis Commenced	: 18-Sep-2024
C-O-C number	: ----	Issue Date	: 25-Sep-2024 17:17
Sampler	: [redacted], PHILLIP [redacted]		
Site	:		
Quote number	: Contract ES23CPBGHE0004		
No. of samples received	: 6		
No. of samples analysed	: 6		

NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.58**	**6.54**	**7.72**	**8.33**	**7.14**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**6590**	**4130**	**11600**	**2660**	**28300**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**3760**	**2400**	**7010**	**1520**	**16600**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as $CaCO_3$	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as $CaCO_3$	3812-32-6	1	mg/L	<1	<1	<1	**22**	<1
Bicarbonate Alkalinity as $CaCO_3$	71-52-3	1	mg/L	**63**	**48**	**392**	**592**	**380**
Total Alkalinity as $CaCO_3$	----	1	mg/L	**63**	**48**	**392**	**613**	**380**
ED041G: Sulfate (Turbidimetric) as SO_4 2- by DA								
Sulfate as SO_4 - Turbidimetric	14808-79-8	1	mg/L	**330**	**413**	**178**	**225**	**1220**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**1800**	**968**	**3440**	**388**	**8380**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**410**	**170**	**155**	**137**	**133**
Magnesium	7439-95-4	1	mg/L	**12**	**116**	**266**	**5**	**858**
Sodium	7440-23-5	1	mg/L	**744**	**415**	**1660**	**436**	**4070**
Potassium	7440-09-7	1	mg/L	**39**	**7**	**4**	**7**	**13**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.02**	<0.01	**0.02**	**0.05**	**0.09**
Arsenic	7440-38-2	0.001	mg/L	**0.002**	<0.001	**0.002**	**0.012**	**0.011**
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	**0.016**	<0.001	<0.001	**0.003**	<0.001
Copper	7440-50-8	0.001	mg/L	**0.003**	<0.001	**0.002**	<0.001	**0.001**
Nickel	7440-02-0	0.001	mg/L	**0.003**	**0.016**	**0.003**	**0.005**	**0.010**
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
Sampling date / time				17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
				ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	**0.016**	**0.032**	<0.005	<0.005	**0.030**
Manganese	7439-96-5	0.001	mg/L	**0.027**	**0.471**	**0.170**	**0.147**	**3.06**
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	**0.42**	**0.13**	**1.43**
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.80**	**8.08**	**40.1**	**0.07**	**1.45**
Cobalt	7440-48-4	0.001	mg/L	**0.002**	**0.048**	**0.045**	**0.001**	**0.015**
Manganese	7439-96-5	0.001	mg/L	**0.058**	**1.54**	**0.588**	**0.162**	**3.27**
Iron	7439-89-6	0.05	mg/L	**1.08**	**12.8**	**81.8**	**0.20**	**3.27**
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.10**	**0.14**	**0.09**	**0.74**	**0.22**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**1.72**	**0.31**	<0.01	<0.01	**0.05**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**1.72**	**0.31**	<0.01	<0.01	**0.05**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.5**	**4.0**	**4.6**	**6.7**	**0.4**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**2.2**	**4.3**	**4.6**	**6.7**	**0.4**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.03**	**1.02**	**2.29**	**0.74**	**0.07**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	<0.01	**0.04**	**0.01**	<0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**58.9**	**36.9**	**108**	**27.9**	**269**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**54.8**	**36.3**	**102**	**26.4**	**255**
ø Ionic Balance	----	0.01	%	**3.60**	**0.82**	**3.15**	**2.74**	**2.82**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**8**	**3**	**7**	**54**	**4**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	**0.02**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1024	SBT-GW-1805	SBT-GW-1804	SMGW-BH-A107	SBT-GW-1028
			Sampling date / time	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430495-001	ES2430495-002	ES2430495-003	ES2430495-004	ES2430495-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.02**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**96.6**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**115**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**107**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**103**	----	----	----	----
13C8-PFOA	----	0.02	%	**101**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SMGW-BH-A1055	----	----	----	----
			Sampling date / time	17-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2430495-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.40**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1750**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**900**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**350**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**350**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**91**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**310**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**17**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**24**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**298**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**1**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	**0.002**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SMGW-BH-A1055	----	----	----	----
			Sampling date / time	17-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2430495-006	--------	--------	--------	--------
				Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.136**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**2.07**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.004**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.173**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**3.16**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.06**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.43**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.43**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.4**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.8**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.08**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.05**	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**17.6**	----	----	----	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

			Sample ID	SMGW-BH-A1055	----	----	----	----
			Sampling date / time	17-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2430495-006	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**15.8**	----	----	----	----
ø Ionic Balance	----	0.01	%	**5.44**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

/

CHAIN OF CUSTODY

ALS

ALS Laboratory: please tick →

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CLIENT: CPBG

OFFICE: 14 Great Western Highway, Werrington

PROJECT: WSA SBT Project PROJECT NO.:

ORDER NUMBER: PURCHASE ORDER NO.:

PROJECT MANAGER: Emma Kline CONTACT PH: 0402 044 508

SAMPLER: Alan Hillany (AH) / Christopher Blythe (CB) SAMPLER MOBILE: 0417 839 845 (CB)

COC Emailed to ALS? YES / NO EDD FORMAT: ESDAT and PDF

Email Reports to: Emily.Fuda@cpbg-sbt.com.au; christopher.blyth@cpbg-sbt.com.au; joshua.coster@cpbg-sbt.com.au

Email Invoice to: Emily.Fuda@cpbg-sbt.com.au; Reginald.Angelo@cpbg-sbt.com.au

TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):
(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: ES23CPBGHE0004

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY: CPBG	RECEIVED BY: ALS Environmental	RELINQUISHED BY:	RECEIVED BY:
	Thanh		
DATE/TIME: 16/9/2024	DATE/TIME: 16/9/24 1530	DATE/TIME:	DATE/TIME:
[redacted]			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

SAMPLE DETAILS MATRIX: Solid(S) Water(W)

LAB ID (ALS USE ONLY)	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA005P - pH	EA010P - Electrical Conductivity	EA015H - Total Dissolved Solids	NT-01 & 02 - Ca, Mg, Na, K, Cl, SO4, Alkalinity	EP005 - Total Organic Carbon (TOC)	NT-08A - Total Nitrogen, NO2, NO3, NH3, Total P, Reactive P	EG020F - Dissolved Metals by ICP/MS (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn)	EG035F - Dissolved Mercury	EG020T - Total Metals by ICP/MS (Al, Co, Fe, Mn)	EP074 - Volatile Organic Compounds	TPH - TRH (C6-C40)	EP080 - BTEXN	W-04 - TRH/BTEXN	EP231 - Per- and Polyfluoralkyl Substances		Additional Information
1	SBT-GW-4000	16/09/2024 0:00	W		9			X		X	X	X		X				XXXX			
2	SMGW-BH-C320	16/09/2023 0:00	W		9	X	X	X	X	X	X	X	X	X				X	X		
3	SMGW-BH-C330	16/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X							
4	SBT-GW-4008	16/09/2023 0:00	W		5	X	X	X	X	X	X	X	X	X							
5	SBT-GW-4003	16/09/2024 0:00	W		9	X	X	X	X	X	X	X	X	X				X	X		
6	SBT-GW-4800	16/09/2024 0:00	W		5	X	X	X	X	X	X	X	X	X							
7	SBT-GW-4801	16/09/2024 0:00	W		5	X	X	X	X	X	X	X	X	X							
8	SBT-GW-4802	16/09/2024 0:00	W		5	X	X	X	X	X	X	X	X	X							
				TOTAL	52																

Environmental Division
Sydney
Work Order Reference
ES2430297

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Forma[illegible]yde Pres[illegible]d Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

HT

CERTIFICATE OF ANALYSIS

Work Order	: **ES2430297**	Page	: 1 of 11
Client	: **CPB Contractors Pty Ltd & Ghella Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Customer Services ES
Address	: 14 GREAT WESTERN HWY WERRINGTON 2747	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WSA SBT Project	Date Samples Received	: 16-Sep-2024 15:30
Order number	: ----	Date Analysis Commenced	: 16-Sep-2024
C-O-C number	: ----	Issue Date	: 23-Sep-2024 15:00
Sampler	: [redacted], CHRISTOPHER BLYTH		
Site	:		
Quote number	: Contract ES23CPBGHE0004		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4000	SMGW-BH-C320	SMGW-BH-C330	SBT-GW-4008	SBT-GW-4003
			Sampling date / time	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430297-001	ES2430297-002	ES2430297-003	ES2430297-004	ES2430297-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.52**	**7.48**	**6.38**	**7.66**	**7.48**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**11300**	**26700**	**26400**	**23400**	**21400**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**6780**	**18100**	**18500**	**15500**	**14000**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**965**	**872**	**101**	**327**	**1080**
Total Alkalinity as CaCO3	----	1	mg/L	**965**	**872**	**101**	**327**	**1080**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**423**	**777**	**1250**	**177**	**934**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**3190**	**8810**	**8840**	**7820**	**6640**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**148**	**278**	**103**	**492**	**243**
Magnesium	7439-95-4	1	mg/L	**260**	**805**	**1000**	**279**	**725**
Sodium	7440-23-5	1	mg/L	**1880**	**4660**	**5070**	**4740**	**3500**
Potassium	7440-09-7	1	mg/L	**19**	**10**	**10**	**65**	**29**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.01**	<0.01	**0.20**	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	**0.003**	<0.001	<0.001	**0.005**	**0.002**
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	**0.0010**	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.001**	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.014**	**0.007**	<0.001
Nickel	7440-02-0	0.001	mg/L	**0.004**	**0.015**	**0.238**	<0.001	**0.002**
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-4000	SMGW-BH-C320	SMGW-BH-C330	SBT-GW-4008	SBT-GW-4003
Sampling date / time				16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00
				ES2430297-001	ES2430297-002	ES2430297-003	ES2430297-004	ES2430297-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	**0.015**	**0.022**	**0.473**	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**2.05**	**1.77**	**3.91**	**0.171**	**0.061**
Iron	7439-89-6	0.05	mg/L	**0.83**	**0.64**	<0.05	**0.56**	**0.84**
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**2.58**	**2.51**	**5.35**	**1.69**	**2.44**
Cobalt	7440-48-4	0.001	mg/L	**0.010**	**0.016**	**0.303**	**0.008**	**0.002**
Manganese	7439-96-5	0.001	mg/L	**2.09**	**1.77**	**3.30**	**0.200**	**0.095**
Iron	7439-89-6	0.05	mg/L	**6.12**	**4.57**	**4.07**	**3.96**	**4.10**
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.22**	**0.06**	**0.14**	**8.63**	**2.11**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	**0.04**	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**7.72**	**0.32**	**0.50**	**0.12**	**0.02**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**7.72**	**0.32**	**0.50**	**0.16**	**0.02**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**2.6**	**0.5**	**1.3**	**11.3**	**3.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ **Total Nitrogen as N**	----	0.1	mg/L	**10.3**	**0.8**	**1.8**	**11.5**	**3.2**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.46**	**0.32**	**0.30**	**0.39**	**0.23**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	<0.01	**0.02**	**0.02**	<0.01
EN055: Ionic Balance								
ø **Total Anions**	----	0.01	meq/L	**118**	**282**	**277**	**231**	**228**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-4000	SMGW-BH-C320	SMGW-BH-C330	SBT-GW-4008	SBT-GW-4003
			Sampling date / time	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00
				ES2430297-001	ES2430297-002	ES2430297-003	ES2430297-004	ES2430297-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**111**	**283**	**308**	**255**	**225**
ø Ionic Balance	----	0.01	%	**3.07**	**0.17**	**5.26**	**5.05**	**0.78**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**8**	<1	**6**	**5**	**4**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	<1
Toluene	108-88-3	2	µg/L	<2	<2	----	----	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	<2
^ Total Xylenes	----	2	µg/L	<2	<2	----	----	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	<1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-4000	SMGW-BH-C320	SMGW-BH-C330	SBT-GW-4008	SBT-GW-4003
Sampling date / time				16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00
				ES2430297-001	ES2430297-002	ES2430297-003	ES2430297-004	ES2430297-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	<5
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	----	<0.01	----	----	<0.01
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	<0.01	----	----	<0.01
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	----	<0.1	----	----	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	----	<0.01	----	----	<0.01
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	----	<0.05	----	----	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	----	<0.05	----	----	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	----	<0.05	----	----	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	----	<0.05	----	----	<0.05
EP231P: PFAS Sums								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	----	<0.01	----	----	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	----	<0.01	----	----	<0.01
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**100.0**	**109**	----	----	**112**
Toluene-D8	2037-26-5	2	%	**81.5**	**97.4**	----	----	**98.4**
4-Bromofluorobenzene	460-00-4	2	%	**90.2**	**103**	----	----	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4000	SMGW-BH-C320	SMGW-BH-C330	SBT-GW-4008	SBT-GW-4003
			Sampling date / time	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	ES2430297-001	ES2430297-002	ES2430297-003	ES2430297-004	ES2430297-005
				Result	Result	Result	Result	Result
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	----	**102**	----	----	**105**
13C8-PFOA	----	0.02	%	----	**104**	----	----	**101**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4800	SBT-GW-4801	SBT-GW-4802	----	----
			Sampling date / time	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2430297-006	ES2430297-007	ES2430297-008	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.49**	**7.71**	**7.33**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**17500**	**17500**	**27300**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**11300**	**11300**	**18800**	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**1210**	**713**	**689**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**1210**	**713**	**689**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**675**	**1160**	**422**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**5320**	**5240**	**9320**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**210**	**281**	**479**	----	----
Magnesium	7439-95-4	1	mg/L	**589**	**489**	**738**	----	----
Sodium	7440-23-5	1	mg/L	**2860**	**2890**	**4480**	----	----
Potassium	7440-09-7	1	mg/L	**27**	**29**	**45**	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.001**	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	**0.0002**	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	**0.003**	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	**0.002**	**0.019**	**0.009**	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4800	SBT-GW-4801	SBT-GW-4802	----	----
			Sampling date / time	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2430297-006	ES2430297-007	ES2430297-008	--------	--------
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	**0.007**	**0.015**	**0.009**	----	----
Manganese	7439-96-5	0.001	mg/L	**0.305**	**0.346**	**0.700**	----	----
Iron	7439-89-6	0.05	mg/L	**2.13**	<0.05	<0.05	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**7.62**	**14.4**	**2.52**	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.009**	**0.037**	**0.017**	----	----
Manganese	7439-96-5	0.001	mg/L	**0.995**	**1.12**	**0.844**	----	----
Iron	7439-89-6	0.05	mg/L	**26.8**	**34.9**	**6.30**	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.32**	**0.14**	**1.00**	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	**0.04**	**0.02**	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.06**	**16.3**	**6.92**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.06**	**16.3**	**6.94**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**5.4**	**4.4**	**2.2**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ **Total Nitrogen as N**	----	0.1	mg/L	**5.5**	**20.7**	**9.1**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**1.48**	**1.09**	**0.35**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance								
ø **Total Anions**	----	0.01	meq/L	**188**	**186**	**285**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4800	SBT-GW-4801	SBT-GW-4802	----	----
			Sampling date / time	16-Sep-2024 00:00	16-Sep-2024 00:00	16-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2430297-006	ES2430297-007	ES2430297-008	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**184**	**181**	**281**	----	----
ø Ionic Balance	----	0.01	%	**1.14**	**1.50**	**0.85**	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**2**	**8**	**1**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

CHAIN OF CUSTODY

ALS Laboratory: *please tick* →

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☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 48 Callemondah Drive Gladstone QLD 4680 Ph: 07 4978 7944 E: ALSEnviro.Gladstone@alsglobal.com
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☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 26 Rigali Way Wangara WA 6065 Ph: 08 9406 1301 E: samples.perth@alsglobal.com
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☐WOLLONGONG 1/19-21 Ralph Black Drive, Nth Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: CPBG	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT: **2/07/2024** ☐ ~~Non Standard or urgent TAT~~ **(List due date):**
OFFICE: 14 Great Western Highway, Werrington		
PROJECT: WSA SBT Project **PROJECT NO.:**	**ALS QUOTE NO.:** ES23CPBGHE0004	**COC SEQUENCE NUMBER (Circle)**
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN:**	**COC:** 1 2 3 4 5 6 7
PROJECT MANAGER: Emma Kline	**CONTACT PH:** 0402 044 508	**OF:** 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)			
Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:	°C		
Other comment:			

SAMPLER: Emily Fuda (EF); Joshua Cosier (JC)	**SAMPLER MOBILE:** 0412656685	**RELINQUISHED BY:** CPBG	**RECEIVED BY:** ALS Environmental FMS:	**RELINQUISHED BY:**
COC Emailed to ALS? YES / NO	**EDD FORMAT:** ESDAT and PDF			
Email Reports to: Emily.Fuda@cpbg-sbt.com.au; **Joshua.Cosier@cpbg-sbt.com.au**		DATE/TIME:	DATE/TIME: 25/6/24 12pm	DATE/TIME:
Email Invoice to: Joshua.Cosier@cpbg-sbt.com.au; wsasbt.progressclaims@cpbg-sbt.com.au				

RECEIVED BY:

DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).																	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (*refer to codes below*)	TOTAL BOTTLES	EA005P - pH	EA010P - Electrical Conductivity	EA015H - Total Dissolved Solids	NT-01 & 02 - Ca, Mg, Na, K, Cl, SO4, Alkalinity	EP005 - Total Organic Carbon (TOC)	NT-08A - Total Nitrogen, NO2, NO3, NH3, Total P, Reactive P	EG020F - Dissolved Metals by ICP/MS (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn)	EG035F - Dissolved Mercury	EG020T - Total Metals by ICP/MS (Al, Co, Fe, Mn)	EP074 - Volatile Organic Compounds	TPH - TRH (C6-C40)	EP080 - BTEXN	W-04 - TRH/BTEXN	EP231 - Per- and Polyfleuralkyl Substances				HT
1	SBT-GW-4010	19/09/2023 12:00	W		5	X	X	X	X	X	X	X	X	X									
				TOTAL	5																		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Environmental Division
Sydney
Work Order Reference
ES2420854

Telephone : + 61-2-8784 8555

CERTIFICATE OF ANALYSIS

Work Order	: **ES2420854**	Page	: 1 of 5
Client	: **CPB Contractors Pty Ltd & Ghella Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: CHRISTOPHER BLYTH	Contact	: Customer Services ES
Address	: 14 GREAT WESTERN HWY WERRINGTON 2747	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WSA SBT Project	Date Samples Received	: 25-Jun-2024 12:00
Order number	: ----	Date Analysis Commenced	: 26-Jun-2024
C-O-C number	: ----	Issue Date	: 02-Jul-2024 18:38
Sampler	: [redacted](EF); [redacted] (JC)		
Site	:		
Quote number	: Contract ES23CPBGHE0004		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Poor spike recovery for Sulfhate due to matrix interferences
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4010	----	----	----	----
			Sampling date / time	19-Jun-2024 12:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2420854-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.91**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**15600**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**10400**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**542**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**542**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**1470**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**4760**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**170**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**694**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**2170**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**20**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.03**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.003**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	**0.0003**	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.005**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.022**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4010	----	----	----	----
			Sampling date / time	19-Jun-2024 12:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2420854-001	--------	--------	--------	--------
				Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Nickel	7440-02-0	0.001	mg/L	**0.006**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.040**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**20.6**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.009**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.142**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**18.0**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.04**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	**0.01**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**7.07**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**7.08**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**7.0**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ **Total Nitrogen as N**	----	0.1	mg/L	**14.1**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**2.21**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.08**	----	----	----	----
EN055: Ionic Balance								
ø **Total Anions**	----	0.01	meq/L	**176**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-4010	----	----	----	----
			Sampling date / time	19-Jun-2024 12:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2420854-001	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**160**	----	----	----	----
ø Ionic Balance	----	0.01	%	**4.52**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**24**	----	----	----	----

CHAIN OF CUSTODY

ALS Laboratory: *please tick* →

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CLIENT: CPBG
OFFICE: 14 Great Western Highway, Werrington
PROJECT: WSA SBT Project **PROJECT NO.:**
ORDER NUMBER: **PURCHASE ORDER NO.:**
PROJECT MANAGER: Emma Kline **CONTACT PH:** 0402 044 508
SAMPLER: **SAMPLER MOBILE:**
COC Emailed to ALS? YES / NO **EDD FORMAT:** ESDAT and PDF
Email Reports to: Emily.Fuda@cpbg-sbt.com.au; **Joshua.Cosier@cpbg-sbt.com.au; Andrew.Smith@cpbg-sbt.com.au**
Email Invoice to: Emily.Fuda@cpbg-sbt.com.au; Amanda.Sullivan@cpbg-sbt.com.au

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☐ Standard TAT (**List due date**):
☐ Non Standard or urgent TAT (**List due date**):

ALS QUOTE NO.: ES23CPBGHE0004
COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY: CPBG	RECEIVED BY: ALS Environmental	RELINQUISHED BY: P Roomm	RECEIVED BY:
	BULENT CESURCAN		
DATE/TIME:	DATE/TIME: 22/10/24 1:03pm	DATE/TIME: 22/10/24 1:02pm	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).

ALS USE ONLY: LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W): SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION: TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA005P - pH	EA010P - Electrical Conductivity	EA015H - Total Dissolved Solids	NT-01 & 02 - Ca, Mg, Na, K, Cl, SO4, Alkalinity	EP005 - Total Organic Carbon (TOC)	NT-08A - Total Nitrogen, NO2, NO3, NH3, Total P, Reactive P	EG020F - Dissolved Metals by ICP/MS (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn)	EG035F - Dissolved Mercury	EG020T - Total Metals by ICP/MS (Al, Co, Fe, Mn)	EP074 - Volatile Organic Compounds	TPH - TRH (C6-C40)	EP080 - BTEXN	W-04 - TRH/BTEXN	EP231 - Per- and Polyfleuralkyl Substances				Additional Information
1	SBT-GW-1804	21.10.24 ~~18/10/2023 11:00~~	W		5	X	X	X	X	X	X	X	X	X									
2	SMGW-BH-A107	21.10.24 ~~18/10/2023 11:00~~	W		5	X	X	X	X	X	X	X	X	X									
3	SMGW-BH-A360	21.10.24 ~~18/10/2023 11:00~~	W		8	X	X	X	X	X	X	X	X	X	X	X		X	X				
4	SMGW-BH-A360 (FIELD DUPLICATE)	21.10.24 ~~18/10/2023 11:00~~	W		8	X	X	X	X	X	X	X	X	X	X	X		X	X				
5	Trip Blank	16/10/24 ~~18/10/2023 11:00~~	W																				
6	Rinsate	21.10.24 ~~18/10/2023 11:00~~	W		1													X					
7	Field Method Blank	No date ~~18/10/2023 11:00~~	W			X	X	X	X		X	X		X									
extra 8	Trip spike 13	16/10/2024																					
				TOTAL																			

→ received as blank

Environmental Division
Sydney
Work Order Reference
ES2434376

Telephone : + 61-2-8784 8555

URGENT

HT

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ES2434376

CERTIFICATE OF ANALYSIS

Work Order	: **ES2434376**	Page	: 1 of 10
Amendment	: **1**		
Client	: **CPB Contractors Pty Ltd & Ghella Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Customer Services ES
Address	: 14 GREAT WESTERN HWY WERRINGTON 2747	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WSA SBT Project	Date Samples Received	: 22-Oct-2024 13:02
Order number	: ----	Date Analysis Commenced	: 22-Oct-2024
C-O-C number	: ----	Issue Date	: 20-Mar-2025 15:00
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 8		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Amendment (20/3/25): This report has been amended as a result of a request to change sample identification numbers (IDs) received from [redacted].F / Andrew.S, for samples #3 and 4. All analysis results are as per the previous report.
- EP080/EP074: Particular samples required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
			Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.81**	**8.33**	**7.52**	**7.53**	**5.83**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**21000**	**2900**	**429**	**426**	<1
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**13300**	**1550**	**289**	**246**	<10
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	**16**	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**536**	**589**	**108**	**109**	<1
Total Alkalinity as CaCO3	----	1	mg/L	**536**	**605**	**108**	**109**	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**385**	**213**	**19**	**19**	<1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**7080**	**475**	**54**	**54**	<1
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**337**	**184**	**20**	**21**	<1
Magnesium	7439-95-4	1	mg/L	**630**	**4**	**6**	**6**	<1
Sodium	7440-23-5	1	mg/L	**3620**	**467**	**60**	**61**	<1
Potassium	7440-09-7	1	mg/L	**5**	**7**	**4**	**4**	<1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	**0.03**	**0.03**	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.010**	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	**0.002**	**0.005**	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
			Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.005**	**0.006**	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.290**	**0.148**	**0.008**	**0.012**	<0.001
Iron	7439-89-6	0.05	mg/L	**1.18**	**0.10**	**0.11**	**0.08**	<0.05
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**2.68**	**0.79**	**2.21**	**2.30**	<0.01
Cobalt	7440-48-4	0.001	mg/L	**0.008**	**0.001**	**0.002**	**0.002**	<0.001
Manganese	7439-96-5	0.001	mg/L	**0.314**	**0.168**	**0.020**	**0.042**	<0.001
Iron	7439-89-6	0.05	mg/L	**8.78**	**0.75**	**3.45**	**3.58**	<0.05
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.05**	**0.70**	**0.05**	**0.06**	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.16**	<0.01	**0.83**	**0.84**	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.16**	<0.01	**0.83**	**0.84**	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.6**	**3.5**	**1.3**	**1.1**	<0.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.8**	**3.5**	**2.1**	**1.9**	<0.1
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.18**	**0.51**	**0.27**	**0.24**	**0.04**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	**0.34**	**0.02**	**0.02**	<0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**218**	**29.9**	**4.08**	**4.10**	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
			Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**226**	**30.0**	**4.20**	**4.30**	<0.01
ø Ionic Balance	----	0.01	%	**1.76**	**0.14**	**1.54**	**2.39**	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**5**	**53**	**8**	**5**	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	1	µg/L	----	----	<5	<5	----
Toluene	108-88-3	2	µg/L	----	----	<5	<5	----
Ethylbenzene	100-41-4	2	µg/L	----	----	<5	<5	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<5	<5	----
Styrene	100-42-5	5	µg/L	----	----	<5	<5	----
ortho-Xylene	95-47-6	2	µg/L	----	----	<5	<5	----
Isopropylbenzene	98-82-8	5	µg/L	----	----	<5	<5	----
n-Propylbenzene	103-65-1	5	µg/L	----	----	<5	<5	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	----	----	<5	<5	----
sec-Butylbenzene	135-98-8	5	µg/L	----	----	<5	<5	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	----	----	<5	<5	----
tert-Butylbenzene	98-06-6	5	µg/L	----	----	<5	<5	----
p-Isopropyltoluene	99-87-6	5	µg/L	----	----	<5	<5	----
n-Butylbenzene	104-51-8	5	µg/L	----	----	<5	<5	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	50	µg/L	----	----	<50	<50	----
2-Butanone (MEK)	78-93-3	50	µg/L	----	----	<50	<50	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	----	----	<50	<50	----
2-Hexanone (MBK)	591-78-6	50	µg/L	----	----	<50	<50	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	5	µg/L	----	----	<5	<5	----
EP074D: Fumigants								

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
			Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
				ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
				Result	Result	Result	Result	Result
EP074D: Fumigants - Continued								
2.2-Dichloropropane	594-20-7	5	µg/L	----	----	<5	<5	----
1.2-Dichloropropane	78-87-5	5	µg/L	----	----	<5	<5	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	----	----	<5	<5	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	----	----	<5	<5	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	----	----	<5	<5	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	----	----	<50	<50	----
Chloromethane	74-87-3	50	µg/L	----	----	<50	<50	----
Vinyl chloride	75-01-4	50	µg/L	----	----	<50	<50	----
Bromomethane	74-83-9	50	µg/L	----	----	<50	<50	----
Chloroethane	75-00-3	50	µg/L	----	----	<50	<50	----
Trichlorofluoromethane	75-69-4	50	µg/L	----	----	<50	<50	----
1.1-Dichloroethene	75-35-4	5	µg/L	----	----	<5	<5	----
Iodomethane	74-88-4	5	µg/L	----	----	<5	<5	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	----	----	<5	<5	----
1.1-Dichloroethane	75-34-3	5	µg/L	----	----	<5	<5	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	----	----	**266**	**265**	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	----	----	<5	<5	----
1.1-Dichloropropylene	563-58-6	5	µg/L	----	----	<5	<5	----
Carbon Tetrachloride	56-23-5	5	µg/L	----	----	<5	<5	----
1.2-Dichloroethane	107-06-2	5	µg/L	----	----	<5	<5	----
Trichloroethene	79-01-6	5	µg/L	----	----	**300**	**296**	----
Dibromomethane	74-95-3	5	µg/L	----	----	<5	<5	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	----	----	<5	<5	----
1.3-Dichloropropane	142-28-9	5	µg/L	----	----	<5	<5	----
Tetrachloroethene	127-18-4	5	µg/L	----	----	**1580**	**1500**	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	----	----	<5	<5	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
			Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	----	----	<5	<5	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	----	----	<5	<5	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	----	----	<5	<5	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	----	----	<5	<5	----
Pentachloroethane	76-01-7	5	µg/L	----	----	<5	<5	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	----	----	<5	<5	----
Hexachlorobutadiene	87-68-3	5	µg/L	----	----	<5	<5	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	----	----	<5	<5	----
Bromobenzene	108-86-1	5	µg/L	----	----	<5	<5	----
2-Chlorotoluene	95-49-8	5	µg/L	----	----	<5	<5	----
4-Chlorotoluene	106-43-4	5	µg/L	----	----	<5	<5	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	----	----	<5	<5	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	----	----	<5	<5	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	----	----	<5	<5	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	----	----	<5	<5	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	----	----	<5	<5	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	----	----	**41**	**42**	----
Bromodichloromethane	75-27-4	5	µg/L	----	----	**7**	**7**	----
Dibromochloromethane	124-48-1	5	µg/L	----	----	<5	<5	----
Bromoform	75-25-2	5	µg/L	----	----	<5	<5	----
EP074H: Naphthalene								
Naphthalene	91-20-3	5	µg/L	----	----	<5	<5	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	**1740**	**1810**	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
				Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
	Compound	CAS Number	LOR	Unit	ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
	C6 - C10 Fraction	C6_C10	20	µg/L	----	----	**1720**	**1780**	----
^	C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	**1720**	**1780**	----
EP080: BTEXN									
	Benzene	71-43-2	1	µg/L	----	----	<5	<5	----
	Toluene	108-88-3	2	µg/L	----	----	<5	<5	----
	Ethylbenzene	100-41-4	2	µg/L	----	----	<5	<5	----
	meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<10	<10	----
	ortho-Xylene	95-47-6	2	µg/L	----	----	<5	<5	----
^	Total Xylenes	----	2	µg/L	----	----	<2	<2	----
^	Sum of BTEX	----	1	µg/L	----	----	<2	<2	----
	Naphthalene	91-20-3	5	µg/L	----	----	<5	<5	----
EP231A: Perfluoroalkyl Sulfonic Acids									
	Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	----	----	<0.02	<0.02	----
	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	----	----	<0.01	<0.01	----
	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	----	**0.18**	**0.22**	----
EP231B: Perfluoroalkyl Carboxylic Acids									
	Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	----	----	<0.1	<0.1	----
	Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	----	----	<0.02	<0.02	----
	Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	----	----	<0.02	<0.02	----
	Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	----	----	<0.02	<0.02	----
	Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	----	----	**0.02**	**0.02**	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	----	----	<0.05	<0.05	----
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	----	----	<0.05	<0.05	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-1804	SMGW-BH-A107	MW01	MW01 (Field duplicate)	Field Method Blank
			Sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
				ES2434376-001	ES2434376-002	ES2434376-003	ES2434376-004	ES2434376-007
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	----	----	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	----	----	<0.05	<0.05	----
EP231P: PFAS Sums								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	----	----	**0.18**	**0.22**	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	----	----	**0.20**	**0.24**	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	----	----	**82.9**	**120**	----
Toluene-D8	2037-26-5	5	%	----	----	**88.1**	**103**	----
4-Bromofluorobenzene	460-00-4	5	%	----	----	**82.4**	**103**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	----	**76.2**	**117**	----
Toluene-D8	2037-26-5	2	%	----	----	**81.8**	**112**	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	**77.1**	**110**	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	----	----	**104**	**102**	----
13C8-PFOA	----	0.02	%	----	----	**101**	**102**	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 3/1 Burma Road Pooraka SA 5095
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☐BRISBANE 2 Byth Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 48 Callemondah Drive Gladstone QLD 4680
Ph: 07 4978 7944 E: ALSEnviro.Gladstone@alsglobal.com

☐MACKAY Unit 2/20 Caterpillar Drive Paget QLD 4740
Ph: 07 4952 5795 E: ALSEnviro.Mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171
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☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304
Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541
Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 26 Rigali Way Wangara WA 6065
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☐TOWNSVILLE 13 Carlton Street Kirwan QLD 4817
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☐WOLLONGONG 1/19-21 Ralph Black Drive, Nth Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: CPBG

OFFICE: 14 Great Western Highway, Werrington

PROJECT: WSA SBT Project **PROJECT NO.:**

ORDER NUMBER: **PURCHASE ORDER NO.:**

PROJECT MANAGER: Emma Kline **CONTACT PH:** 0402 044 508

SAMPLER: **SAMPLER MOBILE:**

COC Emailed to ALS? YES / NO **EDD FORMAT:** ESDAT and PDF

Email Reports to: Emily.Fuda@cpbg-sbt.com.au; **Joshua.Cosier@cpbg-sbt.com.au; Andrew.Smith@cpbg-sbt.com.au**

Email Invoice to: Emily.Fuda@cpbg-sbt.com.au; Amanda.Sullivan@cpbg-sbt.com.au

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☐ Standard TAT **(List due date):**
☐ Non Standard or urgent TAT **(List due date):**

ALS QUOTE NO.: ES23CPBGHE0004

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY: CPBG	RECEIVED BY: ALS Environmental	RELINQUISHED BY: P. Roam	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME: 22/10/24 1.02pm	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).

LAB ID (ALS USE ONLY)	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA005P - pH	EA010P - Electrical Conductivity	EA015H - Total Dissolved Solids	NT-01 & 02 - Ca, Mg, Na, K, Cl, SO4, Alkalinity	EP005 - Total Organic Carbon (TOC)	NT-08A - Total Nitrogen, NO2, NO3, NH3, Total P, Reactive P	EG020F - Dissolved Metals by ICP/MS (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn)	EG035F - Dissolved Mercury	EG020T - Total Metals by ICP/MS (Al, Co, Fe, Mn)	EP074 - Volatile Organic Compounds	TPH - TRH (C6-C40)	EP080 - BTEXN	W-04 - TRH/BTEXN	EP231 - Per- and Polyfleuralkyl Substances				Additional Information
	SBT-GW-1804	18/10/2023 11:00	W		5	X	X	X	X	X	X	X	X	X									
	SMGW-BH-A107	18/10/2023 11:00	W		5	X	X	X	X	X	X	X	X	X									
	SMGW-BH-A360	18/10/2023 11:00	W		8	X	X	X	X	X	X	X	X	X	X	~~X~~		X	X				
NOTE → ENVIRO LAB	SMGW-BH-A360 (FIELD DUPLICATE)	18/10/2023 11:00	W		8	X	X	X	X	X	X	X	X	X	X	~~X~~		X	X				
	Trip Blank	18/10/2023 11:00	W																				
	Rinsate	18/10/2023 11:00	W		1													X					
	Field Method Blank	18/10/2023 11:00	W			X	X	X	X		X	X		X									
				TOTAL																			

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

#364494
22/10/24
DL

CHAIN OF CUSTODY FORM - Client

ENVIROLAB GROUP / ENVIROLAB SERVICES / mpl

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Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	CPBG
Contact Person:	EMMA KLING / ANDREW SMITH
Project Mgr:	" "
Sampler:	P. ROWAN
Address:	14 GREAT WESTERN HWY. WERRINGTON NSW
Phone:	0402 044 568
Mob:	
Email Results to:	Andrew.Smith@cpbg-sbt.com.au
Email Invoice to:	As Above

Client Project Name/Number/Site etc (ie report title):	WSA-SBT
PO No. (if applicable):	
Envirolab Quote No. :	
Date results required:	
Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments:

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Depth	Date Sampled	Type of Sample	Tests Required	Comments: Provide as much information about the sample as you can
1	SMGW-BH-A360(T)				- PLEASE SEE COC FOR ALS	
					- TEST SUITE SAME AS	
					SMGW-BH-A360 (DUPLICATE)	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by (Company):	Received by (Company): ELS SYD	*Lab Use Only*	
Print Name: P. ROWAN	Print Name: Danielle Luff	Job number: 364494	Cooling: Ice / Ice pack / None
Date & Time: 22.10.24 2.03pm	Date & Time: 22/10/24 1405	Temperature: 15	Security seal: Intact / Broken / None
Signature:	Signature:	TAT Req - SAME day / 1 / 2 / 3 / 4 / STD	

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 364494

Client Details

Client	CPB Contractors pty ltd & Ghella JV pty ltd
Attention	[redacted]
Address	14 Great Western Highway Level 2 Suite 4, Werrington Park Corporate Centre, WERRINGTON, NSW, 2747

Sample Details

Your Reference	**WSA SBT Project**
Number of Samples	1 Water
Date samples received	22/10/2024
Date completed instructions received	22/10/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	29/10/2024
Date of Issue	20/03/2025
Reissue Details	This report replaces R00 created on 29/10/2024 due to: Sample ID Amended (Client Request)

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Amanda Chui, LC/Air Toxics Supervisor
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Liam Timmins, Organics Supervisor
Nick Sarlamis, Assistant Operation Manager

Authorised By
Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date Extracted	-	24/10/2024
Date Analysed	-	24/10/2024
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	3
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	260
Bromochloromethane	µg/L	<1
Chloroform	µg/L	47
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	350
Bromodichloromethane	µg/L	9
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	2,400
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	99
Surrogate Toluene-d8	%	99
Surrogate 4-Bromofluorobenzene	%	100

vTRH(C6-C10)/BTEXN in Water		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date extracted	-	24/10/2024
Date analysed	-	24/10/2024
TRH C_6 - C_9	µg/L	5,000
TRH C_6 - C_{10}	µg/L	5,000
TRH C_6 - C_{10} less BTEX (F1)	µg/L	5,000
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	99
Surrogate Toluene-d8	%	99
Surrogate 4-Bromofluorobenzene	%	100

svTRH (C10-C40) in Water		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date extracted	-	29/10/2024
Date analysed	-	29/10/2024
TRH C_{10} - C_{14}	μg/L	<50
TRH C_{15} - C_{28}	μg/L	<100
TRH C_{29} - C_{36}	μg/L	<100
Total +ve TRH (C10-C36)	μg/L	<50
TRH >C_{10} - C_{16}	μg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	μg/L	<50
TRH >C_{16} - C_{34}	μg/L	<100
TRH >C_{34} - C_{40}	μg/L	<100
Total +ve TRH (>C10-C40)	μg/L	<50
Surrogate o-Terphenyl	%	78

HM in water - dissolved		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date prepared	-	23/10/2024
Date analysed	-	23/10/2024
Aluminium-Dissolved	µg/L	<10
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	2
Iron-Dissolved	µg/L	90
Lead-Dissolved	µg/L	<1
Manganese-Dissolved	µg/L	13
Nickel-Dissolved	µg/L	<1
Zinc-Dissolved	µg/L	5
Mercury-Dissolved	µg/L	<0.05

HM in water - total		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date prepared	-	23/10/2024
Date analysed	-	23/10/2024
Aluminium-Total	µg/L	1,500
Cobalt-Total	µg/L	2
Iron-Total	µg/L	2,100
Manganese-Total	µg/L	35

Metals in Waters - Acid extractable		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date prepared	-	23/10/2024
Date analysed	-	24/10/2024
Phosphorus - Total	mg/L	0.2

Miscellaneous Inorganics		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date prepared	-	22/10/2024
Date analysed	-	22/10/2024
pH	pH Units	7.0
Electrical Conductivity	µS/cm	450
Total Dissolved Solids (grav)	mg/L	270
Total Organic Carbon	mg/L	10
Total Nitrogen in water	mg/L	1.0
Nitrate as N in water	mg/L	0.93
Nitrite as N in water	mg/L	<0.005
Ammonia as N in water	mg/L	0.050
Phosphate as P in water	mg/L	0.02

Ion Balance		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date prepared	-	22/10/2024
Date analysed	-	22/10/2024
Calcium - Dissolved	mg/L	16
Potassium - Dissolved	mg/L	4
Sodium - Dissolved	mg/L	60
Magnesium - Dissolved	mg/L	5.3
Hardness (calc) equivalent $CaCO_3$	mg/L	62
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	110
Carbonate Alkalinity as $CaCO_3$	mg/L	<5
Total Alkalinity as $CaCO_3$	mg/L	110
Sulphate, SO4	mg/L	24
Chloride, Cl	mg/L	66
Ionic Balance	%	-8.0

PFAS in Waters Extended		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Date prepared	-	23/10/2024
Date analysed	-	24/10/2024
Perfluorobutanesulfonic acid	µg/L	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	0.19
Perfluorodecanesulfonic acid	µg/L	<0.02
Perfluorobutanoic acid	µg/L	<0.02
Perfluoropentanoic acid	µg/L	<0.02
Perfluorohexanoic acid	µg/L	<0.01
Perfluoroheptanoic acid	µg/L	<0.01
Perfluorooctanoic acid PFOA	µg/L	0.02
Perfluorononanoic acid	µg/L	<0.01
Perfluorodecanoic acid	µg/L	<0.02
Perfluoroundecanoic acid	µg/L	<0.02
Perfluorododecanoic acid	µg/L	<0.05
Perfluorotridecanoic acid	µg/L	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5
4:2 FTS	µg/L	<0.01
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
10:2 FTS	µg/L	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	94
Surrogate $^{13}C_2$ *PFOA*	%	109
Extracted ISTD $^{13}C_3$ *PFBS*	%	102
Extracted ISTD $^{18}O_2$ *PFHxS*	%	95
Extracted ISTD $^{13}C_4$ *PFOS*	%	126
Extracted ISTD $^{13}C_4$ *PFBA*	%	98

PFAS in Waters Extended		
Our Reference		364494-1
Your Reference	UNITS	MW01
Type of sample		Water
Date Sampled		18/10/2024
Extracted ISTD $^{13}C_3$ *PFPeA*	%	105
Extracted ISTD $^{13}C_2$ *PFHxA*	%	98
Extracted ISTD $^{13}C_4$ *PFHpA*	%	94
Extracted ISTD $^{13}C_4$ *PFOA*	%	74
Extracted ISTD $^{13}C_5$ *PFNA*	%	117
Extracted ISTD $^{13}C_2$ *PFDA*	%	101
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	97
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	96
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	92
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	103
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	71
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	105
Extracted ISTD $^{13}C_8$ *FOSA*	%	100
Extracted ISTD d_3 *N MeFOSA*	%	101
Extracted ISTD d_5 *N EtFOSA*	%	103
Extracted ISTD d_7 *N MeFOSE*	%	99
Extracted ISTD d_9 *N EtFOSE*	%	92
Extracted ISTD d_3 *N MeFOSAA*	%	96
Extracted ISTD d_5 *N EtFOSAA*	%	106
Total Positive PFHxS & PFOS	µg/L	0.19
Total Positive PFOA & PFOS	µg/L	0.21
Total Positive PFAS	µg/L	0.21

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation below:- TDS = EC * 0.6
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-060	Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES. Total Phosphate determined stochiometrically from Phosphorus (assumed to be present as Phosphate). Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Method ID	Methodology Summary
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date Extracted	-			24/10/2024	[NT]	[NT]	[NT]	[NT]	24/10/2024	[NT]
Date Analysed	-			24/10/2024	[NT]	[NT]	[NT]	[NT]	24/10/2024	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	95	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate Toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			24/10/2024	[NT]	[NT]	[NT]	[NT]	24/10/2024	[NT]
Date analysed	-			24/10/2024	[NT]	[NT]	[NT]	[NT]	24/10/2024	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	95	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	95	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate Toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/10/2024	[NT]	[NT]	[NT]	[NT]	29/10/2024	[NT]
Date analysed	-			29/10/2024	[NT]	[NT]	[NT]	[NT]	29/10/2024	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate o-Terphenyl	%		Org-020	86	[NT]	[NT]	[NT]	[NT]	87	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			23/10/2024	[NT]	[NT]	[NT]	[NT]	23/10/2024	[NT]
Date analysed	-			23/10/2024	[NT]	[NT]	[NT]	[NT]	23/10/2024	[NT]
Aluminium-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	96	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: HM in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			23/10/2024	[NT]	[NT]	[NT]	[NT]	23/10/2024	[NT]
Date analysed	-			23/10/2024	[NT]	[NT]	[NT]	[NT]	23/10/2024	[NT]
Aluminium-Total	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Iron-Total	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	94	[NT]
Manganese-Total	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			23/10/2024	[NT]	[NT]	[NT]	[NT]	23/10/2024	[NT]
Date analysed	-			24/10/2024	[NT]	[NT]	[NT]	[NT]	24/10/2024	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			22/10/2024	[NT]	[NT]	[NT]	[NT]	22/10/2024	[NT]
Date analysed	-			22/10/2024	[NT]	[NT]	[NT]	[NT]	22/10/2024	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	113	[NT]
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	85	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	115	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	<0.005	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: Ion Balance					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			22/10/2024	[NT]	[NT]	[NT]	[NT]	22/10/2024	[NT]
Date analysed	-			22/10/2024	[NT]	[NT]	[NT]	[NT]	22/10/2024	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	89	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	98	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	88	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	107	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			23/10/2024	[NT]	[NT]	[NT]	[NT]	23/10/2024	[NT]
Date analysed	-			24/10/2024	[NT]	[NT]	[NT]	[NT]	24/10/2024	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	108	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	100	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	88	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	132	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	114	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	126	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	107	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	96	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	111	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	105	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	106	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	96	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	95	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	111	[NT]	[NT]	[NT]	[NT]	108	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	96	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	96	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	96	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	61	[NT]	[NT]	[NT]	[NT]	71	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	93	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	89	[NT]	[NT]	[NT]	[NT]	95	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	83	[NT]	[NT]	[NT]	[NT]	87	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	60	[NT]	[NT]	[NT]	[NT]	63	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	114	[NT]	[NT]	[NT]	[NT]	112	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	90	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	108	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	85	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	104	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

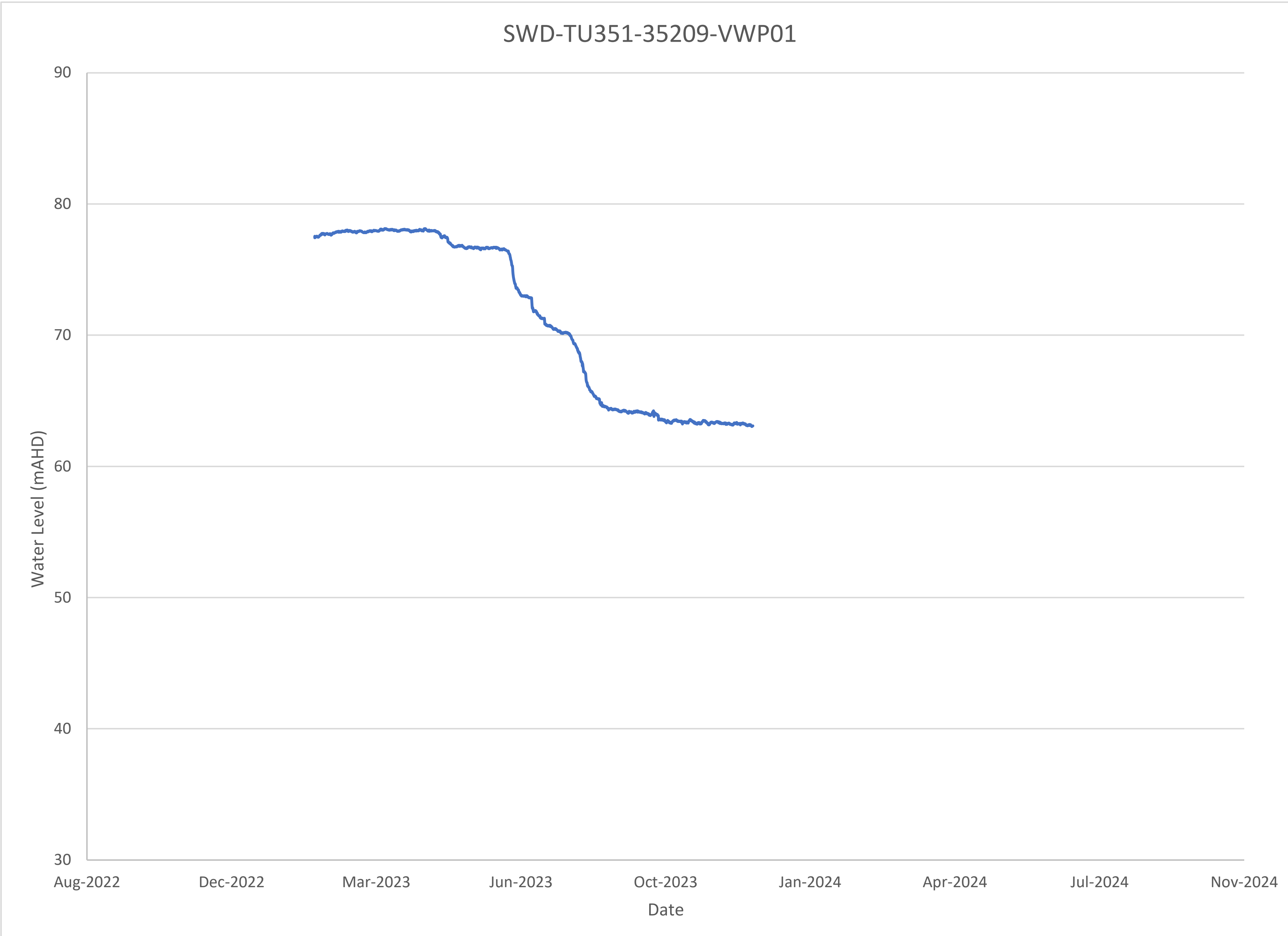
Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

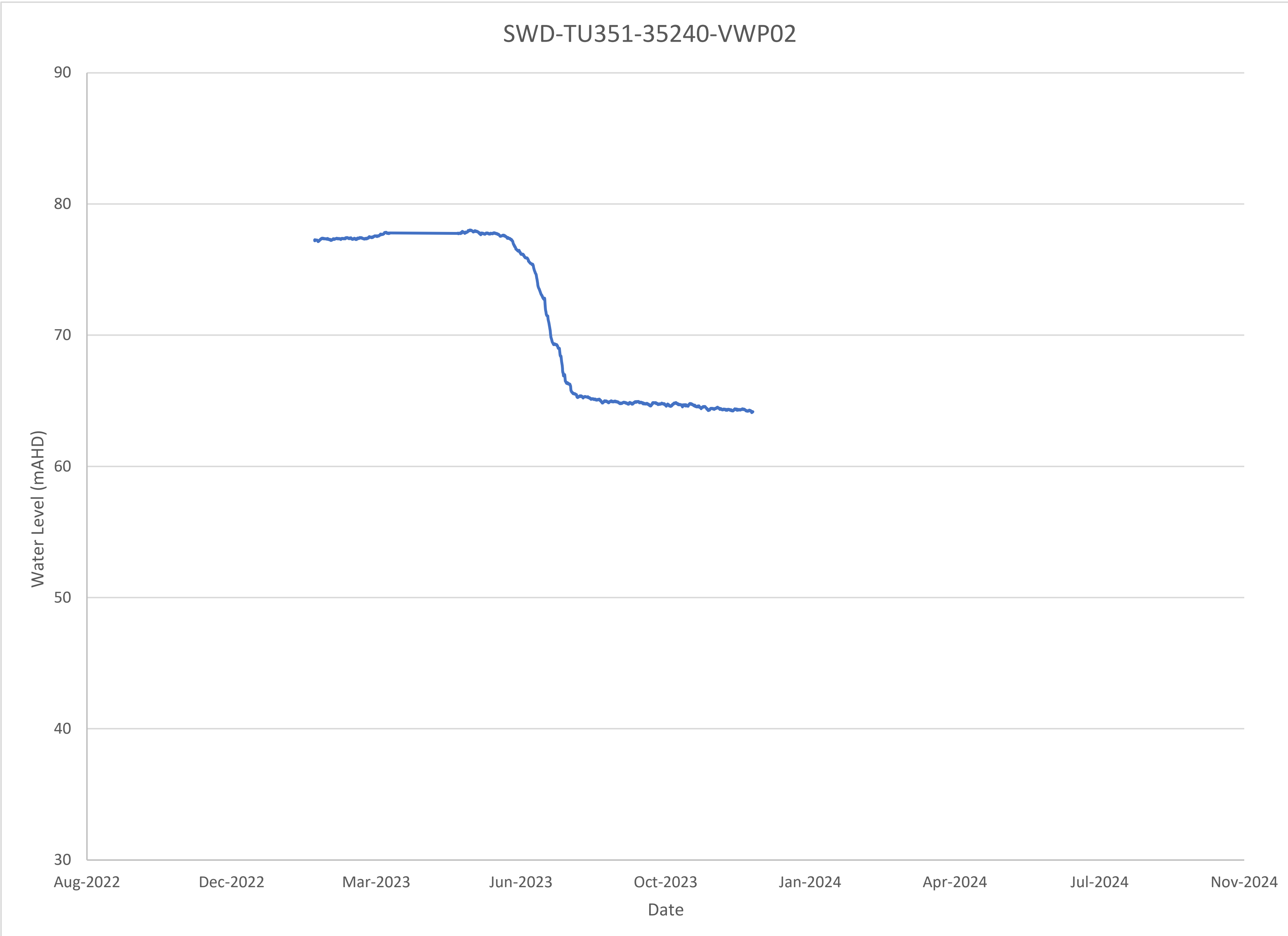
Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

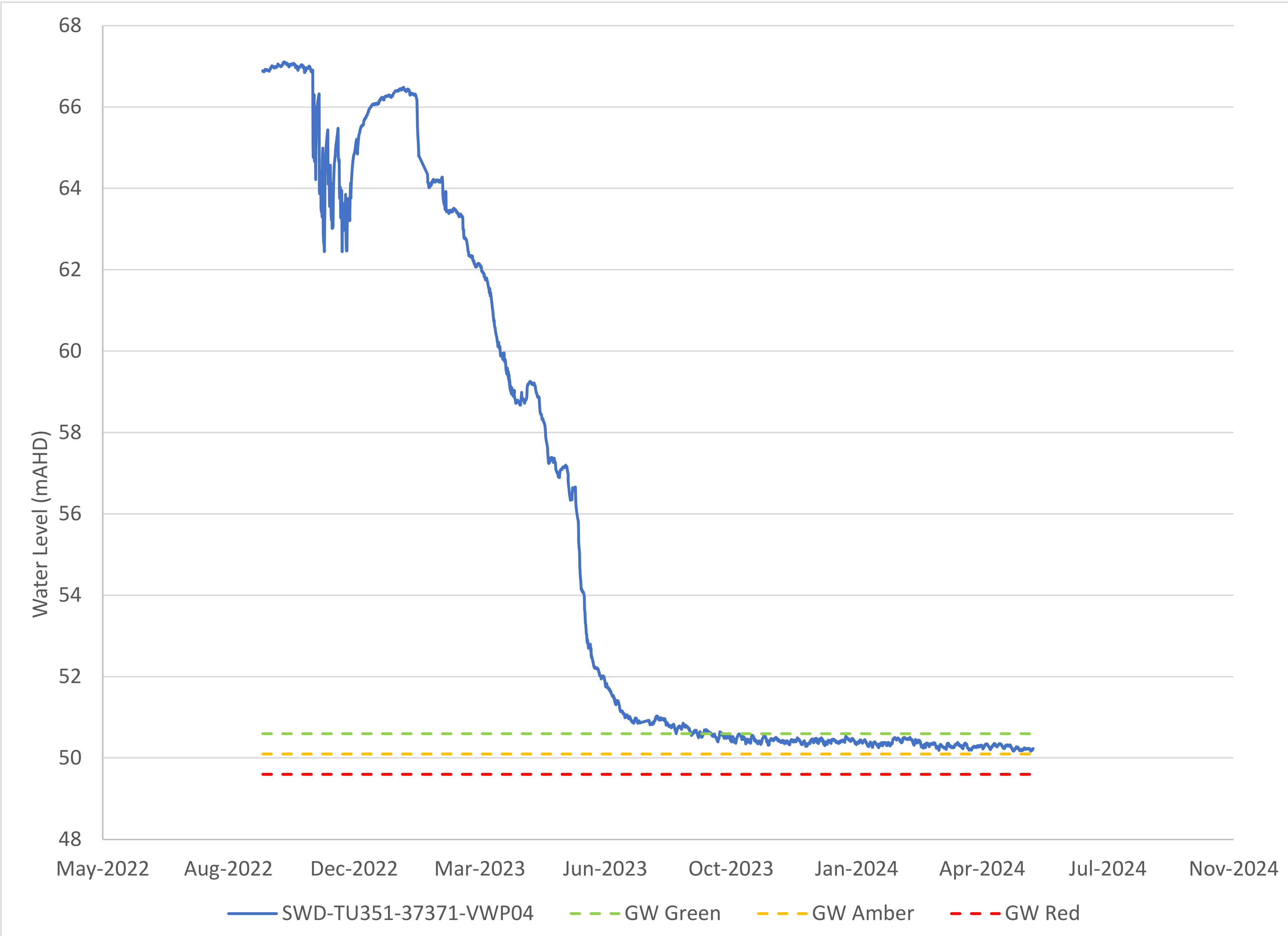
Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Annexure C VWP hydrographs to December 2024

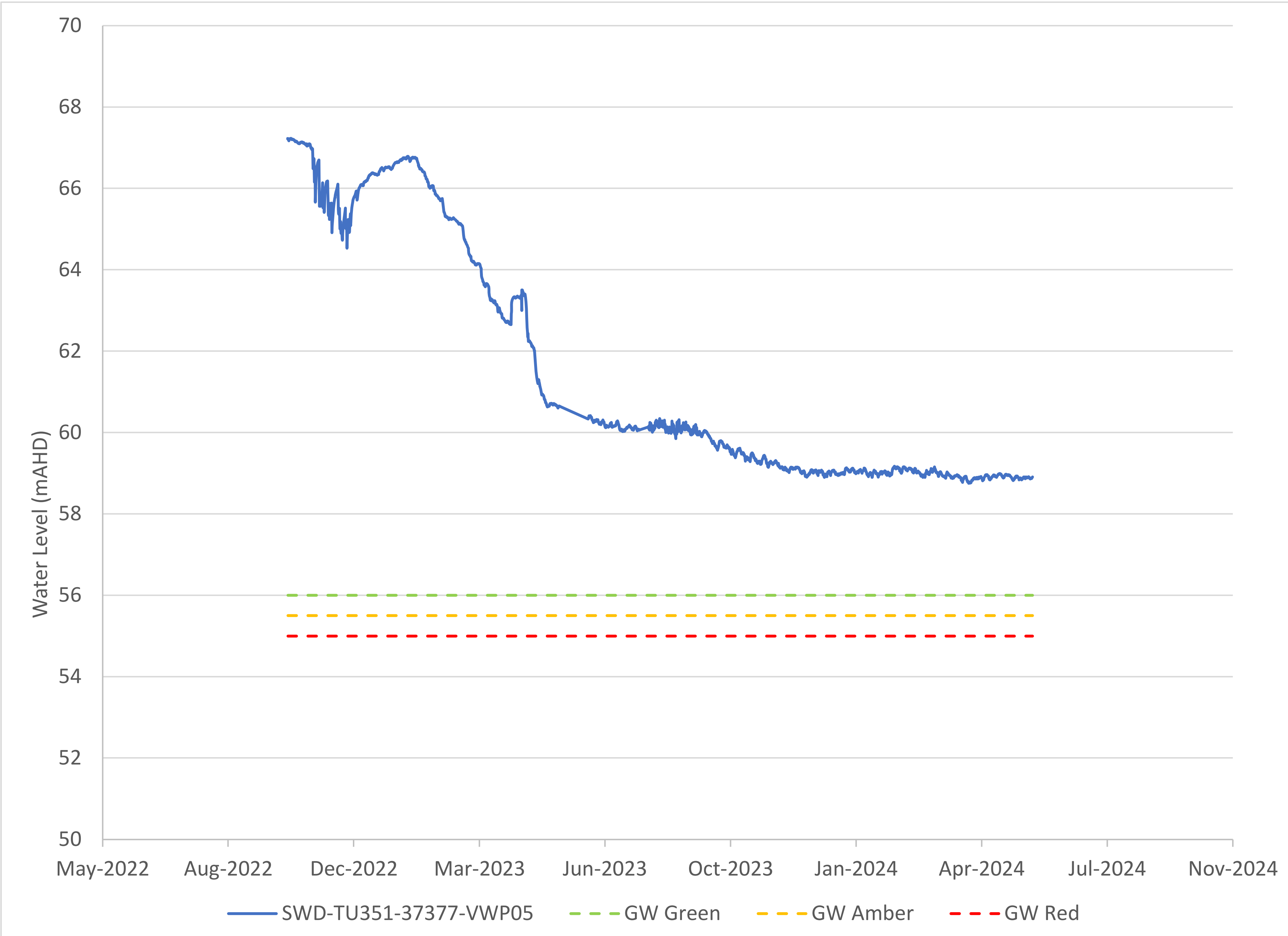


SWD-TU351-35209-VWP01
90
80
70
60
50
40
30
Water Level (mAHD)
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
Date

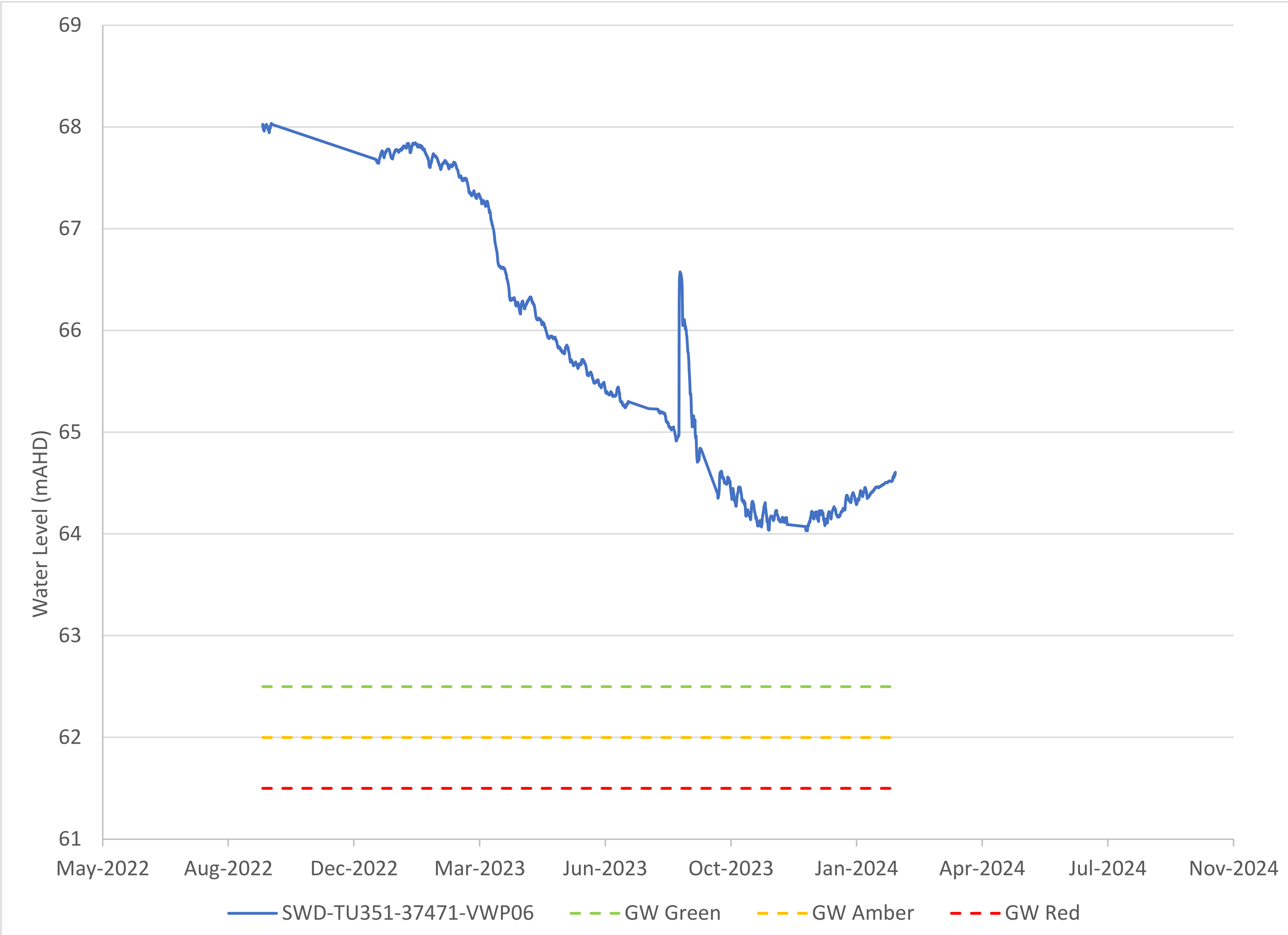

SWD-TU351-35240-VWP02
90
80
70
60
50
40
30
Water Level (mAHD)
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
Date



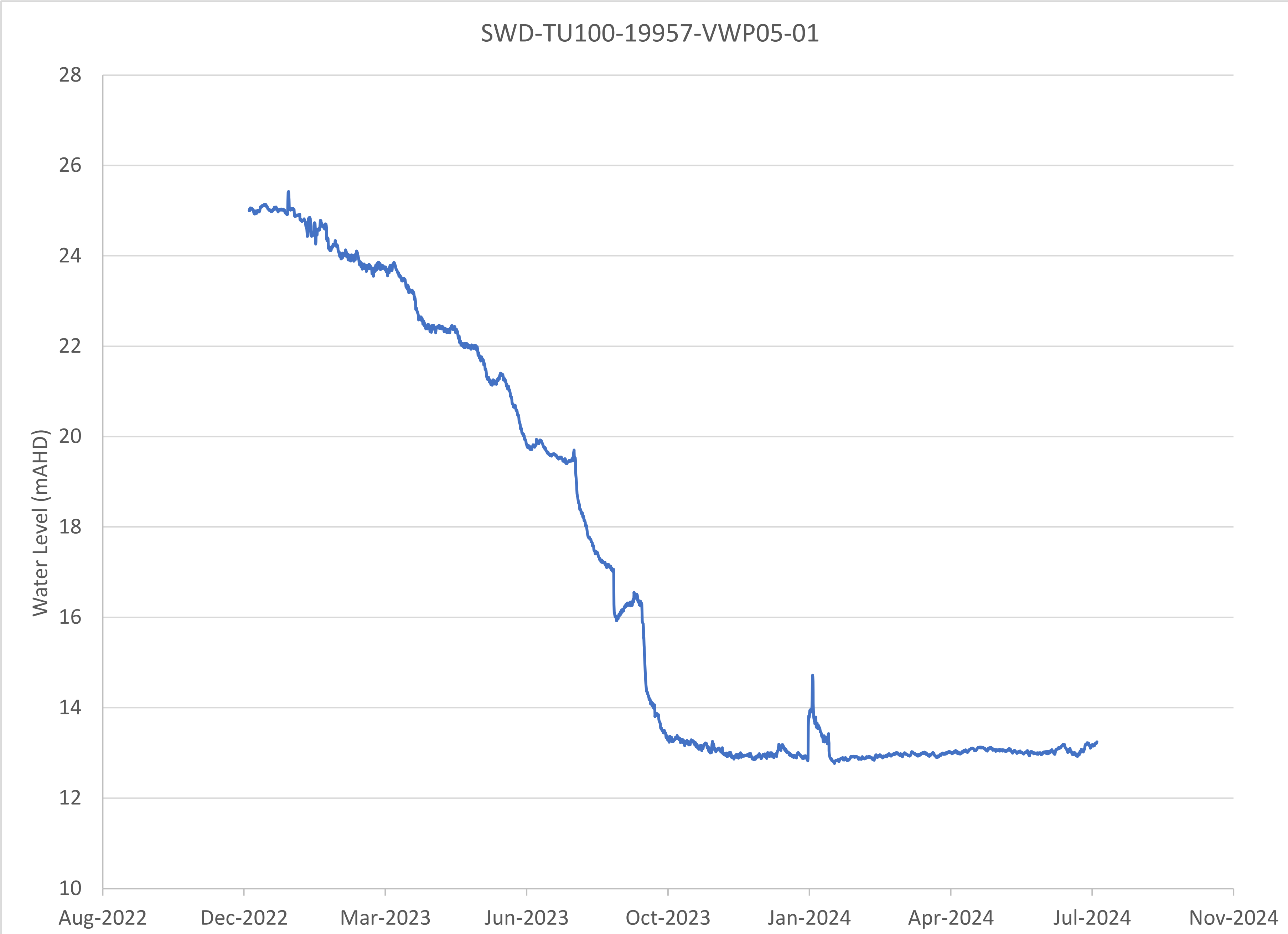
68
66
64
62
60
58
56
54
52
50
48
Water Level (mAHD)
May-2022
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
SWD-TU351-37371-VWP04
GW Green
GW Amber
GW Red

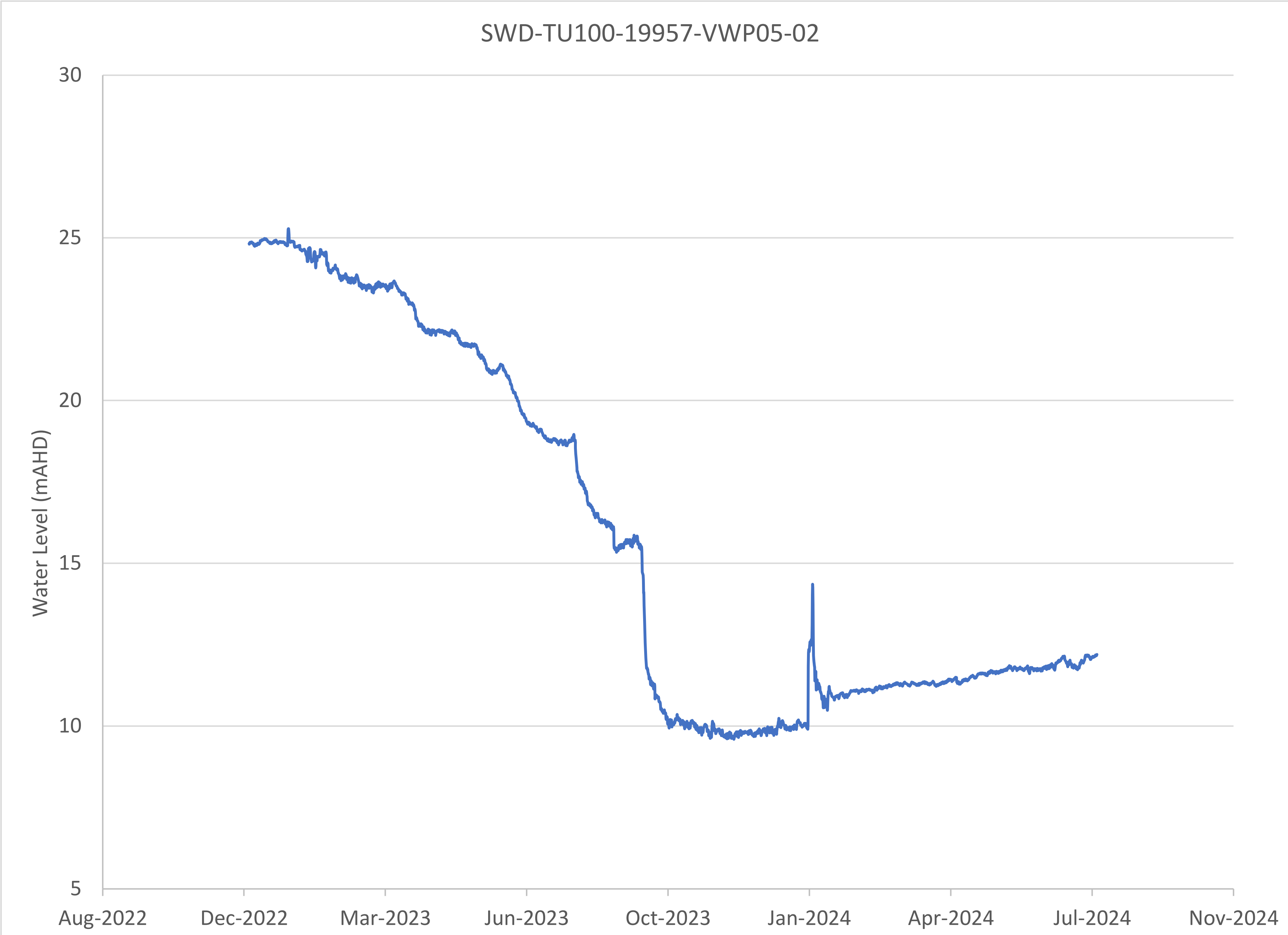


Water Level (mAHD)
70
68
66
64
62
60
58
56
54
52
50
May-2022
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
SWD-TU351-37377-VWP05
GW Green
GW Amber
GW Red

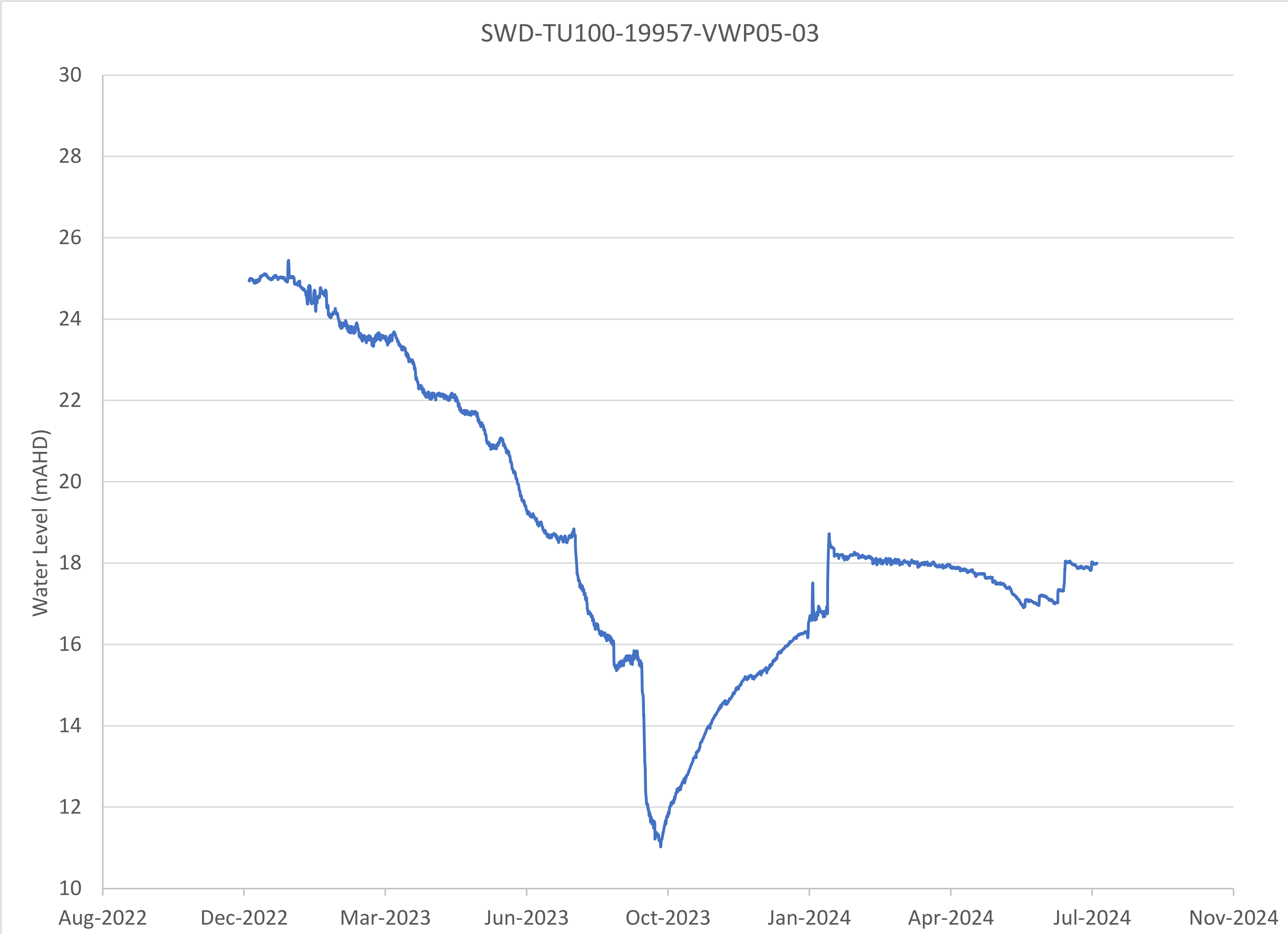


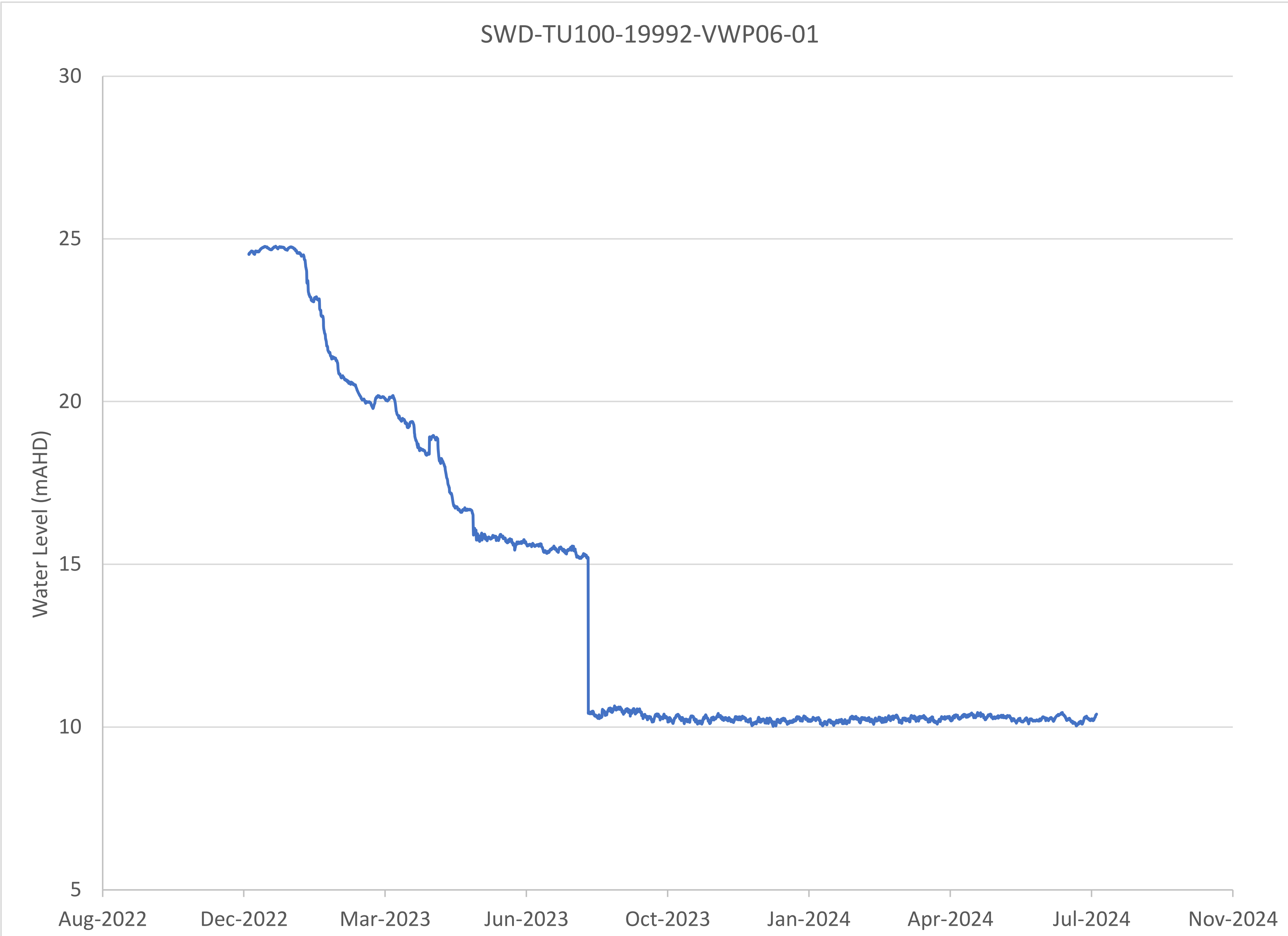
69
68
67
66
65
64
63
62
61
Water Level (mAHD)
May-2022
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
SWD-TU351-37471-VWP06
GW Green
GW Amber
GW Red

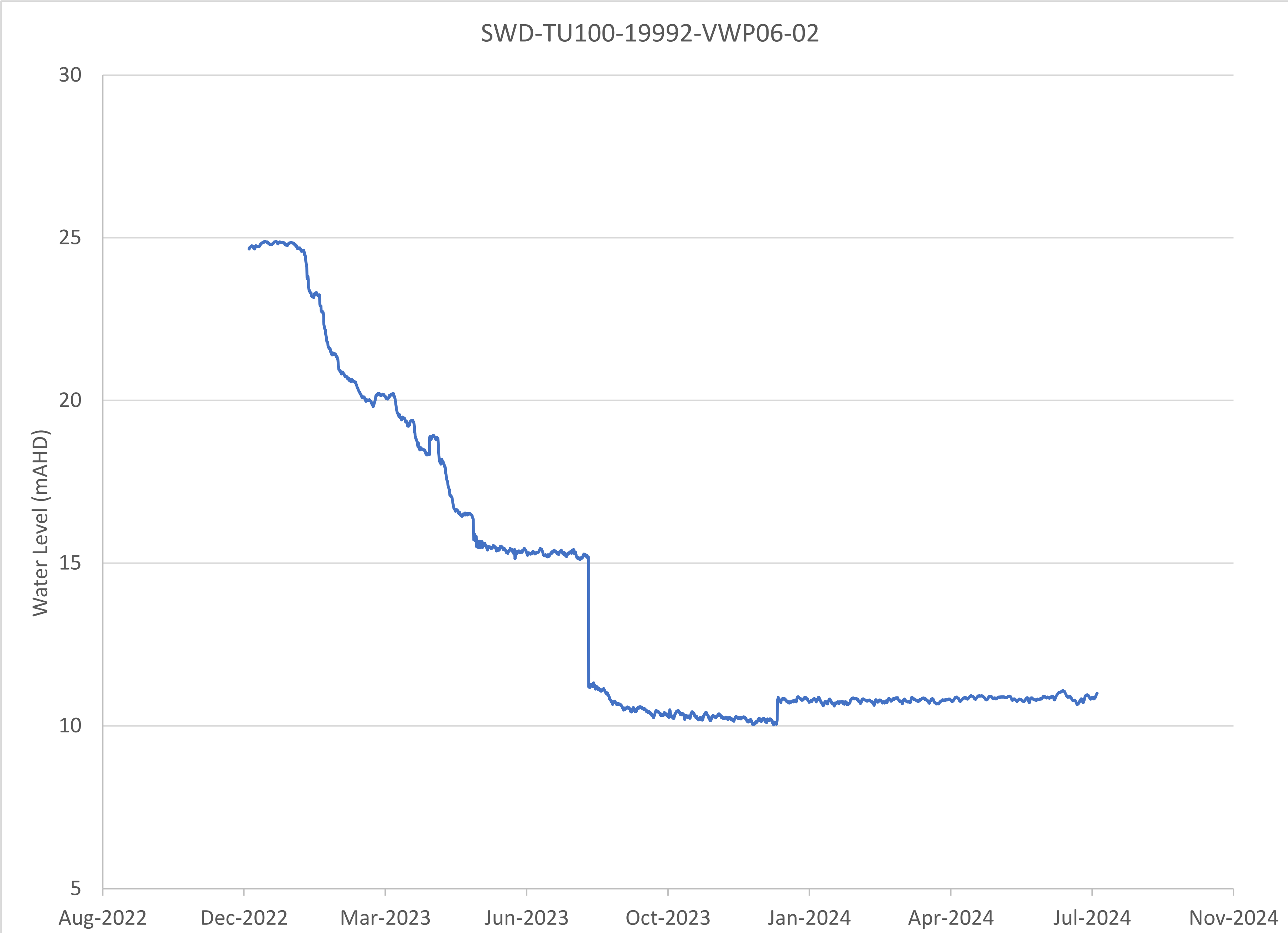

SWD-TU100-19957-VWP05-01
Water Level (mAHD)
28
26
24
22
20
18
16
14
12
10
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024



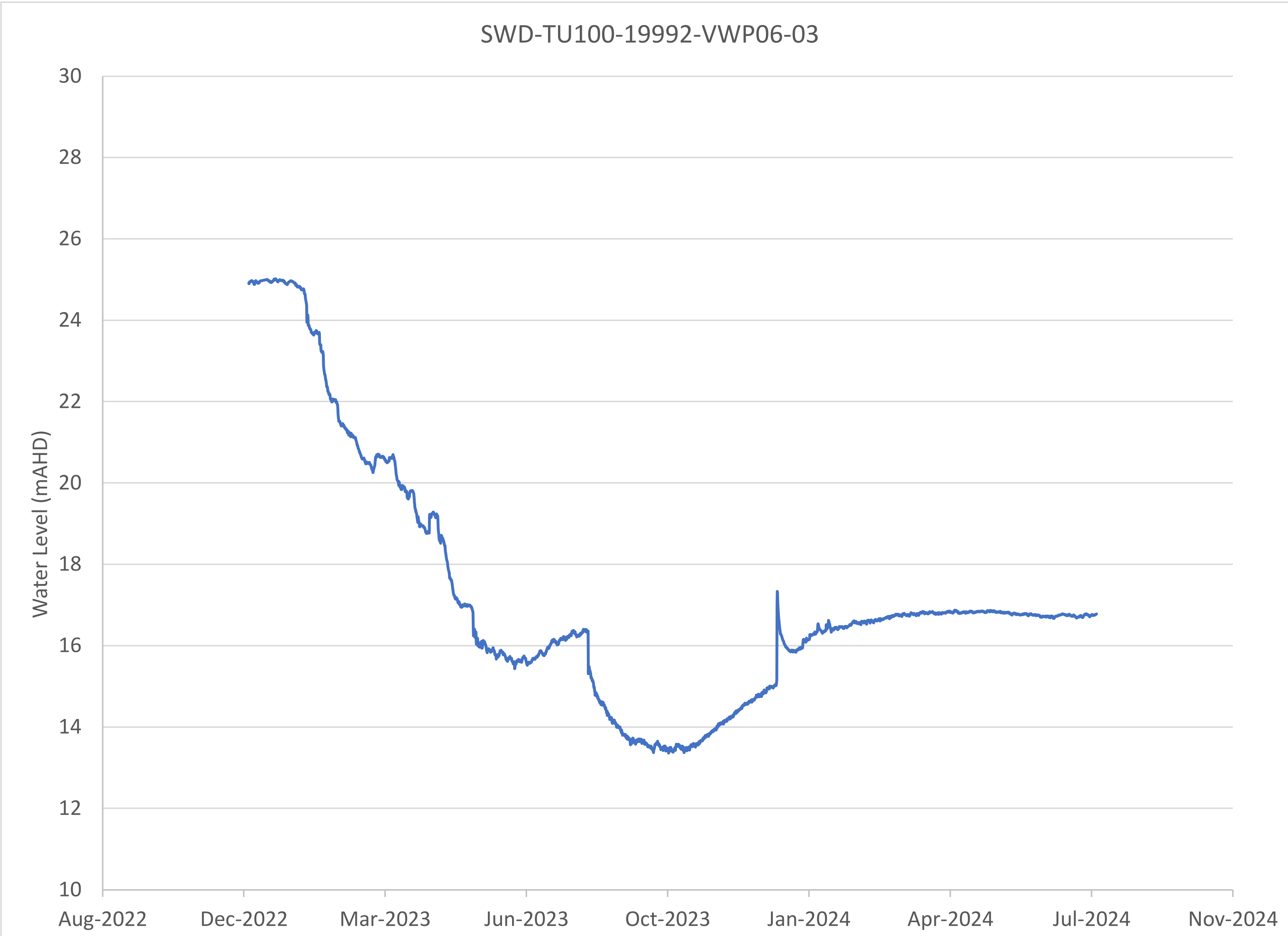
SWD-TU100-19957-VWP05-02
Water Level (mAHD)
30
25
20
15
10
5
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024

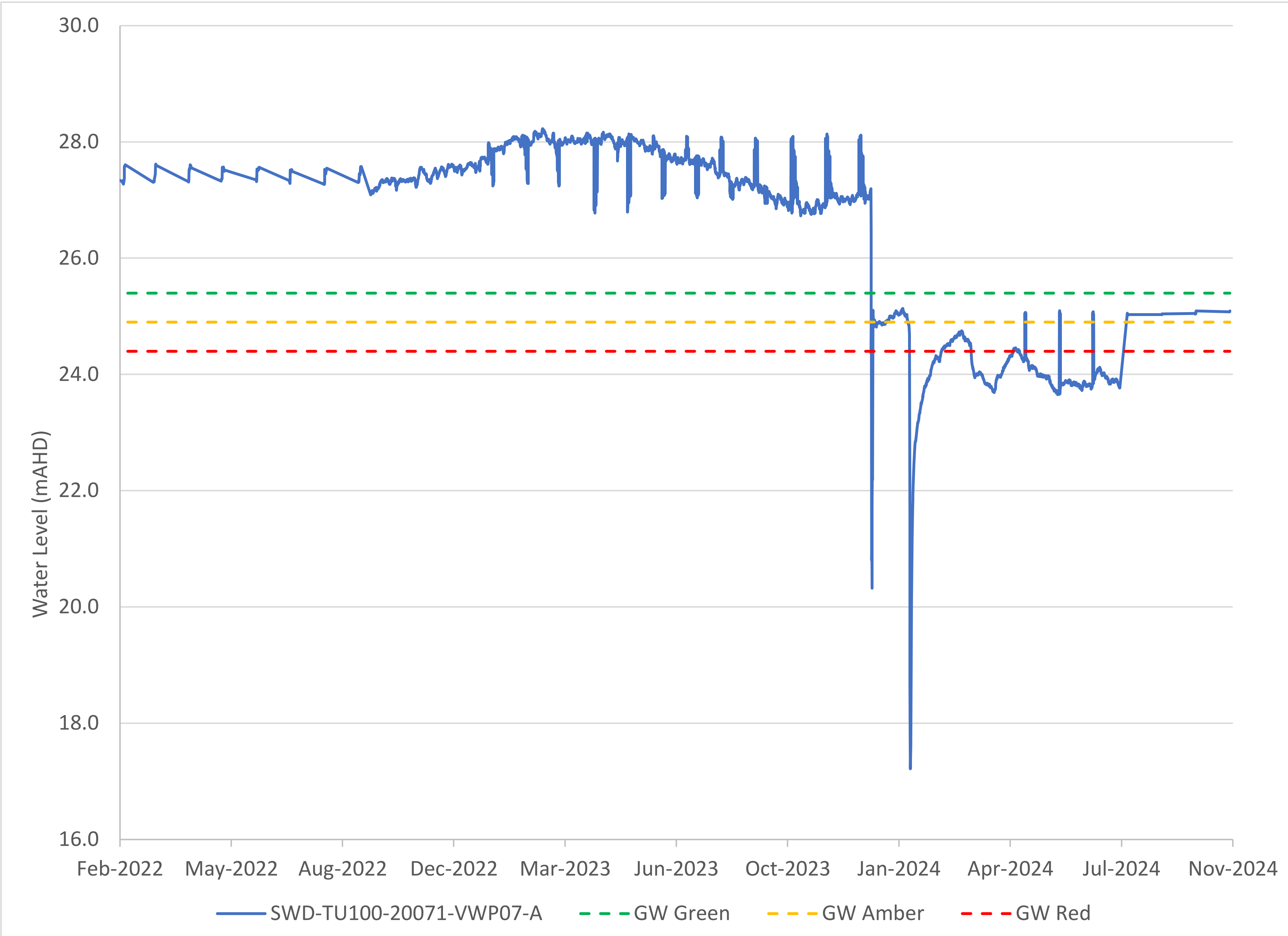

SWD-TU100-19957-VWP05-03
Water Level (mAHD)
30
28
26
24
22
20
18
16
14
12
10
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024

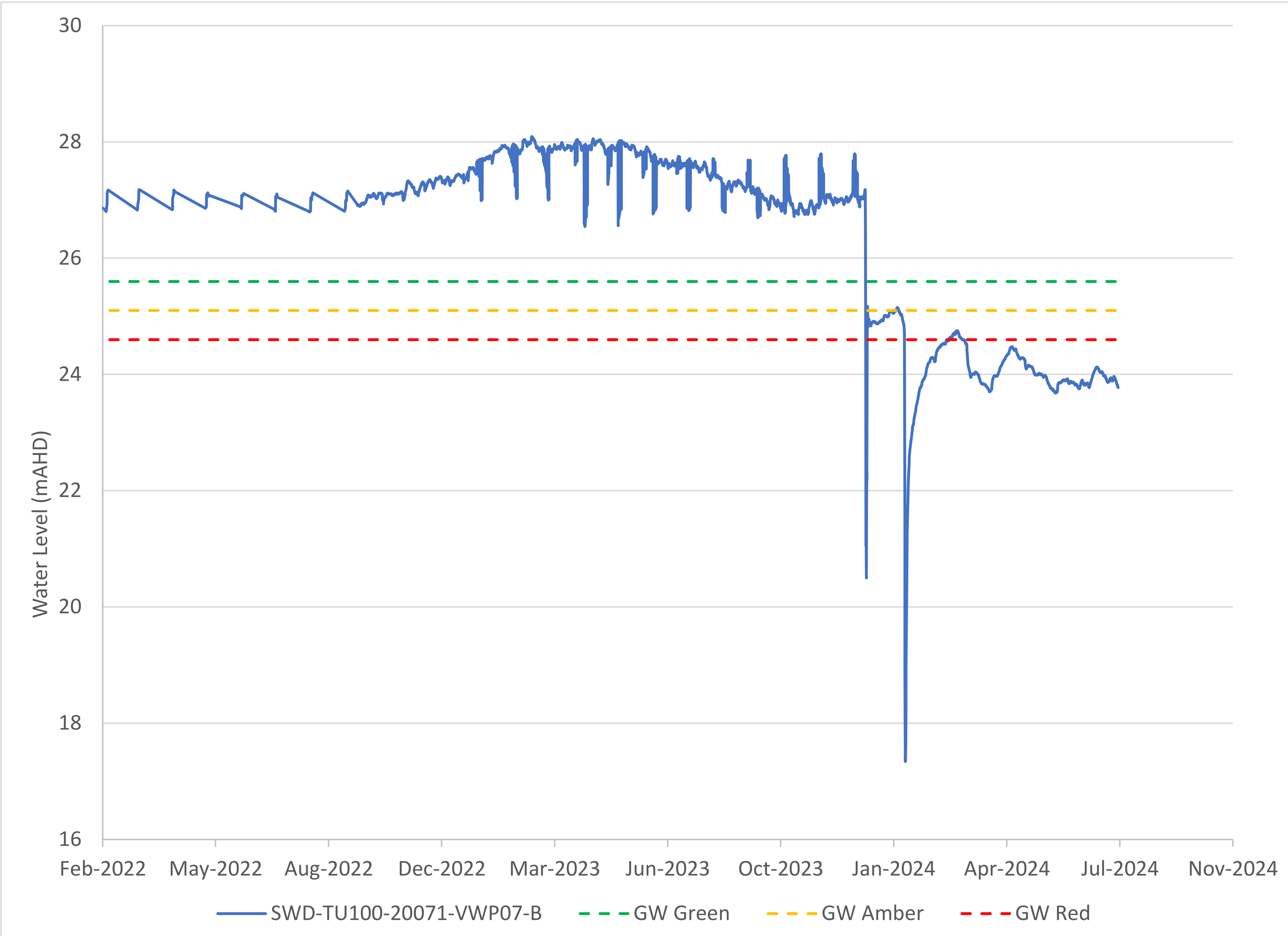

SWD-TU100-19992-VWP06-01
Water Level (mAHD)
30
25
20
15
10
5
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024



SWD-TU100-19992-VWP06-02
Water Level (mAHD)
30
25
20
15
10
5
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024

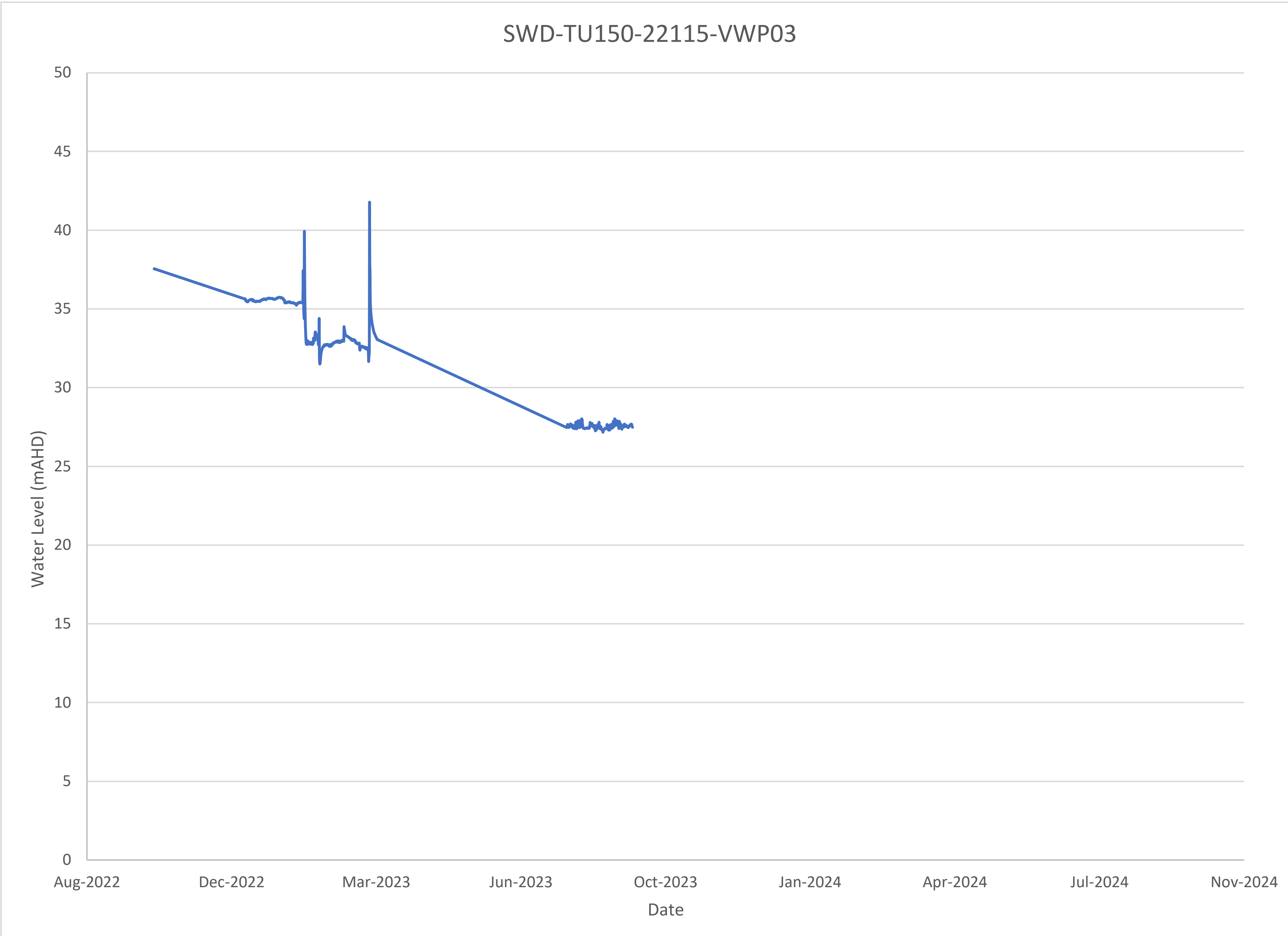

SWD-TU100-19992-VWP06-03
Water Level (mAHD)
30
28
26
24
22
20
18
16
14
12
10
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024


30.0
28.0
26.0
24.0
22.0
20.0
18.0
16.0
Water Level (mAHD)
Feb-2022
May-2022
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
SWD-TU100-20071-VWP07-A
GW Green
GW Amber
GW Red

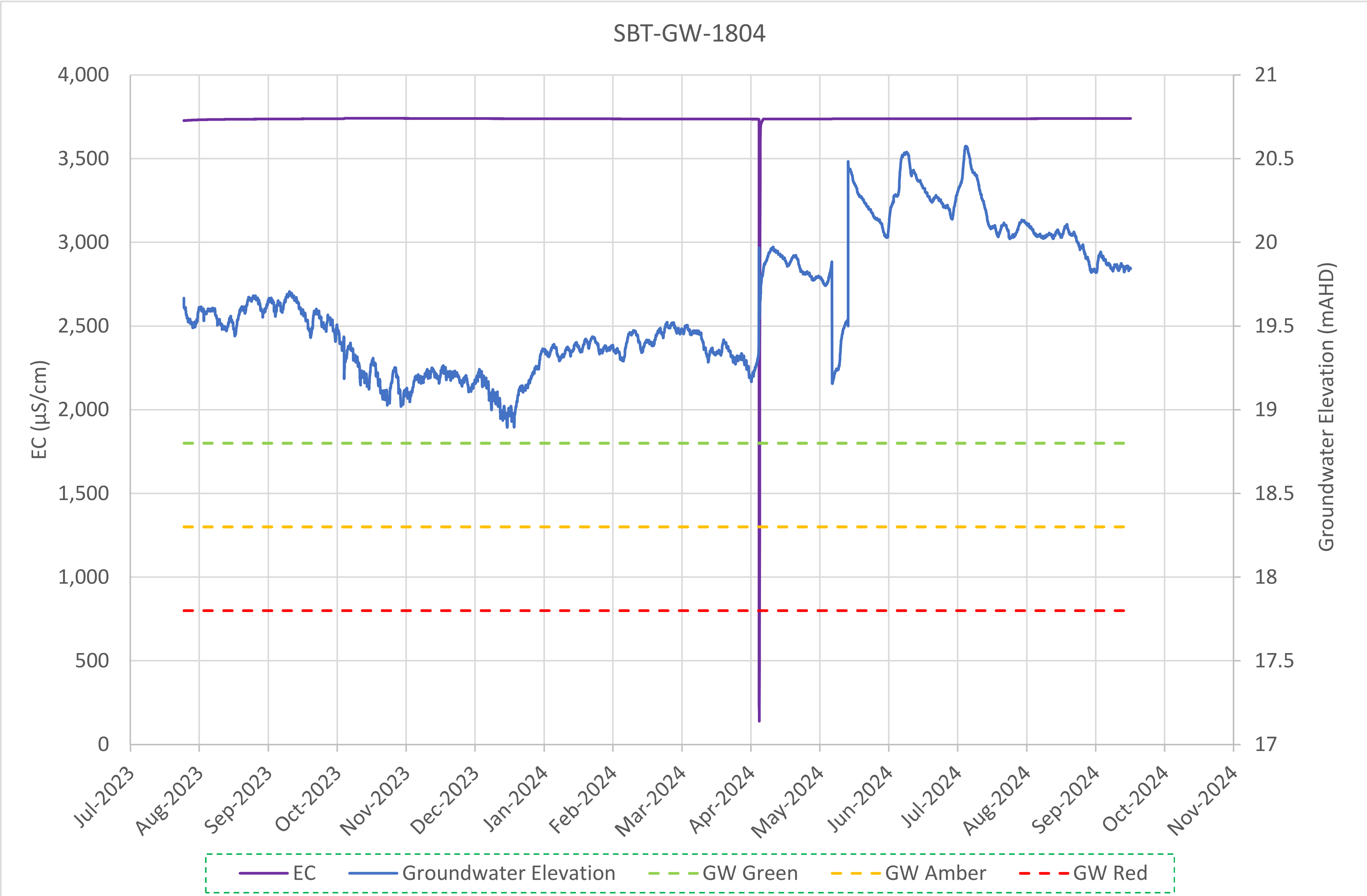


30
28
26
24
22
20
18
16
Water Level (mAHD)
Feb-2022
May-2022
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
SWD-TU100-20071-VWP07-B
GW Green
GW Amber
GW Red

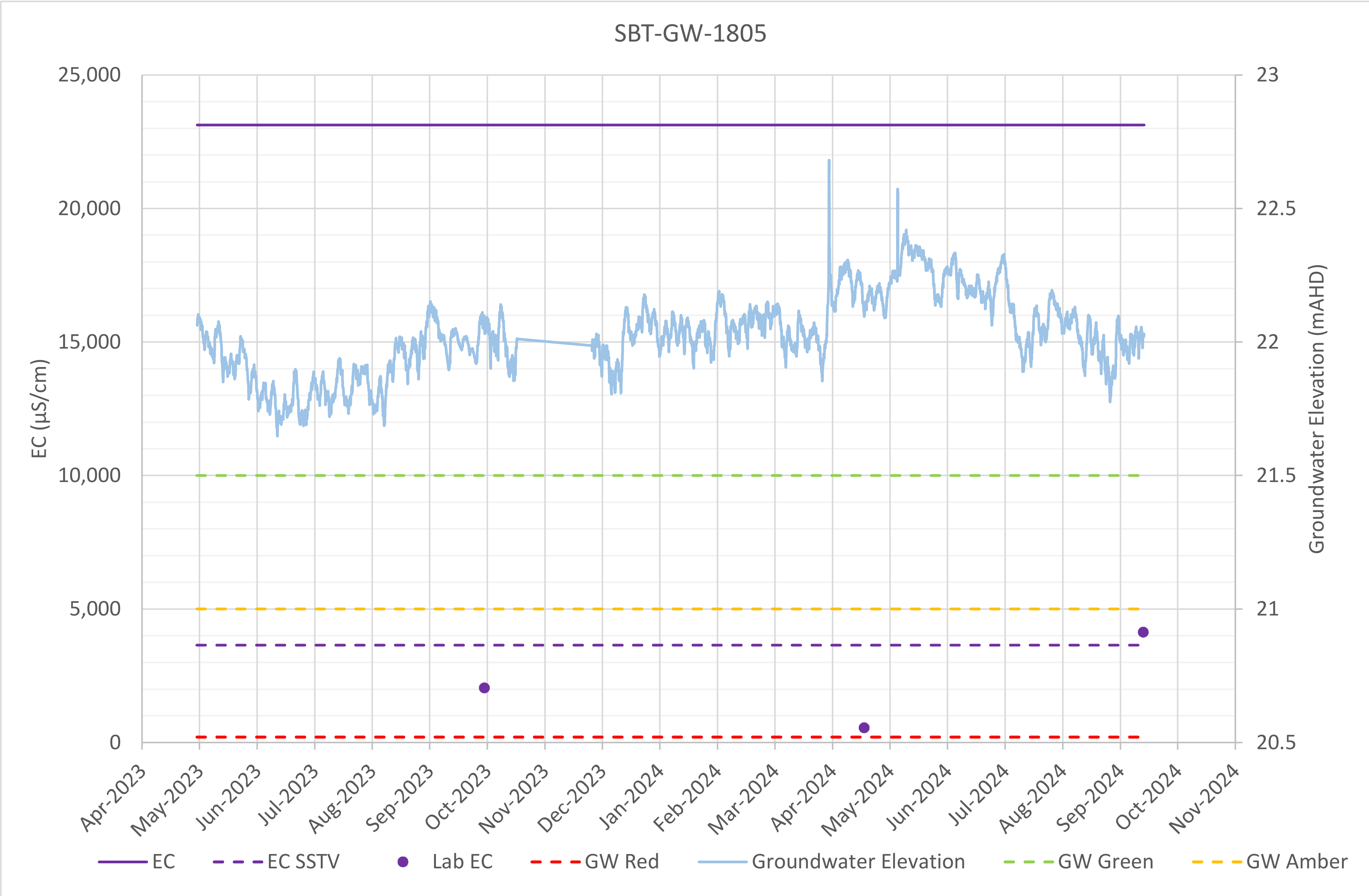

36
35
34
33
32
31
30
29
28
Water Level (mAHD)
May-2022
Aug-2022
Nov-2022
Feb-2023
May-2023
Aug-2023
Nov-2023
Feb-2024
May-2024
Aug-2024
Nov-2024
SWD-TU150-22010-VWP02
GW Green
GW Amber
GW Red


SWD-TU150-22115-VWP03
Water Level (mAHD)
50
45
40
35
30
25
20
15
10
5
0
Aug-2022
Dec-2022
Mar-2023
Jun-2023
Oct-2023
Jan-2024
Apr-2024
Jul-2024
Nov-2024
Date

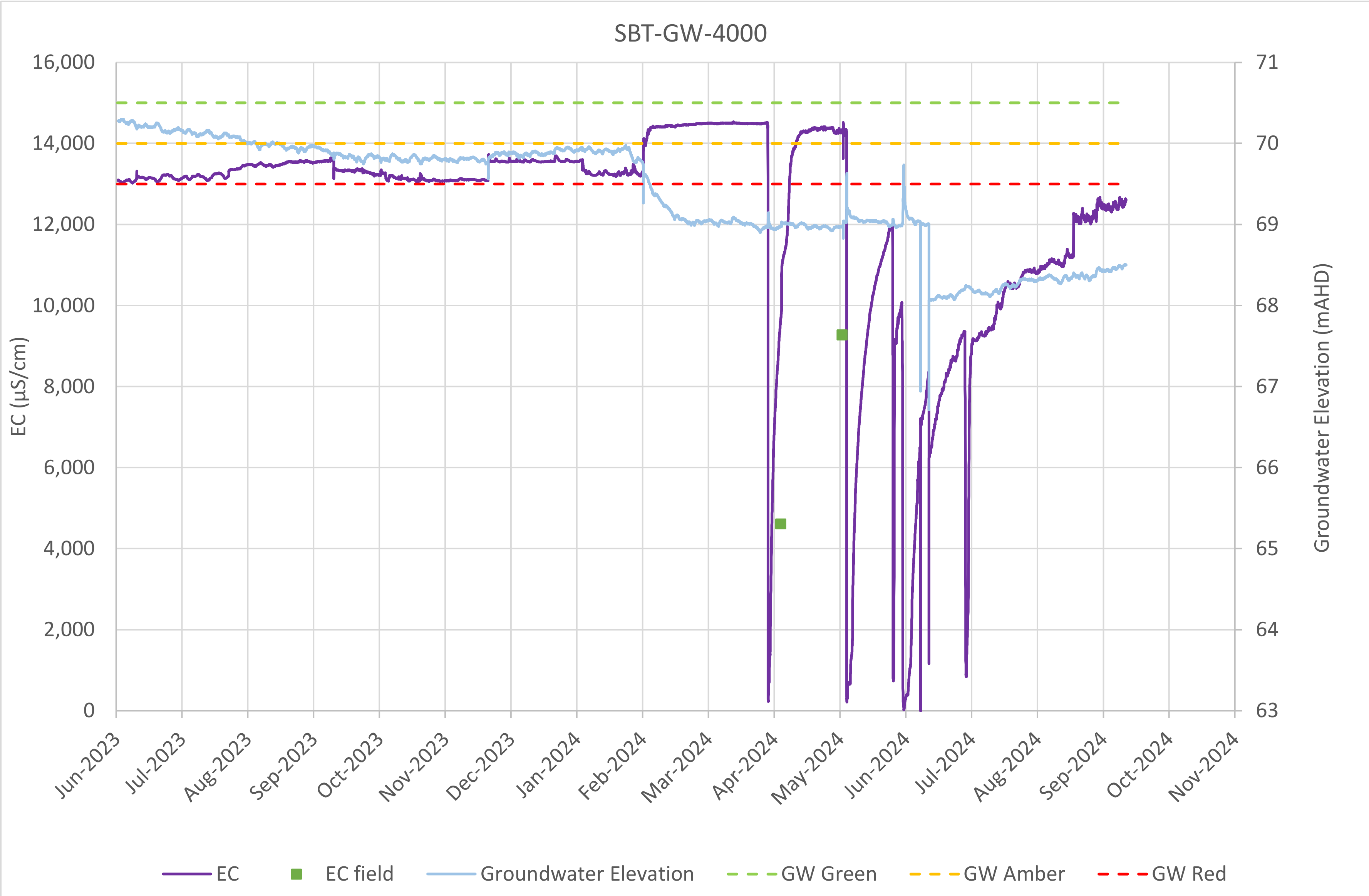
Annexure D GDE groundwater and EC data



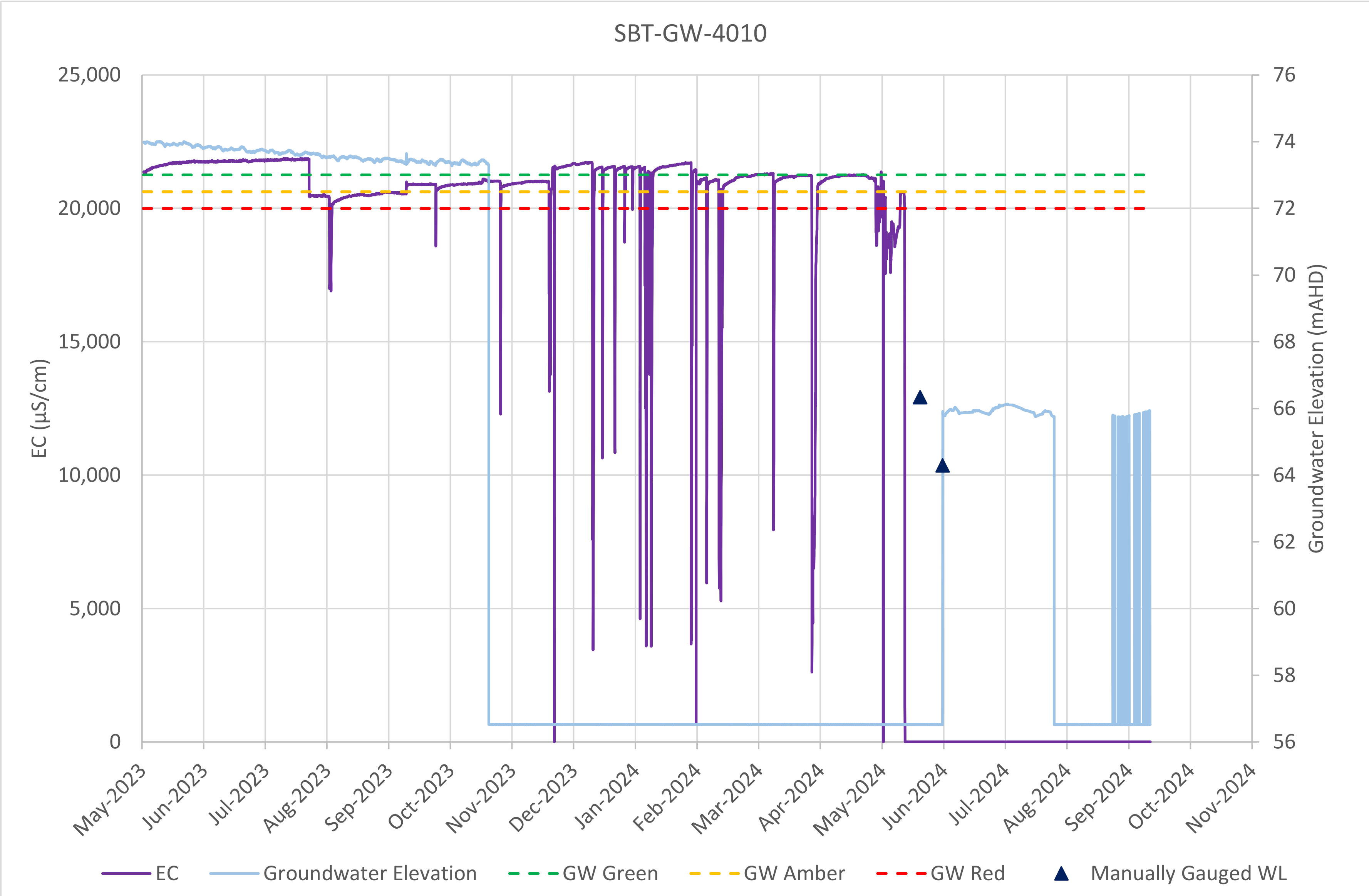
SBT-GW-1804
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
EC (µS/cm)
21
20.5
20
19.5
19
18.5
18
17.5
17
Groundwater Elevation (mAHD)
Jul-2023
Aug-2023
Sep-2023
Oct-2023
Nov-2023
Dec-2023
Jan-2024
Feb-2024
Mar-2024
Apr-2024
May-2024
Jun-2024
Jul-2024
Aug-2024
Sep-2024
Oct-2024
Nov-2024
EC
Groundwater Elevation
GW Green
GW Amber
GW Red

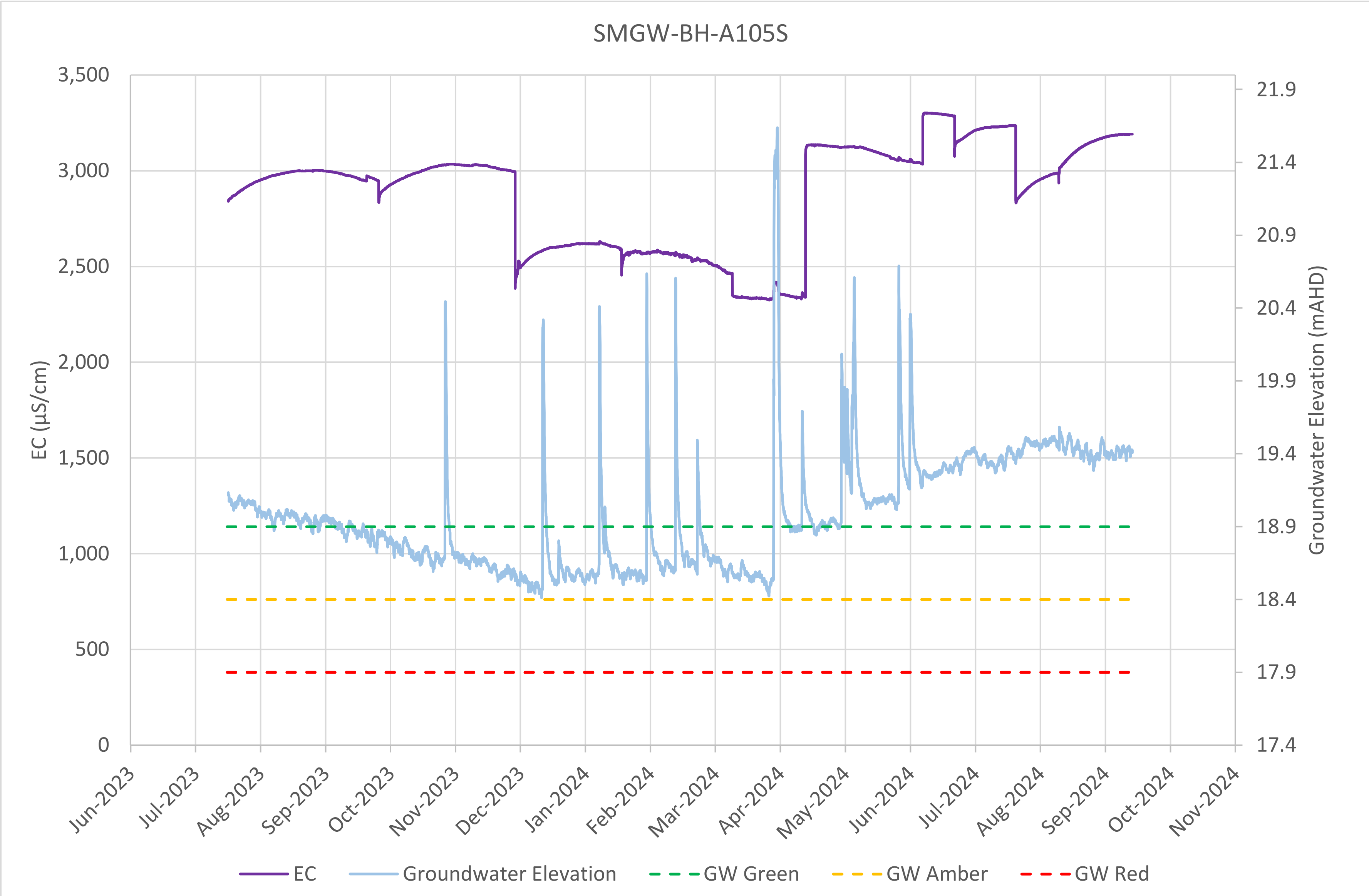


SBT-GW-1805
EC (µS/cm)
Groundwater Elevation (mAHD)
25,000
20,000
15,000
10,000
5,000
0
23
22.5
22
21.5
21
20.5
Apr-2023
May-2023
Jun-2023
Jul-2023
Aug-2023
Sep-2023
Oct-2023
Nov-2023
Dec-2023
Jan-2024
Feb-2024
Mar-2024
Apr-2024
May-2024
Jun-2024
Jul-2024
Aug-2024
Sep-2024
Oct-2024
Nov-2024
EC
EC SSTV
Lab EC
GW Red
Groundwater Elevation
GW Green
GW Amber



SBT-GW-4000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
EC (µS/cm)
71
70
69
68
67
66
65
64
63
Groundwater Elevation (mAHD)
Jun-2023
Jul-2023
Aug-2023
Sep-2023
Oct-2023
Nov-2023
Dec-2023
Jan-2024
Feb-2024
Mar-2024
Apr-2024
May-2024
Jun-2024
Jul-2024
Aug-2024
Sep-2024
Oct-2024
Nov-2024
EC
EC field
Groundwater Elevation
GW Green
GW Amber
GW Red


SBT-GW-4010
EC (µS/cm)
Groundwater Elevation (mAHD)
25,000
20,000
15,000
10,000
5,000
0
76
74
72
70
68
66
64
62
60
58
56
May-2023
Jun-2023
Jul-2023
Aug-2023
Sep-2023
Oct-2023
Nov-2023
Dec-2023
Jan-2024
Feb-2024
Mar-2024
Apr-2024
May-2024
Jun-2024
Jul-2024
Aug-2024
Sep-2024
Oct-2024
Nov-2024
EC
Groundwater Elevation
GW Green
GW Amber
GW Red
Manually Gauged WL


SMGW-BH-A105S
EC (µS/cm)
Groundwater Elevation (mAHD)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
21.9
21.4
20.9
20.4
19.9
19.4
18.9
18.4
17.9
17.4
Jun-2023
Jul-2023
Aug-2023
Sep-2023
Oct-2023
Nov-2023
Dec-2023
Jan-2024
Feb-2024
Mar-2024
Apr-2024
May-2024
Jun-2024
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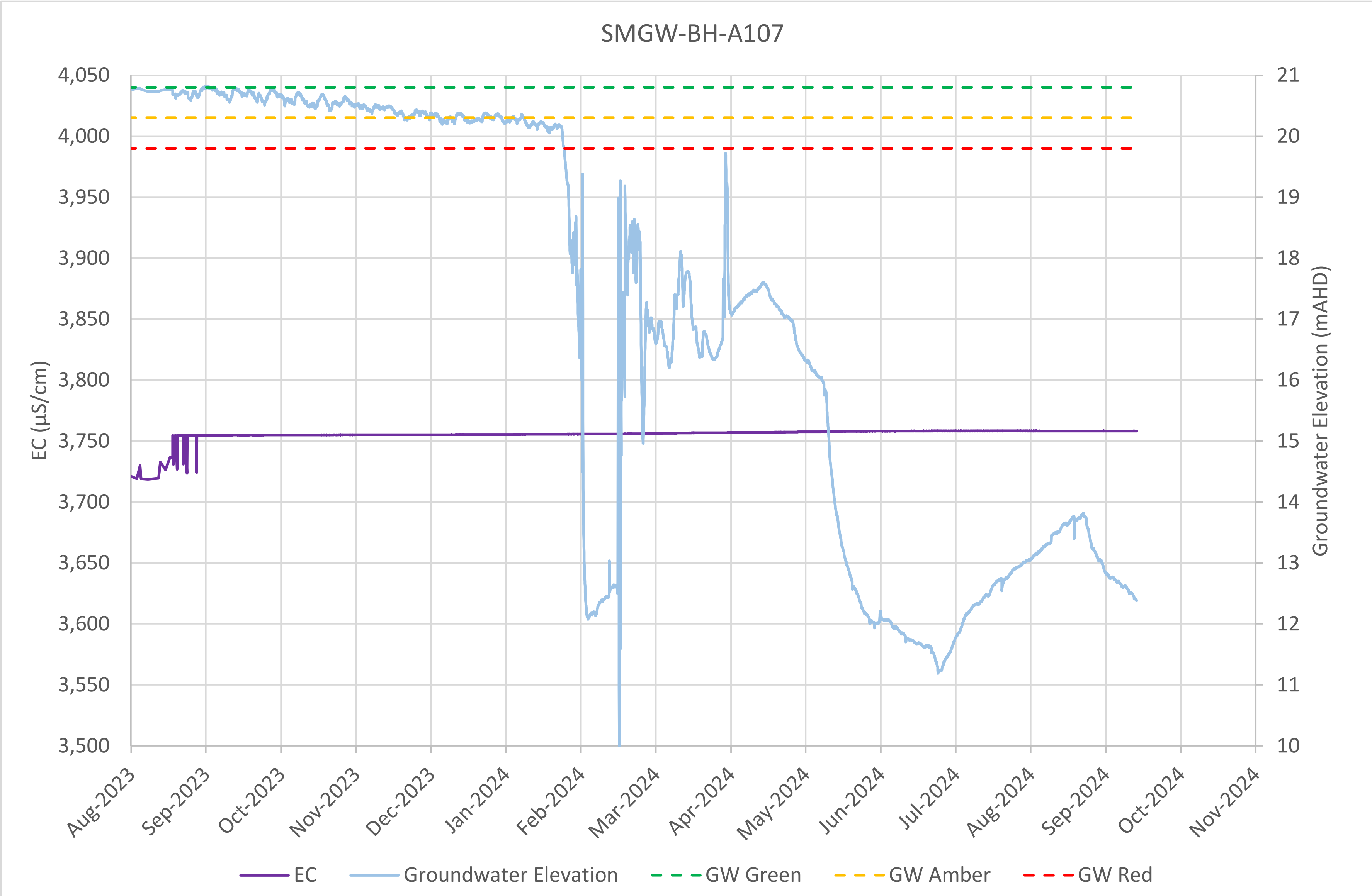
Aug-2024
Sep-2024
Oct-2024
Nov-2024
EC
Groundwater Elevation
GW Green
GW Amber
GW Red


SMGW-BH-A107
EC (µS/cm)
Groundwater Elevation (mAHD)
4,050
4,000
3,950
3,900
3,850
3,800
3,750
3,700
3,650
3,600
3,550
3,500
21
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Aug-2023
Sep-2023
Oct-2023
Nov-2023
Dec-2023
Jan-2024
Feb-2024
Mar-2024
Apr-2024
May-2024
Jun-2024
Jul-2024
Aug-2024
Sep-2024
Oct-2024
Nov-2024
EC
Groundwater Elevation
GW Green
GW Amber
GW Red

Annexure E Statistical trend analysis – groundwater quality

Monitoring Zone	Location ID										total	(n=28)	Tetrachloroethene	Toluene	Zinc
Bringelly	SBT-GW-4003	Green	Green	Green	Green	Green	Grey	Green	Green	Grey	Green	Grey	Grey	Green	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	3.2 mg/L	7.48 pH_unit	0.002 mg/L	0.23 mg/L	0.0035 µg/L	0.005 mg/L	0.002 mg/L	0.005 mg/L
		Grey	Grey	Grey	Green	Green	Green	Green	Grey	Grey	Amber	Grey	Grey	Grey	Green
		0.6 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.006 mg/L	0.001 mg/L	6.2mg/L	7.39 pH_unit	0.002 mg/L	0.92 mg/L	0.0157 µg/L	0.005 mg/L	0.002 mg/L	0.05 mg/L
	0	Green	Grey	Grey	Green	Green	Green	Green	Green	Grey	Green	Green	Grey	Grey	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	5.5 mg/L	7.49 pH_unit	0.002 mg/L	1.48 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.007 mg/L
	01	Green	Grey	Grey	Green	Green	Green	Amber	Green	Grey	Amber	Green	Grey	Grey	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0002 mg/L	0.003 mg/L	0.001 mg/L	20.7 mg/L	7.71 pH_unit	0.002 mg/L	1.09 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.015 mg/L
	802	Green	Grey	Grey	Green	Green	Green	Green	Green	Grey	Green	Green	Grey	Grey	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	9.1 mg/L	7.33 pH_unit	0.002 mg/L	0.35 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.009 mg/L
St Marys		Green	Grey	Green	Green	Green	Green	Amber	Green	Green	Green	Grey	Red	Green	Green
		0.03 mg/L	0.1 mg/L	1.74 mg/L	0.0001 mg/L	0.003 mg/L	0.001 mg/L	2.1 mg/L	6.78 pH_unit	0.002 mg/L	0.39 mg/L	1.05 µg/L	1.58mg/L	0.005 mg/L	0.005 mg/L
Claremont Meadows	1024	Green	Green	Green	Green	Amber	Grey	Green	Green	Grey	Green	Green	Grey	Green	Green
		0.02 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.003 mg/L	0.002 mg/L	2.2 mg/L	6.58 pH_unit	0.002 mg/L	0.03 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.016 mg/L
	-1028	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey
		0.09 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.002 mg/L	0.4 mg/L	7.14 pH_unit	0.002 mg/L	0.07 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.03 mg/L
	W-1805	Green	Grey	Grey	Green	Green	Green	Green	Green	Grey	Green	Green	Grey	Grey	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	4.3 mg/L	6.54 pH_unit	0.002 mg/L	1.02 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.032 mg/L
Aerotropolis	W-4008	Grey	Green	Green	Grey	Grey	Green	Grey	Grey	Green	Grey	Green	Green	Green	Grey
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.007 mg/L	0.001 mg/L	11.5 mg/L	7.66 pH_unit	0.002 mg/L	0.39 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.005 mg/L
Northern Tunnels	GW-1804	Green	Grey	Grey	Green	Green	Grey	Green	Green	Grey	Green	Green	Grey	Grey	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	0.8 mg/L	7.81 pH_unit	0.002 mg/L	0.18 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.005 mg/L
	W-BH-5S	Grey	Green	Green	Grey	Grey	Green	Grey	Grey	Green	Grey	Green	Green	Green	Grey
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.002 mg/L	0.001 mg/L	0.8 mg/L	7.4 pH_unit	0.002 mg/L	0.08 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.005 mg/L
	GW-BH-7	Green	Grey	Grey	Green	Green	Grey	Green	Red	Grey	Green	Green	Grey	Grey	Green
		0.03 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	3.5 mg/L	8.33 pH_unit	0.002 mg/L	0.51 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.005 mg/L
	GW-BH-60	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey
		0.01mg/L	0.1mg/L	0.02mg/L	0.0005mg/L	0.003mg/L	0.001mg/L	6.8mg/L	7.45 pH_unit	0.002 mg/L	3.38 mg/L	1.05ug/L	0.005 mg/L	0.002mg/L	0.165mg/L
	BT-GW-4000	Green	Green	Green	Green	Green	Green	Green	Green	Grey	Green	Green	Grey	Green	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	10.3 mg/L	7.52 pH_unit	0.002 mg/L	0.002 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.015 mg/L
WSI	MGW-BH-C320	Green	Green	Green	Green	Green	Grey	Grey	Green	Grey	Grey	Grey	Grey	Green	Green
		0.01 mg/L	0.1 mg/L	0.02 mg/L	0.0001 mg/L	0.001 mg/L	0.001 mg/L	0.8 mg/L	7.48 pH_unit	0.002 mg/L	0.32 mg/L	0.005 µg/L	0.005 mg/L	0.002 mg/L	0.022 mg/L
	SMGW-BH-C330	Green	Grey	Grey	Green	Green	Grey	Green	Green	Grey	Green	Green	Grey	Grey	Green
		0.2 mg/L	0.1 mg/L	0.02 mg/L	0.001 mg/L	0.014 mg/L	0.001 mg/L	1.8 mg/L	6.38 pH_unit	0.002 mg/L	0.3 mg/L	0.01 µg/L	0.005 mg/L	0.002 mg/L	0.473 mg/L

Legend
- Red - Review trigger and system operation if required
- Amber - Review data if required
- Green - No action required
- Grey - Insufficient data for trend

Annexure F QAQC Report

Annexure F QAQC Report

F.1 Introduction

All groundwater quality monitoring was undertaken by CPBG trained personnel, and is understood to have been completed in accordance with the methodology detailed in Section 7.4 of the GMP.

Quality assurance (QA) and quality control (QC) measures during sampling and field data collection to ensure data integrity are detailed in Section 7 of the GMP. The measures outlined in the GMP included:

- Use of NATA accredited laboratories for sample analysis;
- Use of Chain of Custody (CoC) procedures between sample collection in the field and subsequent reception of the sample by the laboratory. CoC documentation included the sample type and code, analysis required, collection data, sampler and sample receiver(s);
- Appropriate sample handling and storage including using laboratory supplied containers, keeping samples chilled during storage and transport, ensuring samples are received in good condition within specified holding times by the laboratory;
- A consistent program of quality control sampling was adopted for fieldwork, including:
  - Collection of duplicate and triplicate samples at an average frequency of one sample per twenty primary samples (an overall ratio of 1:10 where PFAS sampled in accordance with NEMP 2.0);
  - Collection of rinsate blanks to measure the effectiveness of decontamination procedures; and
  - Collection of trip blanks to assess the adequacy of sample storage and transport procedures in preventing cross contamination.
  -

F.2 Quality Control

The steps in the sampling and analysis process are subject to natural and inherent variability, and this can affect the results produced, and the overall quality of the data sets generated. In order to minimise the effect of this, standard procedures are used for works carried out in the field, and in the laboratory. The use of such procedures represents one aspect of the quality assurance process. To measure the effectiveness of the quality assurance process, quality control samples can be tested, and other quality control tests can be conducted during the analysis of samples taken in the field.

Quality control (QC) samples and tests can be used to assess both the accuracy, and the precision of the results produced.

Measures of ACCURACY provide information on how close the reported result is to the true result. For practical reasons, measures of accuracy are usually confined to the laboratory steps in the overall process.

Measures of PRECISION provide information on the variability in the results. Precision can be assessed as:

- "repeatability" or intra-laboratory variation – the degree of variation in a result when the same laboratory analyses a sample (or blind replicate) several times, and;

- "reproducibility" or inter-laboratory variation – the degree of variation in a result when a different laboratory separately analyses a sample.

In addition, blank samples can be used to assess whether extraneous materials and factors have contributed to the results obtained from the sampling and analysis process.

QC testing can be conducted for all steps of the sampling and analysis process (referred to as Field QC in this report), or just one portion of the process, such as the laboratory steps (referred to as Laboratory QC in this report).

F.2.1 Field Quality Control

Precision of the sample collection, transport and analysis process is measured by the relative percent difference (RPD) between duplicate and triplicate results.

As detailed in the Section 7.7 of the GMP the relative percentage difference (RPD) acceptance limits adopted were:

- No limit analytical results <10 times Level of reporting (LOR)
- 50% analytical results 10-20 times LOR
- 30% analytical results >20 times LOR.

F.2.1 Laboratory Quality Control

Laboratories are accredited by the National Association of Testing Authorities, Australia (NATA) on the basis of their ability to provide quantitative evidence of their ability and competence to produce reliable results against recognised benchmarks. Both the primary laboratory Australian Laboratory Services (ALS) and secondary laboratory Eurofins are accredited by the National Association of Testing Authorities (NATA).

NATA accredited laboratories are able to demonstrate the ability to produce reliable, repeatable results for a range of parameters within a range of sample matrices. Each laboratory method used undergoes a validation process before it is adopted by the laboratory and accredited by NATA. As part of the validation process, the precision and accuracy of the method are established.

In addition, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The results of this testing are compared with the validated precision and accuracy.

Precision of results is measured by the RPD between replicate samples selected at the laboratory.

Accuracy of results is assessed in a number of ways:

- **Method blanks:** An analyte free matrix, which is carried through the complete preparation and analytical procedure.
- **Matrix spikes**: Known amounts of targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The recoveries of the spiked analytes are evaluated to determine accuracy in a given matrix.
- **Surrogate spikes:** Known amounts of chemical compounds with similar properties to the targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The recoveries of the surrogate spikes are evaluated to determine extraction efficiency.

- **Laboratory control samples (LCS)**: A clean matrix (not containing any of the analyte of interest) spiked with known concentrations of the analytes of interest. LCS samples are analysed to determine if the procedure is working within established control limits where matrix interference is not an issue.

Schedule B(3) of the National Environment Protection Measure (NEPM) for contaminated sites states that, in general, at least 70% recovery should be achievable from a reference method. Additionally, standard methods prepared by international agencies such as the US EPA and APHA, frequently have performance data such as expected spike recovery incorporated within the method. Where these vary from 70% as indicated in NEPM, they are noted in the discussion of results.

A default acceptable range of 70% - 130% for metals and inorganics, and 60% - 140% for organics, was adopted for matrix spike recovery results (Table F-1).

F.2.1 Summary of data quality acceptance targets for groundwater QC samples

Data quality acceptance targets for groundwater field and laboratory QC samples are summarised in Table F-1 below.

Table F.1: Data quality acceptance targets for field and analytical results for groundwater water samples

QC sample type	Acceptance limit
Duplicate and Triplicate Samples (applies to both field and lab duplicates)	Relative Percentage Difference (RPD) within 50% for groundwater.
Spike and surrogate recoveries	Spike and surrogate recoveries between the laboratory lower control limit and upper control limit and where not defined the following range to be adopted: 70% - 130% for inorganics / metals; and 60% - 140% for organics.
Lab control samples	Refer to internal laboratory control limits
Blanks	Analytes not detected, i.e., below the level of reporting (LOR).

F.3 Analytical Laboratory Processes

Table F-2: Summary of analytical laboratory processes

Analytical laboratory processes	YES	NO
1. Was a NATA registered laboratory used?	☒	☐
2. Did the laboratory perform the requested analysis?	☒	☐
3. Were the laboratory methods adopted NATA endorsed?	☒	☐
4. Were the appropriate test procedures followed?	☒	☐
5. Were the reporting limits satisfactory?	☒	☐
6. Was the NATA seal on the reports?	☒	☐
7. Were the reports signed by an authorised person?	☒	☐

COMMENTS

Nil.

Precision/Accuracy of the Laboratory Report		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

F.4 Sample Handling Procedures

Table F-3: Summary of sample handling procedures

Sample handling	YES	NO
1. Were the sample holding times met for COPC?	☒	☐
2. Were the samples in proper custody between the field and laboratory?	☒	☐
3. Were the samples properly and adequately preserved? (This includes chilling the samples where appropriate)	☒	☐
4. Were the samples received by the laboratory in good condition?	☒	☐

COMMENTS

Sample Handling Procedure		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

Analysis Holding Time Outliers

Nil.

F.5 Field QA/QC sampling and procedures

The monitoring event occurred over 155 days between 5th July 2024 and 6th December 2024. A summary of QC samples collected during the GME is provided in Table F-4, and results for primary to QC samples RPDs are presented in Table 1.

Table F-4: QA/QC sample summary

Sample Type	QC sample frequency requirements	Number of samples required	Number of samples collected
Primary Samples		-	17
QA/QC Samples	Field Duplicate pairs (1 in 20 primary samples)	1	2
	Field Triplicate pairs (1 in 20 primary samples)	1	1
	Trip Blanks (1 / sample batch)	2	0
	Field Blanks (1 / sampling event)	2	1
	Equipment Rinsates (1 / person / day where non-disposable equipment used for sampling)	2 (if non-disposable equipment used)	0

F.5.1 Field QA/QC Summary

Field replicates collected over the monitoring period are summarised in Table F-5.

Table F-5: QA/QC samples

Primary sample ID	Duplicate IDs (ALS)	Duplicate IDs (Envirolab)	Triplicate ID (Secondary Lab)
SBT-GW-4000	SBT-GW-4000 (TRIPLICATE) 1 SBT-GW-4000 (TRIPLICATE) 2	-	-
SBT-GW-4003	SBT-GW-4003 (DUPLICATE)	-	-
MW1	MW1 (FIELD DUPLICATE)	MW1	-

	YES	NO	N/A
1. Were an adequate number of field replicates analysed for each chemical?	☒	☐	☐
2. Were RPD's for replicate samples within control limits?	☐	☒	☐

Where RPDs were outside the acceptable range, sampling procedures, laboratory analytical methods and laboratory results were investigated. The results of this review are presented in Table F-6.

Table F-6: Replicate RPD exceedance summary

Primary Sample	Duplicate / Triplicate Sample ID	Lab report	Analyte	RP65D %	See Comment
SBT-GW-4000	SBT-GW-4000 (TRIPLICATE) 2	ES2430297; ES2430811	Iron	77	1
			Nickel	55	5
			Aluminium	74	1
			Cobalt	71	1
			TRH C15-C28	149	2
			TRH C29-C36	123	2
			Nitrate (as NO_3-N)	198	3
			Nitrogen (Total)	130	3
SBT-GW-4000	SBT-GW-4000 (TRIPLICATE) 1	ES2430297; ES2430811	Iron	68	1
			Zinc	55	5
			Aluminium	65	1
			Cobalt	62	1
			TRH C15-C28	126	2
			TRH C29-C36	67	2
			Nitrate (as NO_3-N)	199	3
			Nitrogen (Total)	124	3
SBT-GW-4003	SBT-GW-4003 (DUPLICATE)	ES2430297; ES2430811	Arsenic	67	1
			Iron	123	1
			Iron (filtered)	146	4
			Zinc (filtered)	67	5
			Aluminium	117	1
			Cobalt	120	1
			Manganese	74	1
			Nitrate (as NO_3-N)	111	4

Primary Sample	Duplicate / Triplicate Sample ID	Lab report	Analyte	RP65D %	See Comment
MW1	MW1 (FIELD DUPLICATE)	ES2434376	Aluminium (filtered)	100	3
			Nitrate (as NO_3-N)	111	3
MW1	MW1 (FIELD DUPLICATE)	ES2434376	Aluminium (filtered)	100	3
			Manganese	71	1
MW1	MW1	ES2434376; 364494	Aluminium	100	1
			TRH C6-C9	97	4
			Manganese	55	1

Comments

1) Poor RPDs identified in total but not filtered metals, indicating that poor reproducibility was associated with metals sorbed to particulates rather than issues with sampling or analysis.
2) RPD exceedances are associated with heavier end hydrocarbons that are typically bound or sorbed to particulates, and therefore poor RPDs are due to particulates (i.e. turbid samples) rather than issues with sampling or analysis.
3) RPDs reported outside the acceptable range are where the primary result is higher than the duplicate/triplicate reported result.
4) RPDs reported outside the acceptable range are where the primary result is lower than the duplicate/triplicate reported result.
5) Poor RPDs are attributed to concentrations <10X LOR

In total 31 of 391 (8%) duplicate pairs of analysis exceeded adopted RPD acceptance limits. The precision of the field investigation is not considered to be materially affected by non-compliant RPDs, as the highest concentration reported in QC replicates pairs has been adopted for interpretation, and most of the RPD exceedances are associated with either metals or heavy end hydrocarbons sorbed to particulates. As the reported concentrations for both primary and duplicate sample were typically below the adopted criteria, the RPD exceedances are not considered to alter the assessment results.

F.5.2 Field Blanks Summary

Blank field quality control samples include trip blanks, field blanks and equipment rinsates.

Trip blanks are used to assess whether sample storage and transport procedures minimised the introduction of contamination during storage and transport. Trip blanks are typically collected and analysed where volatile contaminants of concern are being assessed in the sample batch.

Trip blanks are laboratory prepared vials of distilled water that remained with the sample containers during sampling and transport to the laboratory. At no time during these procedures are the blanks opened.

Field blank samples are collected to assess if sampling procedures were conducted appropriately to minimise the potential impact of environmental factors during sample collection.

The blank is typically prepared by pouring laboratory supplied distilled water into sampling bottles, which were then stored (with lids off) with other samples throughout sampling activities.

Equipment rinsates are collected to assess if procedures for decontamination of non-disposable sampling equipment were adequate to minimise for cross-contamination between sampling points.

Rinsate samples are prepared in the field using laboratory supplied bottles and the distilled water used for the cleaning of non-disposable sampling equipment. Rinsate samples are typically collected at a rate of one per field operator per day where non-disposable sampling equipment was used.

Trip Blanks

	Yes	No (see comment)
Were an adequate number of trip blanks collected?	☐	☒
Were trip blanks free of contaminants?	☐	☐ N/A

Comments

Although the number of trip blanks collected was non-compliant, as volatile contaminants have not been identified as COPC along the alignment, apart from St Marys where there is a targeted mitigation monitoring program and appropriate QC samples have been taken (refer reports in Annexure G), the lack of trip blanks for the six monthly monitoring program is not considered to have impacted the useability of the dataset.

Rinsates

	Yes	No (See comment)
Were an adequate number of rinsate blanks collected?	☐	☒
Were rinsate blanks free of contaminants?	☐	☐ N/A

Comments

Although no rinsate blank were collected during sampling events this is not considered to have affected the quality of data collected as no sampling equipment was re-used between sampling locations, therefore the potential for cross-contamination is negligible.

Blanks and Rinsate Sampling and Analysis		
Satisfactory ☐	Partially Satisfactory ☒	Unsatisfactory ☐

F.6.1 Laboratory Quality Control Procedures

As noted in Section F.2, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. An assessment of the adequacy of these procedures is provided in Tables F-8 and F-9.

Table F-8: Acceptability of laboratory quality controls

	YES	NO
Were laboratory method blanks free of contamination?	☒	☐
Were the matrix spike recoveries within control limits?		☒ See comment
Were the Lab control samples within control limits?	☒	☐
Were the RPD's of the laboratory duplicates within control limits?	☐	☒ See comment
Were the surrogate recoveries within laboratory control limits?	☒	☐

Table F-9: Summary of laboratory quality controls results

Sample Type	Total Number of Analyses	Number of Identified Issues	% of Analyses with Identified Issues	Comment/Issues Identified
Method blank	315	0	0%	All results <LOR
Matrix spike % recovery	161	1	0.62	One sulfate analysis was outside laboratory control limits:
Laboratory control sample % recovery	392	0	0	-
Laboratory duplicates	569	14	0.5	The following analytes had RPDs exceedances: • Cobalt • Nickel (filtered) • TOC • TDS • Ammonia as N • Chloroform • Reactive Phosphorus as P • Phosphorus (total)
Surrogate % recovery	43	0	0	-
Total	**1,192**	**15**	**1.25%**	-

Most of the RPD exceedances were reported where concentrations were < 10X LOR, and are therefore not an issue. Based on the low percentage of non-compliant matrix spikes, laboratory control samples, laboratory duplicates and surrogates, the data set is considered to be acceptable for use.

F.7 Field Data Useability

Overall, of the 1,583 individual analyses conducted in association with the quality assessment, issues were identified in 46 analyses (2.9%). A summary of the total analyses and proportion with issues is provided in Table F-10 below.

Table F-10: Quality Control Program Summary

Sample Type	Total Number of Analyses	Number of Identified Issues	% of Analyses with Identified Issues	Issues Identified
Field Duplicate/ Triplicates samples	391	31	8	RPDs outside acceptable range
Field quality control samples (rinsates, field blanks and trip blanks)	-	-	-	Number of rinsate and trip blank samples was non-compliant, but is not considered to have affected useability of dataset based on COPCs
Internal laboratory analyses	1,192	15	1.25	Laboratory quality control results outside of control limits
Total	**1,583**	**46**	**2.9%**	

Recommendations for interpretation and future monitoring events include:

- Sample turbidity should be considered when interpreting total metal and heavy end hydrocarbon concentrations as the presence of particulates may result in higher total concentrations being reported.
- Collect rinsate blanks and include trip blanks to be in line with the GMP requirements.

Overall, the percentage of issues identified in the quality assessment (2.9%) is considered acceptable, and therefore the data is considered to be of appropriate quality for use.

Annexure G

St Marys Station Monthly Mitigation Monitoring Report 13 – July 2024

Document Number: SMWSASBT-CPG-SWD-SW000-GE-RPT-040420
(September 2024)

St Marys Station Monthly Mitigation Monitoring Report 18 – December 2024

Document Number: SMWSASBT-CPG-SWD-SW000-GE-RPT-040425
(February 2025)

St Marys Station Monthly Mitigation Monitoring Report 13 – July 2024

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

Project number	WSA-200-SBT
Document number	SMWSASBT-CPG-SWD-SW000-GE-RPT-040420
Revision date	11/09/2024
Revision	A.01

Document approval

Rev	Date	Prepared by	Reviewed by	Remarks
Rev A.01	11/09/2024	Sam Latham	[redacted]	Provided to CPBG for internal review

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Annexures

Abbreviations

Abbreviation	Definition
AHD	Australian height datum (0 mAHD corresponds roughly to mean sea level)
btoc	Below the top of casing
Cis 1,2 DCE	Cis 1,2 dichloroethene
COC	Chain of Custody
CPBG	CPB Contractors Ghella Joint Venture
CV	Co-efficient of variation
EC	Electrical conductivity
HHRA	Human Health Risk Assessment
m	Metre
LNAPL	Light Non Aqueous Phase Liquid
LOR	Limit of Reporting
mg/L	Milligram per litre
NSW	New South Wales
NATA	National Association of Testing Authorities
PCE	Tetrachloroethene
PRB	Permeable Reactive Barrier
QA	Quality Assurance
QC	Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SBT	Station Boxes and Tunnelling Works
SOP	Standard Operating Procedures
TBM	Tunnelling boring machine
TCE	Trichloroethene
TfNSW	Transport for New South Wales
TTMP	Tetra Tech Major Projects Pty Ltd (Tetra Tech)
µg/L	Micro gram per litre
VC	Vinyl chloride
WSA	Western Sydney Airport

1. Introduction

Sydney Metro has engaged the CPB Ghella Joint Venture (CPBG) for the design and construction of the Station Boxes and Tunnelling Works (SBT Works) for the Sydney Metro Western Sydney Airport project (the 'Project').

CPBG has engaged Tetra Tech Major Projects Pty Ltd (Tetra Tech) to provide geotechnical, hydrogeological and contaminated land consultancy services associated with the design and construction of the SBT Works.

Groundwater contaminated with chlorinated hydrocarbons from a former dry cleaner located at 1-7 Queen St, St Marys has been identified approximately 200m west of the St Marys Station Box. Construction related dewatering during station box construction was predicted to draw down groundwater in the vicinity, reversing the existing westerly groundwater flow direction, potentially drawing the contamination toward the excavation (Tetra Tech 2023a).

A permeable reactive barrier (PRB) was installed on 16 May to 19 May 2023 to the west of St Marys Station to intercept potential migration of chlorinated hydrocarbons in groundwater due to construction associated drawdown. Given the potential for unacceptable inhalation or direct contact risk, a targeted multi-level groundwater monitoring and contingency mitigation approach has been applied, to allow contingency mitigation to be implemented before an unacceptable risk occurs.

In addition to monitoring for potential contaminant mobilisation due to station construction, the mitigation monitoring program was expanded in mid-March 2024 to incorporate assessment for potential impacts due to rail tunnel construction. Tunnel boring machine (TBM) monitoring was established to monitor groundwater conditions in the vicinity of the former dry cleaner when the TBMs progress through the area. The TBMs broke through at St Marys Station Box in May and June 2024. Monitoring has continued for four weeks after break through, with the final samples for this monitoring program collected on 12 July 2024.

Pre-construction groundwater conditions across the St Marys Station area have been assessed through a Detailed Site Investigation (DSI) (Tetra Tech, 2022), and the Baseline Groundwater Report (Tetra Tech, 2023b) and as detailed in the Groundwater Monitoring Program (GMP).

The remediation strategy is outlined in the remedial action plan (RAP) for the SBT Works at St Marys:

- Tetra Tech (2023c); *St Marys Station Remedial Action Plan* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040521. 22/05/2023. Rev A08).

Details of the installation of the PRB and mitigation monitoring are detailed in:

- Tetra Tech (2023d); *Implementation of Permeable Reactive Barrier* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040561. 02/08/2023. Rev A).

An outline of the TBM monitoring program is provided in:

- Tetra Tech (2024); *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater monitoring network* (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040403_A.01. 26/03/2024. Rev A).

This report documents the thirteenth month (July 2024) of groundwater sampling to monitor the mitigation of potential risks due to construction related mobilisation of groundwater impacted with chlorinated hydrocarbons. This report also presents final post-TBM groundwater conditions in the vicinity of the source area.

1.1. Purpose and objectives

The purpose of the monitoring works was to:

- Monitor the effectiveness of the PRB;

- Identify if an adverse change in risk profile is likely which requires contingency mitigation measures to be implemented as outlined in Section 11.6 of the RAP, and;
- Assess groundwater conditions in the vicinity of the contamination source area when the TBMs pass through the area.

The objectives of the works were to:

- Undertake groundwater monitoring from nominated monitoring wells to measure the groundwater level and quality between the source area and the Station box (as shown in Figure 1);
- Assess the monitoring results relative to the trigger values outlined in the RAP;
- Where detectable concentrations of chlorinated ethenes are reported in monitoring wells between the station and the PRB, review the model predictions outlined in the Human Health Risk Assessment (HHRA) (Tetra Tech, 2023a) to assess whether concentrations exceeding the trigger values are likely to reach the excavation before sealing occurs.
- Assess potential impacts due to tunnelling beneath the suspected source area at the rear of the former dry cleaner on chlorinated hydrocarbon concentrations and trends in groundwater.

The locations of the PRB injection wells and associated monitoring well network, and wells monitored in the source area in July 2024, are shown in Figure 1.

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LEGEND

- PRB mitigation monitoring
- TBM monitoring well
- PRB injection well
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Railway
- Minor Road
- Path
- STM Site Boundary
- Cadastral Boundary

SOURCE
Mitigation Monitoring Wells, PRB Wells and boundary from Tetra Tech Coffey.
Existing investigations, site layout, station box and alignment supplied by CPBG.
Cadastre from DFSI.
Aerial imagery from Nearmap (capture date 30-03-2023).

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WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 1

Mitigation monitoring wells – St Marys

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2. Scope of Works

The mitigation monitoring works consists of sampling and analysis of the groundwater monitoring well network located between the contamination source and the Station box (PRB monitoring), and in the suspected source area (TBM monitoring).

The works entailed sampling of PRB mitigation monitoring wells on a fortnightly basis, and weekly sampling of TBM monitoring locations with the last samples collected on 12 July 2024, four weeks after TBM breakthrough at St Marys Station box. Well installation details for the network are provided in Table A1, Annexure A.

The PRB mitigation monitoring program, as outlined in Section 11 of the RAP, began at the commencement of bulk excavation beneath the groundwater table at the western end of the St Marys Station box (Zone 4), which commenced on 16 June 2023.

The typical pre-construction groundwater level in the upper Bringelly Shale was 32.5 to 33mAHD, based on Section 14.5.1 of the Hydrogeological Interpretive Report (Tetra Tech 2023f). Baseline groundwater conditions were established in mitigation monitoring wells through groundwater sampling between 20 January 2023 and 14 April 2023.

PRB well monitoring was undertaken on a weekly basis from June to December 2023.

In December 2023, after six months of weekly monitoring, the frequency of monitoring was reviewed and revised to fortnightly as the groundwater gradient in the vicinity of the former dry cleaner had not changed, and chlorinated hydrocarbon concentrations in all monitoring wells were below the level of reporting (LOR). The revision was outlined in the *Memorandum: St Marys Station Remedial Action Plan - Proposed revision to mitigation groundwater sampling frequency'*, dated 19 December 2023 (Tetra Tech 2023e), and agreed to by the auditor on 21 December 2023, and Sydney Metro on 22 December 2023.

The mitigation monitoring program was again revised in March 2024 to incorporate weekly monitoring of wells in the suspected source area prior to, during, and after the TBMs passing beneath the site. In advance of the TBMs passing through both the contaminant source area and the PRB area, monitoring wells within 3m of the tunnels required grouting as the TBMs are pressurised, and groundwater wells provide potential pathways to the surface which may result in depressurisation. The program was therefore also adjusted as numerous monitoring wells from the PRB mitigation program were decommissioned (Tetra Tech 2024).

The initial and revised monitoring scope is detailed in the following subsection.

2.1. Groundwater Monitoring

The mitigation monitoring program consists of groundwater level gauging and sampling from nominated monitoring wells and comprises:

- PRB mitigation monitoring (fortnightly, as detailed in Table 1) and;
- TBM monitoring (weekly, as detailed in Table 2).

Table 1: Construction Phase Groundwater Monitoring Schedule – Initial PRB mitigation monitoring

Monitoring Well	Monitoring frequency	Analytes	Trigger Value and Contingency Plan
SBT-GW-0001 **SBT-GW-0001b**	Fortnightly	Volatile chlorinated hydrocarbons	**Trigger Values:** PCE 0.3mg/L TCE 0.055mg/L cis 1,2 DCE 0.25mg/L VC 0.2mg/L Refer HHRA for determination of trigger values **Contingency Plan**: Refer to Section 11.6 of the RAP
SBT-GW-1012 [1] SBT-GW-1013 [1] SBT-GW-1014 [1]	Fortnightly		
SBT-GW-1347a [2] SBT-GW-1347b [2] **SBT-GW-1347c [2]** SBT-GW-1348a [2] SBT-GW-1348b [2] SBT-GW-1348c [2]	Fortnightly for 'c' interval wells (at ~18mAHD) *If contingency mitigation implemented, then all multi-level wells monitored weekly*		

1. SBT-GW-1012, SBT-GW-1013 and SBT-GW-1014 are screened from the pre-construction water table to 20mAHD with a saturated interval of 12m. Three hydrasleeves placed in each well at 30mAHD, 27mAHD and 24mAHD.

2. SBT-GW-1347a, SBT-GW-1347b, SBT-GW-1347c, SBT-GW-1348a, SBT-GW-1348b, SBT-GW-1348c are multi-level groundwater wells, with details provided in Table A1.

The TBM monitoring program initially comprised five groundwater wells in the vicinity of the contaminant source area as outlined in Table 2. Monitoring commenced on 15 March 2024, four weeks before TBM-1 passed through the suspected source area (starting 12 April 2024).

Table 2: Initial Source Area/TBM Groundwater Monitoring Schedule

Monitoring Well	Monitoring frequency	Analytes	Assessment
MW1 **MW2** SBT-GW-1019_R SBT-CM-1020 **SMGW-GW02**	Weekly from mid-March to four weeks after TBM-2 reaches St Marys Station.	Volatile chlorinated hydrocarbons	Comparison to previous concentration ranges for PCE, TCE, cis 1,2 DCE and vinyl chloride, and trends over TBM monitoring period

Groundwater monitoring in bold were to be sampled in July 2024, the remaining wells were decommissioned in April 2024.

Due to the decommissioning of monitoring wells in April 2024 prior to the TBM passing through the area, the PRB and TBM/source area monitoring programs have been combined into an ongoing mitigation monitoring program as detailed in the *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater monitoring network* (Tetra Tech, 2024).

The revised ongoing monitoring program based on the seven wells which were not decommissioned is outlined in Table 3 and shown on Figure 2. The revised monitoring scope was implemented from 8 April 2024.

Table 3: Ongoing Mitigation Monitoring Network

Monitoring Well	Sampling frequency	Analytes	Comment
SBT-GW-1347a	Fortnightly	Volatile chlorinated hydrocarbons	Shallow well downgradient of PRB
SBT-GW-1347c			Deep well downgradient of PRB
SBT-GW-0001			Shallow well upgradient of PRB and downgradient of suspected source area
SBT-GW-0001B			Mid-level well upgradient of PRB and downgradient of suspected source area
MW1	Weekly until four weeks after TBM-2 reaches St Marys Station. TBM-2 reached the Station on 20 June, therefore last samples were taken on 12 July 2024.		Shallow well in vicinity of source
MW2			Shallow (impacted) well to north of source area
SMGW-GW02			Shallow (impacted) well to south of source area

2.1.1. Adopted Trigger Values

Risk based trigger values developed in the HHRA (Tetra Tech, 2023a) for the PRB monitoring wells are summarised in Table 1.

Where detectable concentrations of chlorinated ethenes are reported in mitigation monitoring wells between the station and the PRB, model predictions outlined in the HHRA (Tetra Tech, 2023a) will be reviewed. The review will assess whether concentrations exceeding the trigger values are likely to reach the excavation before sealing occurs, and whether contingency mitigation needs to be implemented.

Chlorinated hydrocarbon concentrations in groundwater wells in the source area will be assessed compared to historical ranges, and trends over the TBM monitoring period (to 12 July 2024).

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LEGEND

- Ongoing mitigation monitoring
- PRB monitoring well - To be decommissioned
- TBM monitoring well - To be decommissioned
- PRB injection well - To be decomissioned
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Railway
- Minor Road
- Path
- STM Site Boundary
- Cadastral Boundary

NOTE
SBT-GW-1347b has been decommissioned.
SOURCE
Mitigation Monitoring Wells, PRB Wells and boundary from Tetra Tech Coffey.
Existing investigations, site layout, station box and alignment supplied by CPBG.
Cadastre from DFSI.
Aerial imagery from Nearmap (capture date 30-03-2023).

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STATION BOXES AND TUNNELLING WORKS

FIGURE 2

Ongoing Mitigation Monitoring Wells – St Marys

TETRA TECH COFFEY

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2.2. Monitoring Methodology

2.2.1 Groundwater Level Monitoring

Groundwater levels were manually gauged in all wells prior to sampling for groundwater quality.

Gauging was undertaken using an electronic groundwater level interface probe (IP) measuring from a surveyed set point at the top of the well casing to the top of the water table. Measurements were taken to the nearest mm, and recorded as metres below the top of casing (mBTOC).

2.2.2 Groundwater Sampling Procedure

Groundwater sampling was conducted by suitably qualified and experienced personnel from Tetra Tech.

Groundwater samples were collected using the Hydrasleeve™ method. A Hydrasleeve™ captures a core of water, typically 1 litre, from the screened interval of the well. The Hydrasleeve™ is deployed to a target depth based on the screened interval and rationale for sampling, and left until conditions are considered to have stabilised. The time to stabilisation depends on the transmissivity of the aquifer, with more transmissive aquifers stabilising more rapidly. Typically, at least 5 days was allowed for stabilisation, which is considered appropriate given many of the wells are screened within the bedrock aquifer.

The Hydrasleeve™ is sealed except during sample collection when it is pulled up through the sampling interval, and re-seals once full. Therefore, only groundwater from the target depth interval is sampled and recovered.

Groundwater samples were collected in appropriate laboratory supplied bottles and sent to a laboratory for analysis under the Chain of Custody (COC) process. The laboratories contracted to undertake the analysis included ALS (primary samples) and Eurofins (interlab triplicate samples). Both ALS and Eurofins hold analytical methods accredited by the National Association of Testing Authorities (NATA) for a range of volatile halogenated hydrocarbons (VHC), including the chlorinated hydrocarbons of interest on this site.

To reduce volatile losses samples were collected as rapidly as practicable with minimal agitation and zero headspace in sample bottles. Once the laboratory supplied bottles were filled, water quality parameters were measured using the remainder of the Hydrasleeve™ sample with a calibrated field water quality meter. Parameters measured include pH (pH units), electrical conductivity (mS/cm), redox potential (mV), dissolved oxygen content (µg/L), temperature (°C). The sample's visual appearance, whether Light Non Aqueous Phase Liquid (LNAPL) was present and/or any odours were also recorded on the field sheets. Field measurements were recorded digitally, with the digital data imported to the electronic database using an in-house GIS application.

Samples were submitted as soon as practicable to the laboratories to also minimise volatile losses while in storage or transit, and were analysed within recommended holding times. Sample containers were placed directly into an ice filled cooler and transported to the nominated laboratories under COC processes. Samples are required to be documented as received by the laboratory chilled and intact. All samples were analysed for a broad range of VHC.

Re-usable equipment used in more than one location (limited to the IP) was decontaminated between each sampling location. Equipment was rinsed with tap water, cleaned with Liquinox (or equivalent), further again rinsed with tap water, and then deionised water. Equipment was then allowed to dry before being used at another location.

3. Results

3.1. Groundwater Monitoring Activities and Observations

Four groundwater monitoring events were conducted in July 2024 (the thirteenth month of PRB groundwater mitigation monitoring), in accordance with the methodology described in Section 2.2.

Table 4 provides a summary of the monitoring activities and observations recorded during fieldworks.

Table 4: Groundwater Monitoring Details and Observations for July 2024

Activity	Detail/Comments
Date of field activities	Sampling events were carried out on 5 July, 12 July, 19 July and 26 July 2024.
Gauged and sampled	The following monitoring bores were gauged and then sampled for VHC analysis: • SBT-GW-0001 (19 and 26 July 2024) • SBT-GW-0001b (19 and 26 July 2024) • SBT-GW-1347a (19 and 26 July 2024) • SBT-GW-1347c (19 and 26 July 2024) • MW1 (5 and 12 July 2024) • MW2 (5 and 12 July 2024)
Standing water level	Standing water level (mBTOC) ranged between: • 0.447 mBTOC (MW1 on 5 July 2024) and 10.970 mBTOC (SBT-GW-1347c on 19 July 2024)
Presence of LNAPL	LNAPL was not detected in any monitoring well.
Field observations (odours, colour, turbidity)	The sample from MW1 was noted to be 'slightly cloudy' and of 'pale grey' colour on 12 July 2024. The sample from SBT-GW-0001 was noted as 'cloudy' and of 'pale brown' colour on 19 July 2024 and 'slightly cloudy' and of 'pale grey' colour on 26 July 2024. The sample from SBT-GW-0001b was noted as 'slightly cloudy' and of 'pale brown' colour on 19 July 2024. The sample from SBT-GW1347a was noted as 'slightly cloudy' and of 'pale grey' colour on 26 July 2024. The sample from SBT-GW-1347c was noted as 'cloudy' and of 'pale brown' colour on 26 July 2024. In general field observations indicated that samples were cloudier than previously reported.
Deviations from scope	Deviations from the scope as outlined in Section 2 for the July 2024 monitoring period included: • No samples were collected from SMGW-GW02 as the location was not accessible. • PRB mitigation monitoring was undertaken on 19 July instead of 12 July 2024 due to access issues (traffic management).

3.2. Field Parameters

Field water quality parameters are summarised in Table 5, with all available field data provided in Table A2 of Annexure A.

In general, field water quality parameters at most wells were relatively stable throughout the July 2024 monitoring events. Some variability in the field water quality parameters was noted between monitoring wells, consistent with previous monitoring events.

Table 5: Field Water Quality Parameters – 5 July 2024 to 26 July 2024

	Minimum	Maximum	Comment
pH	3.47 SBT-GW-0001 19 July 2024	6.98 MW1 12 July 2024	The pH reported in groundwater ranged from 3.47 to 6.98, indicating groundwater ranges from acidic to neutral. In the deepest well, SBT-GW-1347c, the pH ranged from 6.4 to 6.5, consistent with previous results indicating that the groundwater pH was generally neutral at depth.
Electrical conductivity	0.603 mS/cm MW1 12 July 2024	29.074 mS/cm SBT-GW-1347a 26 July 2024	The groundwater EC ranged from 0.6 to 29 mS/cm. EC measurements have fluctuated at all locations since the monitoring started (shown on Figure 3), and have generally been much lower in contaminant source area wells (MW1 and MW2) than between the PRB and the station box. Groundwater EC in the source area was consistent with values recorded in the April, May and June monitoring periods and previous investigations (Tetra Tech 2023a). EC however appears to be increasing in wells closest to the station box (SBT-GW-1347a and SBT-GW-1347c) since May 2024.
Dissolved Oxygen	700 µg/L SGT-GW-0001 19 June 2024	2,300 µg/L MW1 5 July 2024	Dissolved oxygen (DO) concentrations were typically low, and ranged from 700 µg/L to 2,300 µg/L. There was no apparent trend over time or with depth.
Redox potential	-22 mV SBT-GW-0001b 19 July 2024	238 mV SGT-GW-1347a 19 July 2024	The redox potential reported in groundwater has been highly variable during the monitoring program. Redox potential typically decreased with depth. Shallow locations (SBT-GW-0001 and SBT-GW-1347a) typically reported higher values (up to 238 mV), while in deeper monitoring well SBT-GW-1347c conditions were more reducing (up to 131 mV).
Temperature	17.0°C MW1 5 July 2024	20.9°C SBT-GW-1347a 26 July 2024	Water temperatures were consistent across the sampling locations, within the range expected for July, and the ambient air temperature at the time of sampling.

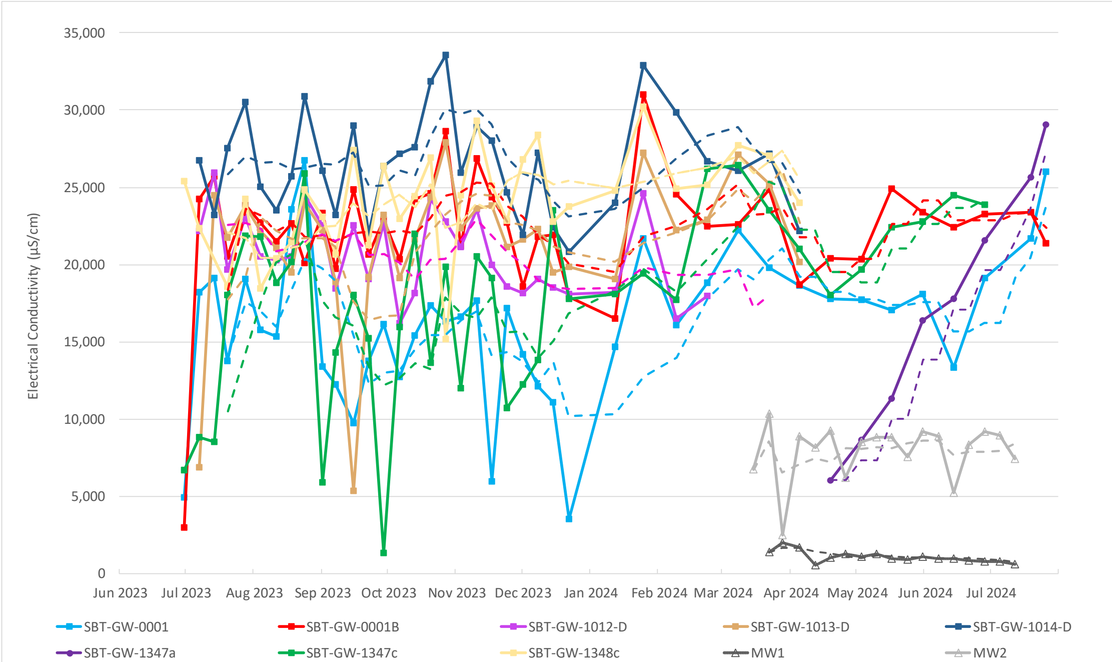

Figure 3: Electrical Conductivity of groundwater in PRB mitigation (squares) and source area (triangles) wells

Note: EC measurements shown for all sampling locations, except shallow- and mid-level samples from; SBT-GW-1012, SBT-GW-1013 and SBT-GW-1014, which were excluded to limit noise in the graph. Rolling averages over four events shown as dashed lines.

3.3. Groundwater levels

Gauged groundwater levels are tabulated in Table A2, Annexure A, and presented in Figure 4.

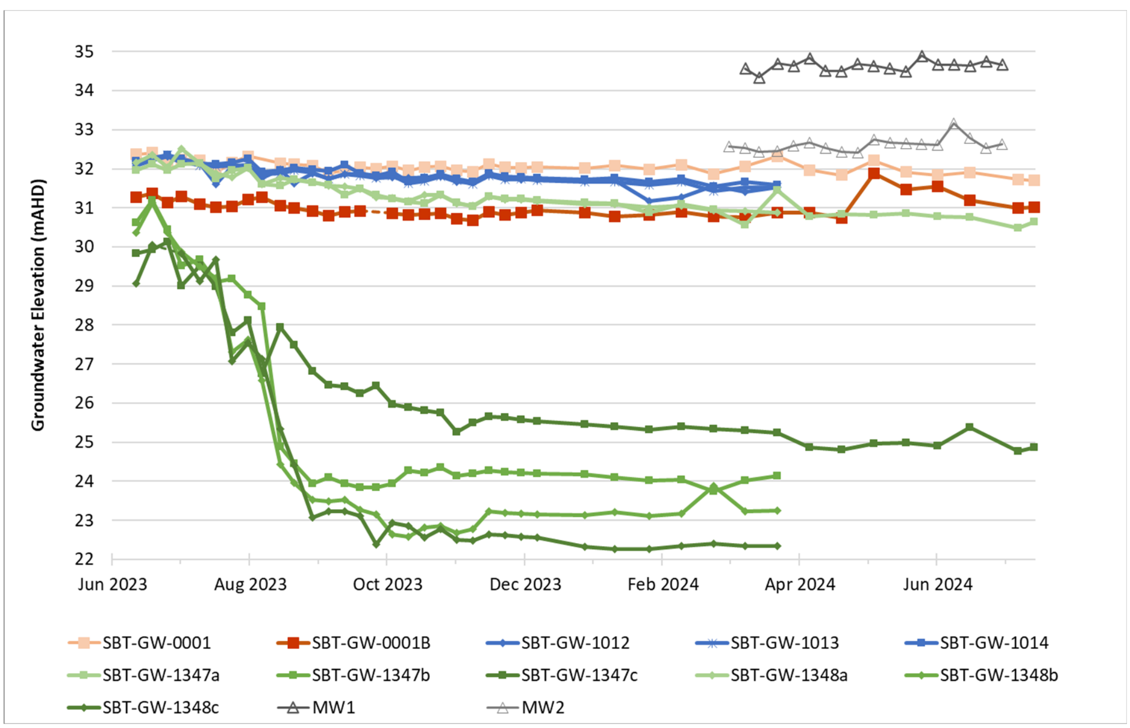

Figure 4: Manually gauged groundwater levels in PRB mitigation (squares) and source area (triangles) wells

The standing water level remained relatively stable at all monitoring locations throughout July 2024.

Groundwater levels at deeper monitoring locations SBT-GW-1347c and SBT-GW-1348c have decreased by approximately 7m since PRB monitoring commenced on 30 June 2023. The groundwater levels at shallow monitoring locations closest to the station box, SBT-GW-1347a (and previously in SBT-GW-1348a, the pale green line in Figure 4), have gradually decreased more than 1.5m since the commencement of PRB monitoring. Groundwater levels in deeper wells closest to the excavation decreased rapidly initially (mostly in August and September 2023), with the decrease slowly continuing over the past nine months. Groundwater levels in the vicinity of the PRB have only decreased slightly (<0.5m) over the same period.

Gauging results up to 5 April 2024, when wells used to calculate the gradient were decommissioned, indicated that excavation and dewatering associated with construction of St Marys Station box had not yet resulted in a change in groundwater levels and gradient between the PRB and the station box (Figure 5).

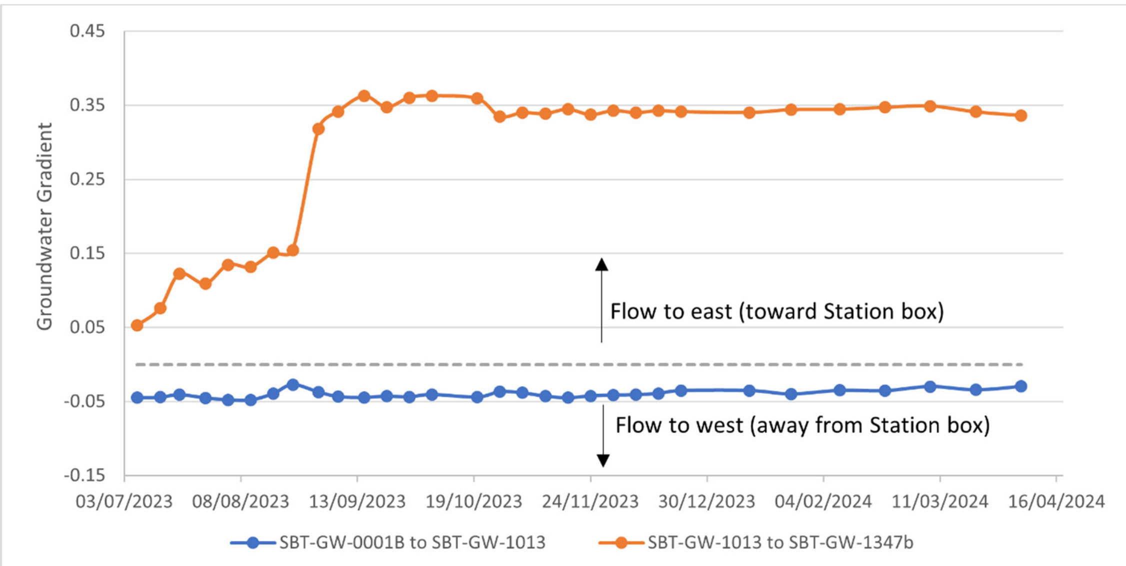

Figure 5: Groundwater gradients from SBT-GW-1013 to SBT-GW-1347b (toward Station) and SBT-GW-0001B (near PRB)

Groundwater levels in the source area (MW1 and MW2) have been relatively stable since TBM monitoring commenced in March 2024 (Figure 4).

With the reduction in monitoring wells since early April 2024, gradients have since been assessed based on levels in shallow groundwater between the source area and the PRB (MW1 and SBT-GW-0001), and between the PRB and St Marys Station Box in shallow and deeper groundwater, as shown in Figure 6.

While these gradients indicate that groundwater is flowing to the east, toward the station box, the flow regime is more complex:

- The easterly shallow flow from the source area (MW1) to the PRB (SBT-GW-0001), as shown by the blue line in Figure 6, is attributed to mounding in the source area due to leakage from subsurface infrastructure (refer HHRA, Tetra Tech 2023a). MW1 was not gauged at the same time as PRB monitoring wells in July 2024, therefore the final gradient between the source area and PRB cannot be directly assessed. However, as levels in both MW1 and SBT-GW-0001 were relatively stable when gauged in July 2024, the gradient is inferred to have not changed.
- Previous data from SBT-GW-1012, SBT-GW-1013 and SBT-GW-1014, midway between the PRB and the multi-level wells closer to where drawdown has been significant, has consistently shown that groundwater levels are higher in this area, hindering migration to the east from the PRB (and source area).

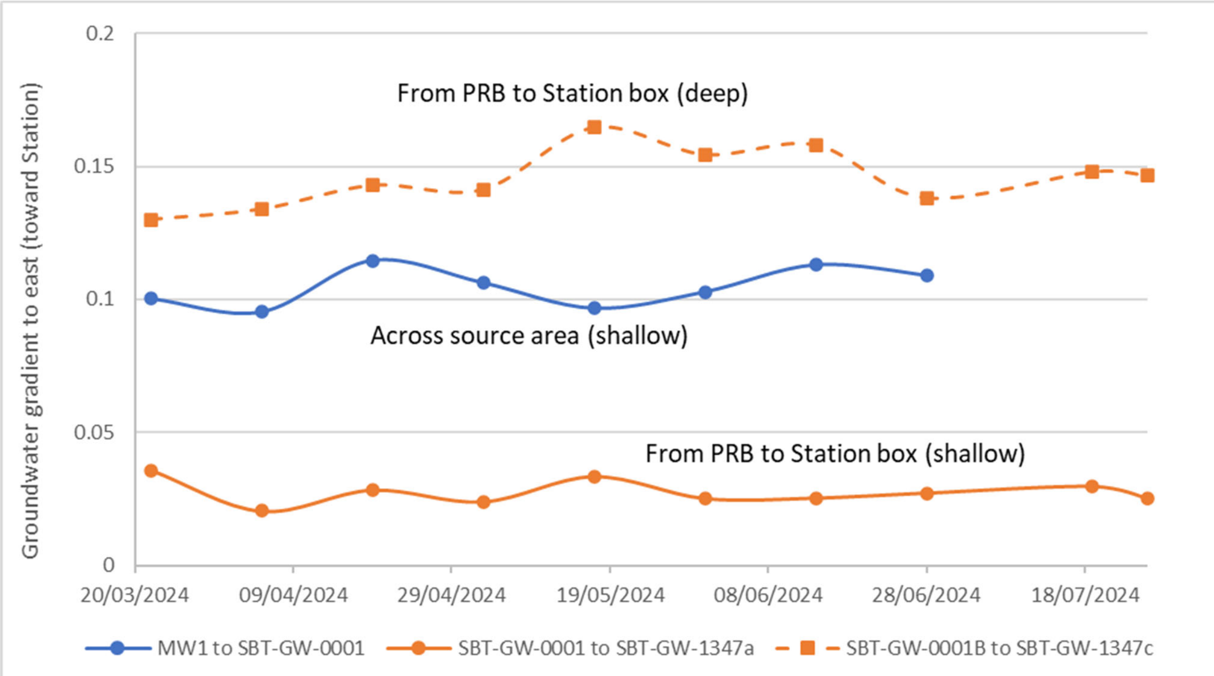

Figure 6: Groundwater gradients in shallow groundwater across the source area, and in shallow and deep groundwater from PRB to station box

Changes in migration potential have been assessed via the gradient in shallow groundwater to the east of the PRB (SBT-GW-0001 to SBT-GW-1347a, as shown in solid orange line in Figure 6). An increase in this gradient may indicate that the groundwater high in the vicinity of SBT-GW-1013 has dissipated, and impacted groundwater may potentially flow toward the station box. This gradient has remained relatively stable in July 2024, indicating that the groundwater high remains between the PRB and SBT-GW-1347a. The slight increase in the deeper groundwater gradient from the PRB to Station Box (orange dashed line) in early May to early June, is attributed a transient increase in levels in SBT-GW-0001B as TBM-1 and TBM-2 passed beneath the PRB area.The transient nature of this increase is confirmed by the return to the previous gradient in late June and July 2024.

Assessment of any changes in the groundwater flow regime will need to be considered along with results from ongoing groundwater quality monitoring in SBT-GW-0001 and SBT-GW-0001b, as discussed in Section 3.4 below.

3.4. Analytical Results

All available groundwater analytical data is tabulated and presented in Table A3 of Annexure A. Laboratory analysis reports and COC documentation for the mitigation monitoring sampling completed in July 2024 are provided in Annexure B.

3.4.1 PRB Monitoring

A summary of the maximum concentrations of key chlorinated hydrocarbons reported in each PRB monitoring well during the two monitoring events completed in the June 2024 monitoring period is provided in Table 6.

Table 6: PRB monitoring wells - maximum chlorinated ethene concentrations reported in July 2024

Monitoring Location	Tetrachloroethene	Trichloroethene	Cis 1,2 DCE	Vinyl Chloride
SBT-GW-0001	<5ug/L	<5ug/L	<5ug/L	<50ug/L
SBT-GW-0001B	<5ug/L	<5ug/L	<5ug/L	<50ug/L
SBT-GW-1347A	<5ug/L	<5ug/L	<5ug/L	<50ug/L
SBT-GW-1347C	<5ug/L	<5ug/L	<5ug/L	<50ug/L

Concentrations of key chlorinated hydrocarbons were below the LOR, and the trigger values, in all groundwater samples collected between the PRB and the station box during the June 2024 monitoring events.

3.4.2 TBM Source Area Monitoring

The maximum concentration of chlorinated hydrocarbons detected in the two accessible monitoring wells in the contamination source area are summarised in Table 7. The highest chlorinated hydrocarbon concentrations were reported in MW1. Concentrations of Tetrachloroethene (PCE), Trichloroethene (TCE), cis 1,2 DCE and Vinyl Chloride were reported within the historical range at both monitoring locations during July 2024.

Table 7: TBM/Source area monitoring wells – maximum chlorinated ethene concentrations reported in July 2024

Monitoring Location	Tetrachloroethene	Trichloroethene	Cis 1,2 DCE	Vinyl Chloride
MW1	4,600ug/L (31ug/L – 13,000ug/L)	348ug/L (28ug/L – 959ug/L)	314ug/L (17ug/L – 4,220ug/L)	<100g/L (<10ug/L - 320ug/L)
MW2	4,520ug/L (1,960ug/L – 5,070 ug/L)	204ug/L (59ug/L - 365ug/L)	12ug/L (2ug/L - 24ug/L)	<100ug/L (<1ug/L - <100ug/L)

() concentrations in brackets indicates historical range reported (Tetra Tech 2023a) including data to the end of June 2024

Concentrations of key chlorinated compounds in the two source area wells have been statistically analysed via Mann Kendall to assess trends. The test compares changes in signs between values collected at each time, with all of those collected later. A positive value indicates an increase in concentrations, and, conversely, a negative value indicates a decrease in concentrations. The strength of the trend is proportional to the magnitude of the statistic, with the confidence in the trend calculated using the Kendall probability table. A 'no-trend' result is reported where the trend is neither statistically increasing, nor decreasing. Evaluation of the variability of the data (co-efficient of variation, or 'CV'), can also be used to determine if the trend is stable.

Where a 'no-trend' result is reported in the absence of a positive Mann Kendall statistic, and the CV is equal or less than one, concentrations can be considered stable.

Trend analysis across the full monitoring period from 15 March to 12 July 2024 indicates that TCE is probably increasing in MW2, cis 1,2 DCE concentration is increasing in MW2, whereas cis 1,2 DCE and TCE in MW1 have decreased. All other chlorinated ethene concentrations were either stable or showed no statistically significant trend (Table 8).

Table 8: Statistical analysis of chlorinated ethene concentrations in TBM monitoring wells - 15 March to 12 July 2024

	MW1				MW2		
Calculation	**PCE**	**TCE**	**DCE**	**VC**	**PCE**	**TCE**	**DCE**
Trend	No Trend	Decreasing	Decreasing	Stable	No Trend	Probably Increasing	Increasing
CV	0.37	0.27	0.36	0.31	0.27	0.27	0.46
Mann-Kendall Statistic (S)	19	-50	-66	-3	33	38	45
Confidence Factor	76.8%	97.9%	99.7%	53.0%	88.5%	91.8%	95.2%

Although increasing or probably increasing across the entire TBM monitoring period, concentrations of TCE and cis 1,2 DCE in MW2 in July were relatively close to pre-TBM concentrations and within the historical range (Figure 7).

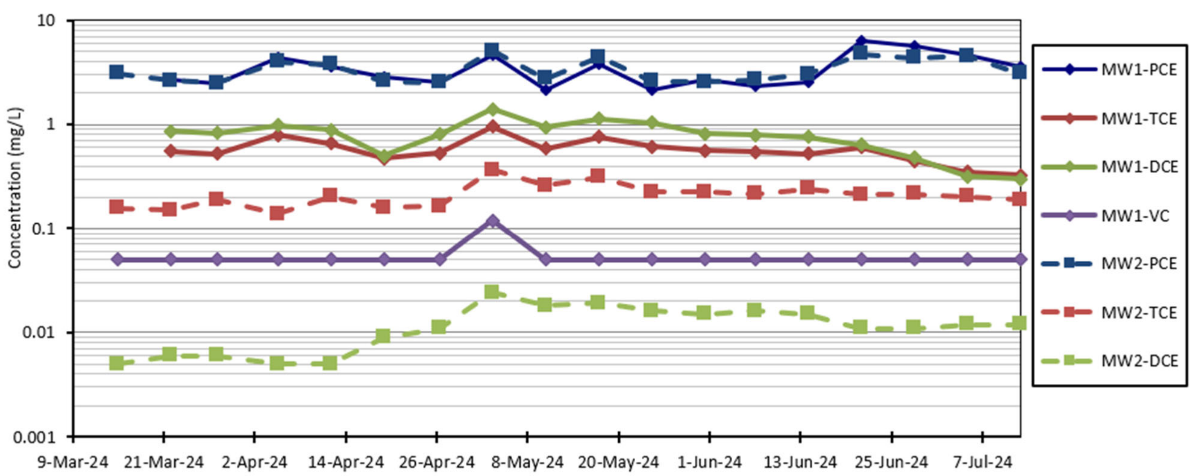

Figure 7: Chlorinated ethene concentrations in MW1 and MW2 – 15 March to 12 July 2024

The maximum concentrations reported correlate with TBM-1 passing beneath the source area in early May 2024. The increase however was transient, and when the statistical analysis is repeated using data from 5 May to 12 July 2024, trends are all decreasing, stable or show no trend (Table 9).

Table 9: Statistical analysis of chlorinated ethene concentrations in TBM monitoring wells – 5 May to 12 July 2024

	MW1				MW2		
Calculation	**PCE**	**TCE**	**DCE**	**VC**	**PCE**	**TCE**	**DCE**
Trend	No Trend	Decreasing	Decreasing	Stable	No Trend	Decreasing	Decreasing
CV	0.4	0.31	0.44	0.37	0.27	0.22	0.26
Mann-Kendall Statistic (S)	12	-43	-51	-10	5	-41	-39
Confidence Factor	79.9%	99.9%	99.9%	75.3%	61.9%	100%	99.9%

In the two monitoring rounds undertaken in early July 2024 concentrations were within the historically reported ranges, confirming a return to pre-TBM conditions. TBM source area monitoring of MW1 and MW2 concluded on 12th July 2024.

As changes in groundwater concentrations beneath the source area were temporary, and there has been a return to pre-existing conditions, no ongoing groundwater monitoring to assess impacts due to tunnelling beneath the source area is required.

3.5. Data Quality and Control

The quality assurance (QA) steps and quality control (QC) results have been reviewed and assessed according to Tetra Tech‘s Standard Operating Procedures (SOPs). This included examining laboratory accreditation, sample preservation methods and holding times, and a review of field and laboratory quality control sample results.

A detailed assessment of data quality is included in Annexure C.

Overall, the quality assessment indicates that data is of appropriate quality for use.

4. Summary and Conclusions

Groundwater monitoring was conducted at St Marys in accordance with the mitigation monitoring program, as amended in March 2024.

The groundwater sampling results from the July 2024 monitoring period indicate:

- Concentrations of chlorinated hydrocarbons in groundwater samples between the PRB and the station box were below the LOR and the trigger values;
- Statistical analysis of the full data set from March to July 2024 indicates that concentrations of cis 1,2 DCE are statistically increasing and TCE is statistically probably increasing in MW2 in the assumed source area. Concentrations of all other key chlorinated hydrocarbons in source area wells are decreasing, stable, or show no trend, and are broadly consistent with previously reported concentrations.
- Maximum concentrations of TCE and cis 1,2 DCE in MW2 were reported in early May, and corresponded with TBM-1 passing beneath the source area. Lower concentrations within the historical range were reported in all monitoring events in June and July 2024, with statistically decreasing trends for these compounds in MW2 based on data from May to July 2024.
- Changes in chlorinated hydrocarbon concentrations beneath the source area were temporary, and there has been a return to pre-existing conditions.
- No further groundwater monitoring is required to assess impacts due to tunnelling beneath the source area.
- Groundwater levels close to the Station excavation have been drawn down by excavation, however Station construction activities do not appear to have changed the groundwater flow regime and gradient in the vicinity of the PRB and source area;
- No additional assessment or contingency measures are currently required.

The revised groundwater PRB mitigation monitoring program will continue on a fortnightly basis throughout the St Marys SBT works, as outlined in Section 2.1

Results of the PRB monitoring program will continue to be provided to CPBG on a fortnightly basis, with monthly reports documenting works completed, field and analytical results, and a summary of groundwater levels and gradients between the Station box excavation and the PRB.

5. References

Tetra Tech (2022) *St Marys Station Detailed Site Investigation* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040513. 29/09/2022. Rev A03) ("St Marys DSI")

Tetra Tech (2023a) *St Marys Station Former Dry Cleaner, 1-7 Queen St – Assessment of Human Health Risk and Mitigation Options.* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040540. 26/4/2023. Rev A.05) ("Queen St HHRA")

Tetra Tech (2023b) *Baseline Groundwater Report (Project Wide)* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040405. 22/08/2023. Rev B.01) ("Baseline Groundwater Report")

Tetra Tech (2023c) *St Marys Station Remedial Action Plan* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040521. 23/5/2023. Rev A.08) ("St Marys RAP")

Tetra Tech (2023d) *Implementation of Permeable Reactive Barrier* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040561. 02/08/2023. Rev A)

Tetra Tech (2023e) *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater sampling frequency* (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040402_A, 19 December 2023)

Tetra Tech (2023f) *Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works Hydrogeological Report (Project-wide)* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040403)

Tetra Tech (2024); *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater monitoring network* (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040403_A.01. 26/03/2024. Rev A).

Annexure A Tables

Table A1: Mitigation Monitoring Well Installation Details (grey indicates wells have been decommissioned)

Well ID	Northing	Easting	Top of casing (mAHD)	Screen interval (mbgl)	Screen interval (mAHD)	Sample Depth (mbgl)	Screened lithology	Comment
SBT-GW-1347a	6261962.40	293953.89	35.734	6 - 9	26.7 - 29.7	7.5	Alluvium to 7mbgl then residual soil	
SBT-GW-1347b	6261962.82	293954.91	35.712	12 - 15	20.7 - 23.7	13.5	Siltstone	Target: upper siltstone
SBT-GW-1347c	6261962.18	293954.59	35.740	17 - 20	15.7 - 18.7	18.5	Siltstone	Target: lower siltstone
SBT-GW-1348a	6261956.09	293952.90	35.796	5.5 – 8.5	27.3 - 30.3	7	Alluvium (Sandy Clay)	
SBT-GW-1348b	6261955.93	293953.96	35.831	11 - 14	21.8 – 24.8	12.5	Siltstone - extremely weathered to 13.2mbgl	Target: upper siltstone
SBT-GW-1348c	6261956.99	293953.44	35.848	17 -20	15.8 – 18.8	18.5	Siltstone	Target: lower siltstone
SBT-GW-1012	293930.5	6261971.2	35.361	3.5 – 15.5	19.9 – 31.9	Multiple – 5, 7 and 10	Residual soil overlying siltstone	Multiple levels sampled via hydrasleeves. Also provides for contingency mitigation measures
SBT-GW-1013	293931.4	6261964.9	35.398	3.5 – 15.5	19.9 – 31.9			
SBT-GW-1014	293931.8	6261959.4	35.471	3.5 – 15.5	20 - 32.0			
SBT-GW-0001b	6261970.18	293910.91	35.211	8.5 – 14.5	20.7 - 26.7	10	Clay to 11m then Siltstone	Target: upper siltstone
SBT-GW-0001 [1]	6261965 [1]	293911 [1]	*35.2*	4.8 – 7.5	*27.7 - 30.4*	6	Unknown	Installed by others
MW1 [2]	6261976	293889	35.2 [2]	4.3 – 7.3	*28 – 31*	5	Unknown	Installed by others
MW2 [2]	6261983	293887	35.2 [2]	4.3 – 7.3	*28 – 31*	6	Unknown	Installed by others
SBT-GW-1019_R	6261979	293888	35.2	13.9 – 18	17.2 – 21.3	15	Sand	
SBT-CM-1020	6261980	293862	34.943	1.5 – 7.5	24 – 27	5	Sand	
SMGW-GW02	6261973	293885.3	35.4	5.0 – 8.0	27.4 – 30.4	6	Clay	Installed by others

1. Approximate – well installed by others. No bore log available with screen depth determined using downhole camera.
2. Approximate – well installed by others. TOC not recorded on bore log, approximate measurement adopted from nearby SBT-GW-1019_R

St Marys Station
Mitigation Monthly Monitoring
Table A2: Summary of Field Water Quality and Gauging Results - July 2024

					Field						
					Depth to groundwater (measured)	Groundwater Elevation	Electrical Conductivity (Non Compensated)	DO (Field)	Redox Potential (Field)	Temp (Field)	pH (Field)
					mBTOC	mAHD	µS/cm	µg/L	mV	°C	pH units
Monitoring Zone	Location Code	Field ID	Date	Sample Comments							
St Marys	MW1	MW1	05 Jul 2024	Clear, No colour, no odour	0.447	35	799	2300	152.9	17	6.91
St Marys	MW1	MW1	12 Jul 2024	Clear, No colour, no odour	0.53	35	603	1410	5.2	17.4	6.98
St Marys	MW2	MW2	05 Jul 2024	Slightly Cloudy, Pale grey, no odour	2.666	33	8,939	1710	197.1	17.6	5.23
St Marys	MW2	MW2	12 Jul 2024	Clear, No colour, no odour	2.564	33	7,396	1650	37.6	18.1	5.27
St Marys	SBT-GW-0001	SBT-GW-0001	19 Jul 2024	Cloudy, Pale brown, no odour	3.471	32	21,680	700	190.5	20	3.47
St Marys	SBT-GW-0001	SBT-GW-0001	26 Jul 2024	Slightly Cloudy, pale grey, no odour	4.223	31	23,411	950	-22.2	18.7	5.08
St Marys	SBT-GW-0001b	SBT-GW-0001b	19 Jul 2024	Slightly Cloudy, No colour, no odour	5.251	30	25,663	1320	238.1	20.7	3.6
St Marys	SBT-GW-0001b	SBT-GW-0001b	26 Jul 2024	Slightly Cloudy, pale brown, no odour	5.09	30	24,197	1740	118.7	20.3	6.47
St Marys	SBT-GW-1347a	SBT-GW-1347-A	19 Jul 2024	Clear, No colour, no odour	4.19	32	26,018	980	167.6	20	4.87
St Marys	SBT-GW-1347a	SBT-GW-1347-A	26 Jul 2024	Slightly Cloudy, pale grey, no odour	3.51	32	21,402	930	73.8	20.5	3.64
St Marys	SBT-GW-1347c	SBT-GW-1347-C	19 Jul 2024	Slightly Cloudy, No colour, no odour	10.97	25	29,074	1250	63.7	20.8	4.52
St Marys	SBT-GW-1347c	SBT-GW-1347-C	26 Jul 2024	Cloudy, pale brown, no odour	10.88	25	26,416	1750	131.1	20.1	6.41

			Chlorinated Hydrocarbons							Halogenated Hydrocarbons	Volatile Organic Compounds			Chloroethanes								Halogenated Benzenes			
			1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,3-dichloropropane	2,2-dichloropropane	Chlorodibromomethane	Dibromomethane	Iodomethane	cis-1,4-Dichloro-2-butene	trans-1,4-Dichloro-2-butene	Pentachloroethane	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,2-Dichloroethane	1,1-Dichloroethane	Chloroethane	1,2,3-trichlorobenzene	4-chlorotoluene	Bromobenzene	Tetrachloroethene
			mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	ug/L	ug/L	mg/L
EQL			**0.005**	**5**	**0.005**	**0.005**	**0.005**	**0.005**	**5**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.05**	**5**	**5**	**5**	**0.005**
WSA - STM PRB Monitoring			-	-	-	-	-				-		-	-	-	-	-	-		-	-	-	-	0.3
Monitoring Zone	Location Code	Date																						
St Marys	MW1	05 Jul 2024	<0.01	<10	<0.01	<0.01	<0.01	<0.01	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<10	<10	<10	**4.6**
St Marys	MW1	12 Jul 2024	<0.01	<10	<0.01	<0.01	<0.01	<0.01	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<10	<10	<10	**3.57**
St Marys	MW2	05 Jul 2024	<0.01	<10	<0.01	**0.021**	<0.01	<0.01	<10	**0.011**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.103**	<0.01	<0.01	<0.1	<10	<10	<10	**4.52**
St Marys	MW2	12 Jul 2024	<0.01	<10	<0.01	<0.01	<0.01	<0.01	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<10	<10	<10	**3.06**
St Marys	SBT-GW-0001	26 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-0001	19 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-0001B	19 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-0001B	26 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-1347a	26 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-1347a	19 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-1347c	19 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005
St Marys	SBT-GW-1347c	26 Jul 2024	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005

			Chloroethenes					Chloromethanes			VOCs															
			Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Carbon Tetrachloride	Chloroform	Chloromethane	1,2,4-Trichlorobenzene	1,2-Dibromoethane (EDB)	1,2-Dichlorobenzene	1,2-Dichloropropane	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2-Chlorotoluene	Bromodichloromethane	Bromoform	Bromomethane	Chlorobenzene	cis-1,3-Dichloropropene	Freon 11	Freon 12	Hexachlorobutadiene	trans-1,3-Dichloropropene
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			**0.005**	**0.005**	**0.005**	**0.005**	**0.05**	**0.005**	**0.005**	**0.05**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.05**	**0.005**	**0.005**	**0.05**	**0.05**	**0.005**	**0.005**
WSA - STM PRB Monitoring			0.055	0.25	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monitoring Zone	Location Code	Date																								
St Marys	MW1	05 Jul 2024	**0.348**	**0.314**	<0.01	<0.01	<0.1	<0.01	**0.043**	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01
St Marys	MW1	12 Jul 2024	**0.324**	**0.297**	<0.01	<0.01	<0.1	<0.01	**0.042**	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01
St Marys	MW2	05 Jul 2024	**0.204**	**0.012**	<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01
St Marys	MW2	12 Jul 2024	**0.19**	**0.012**	<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01
St Marys	SBT-GW-0001	26 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-0001	19 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-0001B	19 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-0001B	26 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-1347a	26 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-1347a	19 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-1347c	19 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
St Marys	SBT-GW-1347c	26 Jul 2024	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005

Annexure B Laboratory Reports and Chain of Custody Documentation

CERTIFICATE OF ANALYSIS

Work Order	: **ES2422319**	Page	: 1 of 7
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Katie Trevor	Contact	: Jason Dighton
Address	: UNIT 2/16 MILDURA STREET FYSHWICK ACT, AUSTRALIA 2609	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE292575-4 WSA SBT	Date Samples Received	: 05-Jul-2024 15:40
Order number	: ----	Date Analysis Commenced	: 09-Jul-2024
C-O-C number	: ----	Issue Date	: 11-Jul-2024 16:22
Sampler	: KATIE TREVOR		
Site	: ----		
Quote number	: ES23COFENV0012		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- Sample QC44_050724 has been forwarded to EUROFINS.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW1	MW2	QC43_050724	RB_050724	TB_010724
			Sampling date / time	05-Jul-2024 14:00	05-Jul-2024 14:00	05-Jul-2024 14:00	05-Jul-2024 14:00	01-Jul-2024 14:00
Compound	CAS Number	LOR	Unit	ES2422319-001	ES2422319-002	ES2422319-003	ES2422319-004	ES2422319-005
				Result	Result	Result	Result	Result
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<10	<10	<10	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L	<10	<10	<10	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<10	<10	<10	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<10	<10	<10	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<10	<10	<10	<5	<5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<100	<100	<100	<50	<50
Chloromethane	74-87-3	50	µg/L	<100	<100	<100	<50	<50
Vinyl chloride	75-01-4	50	µg/L	<100	<100	<100	<50	<50
Bromomethane	74-83-9	50	µg/L	<100	<100	<100	<50	<50
Chloroethane	75-00-3	50	µg/L	<100	<100	<100	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L	<100	<100	<100	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L	<10	<10	<10	<5	<5
Iodomethane	74-88-4	5	µg/L	<10	**11**	<10	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<10	<10	<10	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L	<10	<10	<10	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L	**314**	**12**	**12**	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L	<10	<10	<10	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L	<10	<10	<10	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L	<10	<10	<10	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L	<10	<10	<10	<5	<5
Trichloroethene	79-01-6	5	µg/L	**348**	**204**	**222**	<5	<5
Dibromomethane	74-95-3	5	µg/L	<10	<10	<10	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L	<10	**103**	<10	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L	<10	**21**	<10	<5	<5
Tetrachloroethene	127-18-4	5	µg/L	**4600**	**4520**	**4120**	<5	<5
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<10	<10	<10	<5	<5

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	MW1	MW2	QC43_050724	RB_050724	TB_010724
Sampling date / time				05-Jul-2024 14:00	05-Jul-2024 14:00	05-Jul-2024 14:00	05-Jul-2024 14:00	01-Jul-2024 14:00
				ES2422319-001	ES2422319-002	ES2422319-003	ES2422319-004	ES2422319-005
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<10	<10	<10	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<10	<10	<10	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<10	<10	<10	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L	<10	<10	<10	<5	<5
Pentachloroethane	76-01-7	5	µg/L	<10	<10	<10	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<10	<10	<10	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L	<10	<10	<10	<5	<5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<10	<10	<10	<5	<5
Bromobenzene	108-86-1	5	µg/L	<10	<10	<10	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L	<10	<10	<10	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L	<10	<10	<10	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L	<10	<10	<10	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L	<10	<10	<10	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L	<10	<10	<10	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<10	<10	<10	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<10	<10	<10	<5	<5
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	**43**	<10	<10	<5	<5
Bromodichloromethane	75-27-4	5	µg/L	<10	<10	<10	<5	<5
Dibromochloromethane	124-48-1	5	µg/L	<10	<10	<10	<5	<5
Bromoform	75-25-2	5	µg/L	<10	<10	<10	<5	<5
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	----	----	<1
Toluene	108-88-3	2	µg/L	----	----	----	----	<2
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	<2

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

			Sample ID	MW1	MW2	QC43_050724	RB_050724	TB_010724
			Sampling date / time	05-Jul-2024 14:00	05-Jul-2024 14:00	05-Jul-2024 14:00	05-Jul-2024 14:00	01-Jul-2024 14:00
Compound	CAS Number	LOR	Unit	ES2422319-001	ES2422319-002	ES2422319-003	ES2422319-004	ES2422319-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	<2
^ Total Xylenes	----	2	µg/L	----	----	----	----	<2
^ Sum of BTEX	----	1	µg/L	----	----	----	----	<1
Naphthalene	91-20-3	5	µg/L	----	----	----	----	<5
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	95.1	98.5	104	87.5	108
Toluene-D8	2037-26-5	5	%	109	112	116	97.8	107
4-Bromofluorobenzene	460-00-4	5	%	102	103	106	93.1	101
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	----	----	----	106
Toluene-D8	2037-26-5	2	%	----	----	----	----	100.0
4-Bromofluorobenzene	460-00-4	2	%	----	----	----	----	109

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

			Sample ID	TS_010724	----	----	----	----
			Sampling date / time	01-Jul-2024 14:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2422319-006	--------	--------	--------	--------
				Result	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**15**	----	----	----	----
Toluene	108-88-3	2	µg/L	**15**	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	**15**	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	**15**	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	**16**	----	----	----	----
^ **Total Xylenes**	----	2	µg/L	**31**	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L	**76**	----	----	----	----
Naphthalene	91-20-3	5	µg/L	**16**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**91.9**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**98.8**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**108**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

CERTIFICATE OF ANALYSIS

Work Order	: **ES2423095**	Page	: 1 of 7
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Katie Trevor	Contact	: Jason Dighton
Address	: 8/12 MARS ROAD LANE COVE WEST NSW, AUSTRALIA 2066	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE29257-4 WSA SBT	Date Samples Received	: 12-Jul-2024 11:00
Order number	: ----	Date Analysis Commenced	: 15-Jul-2024
C-O-C number	: ----	Issue Date	: 17-Jul-2024 14:22
Sampler	: KATIE TREVOR		
Site	:		
Quote number	: EN/000		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

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- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney.
- EP074: Particular samples required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sample QC46_120724 has been forwarded EUROFINS

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW1	MW2	RB_120724	QC45_120724	TB_120724
			Sampling date / time	12-Jul-2024 09:00	12-Jul-2024 09:00	12-Jul-2024 09:00	12-Jul-2024 09:00	08-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	ES2423095-001	ES2423095-002	ES2423095-003	ES2423095-004	ES2423095-005
				Result	Result	Result	Result	Result
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<10	<10	<5	<10	<5
1.2-Dichloropropane	78-87-5	5	µg/L	<10	<10	<5	<10	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<10	<10	<5	<10	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<10	<10	<5	<10	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<10	<10	<5	<10	<5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<100	<100	<50	<100	<50
Chloromethane	74-87-3	50	µg/L	<100	<100	<50	<100	<50
Vinyl chloride	75-01-4	50	µg/L	<100	<100	<50	<100	<50
Bromomethane	74-83-9	50	µg/L	<100	<100	<50	<100	<50
Chloroethane	75-00-3	50	µg/L	<100	<100	<50	<100	<50
Trichlorofluoromethane	75-69-4	50	µg/L	<100	<100	<50	<100	<50
1.1-Dichloroethene	75-35-4	5	µg/L	<10	<10	<5	<10	<5
Iodomethane	74-88-4	5	µg/L	<10	<10	<5	<10	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<10	<10	<5	<10	<5
1.1-Dichloroethane	75-34-3	5	µg/L	<10	<10	<5	<10	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L	**297**	**12**	<5	**14**	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L	<10	<10	<5	<10	<5
1.1-Dichloropropylene	563-58-6	5	µg/L	<10	<10	<5	<10	<5
Carbon Tetrachloride	56-23-5	5	µg/L	<10	<10	<5	<10	<5
1.2-Dichloroethane	107-06-2	5	µg/L	<10	<10	<5	<10	<5
Trichloroethene	79-01-6	5	µg/L	**324**	**190**	<5	**222**	<5
Dibromomethane	74-95-3	5	µg/L	<10	<10	<5	<10	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L	<10	<10	<5	<10	<5
1.3-Dichloropropane	142-28-9	5	µg/L	<10	<10	<5	<10	<5
Tetrachloroethene	127-18-4	5	µg/L	**3570**	**3060**	<5	**3620**	<5
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<10	<10	<5	<10	<5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW1	MW2	RB_120724	QC45_120724	TB_120724
			Sampling date / time	12-Jul-2024 09:00	12-Jul-2024 09:00	12-Jul-2024 09:00	12-Jul-2024 09:00	08-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	ES2423095-001	ES2423095-002	ES2423095-003	ES2423095-004	ES2423095-005
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<10	<10	<5	<10	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<10	<10	<5	<10	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<10	<10	<5	<10	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L	<10	<10	<5	<10	<5
Pentachloroethane	76-01-7	5	µg/L	<10	<10	<5	<10	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<10	<10	<5	<10	<5
Hexachlorobutadiene	87-68-3	5	µg/L	<10	<10	<5	<10	<5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<10	<10	<5	<10	<5
Bromobenzene	108-86-1	5	µg/L	<10	<10	<5	<10	<5
2-Chlorotoluene	95-49-8	5	µg/L	<10	<10	<5	<10	<5
4-Chlorotoluene	106-43-4	5	µg/L	<10	<10	<5	<10	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L	<10	<10	<5	<10	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L	<10	<10	<5	<10	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L	<10	<10	<5	<10	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<10	<10	<5	<10	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<10	<10	<5	<10	<5
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	**42**	<10	<5	<10	<5
Bromodichloromethane	75-27-4	5	µg/L	<10	<10	<5	<10	<5
Dibromochloromethane	124-48-1	5	µg/L	<10	<10	<5	<10	<5
Bromoform	75-25-2	5	µg/L	<10	<10	<5	<10	<5
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	----	----	<1
Toluene	108-88-3	2	µg/L	----	----	----	----	<2
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW1	MW2	RB_120724	QC45_120724	TB_120724
			Sampling date / time	12-Jul-2024 09:00	12-Jul-2024 09:00	12-Jul-2024 09:00	12-Jul-2024 09:00	08-Jul-2024 00:00
Compound	*CAS Number*	*LOR*	*Unit*	ES2423095-001	ES2423095-002	ES2423095-003	ES2423095-004	ES2423095-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	<2
^ **Total Xylenes**	----	2	µg/L	----	----	----	----	<2
^ **Sum of BTEX**	----	1	µg/L	----	----	----	----	<1
Naphthalene	91-20-3	5	µg/L	----	----	----	----	<5
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	**104**	**111**	**95.3**	**108**	**88.5**
Toluene-D8	2037-26-5	5	%	**106**	**125**	**90.7**	**114**	**79.6**
4-Bromofluorobenzene	460-00-4	5	%	**102**	**123**	**97.5**	**109**	**83.5**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	----	----	----	**86.4**
Toluene-D8	2037-26-5	2	%	----	----	----	----	**81.2**
4-Bromofluorobenzene	460-00-4	2	%	----	----	----	----	**92.5**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

			Sample ID	**TS_120724**	----	----	----	----
			Sampling date / time	08-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	**ES2423095-006**	--------	--------	--------	--------
				Result	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**19**	----	----	----	----
Toluene	108-88-3	2	µg/L	**18**	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	**16**	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	**16**	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	**16**	----	----	----	----
^ **Total Xylenes**	----	2	µg/L	**32**	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L	**85**	----	----	----	----
Naphthalene	91-20-3	5	µg/L	**21**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**104**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**102**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**110**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

CERTIFICATE OF ANALYSIS

Work Order	: **ES2423757**	Page	: 1 of 8
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Elliot Wood	Contact	: Jason Dighton
Address	: LEVEL 19, TOWER B- CITADEL TOWER 799 PACIFIC HIGHWAY CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE292575-4 700.05 STM MITIG WSA SBT	Date Samples Received	: 19-Jul-2024 10:10
Order number	: ----	Date Analysis Commenced	: 22-Jul-2024
C-O-C number	: ----	Issue Date	: 23-Jul-2024 18:00
Sampler	: Elliot Wood		
Site	:		
Quote number	: EN/000		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-0001B	SBT-GW-0001	SBT-GW-1347a	SBT-GW-1347c	QC47_190724
			Sampling date / time	19-Jul-2024 09:00	19-Jul-2024 09:00	19-Jul-2024 09:00	19-Jul-2024 09:00	19-Jul-2024 09:00
Compound	CAS Number	LOR	Unit	ES2423757-001	ES2423757-002	ES2423757-003	ES2423757-004	ES2423757-005
				Result	Result	Result	Result	Result
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	<5	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	<5	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	<5	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	<5	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L	<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L	<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L	<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L	<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	<50	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L	<5	<5	<5	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	<5	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	<5	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	<5	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	<5	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	<5	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L	<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L	<5	<5	<5	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	<5	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	<5	<5	<5
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-0001B	SBT-GW-0001	SBT-GW-1347a	SBT-GW-1347c	QC47_190724
			Sampling date / time	19-Jul-2024 09:00	19-Jul-2024 09:00	19-Jul-2024 09:00	19-Jul-2024 09:00	19-Jul-2024 09:00
Compound	CAS Number	LOR	Unit	ES2423757-001	ES2423757-002	ES2423757-003	ES2423757-004	ES2423757-005
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L	<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L	<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	<5	<5	<5
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L	<5	<5	<5	<5	<5
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	100	96.5	102	98.9	97.5
Toluene-D8	2037-26-5	5	%	105	100	107	100	102
4-Bromofluorobenzene	460-00-4	5	%	108	103	108	103	104

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RB_190724	TB_080724	TS_120724	----	----
			Sampling date / time	19-Jul-2024 09:00	08-Jul-2024 09:00	08-Jul-2024 09:00	----	----
Compound	CAS Number	LOR	Unit	ES2423757-006	ES2423757-007	ES2423757-008	--------	--------
				Result	Result	Result	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RB_190724	TB_080724	TS_120724	----	----
			Sampling date / time	19-Jul-2024 09:00	08-Jul-2024 09:00	08-Jul-2024 09:00	----	----
Compound	CAS Number	LOR	Unit	ES2423757-006	ES2423757-007	ES2423757-008	--------	--------
				Result	Result	Result	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	----	----	----	----
Bromoform	75-25-2	5	µg/L	<5	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	<1	**21**	----	----
Toluene	108-88-3	2	µg/L	----	<2	**18**	----	----
Ethylbenzene	100-41-4	2	µg/L	----	<2	**18**	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	<2	**19**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RB_190724	TB_080724	TS_120724	----	----
			Sampling date / time	19-Jul-2024 09:00	08-Jul-2024 09:00	08-Jul-2024 09:00	----	----
Compound	CAS Number	LOR	Unit	ES2423757-006	ES2423757-007	ES2423757-008	--------	--------
				Result	Result	Result	----	----
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	2	µg/L	----	<2	**20**	----	----
^ Total Xylenes	----	2	µg/L	----	<2	**39**	----	----
^ Sum of BTEX	----	1	µg/L	----	<1	**96**	----	----
Naphthalene	91-20-3	5	µg/L	----	<5	**20**	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	**95.4**	----	----	----	----
Toluene-D8	2037-26-5	5	%	**101**	----	----	----	----
4-Bromofluorobenzene	460-00-4	5	%	**103**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	**125**	**120**	----	----
Toluene-D8	2037-26-5	2	%	----	**103**	**104**	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	**115**	**112**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

CERTIFICATE OF ANALYSIS

Work Order	: **ES2424600**	Page	: 1 of 9
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS [redacted] O FARRELL	Contact	: Jason Dighton
Address	: 8/12 MARS ROAD LANE COVE WEST NSW, AUSTRALIA 2066	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 03 9290 7000	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE292575-4 WSA-SBT	Date Samples Received	: 26-Jul-2024 15:09
Order number	: ----	Date Analysis Commenced	: 29-Jul-2024
C-O-C number	: ----	Issue Date	: 31-Jul-2024 16:25
Sampler	: E.WOOD		
Site	:		
Quote number	: EN/000		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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- Analytical Results
- Surrogate Control Limits

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key :
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sample QA50 has been forwarded to EUROFINS.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-0001B	SBT-GW 0001	SBT-GW 1347-A	SBT-GW-1347-C	TS_260724
Sampling date / time				26-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	19-Jul-2024 00:00
				ES2424600-001	ES2424600-002	ES2424600-003	ES2424600-004	ES2424600-005
				Result	Result	Result	Result	Result
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	<5	<5	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	<5	<5	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	<5	<5	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	<5	<5	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	<5	<5	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	<50	<50	----
Chloromethane	74-87-3	50	µg/L	<50	<50	<50	<50	----
Vinyl chloride	75-01-4	50	µg/L	<50	<50	<50	<50	----
Bromomethane	74-83-9	50	µg/L	<50	<50	<50	<50	----
Chloroethane	75-00-3	50	µg/L	<50	<50	<50	<50	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	<50	<50	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	<5	<5	----
Iodomethane	74-88-4	5	µg/L	<5	<5	<5	<5	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	<5	<5	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	<5	<5	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	<5	<5	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	<5	<5	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	<5	<5	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	<5	<5	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	<5	<5	----
Trichloroethene	79-01-6	5	µg/L	<5	<5	<5	<5	----
Dibromomethane	74-95-3	5	µg/L	<5	<5	<5	<5	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	<5	<5	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	<5	<5	----
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	<5	<5	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	<5	<5	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-0001B	SBT-GW 0001	SBT-GW 1347-A	SBT-GW-1347-C	TS_260724
			Sampling date / time	26-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	19-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	ES2424600-001	ES2424600-002	ES2424600-003	ES2424600-004	ES2424600-005
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	<5	<5	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	<5	<5	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	<5	<5	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	<5	<5	----
Pentachloroethane	76-01-7	5	µg/L	<5	<5	<5	<5	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	<5	<5	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	<5	<5	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	<5	<5	----
Bromobenzene	108-86-1	5	µg/L	<5	<5	<5	<5	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	<5	<5	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	<5	<5	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	<5	<5	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	<5	<5	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	<5	<5	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	<5	<5	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	<5	<5	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	<5	<5	----
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	<5	<5	----
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	<5	<5	----
Bromoform	75-25-2	5	µg/L	<5	<5	<5	<5	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	----	----	**15**
Toluene	108-88-3	2	µg/L	----	----	----	----	**16**
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	**14**
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	**14**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SBT-GW-0001B	SBT-GW 0001	SBT-GW 1347-A	SBT-GW-1347-C	TS_260724
			Sampling date / time	26-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	19-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	ES2424600-001	ES2424600-002	ES2424600-003	ES2424600-004	ES2424600-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	15
^ Total Xylenes	----	2	µg/L	----	----	----	----	29
^ Sum of BTEX	----	1	µg/L	----	----	----	----	74
Naphthalene	91-20-3	5	µg/L	----	----	----	----	22
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	88.0	88.6	90.5	91.1	----
Toluene-D8	2037-26-5	5	%	105	105	110	108	----
4-Bromofluorobenzene	460-00-4	5	%	101	99.5	103	101	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	----	----	----	94.5
Toluene-D8	2037-26-5	2	%	----	----	----	----	106
4-Bromofluorobenzene	460-00-4	2	%	----	----	----	----	115

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	TB_260724	RB_260704	QA49_260724	----	----
			Sampling date / time	19-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2424600-006	ES2424600-007	ES2424600-008	--------	--------
				Result	Result	Result	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	<5	----	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	<5	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	<5	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	<5	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	<5	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	<50	----	----
Chloromethane	74-87-3	50	µg/L	<50	<50	<50	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	<50	<50	----	----
Bromomethane	74-83-9	50	µg/L	<50	<50	<50	----	----
Chloroethane	75-00-3	50	µg/L	<50	<50	<50	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	<50	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	<5	----	----
Iodomethane	74-88-4	5	µg/L	<5	<5	<5	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	<5	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	<5	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	<5	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	<5	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	<5	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	<5	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	<5	----	----
Trichloroethene	79-01-6	5	µg/L	<5	<5	<5	----	----
Dibromomethane	74-95-3	5	µg/L	<5	<5	<5	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	<5	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	<5	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	<5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	<5	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	TB_260724	RB_260704	QA49_260724	----	----
			Sampling date / time	19-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2424600-006	ES2424600-007	ES2424600-008	--------	--------
				Result	Result	Result	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	<5	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	<5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	<5	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	<5	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	<5	<5	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	<5	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	<5	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	<5	----	----
Bromobenzene	108-86-1	5	µg/L	<5	<5	<5	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	<5	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	<5	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	<5	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	<5	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	<5	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	<5	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	<5	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	<5	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	<5	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	<5	----	----
Bromoform	75-25-2	5	µg/L	<5	<5	<5	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

			Sample ID	TB_260724	RB_260704	QA49_260724	----	----
			Sampling date / time	19-Jul-2024 00:00	26-Jul-2024 00:00	26-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2424600-006	ES2424600-007	ES2424600-008	--------	--------
				Result	Result	Result	----	----
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	86.3	84.8	89.1	----	----
Toluene-D8	2037-26-5	5	%	103	100	104	----	----
4-Bromofluorobenzene	460-00-4	5	%	97.0	94.6	96.4	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	93.8	----	----	----	----
Toluene-D8	2037-26-5	2	%	104	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	110	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	**Low**	**High**
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

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Certificate of Analysis

Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Katie Trevor**

Report	**1115736-W**
Project name	WSA SBT
Project ID	754-SYDGE292575-4
Received Date	Jul 08, 2024

Client Sample ID			**QC44-050724**
Sample Matrix			**Water**
Eurofins Sample No.			**S24-Jl0020057**
Date Sampled			**Jul 05, 2024**
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
1.1-Dichloroethane	0.001	mg/L	< 0.05
1.1-Dichloroethene	0.001	mg/L	< 0.05
1.1.1-Trichloroethane	0.001	mg/L	< 0.05
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.05
1.1.2-Trichloroethane	0.001	mg/L	< 0.05
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.05
1.2-Dibromoethane	0.001	mg/L	< 0.05
1.2-Dichlorobenzene	0.001	mg/L	< 0.05
1.2-Dichloroethane	0.001	mg/L	< 0.05
1.2-Dichloropropane	0.001	mg/L	< 0.05
1.2.3-Trichloropropane	0.001	mg/L	< 0.05
1.3-Dichlorobenzene	0.001	mg/L	< 0.05
1.3-Dichloropropane	0.001	mg/L	< 0.05
1.4-Dichlorobenzene	0.001	mg/L	< 0.05
Bromodichloromethane	0.001	mg/L	< 0.05
Bromoform	0.001	mg/L	< 0.05
Bromomethane	0.005	mg/L	< 0.05
Carbon Tetrachloride	0.001	mg/L	< 0.05
Chlorobenzene	0.001	mg/L	< 0.05
Chloroform	0.005	mg/L	< 0.25
Chloromethane	0.005	mg/L	< 0.05
cis-1.2-Dichloroethene	0.001	mg/L	< 0.05
cis-1.3-Dichloropropene	0.001	mg/L	< 0.05
Dibromochloromethane	0.001	mg/L	< 0.05
Dibromomethane	0.001	mg/L	< 0.05
Iodomethane	0.001	mg/L	< 0.05
Methylene Chloride	0.005	mg/L	< 0.5
Tetrachloroethene	0.001	mg/L	3.8
trans-1.2-Dichloroethene	0.001	mg/L	< 0.05
trans-1.3-Dichloropropene	0.001	mg/L	< 0.05
Trichloroethene	0.001	mg/L	0.21
Trichlorofluoromethane	0.005	mg/L	< 0.05
Vinyl chloride	0.005	mg/L	< 0.05
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	4.01
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	4.01
Toluene-d8 (surr.)	1	%	114

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Halogenated Volatile Organics	Sydney	Jul 08, 2024	7 Days
- Method: LTM-ORG-2150 VOCs by Purge Trap GCMS			

Company Name: Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: WSA SBT
Project ID: 754-SYDGE292575-4

Order No.:
Report #: 1115736
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 8, 2024 11:30 AM
Due: Jul 15, 2024
Priority: 5 Day
Contact Name: Katie Trevor

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Halogenated Volatile Organics
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	QC44-050724	Jul 05, 2024		Water	S24-Jl0020057	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Environment Testing

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.005			0.005	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.005			0.005	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Methylene Chloride	mg/L	< 0.005			0.005	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.005			0.005	Pass	
Vinyl chloride	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	82			70-130	Pass	
1.1.1-Trichloroethane	%	87			70-130	Pass	
1.2-Dichlorobenzene	%	109			70-130	Pass	
1.2-Dichloroethane	%	109			70-130	Pass	
Trichloroethene	%	89			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	S24-Jn0075971	NCP	%	90			70-130	Pass	
1.1.1-Trichloroethane	S24-Jn0075971	NCP	%	91			70-130	Pass	
1.2-Dichlorobenzene	S24-Jn0075971	NCP	%	112			70-130	Pass	
1.2-Dichloroethane	S24-Jn0075971	NCP	%	110			70-130	Pass	
Trichloroethene	S24-Jn0075971	NCP	%	92			70-130	Pass	

eurofins Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1-Dichloroethene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1-Trichloroethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2-Trichloroethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dibromoethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichlorobenzene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloroethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloropropane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2.3-Trichloropropane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichlorobenzene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichloropropane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.4-Dichlorobenzene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromodichloromethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromoform	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromomethane	S24-Jl0023274	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Carbon Tetrachloride	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chlorobenzene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chloroform	S24-Jl0023274	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Chloromethane	S24-Jl0023274	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
cis-1.2-Dichloroethene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
cis-1.3-Dichloropropene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromochloromethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromomethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iodomethane	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Methylene Chloride	S24-Jl0023274	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tetrachloroethene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.2-Dichloroethene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.3-Dichloropropene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichloroethene	S24-Jl0023274	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichlorofluoromethane	S24-Jl0023274	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Vinyl chloride	S24-Jl0023274	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Nileshni Goundar	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention: **Katie Trevor**

Report	**1117992-W**
Project name	WSA SBT
Project ID	754-SYDGE292575-4
Received Date	Jul 15, 2024

Client Sample ID			[R16] **QC46_120724**
Sample Matrix			**Water**
Eurofins Sample No.			**S24-Jl0037598**
Date Sampled			**Jul 12, 2024**
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
1.1-Dichloroethane	0.001	mg/L	< 0.05
1.1-Dichloroethene	0.001	mg/L	< 0.05
1.1.1-Trichloroethane	0.001	mg/L	< 0.05
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.05
1.1.2-Trichloroethane	0.001	mg/L	< 0.05
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.05
1.2-Dibromoethane	0.001	mg/L	< 0.05
1.2-Dichlorobenzene	0.001	mg/L	< 0.05
1.2-Dichloroethane	0.001	mg/L	< 0.05
1.2-Dichloropropane	0.001	mg/L	< 0.05
1.2.3-Trichloropropane	0.001	mg/L	< 0.05
1.3-Dichlorobenzene	0.001	mg/L	< 0.05
1.3-Dichloropropane	0.001	mg/L	< 0.05
1.4-Dichlorobenzene	0.001	mg/L	< 0.05
Bromodichloromethane	0.001	mg/L	< 0.05
Bromoform	0.001	mg/L	< 0.05
Bromomethane	0.005	mg/L	< 0.05
Carbon Tetrachloride	0.001	mg/L	< 0.05
Chlorobenzene	0.001	mg/L	< 0.05
Chloroform	0.005	mg/L	< 0.25
Chloromethane	0.005	mg/L	< 0.05
cis-1.2-Dichloroethene	0.001	mg/L	< 0.05
cis-1.3-Dichloropropene	0.001	mg/L	< 0.05
Dibromochloromethane	0.001	mg/L	< 0.05
Dibromomethane	0.001	mg/L	< 0.05
Iodomethane	0.001	mg/L	< 0.05
Methylene Chloride	0.005	mg/L	< 0.5
Tetrachloroethene	0.001	mg/L	3.2
trans-1.2-Dichloroethene	0.001	mg/L	< 0.05
trans-1.3-Dichloropropene	0.001	mg/L	< 0.05
Trichloroethene	0.001	mg/L	0.21
Trichlorofluoromethane	0.005	mg/L	< 0.05
Vinyl chloride	0.005	mg/L	< 0.05
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	3.41
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	3.41
Toluene-d8 (surr.)	1	%	91

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Halogenated Volatile Organics	Sydney	Jul 15, 2024	7 Days
- Method: LTM-ORG-2150 VOCs by Purge Trap GCMS			

Company Name: Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: WSA SBT
Project ID: 754-SYDGE292575-4

Order No.:
Report #: 1117992
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 15, 2024 2:30 PM
Due: Jul 22, 2024
Priority: 5 Day
Contact Name: Katie Trevor

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Halogenated Volatile Organics
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	QC46_120724	Jul 12, 2024		Water	S24-Jl0037598	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
μg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.005			0.005	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.005			0.005	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Methylene Chloride	mg/L	< 0.005			0.005	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.005			0.005	Pass	
Vinyl chloride	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	116			70-130	Pass	
1.1.1-Trichloroethane	%	104			70-130	Pass	
1.2-Dichlorobenzene	%	106			70-130	Pass	
1.2-Dichloroethane	%	115			70-130	Pass	
Trichloroethene	%	86			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	S24-Jl0022585	NCP	%	126			70-130	Pass	
1.1.1-Trichloroethane	S24-Jl0022585	NCP	%	90			70-130	Pass	
1.2-Dichlorobenzene	S24-Jl0022585	NCP	%	99			70-130	Pass	
1.2-Dichloroethane	S24-Jl0022585	NCP	%	106			70-130	Pass	
Trichloroethene	S24-Jl0022585	NCP	%	88			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1-Dichloroethene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1-Trichloroethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2-Trichloroethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dibromoethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichlorobenzene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloroethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloropropane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2.3-Trichloropropane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichlorobenzene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichloropropane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.4-Dichlorobenzene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromodichloromethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromoform	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromomethane	N24-Jl0034529	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Carbon Tetrachloride	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chlorobenzene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chloroform	N24-Jl0034529	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Chloromethane	N24-Jl0034529	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
cis-1.2-Dichloroethene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
cis-1.3-Dichloropropene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromochloromethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromomethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iodomethane	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Methylene Chloride	N24-Jl0034529	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tetrachloroethene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.2-Dichloroethene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.3-Dichloropropene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichloroethene	N24-Jl0034529	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichlorofluoromethane	N24-Jl0034529	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Vinyl chloride	N24-Jl0034529	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
R16	The LORs have been raised due to the high concentration of one or more analytes

Authorised by:

Asim Khan	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins | Environment Testing

Certificate of Analysis

Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Katie Trevor**

Report **1120973-W**
Project name WSA SBT
Project ID 754-SYDGE292575-4
Received Date Jul 22, 2024

Client Sample ID			**QC48_190724**
Sample Matrix			**Water**
Eurofins Sample No.			**S24-Jl0060508**
Date Sampled			**Jul 19, 2024**
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
1.1-Dichloroethene	0.001	mg/L	< 0.001
1.1.1-Trichloroethane	0.001	mg/L	< 0.001
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.1.2-Trichloroethane	0.001	mg/L	< 0.001
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.2-Dibromoethane	0.001	mg/L	< 0.001
1.2-Dichlorobenzene	0.001	mg/L	< 0.001
1.2-Dichloroethane	0.001	mg/L	< 0.001
1.2-Dichloropropane	0.001	mg/L	< 0.001
1.2.3-Trichloropropane	0.001	mg/L	< 0.001
1.3-Dichlorobenzene	0.001	mg/L	< 0.001
1.3-Dichloropropane	0.001	mg/L	< 0.001
1.4-Dichlorobenzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.005	mg/L	< 0.005
Carbon Tetrachloride	0.001	mg/L	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001
Chloroform	0.005	mg/L	< 0.005
Chloromethane	0.005	mg/L	< 0.005
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
Dibromomethane	0.001	mg/L	< 0.001
Iodomethane	0.001	mg/L	< 0.001
Methylene Chloride	0.005	mg/L	< 0.005
Tetrachloroethene	0.001	mg/L	< 0.001
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.005	mg/L	< 0.005
Vinyl chloride	0.005	mg/L	< 0.005
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005
Toluene-d8 (surr.)	1	%	87
1.1-Dichloroethane	0.001	mg/L	< 0.001

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Halogenated Volatile Organics	Sydney	Jul 24, 2024	7 Days
- Method: LTM-ORG-2150 VOCs by Purge Trap GCMS			

Company Name: Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: WSA SBT
Project ID: 754-SYDGE292575-4

Order No.:
Report #: 1120973
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 22, 2024 2:40 PM
Due: Jul 29, 2024
Priority: 5 Day
Contact Name: Katie Trevor

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Halogenated Volatile Organics
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	QC48_190724	Jul 19, 2024		Water	S24-Jl0060508	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Halogenated Volatile Organics							
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.005			0.005	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.005			0.005	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Methylene Chloride	mg/L	< 0.005			0.005	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.005			0.005	Pass	
Vinyl chloride	mg/L	< 0.005			0.005	Pass	
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	95			70-130	Pass	
1.1.1-Trichloroethane	%	107			70-130	Pass	
1.2-Dichlorobenzene	%	106			70-130	Pass	
1.2-Dichloroethane	%	114			70-130	Pass	
Trichloroethene	%	121			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	N24-Jl0047100	NCP	%	86			70-130	Pass	
1.1.1-Trichloroethane	N24-Jl0047100	NCP	%	90			70-130	Pass	
1.2-Dichlorobenzene	N24-Jl0047100	NCP	%	92			70-130	Pass	
1.2-Dichloroethane	N24-Jl0047100	NCP	%	98			70-130	Pass	
Trichloroethene	N24-Jl0047100	NCP	%	112			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1-Trichloroethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2-Trichloroethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dibromoethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichlorobenzene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloroethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloropropane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2.3-Trichloropropane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichlorobenzene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichloropropane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.4-Dichlorobenzene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromodichloromethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromoform	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromomethane	N24-Jl0060721	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Carbon Tetrachloride	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chlorobenzene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chloroform	N24-Jl0060721	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Chloromethane	N24-Jl0060721	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
cis-1.2-Dichloroethene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
cis-1.3-Dichloropropene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromochloromethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromomethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iodomethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Methylene Chloride	N24-Jl0060721	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tetrachloroethene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.2-Dichloroethene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.3-Dichloropropene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichloroethene	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichlorofluoromethane	N24-Jl0060721	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Vinyl chloride	N24-Jl0060721	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
1.1-Dichloroethane	N24-Jl0060721	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins Environment Testing

Certificate of Analysis

Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: [redacted]

Report **1123049-W**
Project name WSA SBT
Project ID 754-SYDGE292575-4
Received Date Jul 29, 2024

Client Sample ID			**QA50_260724**
Sample Matrix			**Water**
Eurofins Sample No.			**S24-Jl0077231**
Date Sampled			**Jul 26, 2024**
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
1.1-Dichloroethene	0.001	mg/L	< 0.001
1.1.1-Trichloroethane	0.001	mg/L	< 0.001
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.1.2-Trichloroethane	0.001	mg/L	< 0.001
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.2-Dibromoethane	0.001	mg/L	< 0.001
1.2-Dichlorobenzene	0.001	mg/L	< 0.001
1.2-Dichloroethane	0.001	mg/L	< 0.001
1.2-Dichloropropane	0.001	mg/L	< 0.001
1.2.3-Trichloropropane	0.001	mg/L	< 0.001
1.3-Dichlorobenzene	0.001	mg/L	< 0.001
1.3-Dichloropropane	0.001	mg/L	< 0.001
1.4-Dichlorobenzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.005	mg/L	< 0.005
Carbon Tetrachloride	0.001	mg/L	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001
Chloroform	0.005	mg/L	< 0.005
Chloromethane	0.005	mg/L	< 0.005
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
Dibromomethane	0.001	mg/L	< 0.001
Iodomethane	0.001	mg/L	< 0.001
Methylene Chloride	0.005	mg/L	< 0.005
Tetrachloroethene	0.001	mg/L	< 0.001
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.005	mg/L	< 0.005
Vinyl chloride	0.005	mg/L	< 0.005
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005
Toluene-d8 (surr.)	1	%	82
1.1-Dichloroethane	0.001	mg/L	< 0.001

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Halogenated Volatile Organics	Sydney	Jul 30, 2024	7 Days

- Method: LTM-ORG-2150 VOCs by Purge Trap GCMS

Company Name: Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: WSA SBT
Project ID: 754-SYDGE292575-4

Order No.:
Report #: 1123049
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 29, 2024 1:00 PM
Due: Aug 5, 2024
Priority: 5 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Halogenated Volatile Organics
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	QA50_260724	Jul 26, 2024		Water	S24-Jl0077231	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Halogenated Volatile Organics									
1.1-Dichloroethene			mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane			mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane			mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane			mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane			mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane			mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene			mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane			mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane			mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane			mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene			mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane			mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene			mg/L	< 0.001			0.001	Pass	
Bromodichloromethane			mg/L	< 0.001			0.001	Pass	
Bromoform			mg/L	< 0.001			0.001	Pass	
Bromomethane			mg/L	< 0.005			0.005	Pass	
Carbon Tetrachloride			mg/L	< 0.001			0.001	Pass	
Chlorobenzene			mg/L	< 0.001			0.001	Pass	
Chloroform			mg/L	< 0.005			0.005	Pass	
Chloromethane			mg/L	< 0.005			0.005	Pass	
cis-1.2-Dichloroethene			mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene			mg/L	< 0.001			0.001	Pass	
Dibromochloromethane			mg/L	< 0.001			0.001	Pass	
Dibromomethane			mg/L	< 0.001			0.001	Pass	
Iodomethane			mg/L	< 0.001			0.001	Pass	
Methylene Chloride			mg/L	< 0.005			0.005	Pass	
Tetrachloroethene			mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene			mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene			mg/L	< 0.001			0.001	Pass	
Trichloroethene			mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane			mg/L	< 0.005			0.005	Pass	
Vinyl chloride			mg/L	< 0.005			0.005	Pass	
1.1-Dichloroethane			mg/L	< 0.001			0.001	Pass	
LCS - % Recovery									
Halogenated Volatile Organics									
1.1-Dichloroethene			%	93			70-130	Pass	
1.1.1-Trichloroethane			%	111			70-130	Pass	
1.2-Dichlorobenzene			%	109			70-130	Pass	
1.2-Dichloroethane			%	113			70-130	Pass	
Trichloroethene			%	127			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	N24-Jl0047100	NCP	%	86			70-130	Pass	
1.1.1-Trichloroethane	N24-Jl0047100	NCP	%	90			70-130	Pass	
1.2-Dichlorobenzene	N24-Jl0047100	NCP	%	92			70-130	Pass	
1.2-Dichloroethane	N24-Jl0047100	NCP	%	98			70-130	Pass	
Trichloroethene	N24-Jl0047100	NCP	%	112			70-130	Pass	

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Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1-Trichloroethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2-Trichloroethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dibromoethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichlorobenzene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloroethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloropropane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2.3-Trichloropropane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichlorobenzene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichloropropane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.4-Dichlorobenzene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromodichloromethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromoform	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromomethane	S24-Jl0080793	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Carbon Tetrachloride	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chlorobenzene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chloroform	S24-Jl0080793	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Chloromethane	S24-Jl0080793	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
cis-1.2-Dichloroethene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
cis-1.3-Dichloropropene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromochloromethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromomethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iodomethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Methylene Chloride	S24-Jl0080793	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tetrachloroethene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.2-Dichloroethene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.3-Dichloropropene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichloroethene	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichlorofluoromethane	S24-Jl0080793	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Vinyl chloride	S24-Jl0080793	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
1.1-Dichloroethane	S24-Jl0080793	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

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Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Nileshni Goundar	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Annexure C Quality Assurance and Quality Control Assessment

TETRA TECH

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works – St Marys Station Mitigation Monitoring

Quality Assurance / Quality Control Report – July 2024 (Report 13)

CPB Ghella Joint Venture

LABORATORY REPORTS ASSESSED

Testing Laboratory	Report/Workorder Number
Eurofins Environment Testing	115736, 117992, 1120973, 1123049
Australian Laboratory Services	ES2422319, ES2423095, ES2423757, ES2424600

Reference: SMWSASBT-CPG-SWD-SW000-GE-RPT-040420

Date: 11 September 2024

1. QUALITY CONTROL

1.1 INTRODUCTION

This report provides an assessment of the data quality of groundwater samples collected between 5 July and 26 July 2024 to inform the St Marys Station Mitigation Monitoring for the Sydney Metro Western Sydney Airport Station Boxes and Tunnelling (SBT) project.

The steps in the sampling and analysis process are subject to natural and inherent variability, and this can affect the results produced, and the overall quality of the data sets generated. In order to minimise the effect of this, standard procedures are used for works carried out in the field, and in the laboratory. The use of such procedures represents one aspect of the quality assurance process. To measure the effectiveness of the quality assurance process, quality control samples can be tested, and other quality control tests can be conducted during the analysis of samples taken in the field.

Quality control (QC) samples and tests can be used to assess both the accuracy and the precision of the results produced.

Measures of ACCURACY provide information on how close to the true result is the reported result. For practical reasons, measures of accuracy are usually confined to the laboratory steps in the overall process.

Measures of PRECISION provide information on the variability in the results. Precision can be assessed as:

- “repeatability” or intra-laboratory variation – the degree of variation in a result when the same laboratory analyses a sample (or blind replicate) several times, and;
- “reproducibility” or inter-laboratory variation – the degree of variation in a result when a different laboratory separately analyses a sample.

In addition, blank samples can be used to assess whether extraneous materials and factors have contributed to the results obtained from the sampling and analysis process.

QC testing can be conducted covering all steps of the process (referred to as Field QC in this report), or just one portion of the process, such as the laboratory steps (referred to as Laboratory QC in this report).

1.2 FIELD QUALITY CONTROL

The following activities were implemented as part of the field activities for quality assurance / quality control purposes:

- All field activities were completed by Tetra Tech staff who have received training and are experienced in the sampling methods used in this monitoring program. These sampling methods are based on Tetra Tech’s Standard Operating procedures which were developed using relevant guidelines and good industry practices.
- The same sampling technique was employed throughout the monitoring program to reduce unintentional bias in sample collection.
- Equipment used during the monitoring program included an interface probe and water quality meter, which was calibrated by the equipment supplier prior to use. Equipment calibration records are held on file.
- Intra-laboratory and inter-laboratory duplicate samples were collected during each sampling event to assess the precision of the result.
- Reusable sampling equipment was decontaminated between sampling points to prevent unintentional cross contamination. A rinsate blank sample was collected during each monitoring event by pouring

deionised water over reusable sampling equipment following decontamination to assess the efficiency of the decontamination procedure.

- A laboratory prepared trip spike and trip blank sample was kept with the samples collected in the field during each sampling event to assess the sample storage and handling procedures between the field and laboratory.

The Data Quality Indicators adopted for this monitoring program are detailed in Table A.

Table A – Data Quality Indicators

Field QC Sample	Data Quality Indicator
Duplicate Samples	Intra-lab and inter-lab duplicate samples collected at a rate of 5% (1 sample per 20 primary samples) Duplicate Relative Percentage Difference (RPD) within 50%
Rinsate and Trip Blank Samples	Analytes not detected, i.e., below the level of reporting (LOR).
Trip Spike Samples	60% to 140% for organics

1.3 LABORATORY QUALITY CONTROL

Laboratory analytical methods are accredited by the National Association of Testing Authorities, Australia (NATA) on the basis of the methods to produce reliable, repeatable results for a range of parameters within a range of sample matrices. Each laboratory method used undergoes a validation process before it is adopted by the laboratory and accredited by NATA. As part of the validation process, the precision and accuracy of the method are established.

In addition, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The results of this testing are compared with the validated precision and accuracy.

Precision of results is measured by the RPD between replicate samples selected within the laboratory. RPD is calculated in the same way as described above for Field QC.

Accuracy of results is assessed in a number of ways:

- **Reference materials**, with known concentrations of analytes are analysed with the batch of samples. The results of this analysis are compared with the established concentrations in the reference material.
- **Spike additions**. Known amounts of targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The amount of spiked material is measured as the recovery of the added amount reported in the final result.
- **Surrogate spikes**. Known amounts of chemical compounds with similar properties to the targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The amount of spiked material is measured as the recovery of the added amount reported in the final result.

Schedule B(3) of the National Environment Protection Measure (NEPM) for contaminated sites states that, in general, at least 70% recovery should be achievable from a reference method. Additionally, standard methods prepared by international agencies such as the US EPA and APHA, frequently have performance data such as expected spike recovery incorporated within the method. Where these vary from the 70% figure indicated in the NEPM Schedule, they are noted in the discussion of results below.

Tetra Tech has adopted 70% - 130% as the default acceptable range for spike recovery and surrogates spike recovery results, and as the default acceptance limits for the difference between analysis results and the expected result for reference materials.

The same analytical laboratories have consistently been employed by Tetra Tech to analysis samples for the monitoring program:

- ALS Laboratory, Smithfield has conducted analysis on the primary and intra-lab duplicate samples.
- Eurofins Laboratory, Girraween has conducted analysis on inter-lab duplicate (triplicate) samples.

2. GROUNDWATER SAMPLING QC PROGRAM

2.1 PRECISION & ACCURACY

Analytical laboratory processes	YES	NO
1. Was a NATA registered laboratory used?	☒	☐
2. Did the laboratory perform the requested analysis?	☒	☐
3. Were the laboratory methods adopted NATA endorsed?	☒	☐
4. Were the appropriate test procedures followed?	☒	☐
5. Were the reporting limits satisfactory?	☒	☐
6. Was the NATA seal on the reports?	☒	☐
7. Were the reports signed by an authorised person?	☒	☐

COMMENTS: Nil

Precision/Accuracy of the Laboratory Processes		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

2.2 SAMPLE HANDLING PROCEDURES

Sample handling	YES	NO	N/A
1. Were the sample holding times met?	☒	☐	☐
2. Were the samples in proper custody between the field and laboratory?	☒	☐	☐
3. Were the samples properly and adequately preserved? (This includes chilling the samples where appropriate)	☒	☐	☐
4. Were the samples received by the laboratory in good condition?	☒	☐	☐

COMMENTS: Nil

Sample Handling Procedure		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

3. FIELD QA/QC SAMPLING AND PROCEDURES

3.1 FIELD QA/QC SUMMARY

This report provides an assessment of groundwater samples collected across four sampling events; 5 July, 12 July, 19 July and 26 July 2024. A summary of the QC samples collected is provided in Table B below.

Table B - QA/QC Sampling Summary

Sample Type	QC sample requirements	Number of Samples
Primary Samples		16
QA/QC Samples	Field Duplicate & Triplicate pairs (1 in 20 primary samples)	8 (4 intra lab + 4 inter lab)
	Trip Blanks (1 / sampling event)	4
	Trip Spikes (1 / sampling event)	4
	Equipment Rinsates (1 / sampling event)	4

3.2 FIELD DUPLICATES

	YES	NO	N/A
1. Were an adequate number of field replicates analysed for each chemical?	☒	☐	☐
2. Were RPD's for replicate samples within control limits?	☒	☐	☐

COMMENTS:

The duplicate and triplicate results and calculated RPDs are provided in Table 1, Attachment A. Elevated RPDs were noted between MW2 and QC43_050724 for 1,3-dichloropropane and between both MW2 and QC44-050724 and between MW2 and QC43_050724 for 1,1,2-Trichloroethane. The high RPDs were identified where concentrations were < 10 times the level of reporting, and were identified in a heavily impacted sample. They are considered to indicate an issue with data quality or useability, particularly as the RPDs for all key compounds were acceptable.

3.3 BLANKS AND RINSATES

3.3.1 Trip Blanks

Analytical results for trip blank samples are presented in Table 2, Attachment 1.

	YES	NO	N/A
1. Were an adequate number of trip blanks collected?	☒	☐	☐
2. Were the trip blanks reported to be free of volatile contaminants?	☒	☐	☐

COMMENTS: Nil

3.3.2 Trip Spikes

Analytical results for trip spike samples are presented in Table 2, Attachment 1.

	YES	NO	N/A
3. Were an adequate number of trip spikes collected?	☒	☐	☐
4. Were the trip spikes reported to be within laboratory control limits?	☒	☐	☐

COMMENTS: Nil

3.3.3 Equipment Rinsates

Analytical results for rinsate samples are presented in Table 2, Attachment 1.

	YES	NO	N/A
1. Were an adequate number of equipment rinsates collected?	☒	☐	☐
2. Were the equipment rinsates reported to be free of contaminants?	☒	☐	☐

COMMENTS: Nil

Blanks, Spikes and Rinsate Sampling and Analysis		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

4. LABORATORY QUALITY CONTROL PROCEDURES

As noted in Section 1.3, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The following section assesses the adequacy of these procedures.

	YES	NO
1. Were laboratory method blanks free of contamination?	☒	☐
2. Were the matrix spike recoveries within control limits?	☒	☐
3. Were the Lab control samples within control limits?	☒	☐
4. Were the RPD's of the laboratory duplicates within control limits?	☒	☐
5. Were the surrogate recoveries within laboratory control limits?	☒	☐

COMMENTS:

Nil

Laboratory Internal QA/QC		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

5. DATA USABILITY

Overall, of the 2,967 individual analyses conducted in association with the quality assessment, no significant issues were identified. A summary of the total analyses and proportion with issues for the QC program is provided in Table C below.

Table C: Quality Control Program Summary

Sample Type	Total Number of Analyses	Number of Identified Issues	% of Analyses with Identified Issues	Issues Identified
Duplicate / Triplicate samples	324	3 (minor)	0.92	Three high RPDs were associated with low concentrations (<10 times the level of reporting) of non-key chlorinated hydrocarbons in a heavily impacted sample. RPDs for all key compounds were acceptable.
Field quality control samples (Rinsates, Trip Blanks and Trip Spikes)	373	0	-	None. No concentrations reported above the LOR
Internal laboratory analyses	2,270	0	-	No internal laboratory analyses outside acceptable range
Total	**2,967**	**3**	**0.1%**	-

The data quality assessment indicates that the data is of acceptable quality for use.

Author:
Elliot Wood

Reviewer:
[redacted]

		Lab Report Number	ES2422319	ES2422319			ES2422319	1115736			ES2423095	ES2423095			ES2423095	1117992
		Field ID	MW2	QC43_050724			MW2	QC44-050724			MW2	QC45_120724			MW2	QC46_120724
		Matrix Type	Water	Water			Water	Water			Water	Water			Water	Water
		Date	05 Jul 2024	05 Jul 2024	RPD	Validity	05 Jul 2024	05 Jul 2024	RPD	Validity	12 Jul 2024	12 Jul 2024	RPD	Validity	12 Jul 2024	12 Jul 2024
	Unit	**EQL**								Pass				Pass		
1,1-dichloropropene	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
1,2,3-trichloropropane	µg/L	**1**	<10	<10	0	Pass	<10	<50	0	Pass	<10	<10	0	Pass	<10	<50
1,2-dibromo-3-chloropropane	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
1,3-dichloropropane	mg/L	**0.001**	**0.021**	<0.01	71	Results >20 times the LOR: RPD	**0.021**	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
2,2-dichloropropane	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
Chlorodibromomethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Dibromomethane	µg/L	**1**	<10	<10	0	Pass	<10	<50	0	Pass	<10	<10	0	Pass	<10	<50
Halogenated Hydrocarbons																
Iodomethane	mg/L	**0.001**	**0.011**	<0.01	10	Pass	**0.011**	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Volatile Organic Compounds																
cis-1,4-Dichloro-2-butene	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
trans-1,4-Dichloro-2-butene	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
Pentachloroethane	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
Chloroethanes																
1,1,1,2-Tetrachloroethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,1,2,2-Tetrachloroethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,1,1-Trichloroethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,1,2-Trichloroethane	mg/L	**0.001**	**0.103**	<0.01	165	Results >20 times the LOR: RPD	**0.103**	<0.05	69	Results >20 times the LOR: RPD	<0.01	<0.01	0	Pass	<0.01	<0.05
1,2-Dichloroethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,1-Dichloroethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Chloroethane	mg/L	**0.05**	<0.1	<0.1	0	Pass	<0.1		-	-	<0.1	<0.1	0	Pass	<0.1	-
Halogenated Benzenes																
1,2,3-trichlorobenzene	µg/L	**5**	<10	<10	0	Pass	<10		-	-	<10	<10	0	Pass	<10	-
4-chlorotoluene	ug/L	**5**	<10	<10	0	Pass	<10		-	-	<10	<10	0	Pass	<10	-
Bromobenzene	ug/L	**5**	<10	<10	0	Pass	<10		-	-	<10	<10	0	Pass	<10	-
Chloroethenes																
Tetrachloroethene	mg/L	**0.001**	**4.52**	**4.12**	9	Pass	**4.52**	**3.8**	17	Pass	**3.06**	**3.62**	17	Pass	**3.06**	**3.2**
Trichloroethene	mg/L	**0.001**	**0.204**	**0.222**	8	Pass	**0.204**	**0.21**	3	Pass	**0.19**	**0.222**	16	Pass	**0.19**	**0.21**
cis-1,2-Dichloroethene	mg/L	**0.001**	**0.012**	**0.012**	0	Pass	**0.012**	<0.05	0	Pass	**0.012**	**0.014**	15	Pass	**0.012**	<0.05
trans-1,2-Dichloroethene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,1-Dichloroethene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Vinyl Chloride	mg/L	**0.005**	<0.1	<0.1	0	Pass	<0.1	<0.05	0	Pass	<0.1	<0.1	0	Pass	<0.1	<0.05
Chloromethanes																
Carbon Tetrachloride	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Chloroform	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01	<0.25	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.25
Dichloromethane	mg/L	**0.005**		-	-	-	-	<0.5	-	-		-	-	-	-	<0.5
Chloromethane	mg/L	**0.005**	<0.1	<0.1	0	Pass	<0.1	<0.05	0	Pass	<0.1	<0.1	0	Pass	<0.1	<0.05
VOCs																
1,2,4-Trichlorobenzene	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
1,2-Dibromoethane (EDB)	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,2-Dichlorobenzene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,2-Dichloropropane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,3-Dichlorobenzene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
1,4-Dichlorobenzene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
2-Chlorotoluene	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
Bromodichloromethane	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Bromoform	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Bromomethane	mg/L	**0.005**	<0.1	<0.1	0	Pass	<0.1	<0.05	0	Pass	<0.1	<0.1	0	Pass	<0.1	<0.05
Chlorobenzene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
cis-1,3-Dichloropropene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05
Freon 11	mg/L	**0.005**	<0.1	<0.1	0	Pass	<0.1	<0.05	0	Pass	<0.1	<0.1	0	Pass	<0.1	<0.05
Freon 12	mg/L	**0.05**	<0.1	<0.1	0	Pass	<0.1		-	-	<0.1	<0.1	0	Pass	<0.1	-
Hexachlorobutadiene	mg/L	**0.005**	<0.01	<0.01	0	Pass	<0.01		-	-	<0.01	<0.01	0	Pass	<0.01	-
trans-1,3-Dichloropropene	mg/L	**0.001**	<0.01	<0.01	0	Pass	<0.01	<0.05	0	Pass	<0.01	<0.01	0	Pass	<0.01	<0.05

*RPDs have only been considered where a concentration is greater than 10 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 25 (1 - 20 x EQL); 10 (20 - 20 x EQL); 10 (> 20 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

	Unit	EQL	RPD	Validity			RPD	Validity			RPD	Validity			RPD	Validity
Lab Report Number					ES2423757	ES2423757			ES2424600	ES2424600			ES2424600	1120973		
Field ID					SBT-GW-0001b	QC47_190724			SBT-GW-0001b	QA49_260724			SBT-GW-0001b	QC48_190724		
Matrix Type					Water	Water			Water	Water			Water	Water		
Date					19 Jul 2024	19 Jul 2024			26 Jul 2024	26 Jul 2024			26 Jul 2024	19 Jul 2024		
				Pass				Pass				Pass				Pass
1,1-dichloropropene	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
1,2,3-trichloropropane	µg/L	**1**	0	Pass	<5	<5	0	Pass	<5	<5	0	Pass	<5	<1	0	Pass
1,2-dibromo-3-chloropropane	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
1,3-dichloropropane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
2,2-dichloropropane	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
Chlorodibromomethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Dibromomethane	µg/L	**1**	0	Pass	<5	<5	0	Pass	<5	<5	0	Pass	<5	<1	0	Pass
Halogenated Hydrocarbons																
Iodomethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Volatile Organic Compounds																
cis-1,4-Dichloro-2-butene	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
trans-1,4-Dichloro-2-butene	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
Pentachloroethane	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
Chloroethanes																
1,1,1,2-Tetrachloroethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,1,2,2-Tetrachloroethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,1,1-Trichloroethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,1,2-Trichloroethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,2-Dichloroethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,1-Dichloroethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Chloroethane	mg/L	**0.05**	-	-	<0.05	<0.05	0	Pass	<0.05	<0.05	0	Pass	<0.05	-	-	-
Halogenated Benzenes																
1,2,3-trichlorobenzene	µg/L	**5**	-	-	<5	<5	0	Pass	<5	<5	0	Pass	<5	-	-	-
4-chlorotoluene	ug/L	**5**	-	-	<5	<5	0	Pass	<5	<5	0	Pass	<5	-	-	-
Bromobenzene	ug/L	**5**	-	-	<5	<5	0	Pass	<5	<5	0	Pass	<5	-	-	-
Chloroethenes																
Tetrachloroethene	mg/L	**0.001**	4	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Trichloroethene	mg/L	**0.001**	10	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
cis-1,2-Dichloroethene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
trans-1,2-Dichloroethene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,1-Dichloroethene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Vinyl Chloride	mg/L	**0.005**	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.005	0	Pass
Chloromethanes																
Carbon Tetrachloride	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Chloroform	mg/L	**0.005**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass
Dichloromethane	mg/L	**0.005**	-	-		-	-	-		-	-	-	-	<0.005	-	-
Chloromethane	mg/L	**0.005**	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.005	0	Pass
VOCs																
1,2,4-Trichlorobenzene	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
1,2-Dibromoethane (EDB)	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,2-Dichlorobenzene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,2-Dichloropropane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,3-Dichlorobenzene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
1,4-Dichlorobenzene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
2-Chlorotoluene	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
Bromodichloromethane	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Bromoform	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Bromomethane	mg/L	**0.005**	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.005	0	Pass
Chlorobenzene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
cis-1,3-Dichloropropene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass
Freon 11	mg/L	**0.005**	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.05	0	Pass	<0.05	<0.005	0	Pass
Freon 12	mg/L	**0.05**	-	-	<0.05	<0.05	0	Pass	<0.05	<0.05	0	Pass	<0.05	-	-	-
Hexachlorobutadiene	mg/L	**0.005**	-	-	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	-	-	-
trans-1,3-Dichloropropene	mg/L	**0.001**	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.005	0	Pass	<0.005	<0.001	0	Pass

*RPDs have only been considered where a concentration is greater than 10

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable R

***Interlab Duplicates are matched on a per compound basis as methods v

					BTEXN								Chlorinated Hydrocarbons							Halogenated	Volatile Organic Compounds		
					Benzene	Toluene	Ethyl Benzene	m,p-Xylene	o-Xylene	Total Xylenes	Naphthalene (VOC)	Total BTEX	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,3-dichloropropane	2,2-dichloropropane	Chlorodibromomethane	Dibromomethane	Iodomethane	cis-1,4-Dichloro-2-butene	trans-1,4-Dichloro-2-butene	Pentachloroethane
					ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L
EQL					**1**	**2**	**2**	**2**	**2**	**2**	**5**	**1**	**0.005**	**5**	**0.005**	**0.005**	**0.005**	**0.005**	**5**	**0.005**	**0.005**	**0.005**	**0.005**
Lab Report Numbe	Field ID	Matrix Type	Date	Sample Type																			
ES2422319	RB_050724	Water	05 Jul 2024	Rinsate	-	-	-		-	-	-	-	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2422319	TB_010724	Water	01 Jul 2024	Trip_B	<1	<2	<2	<2	<2	<2	<5	<1	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2423095	RB_120724	Water	12 Jul 2024	Rinsate	-	-	-		-	-	-	-	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2423095	TB_120724	Water	08 Jul 2024	Trip_B	<1	<2	<2	<2	<2	<2	<5	<1	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2423757	RB_190724	Water	19 Jul 2024	Rinsate	-	-	-		-	-	-	-	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2423757	TB_080724	Water	08 Jul 2024	Trip_B	<1	<2	<2	<2	<2	<2	<5	<1	-		-	-	-	-	-		-	-	
ES2424600	RB_260704	Water	26 Jul 2024	Rinsate	-	-	-		-	-	-	-	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2424600	TB_260724	Water	19 Jul 2024	Trip_B	<1	<2	<2	<2	<2	<2	<5	<1	<0.005	<5	<0.005	<0.005	<0.005	<0.005	<5	<0.005	<0.005	<0.005	<0.005
ES2422319	TS_010724	Water	01 Jul 2024	Trip_S	**15**	**15**	**15**	**15**	**16**	**31**	**16**	**76**	-		-	-	-	-	-		-	-	
ES2423095	TS_120724	Water	08 Jul 2024	Trip_S	**19**	**18**	**16**	**16**	**16**	**32**	**21**	**85**	-		-	-	-	-	-		-	-	
ES2423757	TS_120724	Water	12 Jul 2024	Trip_S	**21**	**18**	**18**	**19**	**20**	**39**	**20**	**96**	-		-	-	-	-	-		-	-	
ES2424600	TS_260724	Water	19 Jul 2024	Trip_S	**15**	**16**	**14**	**14**	**15**	**29**	**29**	**74**	-		-	-	-	-	-		-	-	

					Chloroethanes							Halogenated Benzenes			Chloroethenes						Chloromethanes		
					1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,2-Dichloroethane	1,1-Dichloroethane	Chloroethane	1,2,3-trichlorobenzene	4-chlorotoluene	Bromobenzene	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Carbon Tetrachloride	Chloroform	Chloromethane
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	ug/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL					**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.05**	**5**	**5**	**5**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.05**	**0.005**	**0.005**	**0.05**
Lab Report Numbe	Field ID	Matrix Type	Date	Sample Type																			
ES2422319	RB_050724	Water	05 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2422319	TB_010724	Water	01 Jul 2024	Trip_B	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2423095	RB_120724	Water	12 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2423095	TB_120724	Water	08 Jul 2024	Trip_B	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2423757	RB_190724	Water	19 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2423757	TB_080724	Water	08 Jul 2024	Trip_B	-	-	-		-	-	-	-	-		-	-	-	-	-	-		-	
ES2424600	RB_260704	Water	26 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2424600	TB_260724	Water	19 Jul 2024	Trip_B	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<5	<5	<5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05
ES2422319	TS_010724	Water	01 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	-		-	
ES2423095	TS_120724	Water	08 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	-		-	
ES2423757	TS_120724	Water	12 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	-		-	
ES2424600	TS_260724	Water	19 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	-		-	

					VOCs															
					1,2,4-Trichlorobenzene	1,2-Dibromoethane (EDB)	1,2-Dichlorobenzene	1,2-Dichloropropane	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2-Chlorotoluene	Bromodichloromethane	Bromoform	Bromomethane	Chlorobenzene	cis-1,3-Dichloropropene	Freon 11	Freon 12	Hexachlorobutadiene	trans-1,3-Dichloropropene
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL					**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.05**	**0.005**	**0.005**	**0.05**	**0.05**	**0.005**	**0.005**
Lab Report Numbe	Field ID	Matrix Type	Date	Sample Type																
ES2422319	RB_050724	Water	05 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2422319	TB_010724	Water	01 Jul 2024	Trip_B	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2423095	RB_120724	Water	12 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2423095	TB_120724	Water	08 Jul 2024	Trip_B	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2423757	RB_190724	Water	19 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2423757	TB_080724	Water	08 Jul 2024	Trip_B	-	-	-		-	-	-	-	-		-	-	-	-	-	
ES2424600	RB_260704	Water	26 Jul 2024	Rinsate	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2424600	TB_260724	Water	19 Jul 2024	Trip_B	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.005	<0.005
ES2422319	TS_010724	Water	01 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	
ES2423095	TS_120724	Water	08 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	
ES2423757	TS_120724	Water	12 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	
ES2424600	TS_260724	Water	19 Jul 2024	Trip_S	-	-	-		-	-	-	-	-		-	-	-	-	-	

St Marys Station Monthly Mitigation Monitoring Report 18 – December 2024

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

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Document approval

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Rev A.01	03/02/2025	Katie Trevor	[redacted]	Provided to CPBG for internal review

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Abbreviations

Abbreviation	Definition
AHD	Australian height datum (0 mAHD corresponds roughly to mean sea level)
btoc	Below the top of casing
Cis 1,2 DCE	Cis 1,2 dichloroethene
COC	Chain of Custody
CPBG	CPB Contractors Ghella Joint Venture
CV	Co-efficient of variation
EC	Electrical conductivity
HHRA	Human Health Risk Assessment
LNAPL	Light Non Aqueous Phase Liquid
LOR	Limit of Reporting
mg/L	Milligram per litre
NSW	New South Wales
NATA	National Association of Testing Authorities
PCE	Tetrachloroethene
PRB	Permeable Reactive Barrier
QA	Quality Assurance
QC	Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SBT	Station Boxes and Tunnelling Works
SOP	Standard Operating Procedures
SSTOM	Stations, Systems, Trains, Operations and Maintenance
TBM	Tunnelling boring machine
TCE	Trichloroethene
TfNSW	Transport for New South Wales
Tetra Tech	Tetra Tech Major Projects Pty Ltd
µg/L	Micro gram per litre
VC	Vinyl chloride
WSA	Western Sydney Airport

1. Introduction

Sydney Metro has engaged the CPB Ghella Joint Venture (CPBG) for the design and construction of the Station Boxes and Tunnelling Works (SBT Works) for the Sydney Metro Western Sydney Airport project (the 'Project').

CPBG has engaged Tetra Tech Major Projects Pty Ltd (Tetra Tech) to provide geotechnical, hydrogeological and contaminated land consultancy services associated with the design and construction of the SBT Works.

Groundwater contaminated with chlorinated hydrocarbons from a former dry cleaner located at 1-7 Queen St, St Marys has been identified approximately 200m west of the St Marys Station Box. Construction related dewatering during station box construction was predicted to draw down groundwater in the vicinity, reversing the existing westerly groundwater flow direction, potentially drawing the contamination toward the excavation (Tetra Tech 2023a).

A permeable reactive barrier (PRB) was installed on 16 May to 19 May 2023 to the west of St Marys Station to intercept potential migration of chlorinated hydrocarbons in groundwater due to construction associated drawdown. Given the potential for unacceptable inhalation or direct contact risk, a targeted multi-level groundwater monitoring and contingency mitigation approach has been applied, to allow contingency mitigation to be implemented before an unacceptable risk occurs.

Pre-construction groundwater conditions across the St Marys Station area have been assessed through a Detailed Site Investigation (DSI) (Tetra Tech, 2022), and the Baseline Groundwater Report (Tetra Tech, 2023b) and as detailed in the Groundwater Monitoring Program (GMP).

The remediation strategy is outlined in the remedial action plan (RAP) for the SBT Works at St Marys:

- Tetra Tech (2023c); *St Marys Station Remedial Action Plan* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040521. 22/05/2023. Rev A08).

Details of the installation of the PRB and mitigation monitoring are detailed in:

- Tetra Tech (2023d); *Implementation of Permeable Reactive Barrier* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040561. 02/08/2023. Rev A).

In addition to monitoring for potential contaminant mobilisation due to station construction, the mitigation monitoring program was expanded in mid-March 2024 to incorporate assessment for potential impacts due to rail tunnel construction. Tunnel boring machine (TBM) monitoring was established to monitor groundwater conditions in the vicinity of the former dry cleaner when the TBMs progressed through the area.

An outline of the TBM monitoring program, and adjustments to the PRB mitigation monitoring network due to tunnelling, is provided in:

- Tetra Tech (2024); *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater monitoring network* (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040403_A.01. 26/03/2024. Rev A).

The TBMs broke through at St Marys Station Box in May and June 2024, with monitoring continuing for four weeks after break through (until 12 July 2024). The final results of the TBM monitoring program indicated that any change in chlorinated hydrocarbon concentrations beneath the source area had been temporary and, as there had been a return to pre-existing conditions, no further monitoring was required to assess tunnelling related impacts.

The results of the TBM monitoring program are provided in the March to August 2024 monthly reports (Report references SMWSASBT-CPG-SWD-SW000-GE-RPT-040415 to SMWSASBT-CPG-SWD-SW000-GE-RPT-040420). Ongoing reporting is now limited to the PRB area.

The Station excavation is now complete, however it is understood that the Station box will continue to be a drained structure until it is tanked in March 2026 As tunnelling is now complete the responsibility for ongoing monitoring until the station box is tanked has now been handed over to the Station, Systems, Trains, Operations and Maintenance (SSTOM) contractor.

This report documents the eighteenth month (December 2024) and final round of groundwater sampling by SBT to monitor the mitigation of potential risks due to construction related mobilisation of groundwater impacted with chlorinated hydrocarbons.

1.1. Purpose and objectives

The purpose of the monitoring works was to:

- Monitor the effectiveness of the PRB;
- Identify if an adverse change in risk profile is likely which requires contingency mitigation measures to be implemented as outlined in Section 11.6 of the RAP.

The objectives of the works were to:

- Undertake groundwater monitoring from nominated monitoring wells to measure the groundwater level and quality between the source area and the Station box (as shown in Figure 1);
- Assess the monitoring results relative to the trigger values outlined in the RAP;
- Where detectable concentrations of chlorinated ethenes are reported in monitoring wells between the station and the PRB, review the model predictions outlined in the Human Health Risk Assessment (HHRA) (Tetra Tech, 2023a) to assess whether concentrations exceeding the trigger values are likely to reach the excavation before sealing occurs.

The locations of the PRB injection wells and associated current and historical monitoring well network are shown in Figure 1.

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Ongoing PRB mitigation monitoring
- PRB monitoring well – decommissioned
- TBM monitoring well – decommissioned
- PRB injection well - decommissioned
- TBM monitoring well – monitoring complete
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Railway
- Minor Road
- Path
- STM Site Boundary
- Cadastral Boundary

NOTE

SBT-GW-1347b has been decommissioned.

SOURCE

Mitigation Monitoring Wells, PRB Wells and boundary from Tetra Tech Coffey.
Existing investigations, site layout, station box and alignment supplied by CPBG.
Cadastre from DFSI.
Aerial imagery from Nearmap (capture date 30-03-2023).

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SCALE 1:350

PAGE SIZE: A3

PROJECTION: GDA2020 MGA Zone 56

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 1

Ongoing Mitigation Monitoring Well St Marys

TETRA TECH COFFEY

DATE: 10.10.24 PROJECT: 754-SYDGE292575 FILE: 292575_RAP_F001_GIS

SAVED BY: MATTHEW.GOLJANIN 10.10.24 9:51 AM

DOC REFERENCE: S:\GIS\286919_SYDGE_CPBG_WSASBT\CPBG_WSASBT_GIS\APRX\292575_RAP_FIGS_REVA.APRX_2

2. Scope of Works

The PRB mitigation monitoring works consists of sampling and analysis of the post-TBM groundwater monitoring well network located between the contamination source and the Station box. Well installation details for the monitoring well network are provided in Table A1, Annexure A.

The typical pre-construction groundwater level in the upper Bringelly Shale was 32.5 to 33mAHD, based on Section 14.5.1 of the Hydrogeological Interpretive Report (Tetra Tech 2023f). Baseline groundwater conditions were established in mitigation monitoring wells through groundwater sampling between 20 January 2023 and 14 April 2023.

The PRB mitigation monitoring program, as outlined in Section 11 of the RAP, began at the commencement of bulk excavation beneath the groundwater table at the western end of the St Marys Station box (Zone 4), which commenced on 16 June 2023.

PRB well monitoring was undertaken on a weekly basis from June to December 2023. In December 2023, after six months of weekly monitoring, the frequency of monitoring was reviewed and revised to fortnightly as the groundwater gradient in the vicinity of the former dry cleaner had not changed, and chlorinated hydrocarbon concentrations in all monitoring wells were below the level of reporting (LOR). The revision was outlined in the *Memorandum: St Marys Station Remedial Action Plan - Proposed revision to mitigation groundwater sampling frequency'*, dated 19 December 2023 (Tetra Tech 2023e), and agreed to by the auditor on 21 December 2023, and Sydney Metro on 22 December 2023.

The mitigation monitoring program was again revised in March 2024 to incorporate weekly monitoring in the suspected source area prior to, during, and after the TBMs passing beneath the site. In advance of the TBMs passing through both the contaminant source area and the PRB area, monitoring wells within 3m of the tunnels required grouting as the TBMs are pressurised, and groundwater wells provide potential pathways to the surface which may result in depressurisation. The program was therefore also adjusted as numerous monitoring wells from the PRB mitigation program were decommissioned (Tetra Tech 2024).

The TBM monitoring program is now complete with ongoing monitoring limited to sampling of PRB mitigation monitoring wells on a fortnightly basis, the responsibility for which was handed over to the SSTOM contractor, Parklife Metro (PLM), on 9 December 2025

The initial and revised PRB monitoring scopes are detailed in the following subsection.

2.1. Groundwater Monitoring

The initial and revised PRB mitigation monitoring program consists of groundwater level gauging and sampling from nominated PRB mitigation monitoring wells (as detailed in Tables 1 and 2 respectively).

Table 1: Construction Phase Groundwater Monitoring Schedule – Initial PRB mitigation monitoring

Monitoring Well	Monitoring frequency	Analytes	Trigger Value and Contingency Plan
SBT-GW-0001 **SBT-GW-0001b**	Fortnightly	Volatile chlorinated hydrocarbons	**Trigger Values:** PCE 0.3mg/L TCE 0.055mg/L cis 1,2 DCE 0.25mg/L VC 0.2mg/L Refer HHRA for determination of trigger values **Contingency Plan**: Refer to Section 11.6 of the RAP
SBT-GW-1012 [1] SBT-GW-1013 [1] SBT-GW-1014 [1]	Fortnightly		
SBT-GW-1347a [2] SBT-GW-1347b [2] **SBT-GW-1347c** [2] SBT-GW-1348a [2] SBT-GW-1348b [2] SBT-GW-1348c [2]	Fortnightly for 'c' interval wells (at ~18mAHD)		

1. SBT-GW-1012, SBT-GW-1013 and SBT-GW-1014 were screened from the pre-construction water table to 20mAHD with a saturated interval of 12m. Three hydrasleeves were initially placed in each well at 30mAHD, 27mAHD and 24mAHD.

2. SBT-GW-1347a, SBT-GW-1347b, SBT-GW-1347c, SBT-GW-1348a, SBT-GW-1348b, SBT-GW-1348c were multi-level groundwater wells, with details provided in Table A1.

The ongoing monitoring program for volatile chlorinated hydrocarbons is based on the four remaining PRB monitoring wells, as outlined in Table 2. The revised ongoing monitoring scope was implemented from 19 July 2024 with the final round of monitoring by SBT completed on 9 December 2024.

Table 2: Ongoing PRB Mitigation Monitoring Network

Monitoring Well	Sampling frequency	Comment	Trigger Values:
SBT-GW-1347a	Fortnightly	Shallow well between PRB and Station box	As detailed in Table 1
SBT-GW-1347c		Deep well between PRB and Station box	
SBT-GW-0001		Shallow well between PRB and suspected source area	
SBT-GW-0001B		Mid-level well between PRB and suspected source area	

2.1.1. Adopted Trigger Values

Risk based trigger values developed in the HHRA (Tetra Tech, 2023a) for the PRB monitoring wells are summarised in Table 1.

Where detectable concentrations of chlorinated ethenes are reported in mitigation monitoring wells between the station and the PRB, model predictions outlined in the HHRA (Tetra Tech, 2023a) were to be reviewed. The review was to assess whether concentrations exceeding the trigger values are likely to reach the excavation before tanking occurs, and whether contingency mitigation needs to be implemented.

2.2. Monitoring Methodology

2.2.1 Groundwater Level Monitoring

Groundwater levels were manually gauged in all four wells prior to sampling for groundwater quality.

Gauging was undertaken using an electronic groundwater level interface probe (IP) measuring from a surveyed set point at the top of the well casing to the top of the water table. Measurements were taken to the nearest mm, and recorded as metres below the top of casing (mBTOC).

2.2.2 Groundwater Sampling Procedure

Groundwater sampling was conducted by suitably qualified and experienced personnel from Tetra Tech.

Groundwater samples were collected using the Hydrasleeve™ method. A Hydrasleeve™ captures a core of water, typically 1 litre, from the screened interval of the well. The Hydrasleeve™ is deployed to a target depth based on the screened interval and rationale for sampling, and left until conditions are considered to have stabilised. The time to stabilisation depends on the transmissivity of the aquifer, with more transmissive aquifers stabilising more rapidly. Typically, at least 5 days was allowed for stabilisation, which is considered appropriate given many of the wells are screened within the bedrock aquifer.

The Hydrasleeve™ is sealed except during sample collection when it is pulled up through the sampling interval, and re-seals once full. Therefore, only groundwater from the target depth interval is sampled and recovered.

Groundwater samples were collected in appropriate laboratory supplied bottles and sent to a laboratory for analysis under the Chain of Custody (COC) process. The laboratories contracted to undertake the analysis included ALS (primary samples) and Eurofins (interlab triplicate samples). Both ALS and Eurofins hold analytical methods accredited by the National Association of Testing Authorities (NATA) for a range of volatile halogenated hydrocarbons (VHC), including the chlorinated hydrocarbons of interest on this site.

To reduce volatile losses, samples were collected as rapidly as practicable with minimal agitation and zero headspace in sample bottles. Once the laboratory supplied bottles were filled, water quality parameters were measured with a calibrated field water quality meter using the remainder of the Hydrasleeve™ sample. Parameters measured included pH (pH units), electrical conductivity (mS/cm), redox potential (mV), dissolved oxygen content (µg/L), temperature (°C). The sample's visual appearance, whether Light Non Aqueous Phase Liquid (LNAPL) was present and/or any odours were also recorded on the field sheets. Field measurements were recorded digitally, with the digital data imported to the electronic database using an in-house GIS application.

Samples were submitted as soon as practicable to the laboratories to also minimise volatile losses while in storage or transit. Sample containers were placed directly into an ice filled cooler and transported to the nominated laboratories under COC processes. Samples are required to be documented as received by the laboratory chilled and intact. All samples were analysed for a broad range of VHC and were analysed within recommended holding times.

Re-usable equipment used in more than one location (limited to the IP) was decontaminated between each sampling location. Equipment was rinsed with tap water, cleaned with Liquinox (or equivalent), further again rinsed with tap water, and then deionised water. Equipment was then allowed to dry before being used at another location.

3. Results

3.1. Groundwater Monitoring Activities and Observations

One final groundwater monitoring event was conducted on behalf of SBT in December 2024 (the eighteenth month of PRB groundwater mitigation monitoring), in accordance with the methodology described in Section 2.2.

Table 3 provides a summary of the monitoring activities and observations recorded during the final round of fieldworks.

Table 3: Groundwater Monitoring Details and Observations for December 2024

Activity	Detail/Comments
Date of field activities	Sampling event on 6 December 2024.
Gauged and sampled	The following monitoring bores were gauged and then sampled for VHC analysis: • SBT-GW-0001 • SBT-GW-0001b • SBT-GW-1347a • SBT-GW-1347c
Standing water level	Standing water level (mBTOC) ranged between: • 3.599 mBTOC (SBT-GW-0001) and 9.657 mBTOC (SBT-GW-1347)
Presence of LNAPL	LNAPL was not detected in any monitoring well.
Field observations (odours, colour, turbidity)	Samples collected from SBT-GW-1347a and SBT-GW-1347c were noted to be 'slightly cloudy'.
Deviations from scope	There were no deviations from the scope in the sampling event completed in December 2024.

3.2. Field Parameters

Field water quality parameters are summarised in Table 4, with all available field data provided in Table A2 of Annexure A.

Some variability in the field water quality parameters was noted between monitoring wells, consistent with previous monitoring events.

Table 4: Field Water Quality Parameters – 6 December 2024

	Minimum	Maximum	Comment
pH	3.65 SBT-GW-1347a	6.81 SBT-GW-1347c	The pH reported in groundwater ranged from 3.65 to 6.81, indicating groundwater was acidic to neutral. Groundwater pH appeared to increase with depth. The groundwater pH in SBT-GW-0001, which has typically had the lowest pH (often below pH 4) and has previously appeared to be inversely loosely correlated with EC (Figure 3). Similarly, since sampling began at SBT-GW-1347a in April 2024, the EC initially increased with a decrease in pH (Figure 3). The variability in EC in the two shallow wells may be due to rainfall, with the pH mostly increasing when fresh water enters the aquifer, and decreasing as conditions become more saline.

	Minimum	Maximum	Comment
			The relatively neutral pH reported in deeper wells indicates the vertical extent of slight acidification of the aquifer is limited.
Electrical conductivity	23.2 mS/cm SBT-GW-0001	28.7 mS/cm SBT-GW-1347a	The groundwater EC on 6th December 2024 ranged from 23 to 29 mS/cm. EC measurements have fluctuated at all locations since the monitoring started (shown on Figure 2). Groundwater EC appeared to remain consistent at most PRB monitoring locations in December, other than an increase to the upper end of the historical range noted at SBT-GW-0001. Groundwater EC values are similar to those reported in June/July 2024, and the averages across the 18 months of PRB monitoring.
Dissolved Oxygen	790 µg/L SBT-GW-1347a	1,690 µg/L SBT-GW-1347c	Dissolved oxygen (DO) concentrations were typically low, and ranged from 790 µg/L to 1,690 µg/L. There was no apparent trend over time or with depth.
Redox potential	-35 mV SBT-GW-0001	218 mV SBT-GW-1347a	The redox potential reported in groundwater has been highly variable during the monitoring program with no apparent trend over time or with depth.
Temperature	20.7°C SBT-GW-1347c	22.7°C SBT-GW-0001	Water temperatures were consistent across the sampling locations, and within the range as expected for December and the ambient air temperature at the time of sampling.

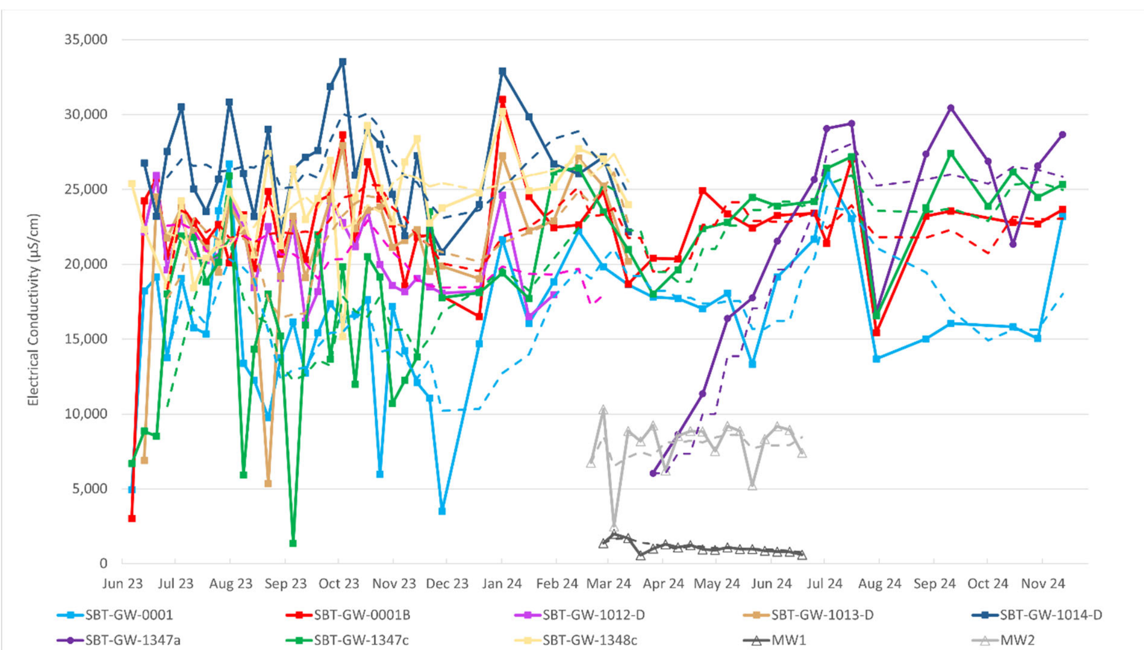
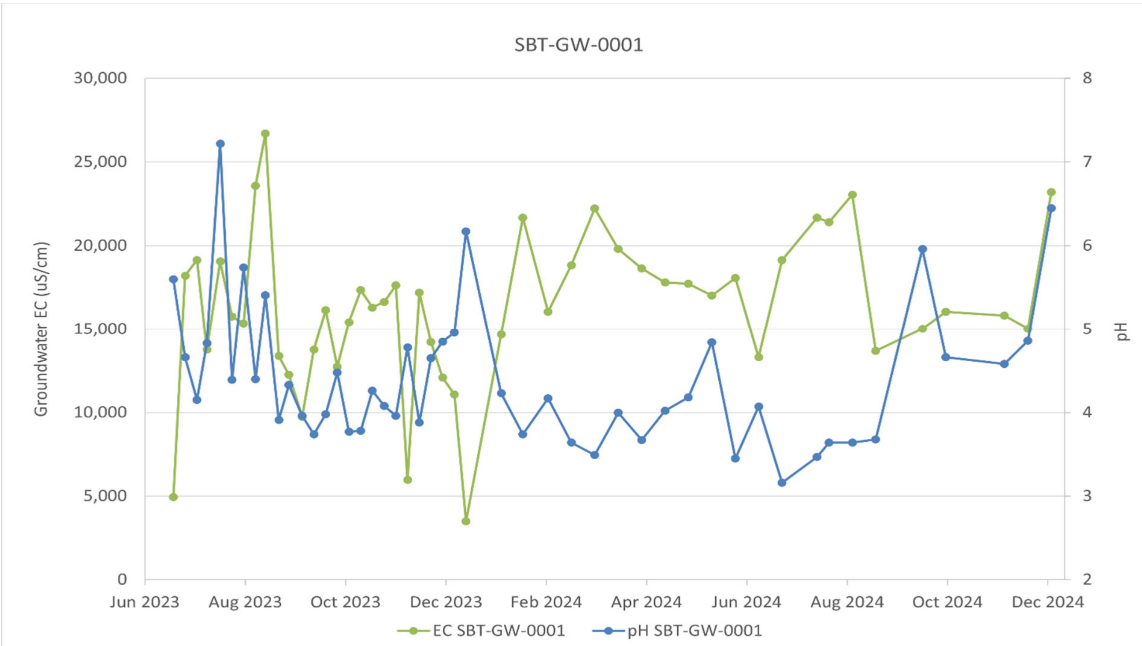


Figure 2: Groundwater EC in PRB mitigation (squares) and source area (triangles) wells

Note: EC measurements shown for all sampling locations, except historically in shallow- and mid-level samples from; SBT-GW-1012, SBT-GW-1013 and SBT-GW-1014, which were excluded to limit noise in the graph. Rolling averages over four events are shown as dashed lines.



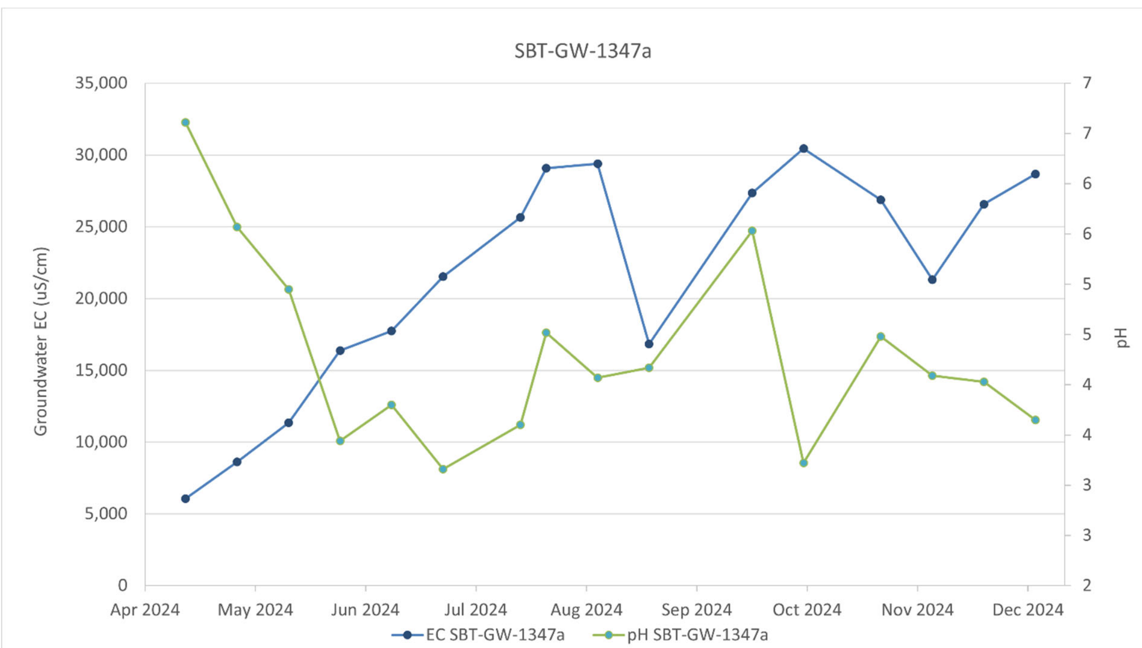


Figure 3: Groundwater pH and EC in SBT-GW-0001 and SBT-GW-1347a

3.3. Groundwater levels

Gauged groundwater levels are tabulated in Table A2, Annexure A, and presented in Figure 4.

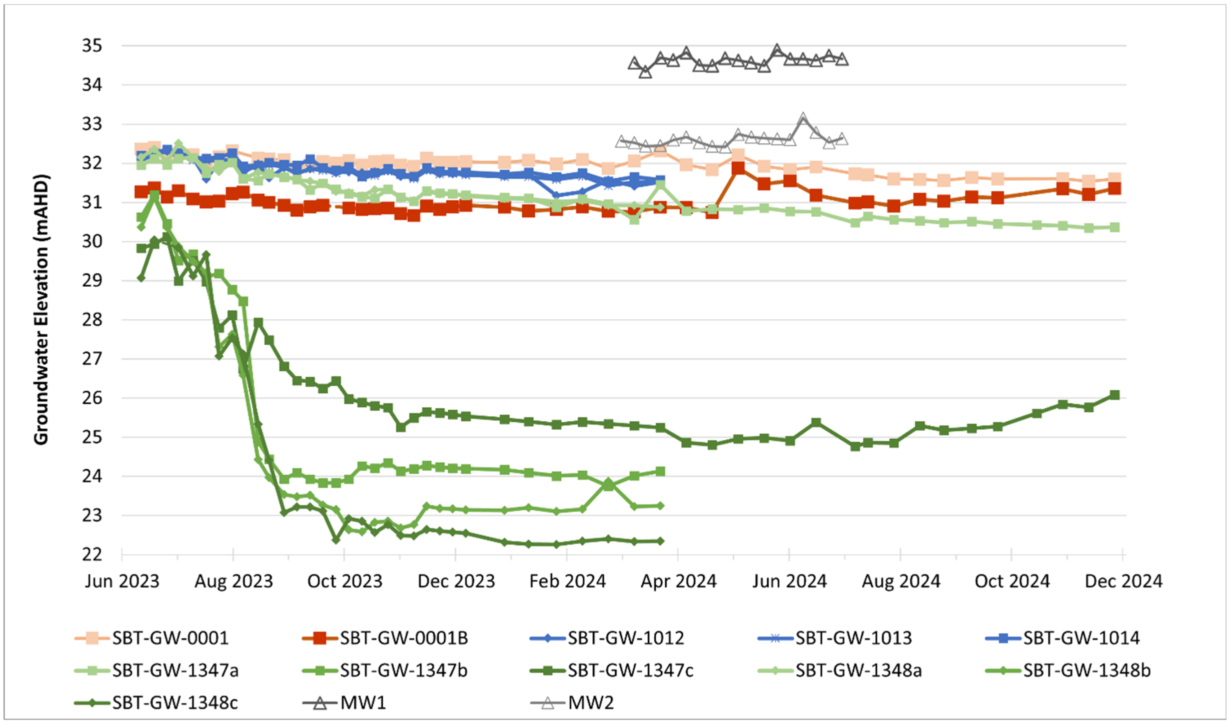


Figure 4: Manually gauged groundwater levels in PRB mitigation (squares) and source area (triangles) wells (no longer monitored)

The groundwater levels at shallow monitoring locations closest to the station box in SBT-GW-1347a (and previously in SBT-GW-1348a, the pale green line in Figure 4), have gradually decreased more than 1.5m over the 18 months of PRB monitoring. Groundwater levels in the vicinity of the PRB have decreased less (~0.8m in SBT-GW-0001) or been influenced by the TBM (SBT-GW-0001B) over the same period. Levels in shallow well SBT-GW-0001 and SBT-GW-0001B were similar in December 2024, mostly due to the decrease in levels in SBT-GW-0001 over the past 18 months.

Groundwater levels at deeper monitoring locations SBT-GW-1347c and SBT-GW-1348c closest to the excavation decreased rapidly initially (by approximately 7m mostly in August and September 2023) and slowly continued to decrease over the next ten months. Since August 2024 there has been a slight increase in groundwater levels at SBT-GW-1347c, potentially indicating that groundwater levels are starting to recover with the sealing (but not tanking) of the station excavation. Ongoing monitoring of levels in SBT-GW-1347c is required to confirm this trend, and the rate of groundwater level rebound at depth near the station excavation.

3.4. Groundwater gradients

Groundwater gradients were initially calculated based on wells; SBT-GW-0001B (PRB), SBT-GW-1013 (contingency PRB) and SBT-GW-1347b (closest to St Marys Station box). Gauging results up to 5 April 2024, when wells used to calculate the gradient were decommissioned, indicated that excavation and dewatering associated with construction of Station box had not yet resulted in a change in groundwater levels or gradient between the PRB and the station box (Figure 5).

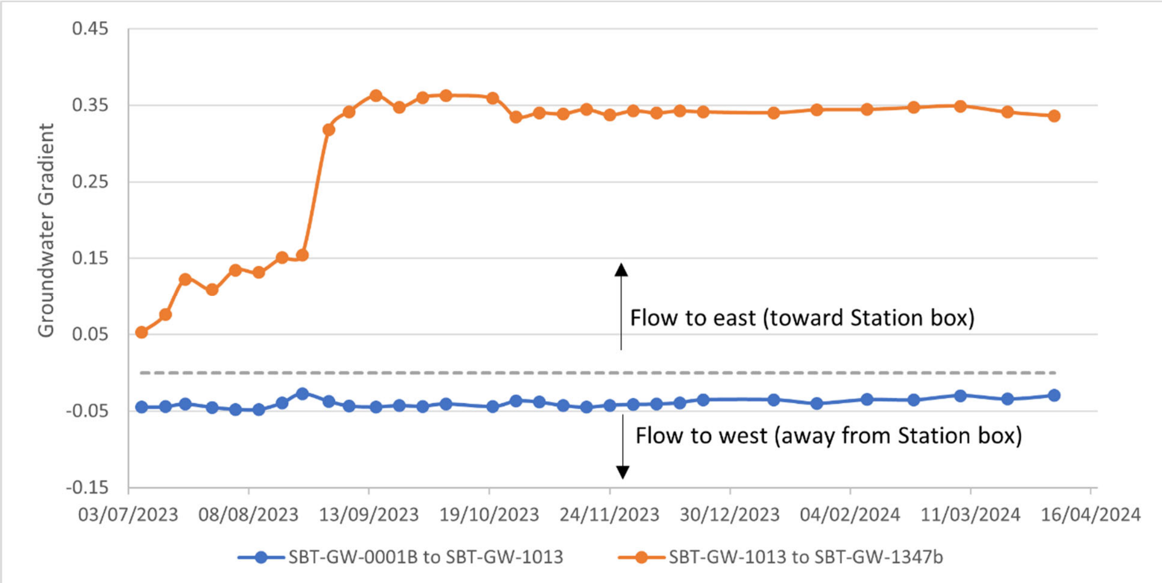


Figure 5: Groundwater gradients from SBT-GW-1013 to SBT-GW-1347b (toward Station) and SBT-GW-0001B (near PRB)

While these gradients indicate that groundwater is flowing to the east, toward the station box, the flow regime is more complex. Previous data from SBT-GW-1013 (and confirmed by SBT-GW-1012 and SBT-GW-1014) midway between the PRB and the multi-level wells closer to where drawdown has been significant, has consistently shown that groundwater levels are higher in the vicinity of the PRB. The high is hindering migration to the east of the PRB, hence the westerly gradient between SBT-GW-0001B and SBT-GW-1013 and in the vicinity of the source area (blue line in Figure 5).

With the reduction in number of locations monitored since early April 2024, and cessation of TBM monitoring, gradients have been assessed based on levels between the PRB and St Marys Station Box in shallow and deeper groundwater, as shown in Figure 6.

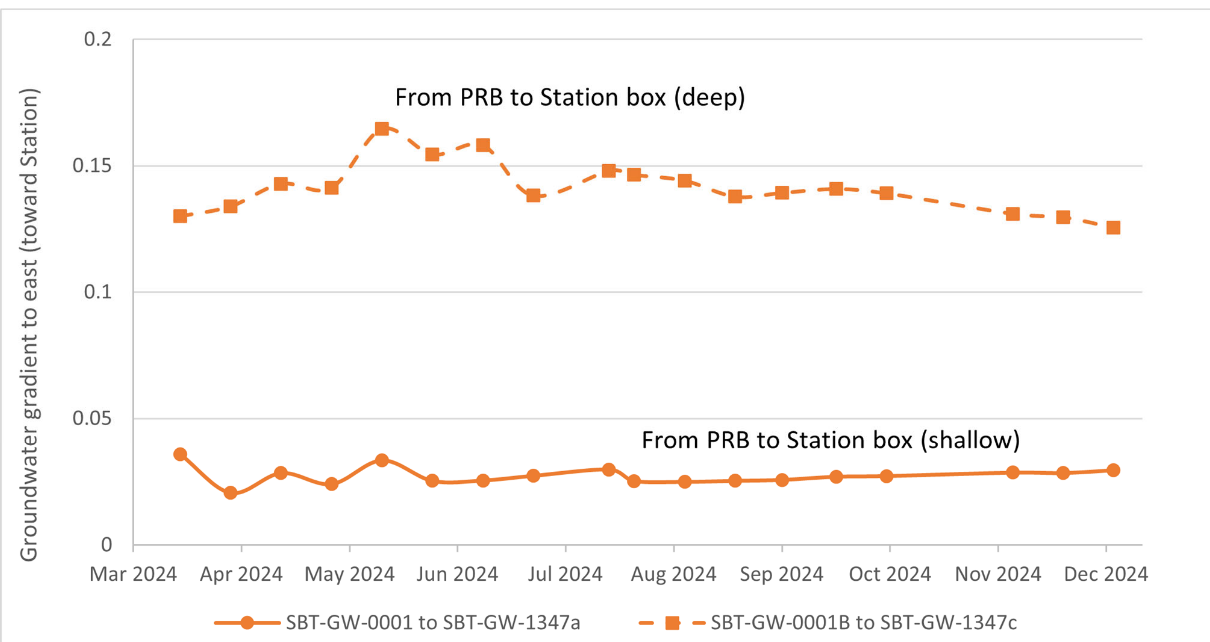


Figure 6: Groundwater gradients in shallow and deep groundwater from PRB to Station box

Changes in migration potential in shallow groundwater to the east of the PRB have been assessed using the gradient between SBT-GW-0001 to SBT-GW-1347a, as shown by the solid orange line in Figure 6. An increase in this gradient may indicate that the groundwater high in the vicinity of SBT-GW-1013 has dissipated, and impacted groundwater may potentially flow toward the station box. This gradient was within the historical range in December 2024, indicating that the groundwater high remains between the PRB and SBT-GW-1347a.

The slight increase in the deeper groundwater gradient from the PRB to Station Box (orange dashed line) in early May to early June is attributed to the transient increase in levels in SBT-GW-0001B as TBM-1 and TBM-2 passed beneath the PRB area. The transient nature of this increase is confirmed by the decrease in gradient from July 2024 onwards. This gradient has now decreased further, which is due to groundwater levels increasing (and potentially starting to rebound) in SBT-GW-1347c near the station box (Figure 4).

Assessment of any changes in the groundwater flow regime will need to be considered until the station is tanked, along with results from ongoing groundwater quality monitoring in SBT-GW-0001 and SBT-GW-0001B, which represent potential migration from the source area, as discussed in Section 3.5 below.

3.5. Analytical Results

Groundwater analytical data from the December 2024 monitoring event is tabulated and presented in Table A3 of Annexure A, with laboratory analysis reports and COC documentation provided in Annexure B.

Concentrations of key chlorinated hydrocarbons reported in each PRB monitoring well during the one monitoring event completed in December 2024 are provided in Table 5.

Table 5: PRB monitoring wells - maximum chlorinated ethene concentrations reported in December 2024

Monitoring Location	Tetrachloroethene	Trichloroethene	Cis 1,2 DCE	Vinyl Chloride
SBT-GW-0001	<5ug/L	<5ug/L	<5ug/L	<50ug/L
SBT-GW-0001B	<5ug/L	<5ug/L	<5ug/L	<50ug/L
SBT-GW-1347A	<5ug/L	<5ug/L	<5ug/L	<50ug/L
SBT-GW-1347C	<5ug/L	<5ug/L	<5ug/L	<50ug/L

Concentrations of remain below the LOR and the trigger values in all four groundwater samples collected between the PRB and the station box during the December 2024 monitoring events.

The absence of detectable concentrations in the two wells between the source and the PRB (SBT-GW-0001 and SBT-GW-0001B) confirms that impacted groundwater from the source area has not yet been drawn into the PRB.

3.5.1. Data Quality and Control

The quality assurance (QA) steps and quality control (QC) results have been reviewed and assessed according to Tetra Tech‘s Standard Operating Procedures (SOPs). This included examining laboratory accreditation, sample preservation methods and holding times, and a review of field and laboratory quality control sample results.

A detailed assessment of data quality is included in Annexure C.

Overall, the quality assessment indicates that data is of appropriate quality for use.

4. Summary and Conclusions

Groundwater monitoring was conducted at St Marys in accordance with the PRB mitigation monitoring program, as amended in March 2024.

The groundwater sampling results up to 6 December 2024, when the responsibility for PRB monitoring was handed over to PLM, indicate:

- Concentrations of chlorinated hydrocarbons in groundwater samples between the PRB and the station box were below the LOR and the trigger values.
- Groundwater levels close to the Station excavation have been drawn down by excavation, with levels beginning to recover at depth.
- Station construction activities do not appear to have changed the groundwater flow regime and gradient in the vicinity of the PRB.
- No additional assessment or contingency measures have been required as a result of station box excavation or tunnelling works.

To meet the requirements of the RAP the PRB mitigation monitoring program will continue until the St Marys station box is tanked, and groundwater levels have returned to the pre-construction range.

This report is the final PRB monthly monitoring report to be issued to CPBG as responsibility for the PRB mitigation system and monitoring program was transferred to the SSTOM contractor (PLM) from 9 December 2024.

5. References

Tetra Tech (2022) *St Marys Station Detailed Site Investigation* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040513. 29/09/2022. Rev A03) ("St Marys DSI")

Tetra Tech (2023a) *St Marys Station Former Dry Cleaner, 1-7 Queen St – Assessment of Human Health Risk and Mitigation Options.* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040540. 26/4/2023. Rev A.05) ("Queen St HHRA")

Tetra Tech (2023b) *Baseline Groundwater Report (Project Wide)* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040405. 22/08/2023. Rev B.01) ("Baseline Groundwater Report")

Tetra Tech (2023c) *St Marys Station Remedial Action Plan* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040521. 23/5/2023. Rev A.08) ("St Marys RAP")

Tetra Tech (2023d) *Implementation of Permeable Reactive Barrier* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040561. 02/08/2023. Rev A)

Tetra Tech (2023e) *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater sampling frequency* (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040402_A, 19 December 2023)

Tetra Tech (2023f) *Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works Hydrogeological Report (Project-wide)* (Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040403)

Tetra Tech (2024); *St Marys Station Remedial Action Plan – Proposed revision to mitigation groundwater monitoring network* (Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040403_A.01. 26/03/2024. Rev A).

Annexure A Tables

Table A1: Mitigation Monitoring Well Installation Details

Well ID	Northing	Easting	Top of casing (mAHD)	Screen interval (mbgl)	Screen interval (mAHD)	Sample Depth (mbgl)	Screened lithology	Comment
SBT-GW-1347a	6261962.40	293953.89	35.734	6 - 9	26.7 - 29.7	7.5	Alluvium to 7mbgl then residual soil	
SBT-GW-1347b	6261962.82	293954.91	35.712	12 - 15	20.7 - 23.7	13.5	Siltstone	Target: upper siltstone
SBT-GW-1347c	6261962.18	293954.59	35.740	17 - 20	15.7 - 18.7	18.5	Siltstone	Target: lower siltstone
SBT-GW-1348a	6261956.09	293952.90	35.796	5.5 – 8.5	27.3 - 30.3	7	Alluvium (Sandy Clay)	
SBT-GW-1348b	6261955.93	293953.96	35.831	11 - 14	21.8 – 24.8	12.5	Siltstone extremely weathered to 13.2m	Target: upper siltstone
SBT-GW-1348c	6261956.99	293953.44	35.848	17 -20	15.8 – 18.8	18.5	Siltstone	Target: lower siltstone
SBT-GW-1012	293930.5	6261971.2	35.361	3.5 – 15.5	19.9 – 31.9	Multiple – 5, 7 and 10	Residual soil overlying siltstone	Multiple levels sampled via hydrasleeves. Also provides for contingency mitigation measures
SBT-GW-1013	293931.4	6261964.9	35.398	3.5 – 15.5	19.9 – 31.9			
SBT-GW-1014	293931.8	6261959.4	35.471	3.5 – 15.5	20 - 32.0			
SBT-GW-0001b	6261970.18	293910.91	35.211	8.5 – 14.5	20.7 - 26.7	10	Clay to 11m then Siltstone	Target: upper siltstone
SBT-GW-0001 [1]	6261965 [1]	293911 [1]	*35.2*	4.8 – 7.5	*27.7 - 30.4*	6	Unknown	Installed by others
MW1 [2]	6261976	293889	35.2 [2]	4.3 – 7.3	*28 – 31*	5	Unknown	Installed by others
MW2 [2]	6261983	293887	35.2 [2]	4.3 – 7.3	*28 – 31*	6	Unknown	Installed by others
SBT-GW-1019_R	6261979	293888	35.2	13.9 – 18	17.2 – 21.3	15	Sand	
SBT-CM-1020	6261980	293862	34.943	1.5 – 7.5	24 – 27	5	Sand	
SMGW-GW02	6261973	293885.3	35.4	5.0 – 8.0	27.4 – 30.4	6	Clay	Installed by others

1. Approximate – well installed by others. No bore log available with screen depth determined using downhole camera.
2. Approximate – well installed by others. TOC not recorded on bore log, approximate measurement adopted from nearby SBT-GW-1019_R

St Marys Station
Mitigation Monthly Monitoring
Table A2: Summary of Field Water Quality and Gauging Results - December 2024

					Field						
					Depth to groundwater (measured)	Groundwater Elevation	Electrical Conductivity (Non Compensated)	DO (Field)	Redox Potential (Field)	Temp (Field)	pH (Field)
					mBTOC	mAHD	µS/cm	µg/L	mV	°C	pH units
Monitoring Zone	Location Code	Field ID	Date	Sam e Comments							
St Marys	SBT-GW-0001	SBT-GW-0001	06 Dec 2024	Clear, no colour, no odour	3.599		23,198	1,000	-34.7	22.7	6.45
St Marys	SBT-GW-0001B	SBT-GW-0001B	06 Dec 2024	Clear, no colour, no odour	3.844	31.3	23,653	1,120	41.4	21.3	5.36
St Marys	SBT-GW-1347a	SBT-GW-1347a	06 Dec 2024	Slightly cloudy, no colour, no odour	5.368	30.366	28,674	790	217.6	21.5	3.65
St Marys	SBT-GW-1347c	SBT-GW-1347c	06 Dec 2024	Slightly cloudy, no colour, no odour	9.657	26.083	25,334	1,690	148.8	20.7	6.81

				Halogenated Benzenes									Halogenated Hydrocarbons														
				1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Iodomethane	Trichlorofluoromethane	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloropropene	1,1-dichloroethane	1,1-dichloroethene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				5	5	5	5	5	5	5	5	5	5	50	50	5	50	5	5	5	5	5	5	5	5	5	5
	Location Code	Field ID	Date																								
	SBT-GW-0001	SBT-GW-0001	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	SBT-GW-0001B	SBT-GW-0001B	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
rys	SBT-GW-1347a	SBT-GW-1347a	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
St Marys	SBT-GW-1347c	SBT-GW-1347c	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

TETRA TECH COFFEY

				Chlorinated Hydrocarbons																				Volatile Organic Compounds		
				1,2,3-trichlorobenzene	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride	cis-1,4-Dichloro-2-butene	trans-1,4-Dichloro-2-butene	Pentachloroethane
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				5	5	5	5	5	5	5	5	50	5	50	5	5	5	5	5	5	5	5	50	5	5	5
															250				55	300			200			
	Location Code	Field ID	Date																							
	SBT-GW-0001	SBT-GW-0001	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5	<5
	SBT-GW-0001B	SBT-GW-0001B	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5	<5
rys	SBT-GW-1347a	SBT-GW-1347a	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5	<5
St Marys	SBT-GW-1347c	SBT-GW-1347c	06 Dec 2024	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5	<5

Annexure B Laboratory Reports and Chain of Custody Documentation

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office: Chatswood
Report Results to: Katie Trevor | Email: katie.trevor@tetratech.com | Mobile: 0458 673 999
Invoices to: general.admin@tetratech.com | Email: casey.ofarrell@tetratech.com | Email: ESDAT_LabReports@coffey.com

Project No: 754-SYDGE292575-4 | Task No: 700.05 STM MITIG
Project Name: WSA SBT | Laboratory: ALS
Sampler's Name: Katie Trevor | Project Manager: Katie Trevor
Quote number (if different to current quoted prices): SY/373/22 V2
Special Instructions: Please forward QC68-061224 to Eurofins for analysis

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	VCH	BTEXN	NOTES
1	SBT-GW-0001B	6/12/24	8:00	Water	4V	Std (5-day)			
2	SBT-GW-0001								
3	SBT-GW-1347a								
4	SBT-GW-1347c								
5	QC67_061224								
	QC68_061224								Forward to Eurofins
6	RB_061224								
7	TB_061224				2V			X	
8	TS_061224				2V				

Environmental Division
Sydney
Work Order Reference
ES2439858
Telephone: +61-2-8784 8555

Subcon / Forward Lab / Split WO: Eurofins
Lab / Analysis:
Organised By / Date: QC68-061224
Relinquished By / Date:
Connote / Courier:
WO No: ES2439858
Attach By PO / Internal Sheet:

RELINQUISHED BY		RECEIVED BY	
Name: Katie Trevor	Date: 6/12/24	Name: Fatz.	Date: 6/12/24
Coffey	Time:	Company:	Time: 4:50
Name:	Date:	Name: Sharlene Santos, SS.	Date: 9/12 2pm
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☑
- All Documentation is in Proper Order ☑
- Samples Received Properly Chilled ☑
- Lab. Ref/Batch No.

8.8°C

*Container Type & Preservation Codes: P - Plastic, G - Glass Bottle, J - Glass Jar, V - Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

#1169681

Sample Receipt Advice

Company name:	Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Contact name:	Katie Trevor
Project name:	WSA SBT
Project ID:	754-SYDGE292575-4
Turnaround time:	5 Day
Date/Time received	Dec 9, 2024 2:00 PM
Eurofins reference	1169681

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 8.8 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✕ Split sample sent to requested external lab.
- ✕ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Asim Khan on phone : or by email: Asim.Khan@eurofinsanz.com

Results will be delivered electronically via email to Katie Trevor - katie.trevor@tetratech.com.

Note: A copy of these results will also be delivered to the general Tetra Tech Coffey Geotechnics Pty Ltd Chatswood email address.

Company Name: Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: WSA SBT
Project ID: 754-SYDGE292575-4

Order No.:
Report #: 1169681
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Dec 9, 2024 2:00 PM
Due: Dec 16, 2024
Priority: 5 Day
Contact Name: Katie Trevor

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Halogenated Volatile Organics
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	QC68_061224	Dec 06, 2024	8:00AM	Water	S24-De0024292	X
Test Counts						1

eurofins Environment Testing

Certificate of Analysis

Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Katie Trevor**

Report **1169681-W**
Project name WSA SBT
Project ID 754-SYDGE292575-4
Received Date Dec 09, 2024

Client Sample ID			**QC68_061224**
Sample Matrix			**Water**
Eurofins Sample No.			**S24-De0024292**
Date Sampled			**Dec 06, 2024**
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
1.1-Dichloroethane	0.001	mg/L	< 0.001
1.1-Dichloroethene	0.001	mg/L	< 0.001
1.1.1-Trichloroethane	0.001	mg/L	< 0.001
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.1.2-Trichloroethane	0.001	mg/L	< 0.001
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.2-Dibromoethane	0.001	mg/L	< 0.001
1.2-Dichlorobenzene	0.001	mg/L	< 0.001
1.2-Dichloroethane	0.001	mg/L	< 0.001
1.2-Dichloropropane	0.001	mg/L	< 0.001
1.2.3-Trichloropropane	0.001	mg/L	< 0.001
1.3-Dichlorobenzene	0.001	mg/L	< 0.001
1.3-Dichloropropane	0.001	mg/L	< 0.001
1.4-Dichlorobenzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.005	mg/L	< 0.005
Carbon Tetrachloride	0.001	mg/L	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001
Chloroform	0.005	mg/L	< 0.005
Chloromethane	0.005	mg/L	< 0.005
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
Dibromomethane	0.001	mg/L	< 0.001
Iodomethane	0.001	mg/L	< 0.001
Methylene Chloride	0.005	mg/L	< 0.005
Tetrachloroethene	0.001	mg/L	< 0.001
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.005	mg/L	< 0.005
Vinyl chloride	0.005	mg/L	< 0.005
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005
Toluene-d8 (surr.)	1	%	113

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Halogenated Volatile Organics	Sydney	Dec 10, 2024	7 Days
- Method: LTM-ORG-2150 VOCs by Purge Trap GCMS			

Company Name: Tetra Tech Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: WSA SBT
Project ID: 754-SYDGE292575-4

Order No.:
Report #: 1169681
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Dec 9, 2024 2:00 PM
Due: Dec 16, 2024
Priority: 5 Day
Contact Name: Katie Trevor

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Halogenated Volatile Organics
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	QC68_061224	Dec 06, 2024	8:00AM	Water	S24-De0024292	X
Test Counts						1

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Environment Testing

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Halogenated Volatile Organics									
1.1-Dichloroethane			mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene			mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane			mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane			mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane			mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane			mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane			mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene			mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane			mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane			mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane			mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene			mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane			mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene			mg/L	< 0.001			0.001	Pass	
Bromodichloromethane			mg/L	< 0.001			0.001	Pass	
Bromoform			mg/L	< 0.001			0.001	Pass	
Bromomethane			mg/L	< 0.005			0.005	Pass	
Carbon Tetrachloride			mg/L	< 0.001			0.001	Pass	
Chlorobenzene			mg/L	< 0.001			0.001	Pass	
Chloroform			mg/L	< 0.005			0.005	Pass	
Chloromethane			mg/L	< 0.005			0.005	Pass	
cis-1.2-Dichloroethene			mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene			mg/L	< 0.001			0.001	Pass	
Dibromochloromethane			mg/L	< 0.001			0.001	Pass	
Dibromomethane			mg/L	< 0.001			0.001	Pass	
Iodomethane			mg/L	< 0.001			0.001	Pass	
Methylene Chloride			mg/L	< 0.005			0.005	Pass	
Tetrachloroethene			mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene			mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene			mg/L	< 0.001			0.001	Pass	
Trichloroethene			mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane			mg/L	< 0.005			0.005	Pass	
Vinyl chloride			mg/L	< 0.005			0.005	Pass	
LCS - % Recovery									
Halogenated Volatile Organics									
1.1-Dichloroethene			%	102			70-130	Pass	
1.1.1-Trichloroethane			%	107			70-130	Pass	
1.2-Dichlorobenzene			%	116			70-130	Pass	
1.2-Dichloroethane			%	99			70-130	Pass	
Trichloroethene			%	120			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1-Dichloroethene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1-Trichloroethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2-Trichloroethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.2-Dibromoethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichlorobenzene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloroethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2-Dichloropropane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.2.3-Trichloropropane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichlorobenzene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.3-Dichloropropane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
1.4-Dichlorobenzene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromodichloromethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromoform	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Bromomethane	S24-No0075704	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Carbon Tetrachloride	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chlorobenzene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chloroform	S24-No0075704	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Chloromethane	S24-No0075704	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
cis-1.2-Dichloroethene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
cis-1.3-Dichloropropene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromochloromethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibromomethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iodomethane	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Methylene Chloride	S24-No0075704	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tetrachloroethene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.2-Dichloroethene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
trans-1.3-Dichloropropene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichloroethene	S24-No0075704	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Trichlorofluoromethane	S24-No0075704	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Vinyl chloride	S24-No0075704	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CERTIFICATE OF ANALYSIS

Work Order	: **ES2439858**	Page	: 1 of 8
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Katie Trevor	Contact	: Jason Dighton
Address	: LEVEL 19, TOWER B- CITADEL TOWER 799 PACIFIC HIGHWAY CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE292575-4 WSA SBT	Date Samples Received	: 06-Dec-2024 21:50
Order number	: ----	Date Analysis Commenced	: 12-Dec-2024
C-O-C number	: ----	Issue Date	: 13-Dec-2024 10:26
Sampler	: KATIE TREVOR		
Site	: ----		
Quote number	: SY/373/22_V2		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-0001B	SBT-GW-0001	SBT-GW-1347a	SBT-GW-1347c	QC67_061224
Sampling date / time				06-Dec-2024 20:00	06-Dec-2024 20:00	06-Dec-2024 20:00	06-Dec-2024 20:00	06-Dec-2024 20:00
				ES2439858-001	ES2439858-002	ES2439858-003	ES2439858-004	ES2439858-005
				Result	Result	Result	Result	Result
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	<5	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	<5	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	<5	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	<5	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L	<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L	<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L	<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L	<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	<50	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L	<5	<5	<5	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	<5	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	<5	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	<5	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	<5	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	<5	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L	<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L	<5	<5	<5	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	<5	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	<5	<5	<5
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	SBT-GW-0001B	SBT-GW-0001	SBT-GW-1347a	SBT-GW-1347c	QC67_061224
			Sampling date / time	06-Dec-2024 20:00	06-Dec-2024 20:00	06-Dec-2024 20:00	06-Dec-2024 20:00	06-Dec-2024 20:00
				ES2439858-001	ES2439858-002	ES2439858-003	ES2439858-004	ES2439858-005
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L	<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L	<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	<5	<5	<5
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L	<5	<5	<5	<5	<5
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	**102**	**115**	**100**	**101**	**99.0**
Toluene-D8	2037-26-5	5	%	**107**	**113**	**100**	**104**	**98.1**
4-Bromofluorobenzene	460-00-4	5	%	**111**	**120**	**105**	**109**	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RB_061224	TB_061224	TS_061224	----	----
			Sampling date / time	06-Dec-2024 20:00	02-Dec-2024 00:00	02-Dec-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2439858-006	ES2439858-007	ES2439858-008	--------	--------
				Result	Result	Result	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RB_061224	TB_061224	TS_061224	----	----
			Sampling date / time	06-Dec-2024 20:00	02-Dec-2024 00:00	02-Dec-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2439858-006	ES2439858-007	ES2439858-008	--------	--------
				Result	Result	Result	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	----	----	----	----
Bromoform	75-25-2	5	µg/L	<5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	<20	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	<20	----	----	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

			Sample ID	RB_061224	TB_061224	TS_061224	----	----
			Sampling date / time	06-Dec-2024 20:00	02-Dec-2024 00:00	02-Dec-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2439858-006	ES2439858-007	ES2439858-008	--------	--------
				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	<1	18	----	----
Toluene	108-88-3	2	µg/L	----	<2	16	----	----
Ethylbenzene	100-41-4	2	µg/L	----	<2	16	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	<2	16	----	----
ortho-Xylene	95-47-6	2	µg/L	----	<2	19	----	----
^ Total Xylenes	----	2	µg/L	----	<2	35	----	----
^ Sum of BTEX	----	1	µg/L	----	<1	85	----	----
Naphthalene	91-20-3	5	µg/L	----	<5	20	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	5	%	98.6	----	----	----	----
Toluene-D8	2037-26-5	5	%	100	----	----	----	----
4-Bromofluorobenzene	460-00-4	5	%	103	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	94.2	110	----	----
Toluene-D8	2037-26-5	2	%	----	98.3	106	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	109	117	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

QUALITY CONTROL REPORT

Work Order	: **ES2439858**	Page	: 1 of 8
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Katie Trevor	Contact	: Jason Dighton
Address	: LEVEL 19, TOWER B- CITADEL TOWER 799 PACIFIC HIGHWAY CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE292575-4 WSA SBT	Date Samples Received	: 06-Dec-2024
Order number	: ----	Date Analysis Commenced	: 12-Dec-2024
C-O-C number	: ----	Issue Date	: 13-Dec-2024
Sampler	: KATIE TREVOR		
Site	: ----		
Quote number	: SY/373/22_V2		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074D: Fumigants (QC Lot: 6244778)									
ES2439673-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
ES2439862-002	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 6244778)									
ES2439673-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 6244778) - continued									
ES2439673-001	Anonymous	EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
ES2439862-002	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	***Sample ID***	***Method: Compound***	***CAS Number***	***LOR***	***Unit***	***Original Result***	***Duplicate Result***	***RPD (%)***	***Acceptable RPD (%)***
EP074E: Halogenated Aliphatic Compounds (QC Lot: 6244778) - continued									
ES2439862-002	Anonymous	EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 6244778)									
ES2439673-001	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
ES2439862-002	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 6244778)									
ES2439673-001	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
ES2439862-002	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6244777)									
ES2439673-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6244777) - continued									
ES2439862-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 6244777)									
ES2439673-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2439862-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 6244777)									
ES2439673-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2439862-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP074D: Fumigants (QCLot: 6244778)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	98.1	68.0	122
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	100	76.0	118
EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	10 µg/L	101	62.0	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	10 µg/L	99.2	60.0	114
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	100.0	69.0	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 6244778)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	97.9	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	100	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	99.1	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	98.2	56.0	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	100	61.0	139
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	97.3	69.0	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	97.7	70.0	124
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	91.6	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	97.8	74.0	118
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	100	74.0	120
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	96.7	77.0	119
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	97.2	67.0	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	97.8	73.0	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	97.3	62.0	120
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	100	73.0	123
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	95.9	76.0	118
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	101	73.0	119
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	95.3	72.0	126
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	101	71.0	129
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	98.6	72.0	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	99.4	66.0	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	101	60.0	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	94.7	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	99.1	70.0	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 6244778) - continued								
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	98.2	74.0	126
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	98.9	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	86.6	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	99.0	58.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 6244778)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	100	79.0	117
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	102	76.0	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	100	73.0	119
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	100	73.0	119
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	101	75.0	117
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	99.8	74.0	118
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	100	75.0	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	96.8	61.0	125
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	97.1	67.0	123
EP074G: Trihalomethanes (QCLot: 6244778)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	99.9	72.0	120
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	102	64.0	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	101	65.0	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	98.9	73.5	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6244777)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	87.2	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6244777)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	79.6	75.0	127
EP080: BTEXN (QCLot: 6244777)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	90.5	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	90.7	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	93.8	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	101	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	97.9	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	117	75.5	124

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 6244778)							
ES2439673-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	92.1	70.0	130
		EP074: Trichloroethene	79-01-6	25 µg/L	111	70.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 6244778)							
ES2439673-001	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	110	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6244777)							
ES2439673-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	110	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6244777)							
ES2439673-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	104	70.0	130
EP080: BTEXN (QCLot: 6244777)							
ES2439673-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	95.0	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	92.8	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	105	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	105	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	108	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2439858**	Page	: 1 of 4
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Katie Trevor	Telephone	: +61-2-8784 8555
Project	: 754-SYDGE292575-4 WSA SBT	Date Samples Received	: 06-Dec-2024
Site	: ----	Issue Date	: 13-Dec-2024
Sampler	: KATIE TREVOR	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method		*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)			*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP074D: Fumigants								
Amber VOC Vial - Sulfuric Acid (EP074)								
SBT-GW-0001B,	SBT-GW-0001,	**06-Dec-2024**	**12-Dec-2024**	20-Dec-2024	✓	**12-Dec-2024**	20-Dec-2024	✓
SBT-GW-1347a,	SBT-GW-1347c,							
QC67_061224,	RB_061224							
EP074E: Halogenated Aliphatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
SBT-GW-0001B,	SBT-GW-0001,	**06-Dec-2024**	**12-Dec-2024**	20-Dec-2024	✓	**12-Dec-2024**	20-Dec-2024	✓
SBT-GW-1347a,	SBT-GW-1347c,							
QC67_061224,	RB_061224							
EP074F: Halogenated Aromatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
SBT-GW-0001B,	SBT-GW-0001,	**06-Dec-2024**	**12-Dec-2024**	20-Dec-2024	✓	**12-Dec-2024**	20-Dec-2024	✓
SBT-GW-1347a,	SBT-GW-1347c,							
QC67_061224,	RB_061224							
EP074G: Trihalomethanes								
Amber VOC Vial - Sulfuric Acid (EP074)								
SBT-GW-0001B,	SBT-GW-0001,	**06-Dec-2024**	**12-Dec-2024**	20-Dec-2024	✓	**12-Dec-2024**	20-Dec-2024	✓
SBT-GW-1347a,	SBT-GW-1347c,							
QC67_061224,	RB_061224							
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
TB_061224		**02-Dec-2024**	**12-Dec-2024**	16-Dec-2024	✓	**12-Dec-2024**	16-Dec-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber VOC Vial - Sulfuric Acid (EP080)								
TB_061224		**02-Dec-2024**	**12-Dec-2024**	16-Dec-2024	✓	**12-Dec-2024**	16-Dec-2024	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
TB_061224,	TS_061224	**02-Dec-2024**	**12-Dec-2024**	16-Dec-2024	✓	**12-Dec-2024**	16-Dec-2024	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
TRH Volatiles/BTEX	EP080	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
TRH Volatiles/BTEX	EP080	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
TRH Volatiles/BTEX	EP080	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
TRH Volatiles/BTEX	EP080	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Volatile Organic Compounds	EP074	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2439858**

Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Katie Trevor	Contact	: Jason Dighton
Address	: LEVEL 19, TOWER B- CITADEL TOWER 799 PACIFIC HIGHWAY CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: katie.trevor@tetratech.com	E-mail	: jason.dighton@alsglobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 754-SYDGE292575-4 WSA SBT	Page	: 1 of 3
Order number	: ----	Quote number	: ES2022COFENV0014 (SY/373/22_V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: KATIE TREVOR		

Dates

Date Samples Received	: 06-Dec-2024 21:50	Issue Date	: 06-Dec-2024
Client Requested Due Date	: 12-Dec-2024	Scheduled Reporting Date	: **12-Dec-2024**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 3.3'c - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Sample QC68_061224 to be forwarded to Eurofins per clients request.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EP074DEFG VOC - Fumigants, Hal Aliphatics, Hal Aromatics,	WATER - EP080 BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2439858-001	06-Dec-2024 20:00	SBT-GW-0001B	✓		
ES2439858-002	06-Dec-2024 20:00	SBT-GW-0001	✓		
ES2439858-003	06-Dec-2024 20:00	SBT-GW-1347a	✓		
ES2439858-004	06-Dec-2024 20:00	SBT-GW-1347c	✓		
ES2439858-005	06-Dec-2024 20:00	QC67_061224	✓		
ES2439858-006	06-Dec-2024 20:00	RB_061224	✓		
ES2439858-007	02-Dec-2024 00:00	TB_061224			✓
ES2439858-008	02-Dec-2024 00:00	TS_061224		✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICE		
- A4 - AU Tax Invoice (INV)	Email	ap@coffey.com
[redacted] O FARRELL		
- *AU Certificate of Analysis - NATA (COA)	Email	[redacted].ofarrell@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	[redacted].ofarrell@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	[redacted].ofarrell@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	[redacted].ofarrell@coffey.com
- Chain of Custody (CoC) (COC)	Email	[redacted].ofarrell@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	[redacted].ofarrell@coffey.com
ESDAT REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	esdat_labreports@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	esdat_labreports@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	esdat_labreports@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	esdat_labreports@coffey.com
- Chain of Custody (CoC) (COC)	Email	esdat_labreports@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	esdat_labreports@coffey.com
GENERAL ADMIN		
- A4 - AU Tax Invoice (INV)	Email	general.admin@coffey.com
Katie Trevor		
- *AU Certificate of Analysis - NATA (COA)	Email	katie.trevor@tetratech.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	katie.trevor@tetratech.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	katie.trevor@tetratech.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	katie.trevor@tetratech.com
- Chain of Custody (CoC) (COC)	Email	katie.trevor@tetratech.com
- EDI Format - ESDAT (ESDAT)	Email	katie.trevor@tetratech.com

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office: Chatswood
Report Results to: Katie Trevor — Email katie.trevor@tetratech.com — Mobile 0458 673 999
Invoices to: general.admin@tetratech.com — Email casey.ofarrell@tetratech.com — Email: ESDAT_LabReports@coffey.com

Project No:	754-SYDGE292575-4	Task No:	700.05 STM MITIG
Project Name:	WSA SBT	Laboratory:	ALS
Sampler's Name:	Katie Trevor	Project Manager:	Katie Trevor

Quote number (if different to current quoted prices): SY/373/22 V2

Special Instructions: Please forward QC68-061224 to Eurofins for analysis.

Analysis Request Section

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	VCH	BTEXN	NOTES
1	SBT-GW-0001B	6/12/24	8:00	Water	4V	Std (5-day)			
2	SBT-GW-0001								
3	SBT-GW-1347a								
4	SBT-GW-1347c								
5	QC67_061224								
—	QC68_061224								Forward to Eurofins
6	RB_061224								
7	TB_061224				4V				
8	TS_061224				2V			X	

Environmental Division
Sydney
Work Order Reference
ES2439858
Telephone + 61-2-8784 8555

Subcon / Forward Lab / Split WO: Eurofins
Lab / Analysis:
Organised By / Date:
Relinquished By / Date: QC68-061224
Connote / Courier:
WO No: ES2439858
Attach By PO / Internal Sheet:

RELINQUISHED BY		RECEIVED BY	
Name: Katie Trevor	Date: 6/12/24	Name: Fma	Date: 6/12/24
Coffey	Time:	Company: AM	Time: 9:50
Name:	Date:	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

Annexure C Quality Assurance and Quality Control Assessment

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works –
St Marys Station Mitigation Monitoring

Quality Assurance / Quality Control Report – December 2024 (Report 18)

CPB Ghella Joint Venture

LABORATORY REPORTS ASSESSED

Testing Laboratory	Report/Workorder Number
Eurofins Environment Testing	1169681
Australian Laboratory Services	ES2439858

Reference: SMWSASBT-CPG-SWD-SW000-GE-RPT-040425

Date: 3 February 2025

1. QUALITY CONTROL

1.1 INTRODUCTION

This report provides an assessment of the data quality of groundwater samples collected on 6 December 2024 to inform the St Marys Station PRB Mitigation Monitoring for the Sydney Metro Western Sydney Airport Station Boxes and Tunnelling (SBT) project.

The steps in the sampling and analysis process are subject to natural and inherent variability, and this can affect the results produced, and the overall quality of the data sets generated. In order to minimise the effect of this, standard procedures are used for works carried out in the field, and in the laboratory. The use of such procedures represents one aspect of the quality assurance process. To measure the effectiveness of the quality assurance process, quality control samples can be tested, and other quality control tests can be conducted during the analysis of samples taken in the field.

Quality control (QC) samples and tests can be used to assess both the accuracy and the precision of the results produced.

Measures of ACCURACY provide information on how close to the true result is the reported result. For practical reasons, measures of accuracy are usually confined to the laboratory steps in the overall process.

Measures of PRECISION provide information on the variability in the results. Precision can be assessed as:

- “repeatability” or intra-laboratory variation – the degree of variation in a result when the same laboratory analyses a sample (or blind replicate) several times, and;
- “reproducibility” or inter-laboratory variation – the degree of variation in a result when a different laboratory separately analyses a sample.

In addition, blank samples can be used to assess whether extraneous materials and factors have contributed to the results obtained from the sampling and analysis process.

QC testing can be conducted covering all steps of the process (referred to as Field QC in this report), or just one portion of the process, such as the laboratory steps (referred to as Laboratory QC in this report).

1.2 FIELD QUALITY CONTROL

The following activities were implemented as part of the field activities for quality assurance / quality control purposes:

- All field activities were completed by Tetra Tech staff who have received training and are experienced in the sampling methods used in this monitoring program. These sampling methods are based on Tetra Tech’s Standard Operating procedures which were developed using relevant guidelines and good industry practices.
- The same sampling technique was employed throughout the monitoring program to reduce unintentional bias in sample collection.
- Equipment used during the monitoring program included an interface probe and water quality meter, which was calibrated by the equipment supplier prior to use. Equipment calibration records are held on file.
- Intra-laboratory and inter-laboratory duplicate samples were collected during each sampling event to assess the precision of the result.
- Reusable sampling equipment was decontaminated between sampling points to prevent unintentional cross contamination. A rinsate blank sample was collected during each monitoring event by pouring

deionised water over reusable sampling equipment following decontamination to assess the efficiency of the decontamination procedure.

- A laboratory prepared trip spike and trip blank sample was kept with the samples collected in the field during each sampling event to assess the sample storage and handling procedures between the field and laboratory.

The Data Quality Indicators adopted for this monitoring program are detailed in Table A.

Table A – Data Quality Indicators

Field QC Sample	Data Quality Indicator
Duplicate Samples	Intra-lab and inter-lab duplicate samples collected at a rate of 5% (1 sample per 20 primary samples) Duplicate Relative Percentage Difference (RPD) within 50%
Rinsate and Trip Blank Samples	Analytes not detected, i.e., below the level of reporting (LOR).
Trip Spike Samples	60% to 140% for organics

1.3 LABORATORY QUALITY CONTROL

Laboratory analytical methods are accredited by the National Association of Testing Authorities, Australia (NATA) based on the methods to produce reliable, repeatable results for a range of parameters within a range of sample matrices. Each laboratory method used undergoes a validation process before it is adopted by the laboratory and accredited by NATA. As part of the validation process, the precision and accuracy of the method are established.

In addition, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The results of this testing are compared with the validated precision and accuracy.

Precision of results is measured by the RPD between replicate samples selected within the laboratory. RPD is calculated in the same way as described above for Field QC.

Accuracy of results is assessed in a number of ways:

- **Reference materials**, with known concentrations of analytes are analysed with the batch of samples. The results of this analysis are compared with the established concentrations in the reference material.
- **Spike additions**. Known amounts of targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The amount of spiked material is measured as the recovery of the added amount reported in the result.
- **Surrogate spikes**. Known amounts of chemical compounds with similar properties to the targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The amount of spiked material is measured as the recovery of the added amount reported in the result.

Schedule B(3) of the National Environment Protection Measure (NEPM) for contaminated sites states that, in general, at least 70% recovery should be achievable from a reference method. Additionally, standard methods prepared by international agencies such as the US EPA and APHA, frequently have performance data such as expected spike recovery incorporated within the method. Where these vary from the 70% figure indicated in the NEPM Schedule, they are noted in the discussion of results below.

Tetra Tech has adopted 70% - 130% as the default acceptable range for spike recovery and surrogates spike recovery results, and as the default acceptance limits for the difference between analysis results and the expected result for reference materials.

The same analytical laboratories have consistently been employed by Tetra Tech to analyse samples for the monitoring program:

- ALS Laboratory, Smithfield has conducted analysis on the primary and intra-lab duplicate samples.
- Eurofins Laboratory, Girraween has conducted analysis on inter-lab duplicate (triplicate) samples.

2. GROUNDWATER SAMPLING QC PROGRAM

2.1 PRECISION & ACCURACY

Analytical laboratory processes	YES	NO
1. Was a NATA registered laboratory used?	☒	☐
2. Did the laboratory perform the requested analysis?	☒	☐
3. Were the laboratory methods adopted NATA endorsed?	☒	☐
4. Were the appropriate test procedures followed?	☒	☐
5. Were the reporting limits satisfactory?	☒	☐
6. Was the NATA seal on the reports?	☒	☐
7. Were the reports signed by an authorised person?	☒	☐

COMMENTS: Nil

Precision/Accuracy of the Laboratory Processes		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

2.2 SAMPLE HANDLING PROCEDURES

Sample handling	YES	NO	N/A
1. Were the sample holding times met?	☒	☐	☐
2. Were the samples in proper custody between the field and laboratory?	☒	☐	☐
3. Were the samples properly and adequately preserved? (This includes chilling the samples where appropriate)	☒	☐	☐
4. Were the samples received by the laboratory in good condition?	☒	☐	☐

COMMENTS: Nil

Sample Handling Procedure		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

3. FIELD QA/QC SAMPLING AND PROCEDURES

3.1 FIELD QA/QC SUMMARY

This report provides an assessment of groundwater samples collected on 6 December 2024. A summary of the QC samples collected is provided in Table B below.

Table B - QA/QC Sampling Summary

Sample Type	QC sample requirements	Number of Samples
Primary Samples		4
QA/QC Samples	Field Duplicate & Triplicate pairs (1 in 20 primary samples)	2 (1 intra lab + 1 inter lab)
	Trip Blanks (1 / sampling event)	1
	Trip Spikes (1 / sampling event)	1
	Equipment Rinsates (1 / sampling event)	1

3.2 FIELD DUPLICATES

	YES	NO	N/A
1. Were an adequate number of field replicates analysed for each chemical?	☒	☐	☐
2. Were RPD's for replicate samples within control limits?	☒	☐	☐

COMMENTS:

The duplicate and triplicate results and calculated RPDs are provided in Table 1, Attachment A.

3.3 BLANKS AND RINSATES

3.3.1 Trip Blanks

Analytical results for trip blank samples are presented in Table 2, Attachment 1.

	YES	NO	N/A
1. Were an adequate number of trip blanks collected?	☒	☐	☐
2. Were the trip blanks reported to be free of volatile contaminants?	☒	☐	☐

COMMENTS: Nil

3.3.3 Trip Spikes

Analytical results for trip spike samples are presented in Table 2, Attachment 1.

	YES	NO	N/A
3. Were an adequate number of trip spikes collected?	☒	☐	☐
4. Were the trip spikes reported to be within laboratory control limits?	☒	☐	☐

COMMENTS: Nil

3.3.4 Equipment Rinsates

Analytical results for rinsate samples are presented in Table 2, Attachment 1.

	YES	NO	N/A
1. Were an adequate number of equipment rinsates collected?	☒	☐	☐
2. Were the equipment rinsates reported to be free of contaminants?	☒	☐	☐

COMMENTS: Nil

Blanks, Spikes and Rinsate Sampling and Analysis		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

4. LABORATORY QUALITY CONTROL PROCEDURES

As noted in Section 1.3, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The following section assesses the adequacy of these procedures.

	YES	NO
1. Were laboratory method blanks free of contamination?	☒	☐
2. Were the matrix spike recoveries within control limits?	☒	☐
3. Were the Lab control samples within control limits?	☒	☐
4. Were the RPD's of the laboratory duplicates within control limits?	☒	☐
5. Were the surrogate recoveries within laboratory control limits?	☒	☐

COMMENTS:

Nil

Laboratory Internal QA/QC		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

5. DATA USABILITY

Overall, of the 677 individual analyses conducted to assess data quality, no significant issues were identified. A summary of the total analyses and proportion with issues for the QC program is provided in Table C below.

Table C: Quality Control Program Summary

Sample Type	Total Number of Analyses	Number of Identified Issues	% of Analyses with Identified Issues	Issues Identified
Duplicate / Triplicate samples	81	0	-	None. No RPDs outside acceptable range
Field quality control samples (Rinsates, Trip Blanks and Trip Spikes)	65	0	-	None. No concentrations reported above the LOR
Internal laboratory analyses	531	0	-	No internal laboratory analyses outside acceptable range
Total	**677**	**0**	**-**	-

The data quality assessment indicates that the data is of acceptable quality for use.

Author:
Katie Trevor

Reviewer:
[redacted]

ATTACHMENT A: QC RESULTS TABLES

Table 1: RPDs Table

Table 2: Blank and Spike Sample Results – December 2024

TETRA TECH COFFEY

		Field ID		QC67_061224		SBT-GW-0001	QC68_061224	
		Dat				06 Dec 2024	06 Dec 2024	
		Lab Report Numb				ES2439858	1169681	
		Matrix Type	Water	Water	RPD	Water	Water	RPD
Ha								
			<5	<5	0	<5	-	-
		5	<5	<5	0	<5	-	-
		1	<5	<5	0	<5	<1	0
		1	<5	<5	0	<5	<1	0
		1	<5	<5	0	<5	<1	0
		5	<5	<5	0	<5	-	-
		5	<5	<5	0	<5	-	-
		5	<5	<5	0	<5	-	-
		1	<5	<5	0	<5	<1	0
Ha								
		1	<5	<5	0	<5	<1	0
		5	<50	<50	0	<50	<5	0
		50	<50	<50	0	<50	-	-
		1	<5	<5	0	<5	<1	0
		5	<50	<50	0	<50	<5	0
Ch								
	g/kg	0.005	-	-	-	-	<0.005	-
	mg/kg	0.005	-	-	-	-	<0.005	-
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	5	<5	<5	0	<5	-	-
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	5	<5	<5	0	<5	-	-
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	5	<5	<5	0	<5	-	-
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	1	<5	<5	0	<5	<1	0
ane	µg/L	1	<5	<5	0	<5	<1	0
	µg/L	50	<50	<50	0	<50	-	-
	µg/L	5	<5	<5	0	<5	<5	0
	µg/L	5	<50	<50	0	<50	<5	0
oethene	µg/L	1	<5	<5	0	<5	<1	0
ropropene	µg/L	1	<5	<5	0	<5	<1	0
thane	µg/L	1	<5	<5	0	<5	<1	0
ethane	µg/L	5	-	-	-	-	<5	-
robutadiene	µg/L	5	<5	<5	0	<5	-	-
oethene	µg/L	1	<5	<5	0	<5	<1	0
hloroethene	µg/L	1	<5	<5	0	<5	<1	0
-1,2-dichloroethene	µg/L	1	<5	<5	0	<5	<1	0
s-1,3-dichloropropene	µg/L	1	<5	<5	0	<5	<1	0
nyl chloride	µg/L	5	<50	<50	0	<50	<5	0
Vo tile Organic Compounds								
cis-1,4-Dichloro-2-butene	µg/L	5	<5	<5	0	<5	-	-
trans-1,4-Dichloro-2-butene	µg/L	5	<5	<5	0	<5	-	-
Pentachloroethane	µg/L	5	<5	<5	0	<5	-	-

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: (1 - 10 x EQL); 50 (10 - 20 x EQL); 30 (> 20 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

TETRA TECH COFFEY

		Field ID	RB_061224	TB_061224	TS_061224
		Dat	06 Dec 2024	02 Dec 2024	02 Dec 2024
		Lab Report Numb	ES2439858	ES2439858	ES2439858
		ype	Rinsate	Trip_B	Trip_S
BT					
			-	<1	18
			-	<2	16
		2	-	<2	16
		2	-	<2	19
		2	-	<2	16
		2	-	<2	35
		5	-	<5	20
		1	-	<1	85
TP					
		20	-	<20	-
		20	-	<20	-
		20	-	<20	-
Ha					
		5	<5	-	-
		5	<5	-	-
		5	<5	-	-
		5	<5	-	-
		5	<5	-	-
	L	5	<5	-	-
	/L	5	<5	-	-
	g/L	5	<5	-	-
	µg/L	5	<5	-	-
Ha					
	µg/L	5	<5	-	-
	µg/L	50	<50	-	-
	µg/L	50	<50	-	-
	µg/L	5	<5	-	-
	µg/L	50	<50	-	-
Ch					
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
pane	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
hane	µg/L	5	<5	-	-
	µg/L	5	<5	-	-
ride	µg/L	5	<5	-	-
methane	µg/L	5	<5	-	-
	µg/L	50	<50	-	-
	µg/L	5	<5	-	-
ane	µg/L	50	<50	-	-
loroethene	µg/L	5	<5	-	-
hloropropene	µg/L	5	<5	-	-
methane	µg/L	5	<5	-	-
lorobutadiene	µg/L	5	<5	-	-
roethene	µg/L	5	<5	-	-
chloroethene	µg/L	5	<5	-	-
s-1,2-dichloroethene	µg/L	5	<5	-	-
ns-1,3-dichloropropene	µg/L	5	<5	-	-
nyl chloride	µg/L	50	<50	-	-
Vo atile Organic Compounds					
cis-1,4-Dichloro-2-butene	µg/L	5	<5	-	-
trans-1,4-Dichloro-2-butene	µg/L	5	<5	-	-
Pentachloroethane	µg/L	5	<5	-	-

Annexure H Field Records – GME3

Field Data Sheet – Groundwater Sampling

Site:	CMF, WTP Bund
Well ID:	SBT-GW-1024
Sample Date:	17.9.24
Sample Time:	9:30 AM
Sampled by:	AH / PR

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	6.24m
TOC Elevation (mAHD)		Colour	clear
Base of Well (mBTOC)		Odour	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	6.42	mS/cm
pH	7.78	
Temperature	17.14	°C
Turbidity	78.7	NTU
Salinity	3.48	Ppt
TDS	4.05	g/L
ORP	153	mV
DO	82.3	%sat
DO	7.77	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

Site:	CMF Asbestos Area
Well ID:	SBT-GW-~~[illegible]~~ 1028
Sample Date:	17.9.24
Sample Time:	10:15 AM
Sampled by:	AH / PR

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	3.20
TOC Elevation (mAHD)		Colour	Clear / Black sediment
Base of Well (mBTOC)		Odour	Methane / Organic
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	26.2	mS/cm
pH	6.84	
Temperature	20.76	°C
Turbidity	196	NTU
Salinity	16.04	Ppt
TDS	16.2	g/L
ORP	50	mV
DO	116.4	%sat
DO	9.48	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

Site:	Penrith council recreation centre
Well ID:	SBT-GW-1030
Sample Date:	17.9.24
Sample Time:	9:00
Sampled by:	Alan Hillary / Phil Rowan

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	4.20
TOC Elevation (mAHD)		Colour	
Base of Well (mBTOC)		Odour	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)		mS/cm
pH		
Temperature		°C
Turbidity		NTU
Salinity		Ppt
TDS		g/L
ORP		mV
DO		%sat
DO		Mg/L

COMMENTS:

Well destroyed, rocks fallen in. No sleeve. Water level reading still taken.

Field Data Sheet – Groundwater Sampling

Site:	OFF-SITE, Outside of Wollemi College
Well ID:	SBT-GW-1804
Sample Date:	[redacted] 14.08.24
Sample Time:	9:44 AM
Sampled by:	Alan Hillany, Joshua Cosier

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate	/	/	/	/	/
Triplicate	/	/	/	/	/

Screen intervals (mAHD)		**SWL (mbtoc)**	1.35m
TOC Elevation (mAHD)		**Colour**	Clear
Base of Well (mBTOC)		**Odour**	None detected
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	2550	mS/cm
pH	8.03	
Temperature	17.02	°C
Turbidity	164	NTU
Salinity	1.34	Ppt
TDS	1.63	g/L
ORP	155	mV
DO	35.2	%sat
DO	3.38	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

Site:	~~[illegible]~~ Outside of Wollemi College, St Marys
Well ID:	SBT-GW-1804
Sample Date:	17.9.24
Sample Time:	11:00 AM
Sampled by:	AH/PR

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	1.6
TOC Elevation (mAHD)		**Colour**	Orange/Brown
Base of Well (mBTOC)		**Odour**	Organic
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	11.5	mS/cm
pH	7.31	
Temperature	20.77	°C
Turbidity	>1000	NTU
Salinity	6.52	Ppt
TDS	7.11	g/L
ORP	-1	mV
DO	36.7	%sat
DO	3.17	Mg/L

COMMENTS:

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	CMF, North-West corner
Well ID:	SBT-GW-1805
Sample Date:	17.9.24
Sample Time:	10:00 AM
Sampled by:	AH/PR

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	2.79
TOC Elevation (mAHD)		Colour	Brown / Orange
Base of Well (mBTOC)		Odour	None detected
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	4.19	mS/cm
pH	7.65	
Temperature	17.92	°C
Turbidity	>1000	NTU
Salinity	2.21	Ppt
TDS	2.68	g/L
ORP	194	mV
DO	83.4	%sat
DO	7.81	Mg/L

COMMENTS:

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	BSF
Well ID:	4003
Sample Date:	16/9/24
Sample Time:	11:30
Sampled by:	

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	11.59
TOC Elevation (mAHD)		Colour	Yellow.
Base of Well (mBTOC)		Odour	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	21700	mS/cm
pH	7.01	
Temperature	18.47	°C
Turbidity	446	NTU
Salinity	12.94	Ppt
TDS	13.4	g/L
ORP	8	mV
DO	29.9	%sat
DO	2.59	Mg/L

COMMENTS:

No odour

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	BSF
Well ID:	4005
Sample Date:	16/9/24
Sample Time:	12:05
Sampled by:	

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	
TOC Elevation (mAHD)		Colour	
Base of Well (mBTOC)		Odour	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)		mS/cm
pH		
Temperature		°C
Turbidity		NTU
Salinity		Ppt
TDS		g/L
ORP		mV
DO		%sat
DO		Mg/L

COMMENTS:

Dry - base of well 17.66

Field Data Sheet – Groundwater Sampling

Site:	XP – AERO FARM
Well ID:	SBT-GW-4008
Sample Date:	23 · 8 · 24
Sample Time:	8:10 AM
Sampled by:	Alan Hillany / Phil Rowan

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					
Screen intervals (mAHD)		**SWL (mbtoc)**	Unable to Read – WATER MOVEMENT		
TOC Elevation (mAHD)		**Colour**			
Base of Well (mBTOC)		**Odour**			
Top of Hydrasleeve (mBTOC)					

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	25.0	mS/cm
pH	7.82	
Temperature	16.44	°C
Turbidity	421	NTU
Salinity	15.14	Ppt
TDS	15.5	g/L
ORP	-132	mV
DO	51.5	%sat
DO	4.59	Mg/L

COMMENTS:

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	
Well ID:	4008
Sample Date:	16/9/24
Sample Time:	1:30
Sampled by:	

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	21.55
TOC Elevation (mAHD)		Colour	Clear /grey.
Base of Well (mBTOC)		Odour	Yes - organic. sulfur.
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	24100	mS/cm
pH	7.75	
Temperature	19.61	°C
Turbidity	122	NTU
Salinity	14.56	Ppt
TDS	14.9	g/L
ORP	-152	mV
DO	19.0	%sat
DO	1.6	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

Site:	XP - AERO FARM
Well ID:	SBT- GW - 4010
Sample Date:	23 . 8 . 24
Sample Time:	8 : 10 AM
Sampled by:	Alan Hillary / Phil Rowan

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	No water in well, dry
TOC Elevation (mAHD)		**Colour**	
Base of Well (mBTOC)		**Odour**	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	2.14	mS/cm
pH	6.85	
Temperature	18.32	°C
Turbidity	120	NTU
Salinity	1.09	Ppt
TDS	1.37	g/L
ORP	24	mV
DO	136.9	%sat
DO	12.78	Mg/L

COMMENTS: The ~~[illegible]~~ Piezometer was unable to read a water depth. Water retrieved from sleeve however.

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	
Well ID:	4010.
Sample Date:	16/9/24
Sample Time:	1:20
Sampled by:	

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	
TOC Elevation (mAHD)		**Colour**	
Base of Well (mBTOC)		**Odour**	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)		mS/cm
pH		
Temperature		°C
Turbidity		NTU
Salinity		Ppt
TDS		g/L
ORP		mV
DO		%sat
DO		Mg/L

COMMENTS:

no water
probe is hitting the top of the VMP - advised not to pull out the VMP

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	BSF
Well ID:	4800
Sample Date:	16/9/24
Sample Time:	11:50 .
Sampled by:	

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	11.26
TOC Elevation (mAHD)		Colour	
Base of Well (mBTOC)		Odour	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	17600	mS/cm
pH	7.15	
Temperature	19.54	°C
Turbidity	1000	NTU
Salinity	10.35	Ppt
TDS	10.9	g/L
ORP	-34	mV
DO	20.6	%sat
DO	1.78	Mg/L

COMMENTS:

Organic odour

Water clarity - gray .

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	BSF
Well ID:	4801
Sample Date:	16/9/24
Sample Time:	12:50
Sampled by:	

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	12.60
TOC Elevation (mAHD)		**Colour**	
Base of Well (mBTOC)		**Odour**	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	17700	mS/cm
pH	7.63	
Temperature	19.35	°C
Turbidity	1000	NTU
Salinity	10.43	Ppt
TDS	11.0	g/L
ORP	99	mV
DO	31.0	%sat
DO	2.68	Mg/L

COMMENTS:

Turbid.
acidic / biological smell.

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	BSF
Well ID:	4802
Sample Date:	16/9/24
Sample Time:	12:30
Sampled by:	

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	16.01
TOC Elevation (mAHD)		Colour	
Base of Well (mBTOC)		Odour	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	27200	mS/cm
pH	7.39	
Temperature	19.52	°C
Turbidity	785	NTU
Salinity	16.65	Ppt
TDS	16.9	g/L
ORP	94	mV
DO	25.2	%sat
DO	2.09	Mg/L

COMMENTS:

yellowish - no odour.

Field Data Sheet – Groundwater Sampling

Site:	St Marys Athletics/BMX Reserve
Well ID:	SMGW-BH-A105S
Sample Date:	17.9.24
Sample Time:	12:15 PM
Sampled by:	AH/PR

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	3.02 m
TOC Elevation (mAHD)		Colour	Clear
Base of Well (mBTOC)		Odour	Methane/Organic
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	1.80	mS/cm
pH	7.48	
Temperature	21.46	°C
Turbidity	171	NTU
Salinity	~~[illegible]~~ 0.91	Ppt
TDS	1.15	g/L
ORP	41	mV
DO	33.1	%sat
DO	2.91	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

Site:	XP – St Marys Reserve
Well ID:	SMGW – BH – A107
Sample Date:	23 · 8 · 24
Sample Time:	1:14 PM
Sampled by:	Alan Hillany / Phil Rowan

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	8.15m
TOC Elevation (mAHD)		**Colour**	
Base of Well (mBTOC)		**Odour**	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	0.947	mS/cm
pH	6.96	
Temperature	21.61	°C
Turbidity	42.8	NTU
Salinity	0.47	Ppt
TDS	0.608	g/L
ORP	−43	mV
DO	167.9	%sat
DO	14.75	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

Site:	St Marys Reserve
Well ID:	SMGW-BH-A107
Sample Date:	17.9.24
Sample Time:	11:30 AM
Sampled by:	AH/PR

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	9.52
TOC Elevation (mAHD)		Colour	Clear, Black sediment
Base of Well (mBTOC)		Odour	Organic / Methane
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	2.77	mS/cm
pH	8.37	
Temperature	21.81	°C
Turbidity	194	NTU
Salinity	1.43	Ppt
TDS	1.77	g/L
ORP	-165	mV
DO	50.6	%sat
DO	4.40	Mg/L

COMMENTS:

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet - Groundwater Sampling

Site:	F301
Sample Date:	16/9/24
Bore Name:	C320
Sampled by:	
Bore head condition:	
Total depth (mbgl):	
Screen intervals (mbgl):	
Data downloaded?	✓
Base of bore measurement (M)	
Pump depth:	

SWL Initial (m below top of casing):		4.20			
Casing height (m above ground):					
SWL Initial (m below ground level): *Use oil/Interface probe*					
Casing:		Colour at Start:	Odour:	Equip?	
PVC			Nil	Y N	
Steel	✓	Colour at End:	H_2S	Psi	
Other			Other	L/s	
Comments:					

Time started purging:			
Time		9.20 am	24hr
EC		28000	µS/cm
pH		6.8	
Temp		15.29	°C
Turbidity		312	NTU
Salinity		17.01	Ppt
TDS		17.3	mg/L
ORP		-14	mV
DO		51.6	%sat
SWL			mbtoc
Flow Rate			L/min
Colour		Clear / yellow	Visual
LNAPL			m
DNAPL			m

Analytes to test			
TOC			24hr
Major Cations			µS/cm
Major Anions			mEq/l
Speciated alkalinity			mEq/l
Dissolved metals			°C
Total metals			NTU
Nutrients			Ppt
Does this bore require additional analytes to be tested ? Check Table 6.7 Ground water monitoring program			
TRH			mV
BTEXN			%sat
VOCs			mbtoc
Phenols			L/min
PFAS			Volts

Comments

water clear
no odour

CPB CONTRACTORS | Ghella 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	FSU C330
Well ID:	330
Sample Date:	16/9/24
Sample Time:	8:30 am
Sampled by:	

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	4.67
Base of Well (mBGL)		**SWL (mbgl)**	
Top of Hydrasleeve (mBGL)		**Colour**	Yellowish
TOC – Ground Level (cm)		**Odour**	No.

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	27600.	µS/cm
pH	5.96	
Temperature	15.35	°C
Turbidity	716	NTU
Salinity	12.0	Ppt
TDS	3.51	mg/L
ORP	137	mV
DO	38.9	%sat

COMMENTS:

CPB CONTRACTORS | Ghella 1894 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	SMGW-BH-A107
Well ID:	Claremont.
Sample Date:	21.10.24
Sample Time:	3PM
Sampled by:	P.R.

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		SWL (mbtoc)	8.41 metres.
TOC Elevation (mAHD)		Colour	clear - tannin stains.
Base of Well (mBTOC)		Odour	N/A.
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	2.88.	mS/cm
pH	7.86	
Temperature	20.97	°C
Turbidity	41.7	NTU
Salinity	1.49.	Ppt
TDS	1.84	g/L
ORP	-188	mV
DO	34.3	%sat
DO	3.03	Mg/L

COMMENTS:

CPB CONTRACTORS | Ghella 1894 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	Claremont - near school
Well ID:	SBT-GW-1804 / 1084 on map
Sample Date:	21.10.24
Sample Time:	3PM -
Sampled by:	P.R

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	1.7 metres
TOC Elevation (mAHD)		**Colour**	Cloudy.
Base of Well (mBTOC)		**Odour**	N/A
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	21.6	mS/cm 21.6.
pH	6.83	
Temperature	21.36 c	°C 21.36
Turbidity	566	NTU
Salinity	12.92	Ppt
TDS	13.4 g/l.	g/L
ORP	-92.	mV
DO	38.2%	%sat
DO	3.14 mg/l.	Mg/L

COMMENTS:

CPB CONTRACTORS | Ghella 1894 5 Generations of Tunnelers

Field Data Sheet – Groundwater Sampling

Site:	Stmarys
Well ID:	SMGW-BH-A360.
Sample Date:	21.10.24
Sample Time:	5PM
Sampled by:	P. Rowan

QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate	0	0	0	0	0
Triplicate	0	0	0	0	0

Screen intervals (mAHD)		**SWL (mbtoc)**	0.67m / 67cm
TOC Elevation (mAHD)		**Colour**	clear.
Base of Well (mBTOC)		**Odour**	not noted.
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	0.476	mS/cm
pH	7.39	
Temperature	20.20	°C
Turbidity	123	NTU
Salinity	0.23	Ppt
TDS	0.309	g/L
ORP	-18	mV
DO	37.6	%sat
DO	3.40	Mg/L

COMMENTS:

Field Data Sheet – Groundwater Sampling

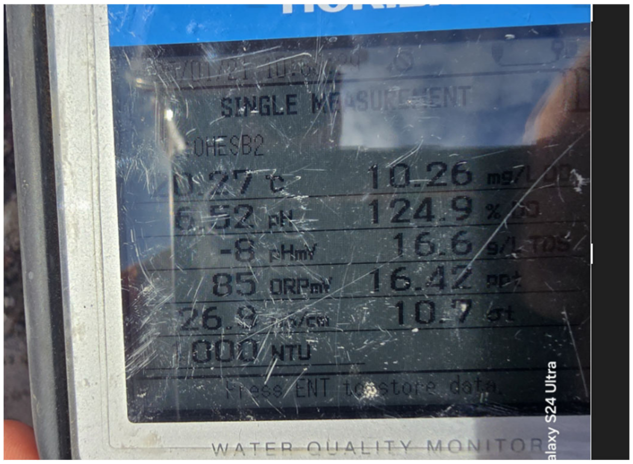
Site:	4005 (Bringelly car park)
Well ID:	4005
Sample Date:	21/1/25
Sample Time:	10am
Sampled by:	Andew Smith

QC Sample	Base Suite	TRH	BTEXN	PFAS	VOCs
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	13.89m
TOC Elevation (mAHD)		**Colour**	
Base of Well (mBTOC)		**Odour**	
Top of Hydrasleeve (mBTOC)			

Field Data		
Water Quality Meter Model:	Horiba U-52	
Water Quality Meter ID/SN		
Electrical Conductivity (EC)	26.9	mS/cm
pH	6.52	
Temperature	20.27	°C
Turbidity	1000	NTU
Salinity	16.42	Ppt
TDS	16.6	g/L
ORP	10.7	mV
DO	124.9	%sat
DO	10.26	Mg/L

COMMENTS:


SINGLE MEASUREMENT
0HESB2
10.26 mg/L DO
6.52 pH
124.9 % DO
-8 pHmV
16.6 g/L TDS
85 ORPmV
16.42 ppt
10.7 σt
NTU
Press ENT to store data.
WATER QUALITY MONITOR
S24 Ultra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Galaxy S24 Ultra


Galaxy S24 Ultra

Field Data Sheet – Groundwater Sampling

Site:	A360 St Marys (Camira St)
Well ID:	A360
Sample Date:	25/3/25
Sample Time:	9am
Sampled by:	Andew Smith

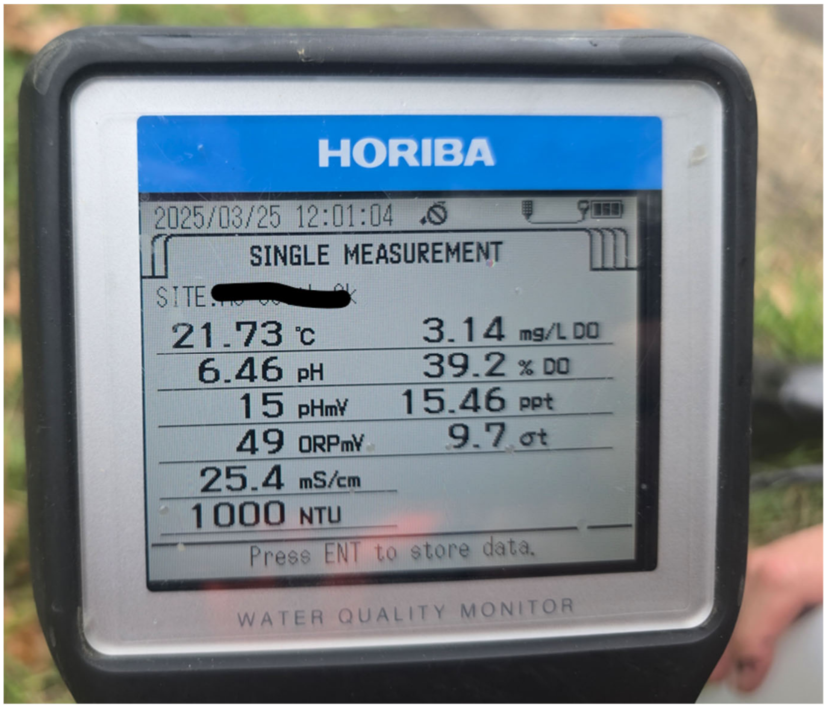
QC Sample	**Base Suite**	**TRH**	**BTEXN**	**PFAS**	**VOCs**
Duplicate					
Triplicate					

Screen intervals (mAHD)		**SWL (mbtoc)**	7.59m
TOC Elevation (mAHD)		**Colour**	Cloudy
Base of Well (mBTOC)		**Odour**	Nil
Top of Hydrasleeve (mBTOC)			

Field Data	
Water Quality Meter Model:	Horiba U-52
Water Quality Meter ID/SN	

Electrical Conductivity (EC)	25.4	mS/cm
pH	6.46	
Temperature	21.73	°C
Turbidity	1000	NTU
Salinity	15.46	Ppt
TDS		g/L
ORP	49	mV
DO	39.2	%sat
DO	3.14	Mg/L

COMMENTS:


HORIBA
2025/03/25 12:01:04
SINGLE MEASUREMENT
SITE:[redacted]
21.73 °C
3.14 mg/L DO
6.46 pH
39.2 % DO
15 pHmV
15.46 ppt
49 ORPmV
9.7 σt
25.4 mS/cm
1000 NTU
Press ENT to store data.
WATER QUALITY MONITOR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Galaxy S24 Ultra

Annexure I

AMBS report – Survey 4

Orchard Hills Metro Station Vegetation Monitoring, Year 2: 4th Survey. Draft report issued to CPBG, October 2024.

AEI report - 2024

AEI (2024). Claremont Creek – AUSRIVAS & Surface Water Survey'. Prepared for AMBS Ecology & Heritage Pty Ltd on behalf of CPB Contractors Ghella (CPBG) by Aquatic Ecological Investigations' 12 July 2024

Orchard Hills Metro Station Vegetation Monitoring, Year 2: 4th Survey

Prepared by AMBS Ecology & Heritage
for CPB Contractors Ghella Joint Venture

Draft

October 2024

AMBS Reference: 22039

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Recipient:	[redacted], Contractors Ghella Joint Venture (CPBG)
Approved by:	[redacted]

Executive Summary

AMBS Ecology & Heritage Pty Ltd has been commissioned by CPB Contractors Ghella Joint Venture (CPBG) to undertake monitoring of the Groundwater Dependant Ecosystem (GDE) at Orchard Hills Metro Station identified in the Project Biodiversity Development and Assessment Report (BDAR). The monitoring is part of the Station Boxes and Tunnelling Works at Sydney Metro Western Sydney Airport.

The monitoring program involves assessing canopy cover and shrub condition along three 100 metre transects. Transect 1 is situated within the study area of the GDE, Transect 2 is located in the control area, and Transect 3 extends across both the study and control areas.

The fourth round of monitoring within the longitudinal survey found a decrease in canopy cover for Transects 1 and 2. This decrease is likely within the range of natural climatic variation and is considered unlikely to be attributed to groundwater drawdown. Canopy cover at Transect 3 has remained relatively consistent across all four surveys. However, the monitored shrubs experienced significant damage from fire between Surveys 1 and 2, an event that is also deemed unrelated to potential groundwater drawdown.

Shrub condition between Surveys 3 and 4 generally remained consistent or showed improvement, and no discernible differences in shrub condition between study and controls areas were observed.

Contents

Tables

Plates

Figures

1 Introduction

The CPB Contractors Ghella Joint Venture (CPBG) have been engaged by Sydney Metro to undertake detailed design and construction of the Station Boxes and Tunnelling Works (SBT Project) of the Sydney Metro Western Sydney Airport (the Project). The Project forms part of the broader Sydney Metro network. It involves the construction and operation of a new 23 km metro rail line that extends from the existing Sydney Trains suburban T1 Western Line (at St Marys) in the north and the Aerotropolis (at Bringelly) in the south. The Project has been granted approval under the *Environment Protection and Assessment Act 1979* (SSI 10051) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) (EPBC 2020/8687) and has an approved Flora and Fauna Management Plan (FFMP). CPBG has appointed AMBS Ecology & Heritage Pty Ltd (AMBS) as the Project Ecologist for the SBT Project.

The FFMP notes that a Groundwater Dependant Ecosystem (GDE) was identified in the Project Biodiversity Development and Assessment Report (BDAR) as occurring at the Orchard Hills box cut site. Modelled water table drawdown associated with construction of the Orchard Hills Metro Station was found to have the potential to impact areas of GDE outside of the approved Project Boundary. The FFMP defined a 6 monthly monitoring schedule to identify potential impacts of water drawdown associated with construction.

The Plant Community Type (PCT) of the site is mapped as PCT 724 *Castlereagh shale - gravel transition forest* (CPBG, 2021). This PCT has since been decommissioned and replaced with PCT 3320 *Cumberland Shale Plains Woodland* (DPE, 2024) which is characterised by a canopy of *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box), with Ironbarks *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus fibrosa* (Red Ironbark) occasionally present, although prominent in localised areas. This change of PCT does not impact the current or future study design or execution.

AMBS is pleased to provide the results of the fourth survey in the longitudinal vegetation monitoring for a potential GDE at Orchard Hills Metro Station. This survey will be compared to the data recorded in previous surveys and against future monitoring surveys.

2 Methods

Access issues during transect establishment and baseline surveys rendered the initially planned four transects north of Lansdowne Road inaccessible. Consequently, three alternative locations were selected. Two transects were located west of Kent Road, one located in the groundwater drawdown contour (study area, Transect 1) and the other transect located just outside the predicted drawdown area (control area, Transect 2), though in the same Plant Community Type (PCT) and within the construction area of impact (Appendix A). The third transect (Transect 3) spans both the groundwater drawdown area (study area) and the control area, south of the draft four Transects (Appendix A).

For the fourth monitoring Survey, AMBS ecologist Mikayla Cashion visited Orchard Hills Metro Station on the 2nd of October. Surveys revisited the three transects previously established in the baseline survey (Appendix A).

Monitoring points were resurveyed at each treatment area, positioned 10 metres (m) apart within a 100 m Transect (Appendix A). At each canopy monitoring point, a fisheye lens camera on a tripod was used to take canopy photos aligned north-south. However, at Transect 3, the presence of a fence obstructed the images, prompting the Surveyor to position the camera directly above the fence at an approximate 30-degree tilt. These canopy photos were subjected to analysis using the coveR R package (Chianucci et al. 2022) to determine percent canopy cover.

During the survey at each monitoring point, mature shrubs, if present, were methodically resurveyed, and observations of leaf condition, cover, disease prevalence, and flowering state were recorded (Plate 1). Both leaf condition and cover were differentiated into good, moderate poor and very poor condition. Leaf condition was determined by how healthy in colour and shape the leaves appeared. For instance, shrubs with wilting and browning leaves were classed as being in very poor condition. Additional photographs were taken to facilitate a comparative assessment of shrub condition for baseline and subsequent surveys.

Both control and study transects will continue to be monitored concurrently every 6 months for the duration of the project in order to compare any changes observed at each site. If similar changes in canopy cover and vegetation health are recorded in both study and control sites, it is more likely due to climatic conditions than groundwater drawdown at Orchard Hills Metro Station.

A Linear Mixed-Effects Model (LME) was used to examine the relationship between Canopy Cover, Survey Time, and Group (Study Group, Control Group) while considering the potential variability associated with transect location as a random effect. The response variable, Canopy Cover, was square root transformed to meet the assumption of normality for residuals. The analysis was conducted using R version 4.3.0 (R Core Team, 2024), utilising the *lme4* R package for fitting the LME model (Bates et al., 2015). To assess the significance of fixed effects, an analysis of variance (ANOVA) was conducted using the car R package (Fox and Weisberg, 2019). A Shapiro-Wilk test was conducted on the residuals to verify the assumption of normality. Post-hoc analysis involved a Tukey HSD test using the *emmeans* R package (Lenth et al., 2024).

3 Results

3.1 Canopy Cover

Statistical analysis indicated a significant difference in Canopy Cover between Survey times (p = 0.041) and a highly significant difference between the Control and Study Groups (p = < 0.001; Figure 1; Table 1).

Post hoc analysis using a Tukey HSD test showed a significant reduction in Canopy Cover between Surveys 1 and 2 ($t^{2,91}$ = 2.4, p = 0.04), a significant increase in Canopy Cover between Surveys 2 and 3 ($t^{2,91}$ = 2.5, p = 0.04), and no significant difference in Canopy Cover between Surveys 1 and 3 ($t^{2,91}$ = -0.01, p = 0.99). There was no significant difference between Survey 4 and Survey 1 ($t^{2,91}$ = 0.40, p = 0.98), Survey 2 ($t^{2,91}$ = -2.08, p = 0.17), or Survey 3 ($t^{2,91}$ = 0.42, p = 0.97). Statistical analyses also revealed significant differences between the Control and Study Groups within Survey 4 ($t^{2,123}$ = 3.6, p = 0.01), Survey 3 ($t^{2,123}$ = 4.0, p = 0.003), and Survey 2 ($t^{2,123}$ = 4.0, p = 0.003). A marginally significant difference was observed in Survey 1 ($t^{2,123}$ = 3.1, p = 0.04).

However, the interaction between Group and Survey time did not reach statistical significance, suggesting that the observed differences in Canopy Cover did not significantly vary for both groups (Table 1).

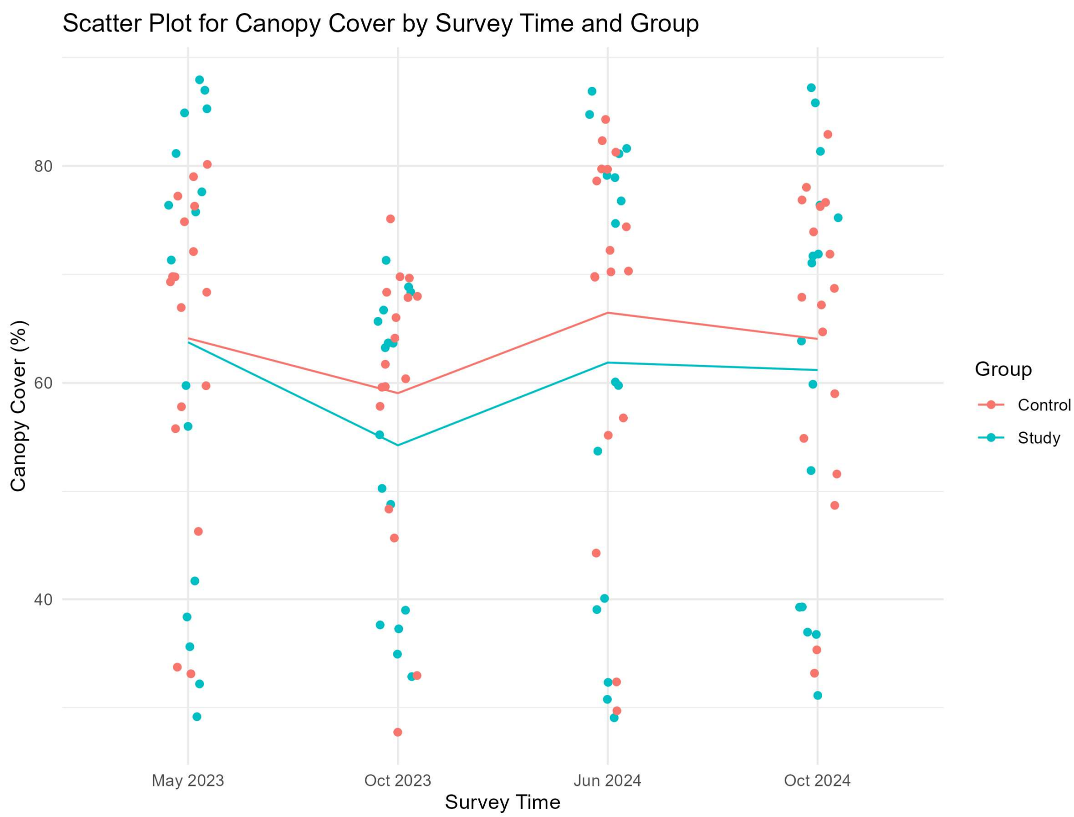

Figure 1. Scatter Plot of Canopy Cover for Control and Study Areas in May 2023, October 2023, June 2024 and October 2024.

Table 1. ANOVA for LME with square root transformed Canopy Cover.

Fixed Effects	F Statistic	Degrees of Freedom	P
Group	26.4848	1	< 0.001 ***
Survey	2.83	3	0.04125 *
Group:Survey	0.21	3	0.887 n.s.

Following a decrease in mean canopy cover for Transect 1 (study) from 77% in Survey 1 to 62% in Survey 2, Survey 3 saw an increase to 75% (Table 2), followed by a slight decrease to 73% in Survey 4. Transect 2 (control) followed a similar pattern, with a decrease in mean canopy cover between Survey 1 (70%) and Survey 2 (63%), followed by an increase to 74% in Survey 3 and a slight decrease to 71% in Survey 4.

Mean canopy cover for Transect 3 has remained relatively consistent in the study area across Survey 1 (35%), Survey 2 (36%) and Survey 3 (34%), followed by a slight increase to 37% in Survey 4 (Table 2). The control area also had little variation in mean canopy cover, with 53% in Survey 1, 51% in Survey 2, 52% in Survey 3 and 52% in Survey 4. Three outlier points in the Transect 3 control area (3.5, 3.7, 3.8) for Survey 2 were deemed inaccurate and incomparable to Survey 1 due to the sun obscuring the images. When excluding these outlier points, mean canopy cover in the control area slightly decreased from 38% in Survey 1 to 36% in Survey 2, remained at 36% in Survey 3 and increased to 39% in Survey 4 (Table 2).

Table 2. Percent canopy cover at canopy monitoring points

Transect 1 (study area)					Transect 2 (control)					Transect 3 (study area & control)				
Point	**% Cover**				**Point**	**% Cover**				**Point**	**% Cover**			
	S1	**S2**	**S3**	**S4**		**S1**	**S2**	**S3**	**S4**		**S1**	**S2**	**S3**	**S4**
1.0	76	64	75	75	**2.0**	56	48	57	52	**3.0 (study area)**	36	37	32	37
1.1	81	68	77	71	**2.1**	60	58	70	68	**3.1 (study area)**	38	38	39	39
1.2	85	67	81	72	**2.2**	70	66	81	74	**3.2 (study area)**	42	39	40	39
1.3	88	71	85	86	**2.3**	68	62	70	67	**3.3 (study area)**	32	33	29	31
1.4	87	69	87	87	**2.4**	77	68	82	77	**3.4 (study area)**	29	35	31	37
										T3 Mean % cover (study area)	**35**	**36**	**34**	**37**
1.5	85	66	82	76	**2.5**	75	68	79	76	**3.5 (control)**	70	60*	70	59
1.6	71	55	60	64	**2.6**	67	60	70	65	**3.6 (control)**	46	46	44	49
1.7	60	50	60	60	**2.7**	69	64	74	72	**3.7 (control)**	58	68*	55	55
1.8	76	63	79	81	**2.8**	72	60	72	69	**3.8 (control)**	7	70*	80	78
1.9	78	64	79	72	**2.9**	76	70	84	83	**3.9 (control)**	33	28	30	33
1.10	56	49	54	52	**2.10**	80	75	80	77	**3.10 (control)**	34	33	32	35
T1 Mean % Cover	**77**	**62**	**75**	**73**	**T2 Mean % Cover**	**70**	**63**	**74**	**71**	**T3 Mean % cover (control)**	**53**	**51**	**52**	**52**
										T3 Mean % cover (control - excluding outliers 3.5, 3.7, 3.8)	**38**	**36**	**36**	**39**

* outlier canopy photo monitoring point due to distortion from direct sunlight

Canopy at all transects was observed to be in good condition. Some minor canopy dieback was observed at Transect 1 during Survey 2. A reduction of shrub cover at Transects 1 and 2 contributed to a reduced average canopy cover during Survey 2, particularly at Transect 1 (Table 2; Table 3; Plate 1). No canopy dieback was observed during Survey 3 and 4, and both surveys recorded a slight cumulative increase in shrub cover for Transect 1, contributing to a general increase in the average canopy cover (Table 2; Table 3). Canopy cover at Transect 3 was found to be relatively consistent across all four surveys. Shrub cover had very little impact on canopy cover percentage at Transect 3 as the positioning of the camera excluded shrubs from the frame.

Plate 1. Example canopy monitoring photograph from Transect point 1.4 during baseline Survey 1 (top-left, 87%) Survey 2 (top-right, 69% cover) Survey 3 (bottom-left, 87% cover) and Survey 4 (bottom-right, 87%), showing a decrease in canopy and shrub cover during Survey 2, an increase during Survey 3 and no change in Survey 4.

3.2 Shrub Condition

Survey 2 recorded a decrease in leaf cover for most monitored shrubs at Transect 1, followed by a slight improvement in leaf cover during Survey 3 (Table 3). Survey 4 found approximately half of the monitored shrubs had improved in cover since Survey 3, whilst the rest remained the same. One shrub at 1.10 was found with no leaf cover and likely to be dead due to being trampled by invasive climbers *Araujia sericifera* (Moth Vine) and *Rumex sagittatus* (Turkey Rhubarb) The remaining shrubs were all recorded to be in good condition, showing no variation from Survey 3. One shrub at 1.9 was found to have some signs of disease, compared to no shrubs during Survey 3 and one during Survey 2. Three shrubs were found to have buds, compared to one during Survey 3.

The majority of the monitored shrubs at Transect 2 continued to have good to moderate leaf cover and condition (Table 3). All shrubs remained the same in leaf cover, and only one shrub reduced in leaf condition between Surveys 3 and 4. Two shrubs (2.3 and 2.8) that were not located during Survey 3 were found during Survey 4, and leaf cover and condition were consistent with their last observations during Survey 2. Presence of disease and flowering status on Transects 1 & 2 were generally consistent across Surveys 1, 2, 3 and 4 (Table 3; Plate 2).

Transect 2 (control) consistently exhibits slightly higher average leaf cover than Transect 1 (study). In contrast, Transect 1 is higher in average leaf condition and has slightly fewer shrubs observed with signs of disease, with one affected shrub observed at Transect 1 compared to three at Transect 2. Three shrubs at Transect 2 had flowering characteristics, compared to one at Transect 1.

Transect 3 showed a large decrease in leaf cover and condition from Survey 1 to Survey 2, with all monitored shrubs having very few leaves or appearing completely dead due to a fire (Table 3; Plate 2)). During Survey 3 some shrubs were observed with regrowth, while others remained completely dead. Survey 4 found some of these shrubs previously observed with regrowth had died, whilst others improved. These changes reveal no clear differences between shrubs in the study and control areas of Transect 3. The fence at Transect 3 limited the accuracy of assessing shrub condition due to separation from the monitored shrubs, and the lack of remaining plant material resulted in no disease or presence of flowering parts found on any of the monitored shrubs.

Table 3. Shrub condition monitoring notes

Transect	Point	Species	Leaf cover (Good [G], Moderate [M], Poor [P], Very Poor [VP])				Leaf condition (Good [G], Moderate [M], Poor [P], Very Poor [VP])				Disease notes (Some Disease [SD], None [N])				Flower status			
			S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
1 (study)	1.0	*Bursaria spinosa*	M	P	P	M	G	M	G	G	N	N	N	N	Buds	Buds	Buds	Buds
	1.1	*Bursaria spinosa*	G	M	P	M	M	M	G	G	SD	SD	N	N	Buds	Buds	None	Buds
	1.2	*Bursaria spinosa*	M	P	M	M	M	M	G	G	N	N	N	N	None	None	None	None
	1.3	*Olea europea**	M	P	M	M	G	G	G	G	N	N	N	N	None	None	None	None
	1.4	*Bursaria spinosa*	G	M	M	G	G	G	G	G	N	N	N	N	None	None	None	None
	1.5	*Olea europea**	M	M	M	G	M	M	G	G	SD	SD	N	N	None	None	None	None
	1.6	*Bursaria spinosa*	G	M	G	G	M	M	G	G	N	N	N	N	None	Buds	None	Buds
	1.7	*Bursaria spinosa*	VP	VP	P	M	M	M	G	G	N	N	N	N	Buds	None	None	None
	1.8	*Bursaria spinosa*	P	P	M	M	G	G	G	G	N	N	N	N	None	None	None	None
	1.9	*Bursaria spinosa*	P	VP	P	P	M	VP	G	G	N	N	N	SD	Buds	None	None	None
	1.10	*Solanum nigrum**	G	VP	VP	VP-dead	M	P	VP	VP-dead	SD	N	N	N	Buds/Flowers/Fruit	None	None	None
	Number "G"/ "N" (/11)		**4**	**0**	**1**	**3**	**4**	**3**	**10**	**10**	**8**	**9**	**11**	**10**	-	-	-	-
2 (control)	2.0	*Bursaria spinosa*	M	M	G	G	G	G	G	G	N	N	N	N	None	Buds	Buds	Buds
	2.1	*Bursaria spinosa*	G	G	G	G	G	G	G	G	N	N	N	N	Buds	Buds	Buds	Buds

Transect	Point	Species	Leaf cover (Good [G], Moderate [M], Poor [P], Very Poor [VP])				Leaf condition (Good [G], Moderate [M], Poor [P], Very Poor [VP])				Disease notes (Some Disease [SD], None [N])				Flower status			
	2.2	*Bursaria spinosa*	G	M	M	M	G	G	G	G	N	N	N	N	Buds	Buds	Buds	Buds
	2.3	*Ligustrum sinense**	G	G	Not located **	G	G	G	Not located **	G	N	N	Not located **	N	Fruit	Flowers	Not located **	Buds/Flowers
	2.4	*Olea europea**	M	M	M	M	G	G	G	M	N	N	N	N	None	None	None	None
	2.5	*Olea europea**	P	P	P	P	M	M	M	M	N	N	N	N	None	None	None	None
	2.6	*Ligustrum sinense**	G	G	G	G	M	M	M	M	N	SD	N	SD	Fruit	Flowers. fruit	Fruit	Buds
	2.7	*Olea europea**	M	P	M	M	M	M	M	M	SD	SD	SD	SD	None	None	None	None
	2.8	*Bursaria spinosa*	M	M	Not located **	M	G	G	Not located **	G	N	N	Not located **	N	None	None	Not located **	Buds
	2.9	*Olea europea**	M	M	M	M	M	M	M	M	SD	SD	SD	SD	Fruit	None	None	None
	2.10	*Bursaria spinosa*	G	G	G	G	G	G	M	M	N	N	N	N	Buds	Buds	Buds	Buds
	Number "G"/ "N" (/11)		**5**	**4**	**4/9****	**5**	**7**	**7**	**4/9****	**5**	**9**	**8**	**8/9****	**8**	**-**	**-**	**-**	**-**
3	3.0 (study area)	*Bursaria spinosa*	G	VP	P	P	G	M	G	G	N	N	N	N	None	None	None	None
	3.1 (study area)	*Acacia elongata*	G	VP-dead	VP-dead	VP-dead	G	VP-none	VP-dead	VP-dead	N	N	N	N	Buds	None	None	None
	3.2 (study area)	*Bursaria spinosa*	M	VP	VP-dead	P (regrowth)	G	M	VP-dead	G (regrowth)	N	N	N	N	None	None	None	None

Transect	Point	Species	**Leaf cover** (Good [G], Moderate [M], Poor [P], Very Poor [VP])				**Leaf condition** (Good [G], Moderate [M], Poor [P], Very Poor [VP])				**Disease notes** (Some Disease [SD], None [N])				**Flower status**			
	3.3 (study area)	No shrub recorded																
	3.4 (study area)	*Melaleuca decora*	G	VP	P	VP	G	M	G	P	N	N	N	N	None	None	None	None
	Study: Number "G"/ "N" (/4)		**3**	**0**	**0**	**0**	**4**	**0**	**2**	**2**	**4**	**4**	**4**	**4**	**-**	**-**	**-**	**-**
	3.5 (control)	*Bursaria spinosa*	M	VP	VP	VP	G	M	G	VP	N	N	N	N	None	None	None	None
	3.6 (control)	*Bursaria spinosa*	M	VP	VP	P	G	P	G	G	N	N	N	N	None	None	None	None
	3.7 (control)	No shrub recorded																
	3.8 (control)	*Bursaria spinosa*	VP	VP-dead	VP-dead	P (regrowth)	G	VP-none	VP-dead	G (regrowth)	N	N	N	N	None	None	None	None
	3.9 (control)	*Bursaria spinosa*	M	VP-dead	VP	VP-dead	G	VP-none	G	VP (dead)	N	N	N	N	None	None	None	None
	3.10 (control)	No shrub recorded																
	Control: Number "G"/ "N" (/4)		**0**	**0**	**0**	**0**	**4**	**0**	**3**	**2**	**4**	**4**	**4**	**4**	**-**	**-**	**-**	**-**

* denotes an introduced species ** shrub/s not located during Survey therefore not assessed

Plate 2: Melaleuca decora (Transect 3 (study area), point 3.4) in good cover and leaf condition during baseline Survey 1 (left), in very poor condition and leaf cover in Survey 2 (middle-left) in poor leaf cover and good condition in Survey 3 (middle-right) and in very poor leaf cover and poor leaf condition in Survey 4 (right). No signs of disease or flowering characteristics were observed in all four surveys.

4 Discussion

Fire, an increase in temperature and a decrease in rainfall between Surveys 1 and 2 likely contributed to a dieback in canopy and shrubs on all three transects. The initial baseline surveys were performed in May and June of 2023. BOM station number 67113 (Penrith Lakes AWS), recorded a mean maximum monthly temperature respectively of 20.7℃ and 18.9℃. Survey 2, conducted in October 2023, recorded an increased mean maximum monthly temperature of 28.3℃ (BOM, 2024). Survey 3 was performed in June 2024, recording a decreased mean maximum monthly temperature of 17.5 ℃ (BOM, 2024). Survey 4 was performed in October 2024, and September recorded a mean maximum monthly temperature of 24.2℃ (BOM, 2024).

BOM station number 67084 (Orchard Hills Treatment Works) recorded monthly rainfall totals of 13.6 mm and 17.1 mm for May and June 2023 respectively, compared to 18.2 mm in October 2023. Although there was a slight increase between these two periods, monthly rainfall in 2022 was significantly higher. Average rainfall reduced from a combined monthly total of from 655.8 mm from May to October of 2022, to 126 mm within that same period in 2023. BOM station number 67113 (Penrith Lakes AWS) recorded an increased monthly rainfall total of 67.2mm in June 2024, which decreased to 25.4mm in September 2024 (BOM, 2024).

The large reduction in rainfall and increase in temperature that occurred between Surveys 1 and 2 likely resulted in a dieback of shrubs and canopy. This was followed by an increase in rainfall and decrease in temperature between Surveys 2 and 3, which resulted in an increase in canopy and shrub cover, as well as regrowth of the burnt shrubs at Transect 3. Variation in shrub and canopy cover is also expected due to the time of year the surveys were completed. Following this pattern, a slight reduction in canopy cover at Transects 1 and 2 between Surveys 3 and 4 can be attributed to slight decrease in rainfall and increase in mean temperature.

While monitored shrubs at Transect 2 (control) continue to exhibit slightly higher average leaf cover compared to those at Transect 1 (study), this disparity occurred during the baseline survey and is likely due to Transect 2’s location in a wetter area with a creek line intersecting the transect.

5 Conclusion

The decrease in canopy cover at Transects 1 and 2 between Surveys 1 and 2, followed by an increase at Survey 3 and a subsequent decrease at Survey 4, is likely to be within natural variation of the climate and unlikely to be a result of potential groundwater drawdown. Canopy cover at Transect 3 has remained relatively consistent across all three surveys, although the monitored shrubs were severely damaged by heat and fire between Surveys 1 and 2, an event that is also unrelated to any potential groundwater drawdown. Shrub condition revealed no strong observable differences between study and control areas, and generally remained consistent or improved between Surveys 3 and 4.

Future monitoring visits will be required to detect whether there are significant changes in canopy cover and/or shrub condition indicative of impacts to the GDE study area. Monitoring visits will continue to occur every six months, until the end of 2028.

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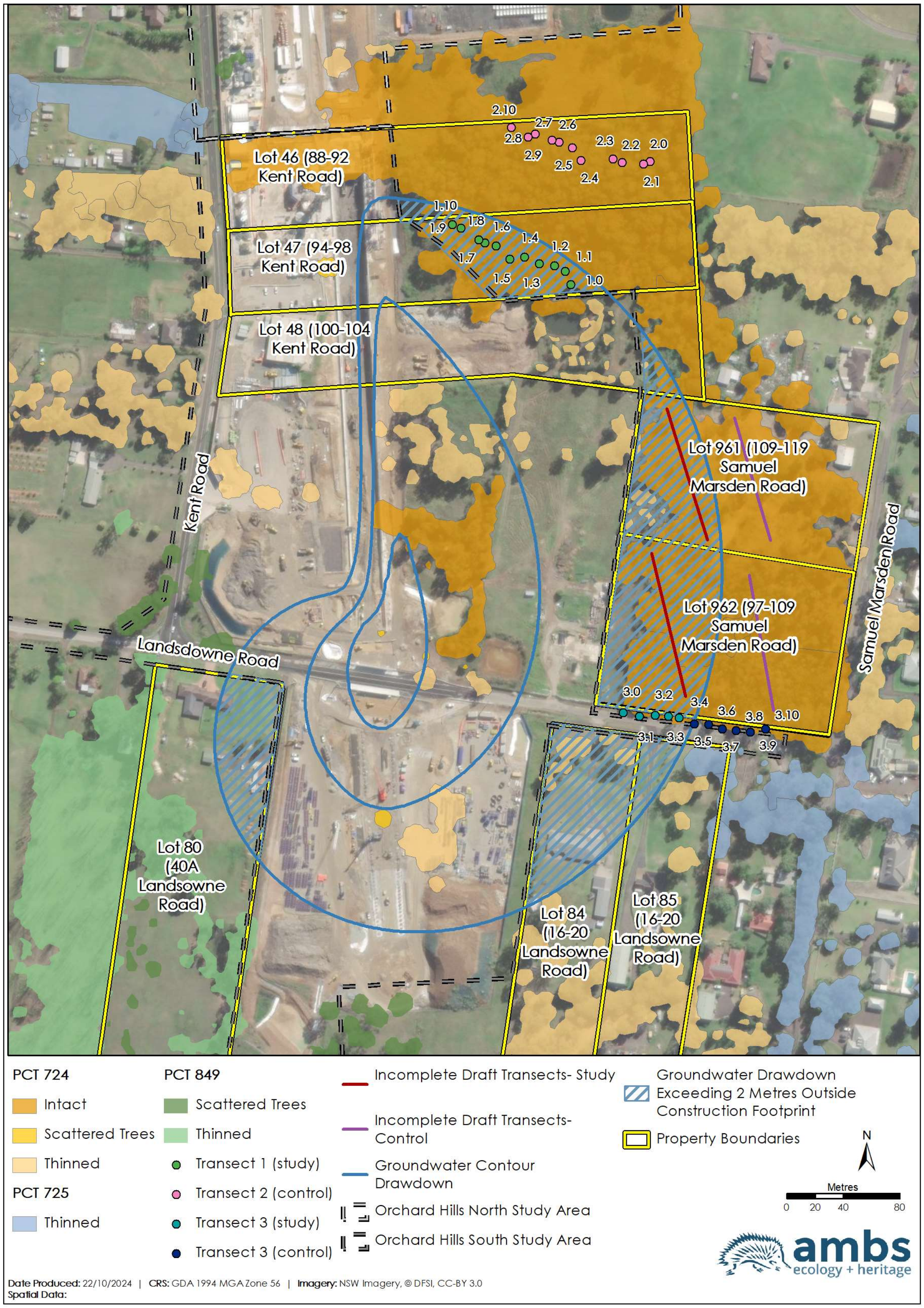
Appendix

Appendix A: Potential Groundwater Drawdown Impact Area and Monitoring Points at Orchard Hills Metro Station



AQUATIC
ECOLOGICAL
INVESTIGATIONS

Claremont Creek

AUSRIVAS & Surface Water Quality Survey

Draft Report prepared for
AMBS Ecology & Heritage

8 July 2024

Document Information

Project Name	Claremont Creek – AUSRIVAS & Surface Water Survey
Prepared for	AMBS Ecology & Heritage
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Prepared by	Sharon Cummins (AEI)
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Table of Contents

1.0 INTRODUCTION

1.1 Background

The Sydney Metro Western Sydney Airport (SMWSA) is a new rail line to the Western Sydney Airport that is currently under construction at from St Mary’s to the new city of Bradfield and the new Western Sydney Airport at Badgerys Creek. The contract to build the WSA Metro Station Boxes and Tunnelling Works (WSA Metro SBT) (the Project) was awarded to the CBP Contractors and Ghella Joint Venture (CPBG).

During tunnelling between the Sydney Metro Claremont Meadows maintenance yard towards St Mary's, water bore monitoring points adjacent to a nearby creek (i.e. Claremont Creek) detected decreases in water table levels. Groundwater drawdown can potentially reduce baseflow and pool water levels which can have potential impacts to aquatic habitat and biota (Buck et al., 2019; Lake, 2000).

Aquatic Ecological Investigations (AEI) has been engaged by AMBS Ecology & Heritage Pty Ltd (AMBS) on behalf of CPBG to undertake a survey of aquatic ecology at selected sites within Claremont Creek. The area of concern is situated from the Great Western Highway to approximately 500 m upstream of the confluence between Claremont Creek and South Creek (or Wianamatta) (Figure 1). South Creek flows generally north before reaching its confluence with the Hawkesbury River, near Windsor.

AEI have been advised that a survey is required at selected sites within Claremont Creek to assess the current ecosystem value and any potential ecological sensitivity to surface water flow changes that could potentially be generated from groundwater levels drawdown. The data is required to enable CPBG to understand potential changes to stream health if groundwater drawdown is impacted surface water flow and pool retention.

1.2 Scope of Works

The scope of works included:

- a field survey of aquatic habitat, *in-situ* water quality and aquatic macroinvertebrates at selected sites within and adjacent to the Study Area;
- a review of previous monitoring data and existing information on aquatic habitat and biota within and adjacent to Study Area;
- provision of recommendations on further surveys if stream health within the Study Area has deteriorated.

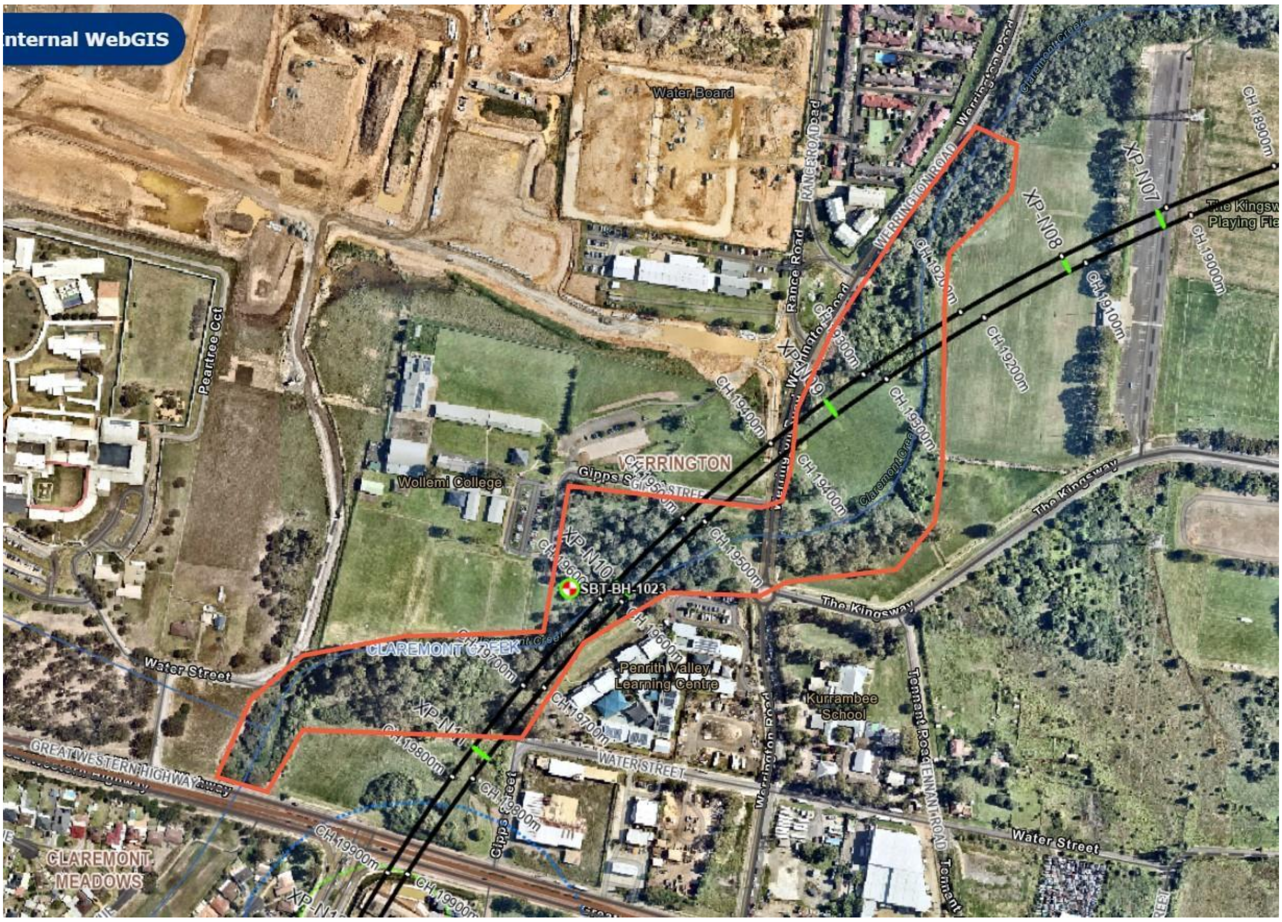

Figure 1. The Study Area

2.0 METHODS

2.1 Survey Overview

A total of nine sites were selected to be surveyed for aquatic habitat, surface water quality and macroinvertebrates (Table 1, Figure 2). The aquatic habitat assessment was done using the AUSRIVAS sampling protocol (Turak et al., 2004). Each site (approximately 100 m in length) was photographed and the locations recorded with a hand-held satellite-based Global Positioning System (GPS).

Collections of macroinvertebrates were completed in accordance with Section 37 of the *NSW Fisheries Management Act 1994* using Scientific Collection Permit Number P03/0032(B) and NSW Agriculture, Animal Research Authority Care and Ethics Certificate of Approval Number 03/2445.

Table 1. Sites sampled for surface water habitats and biota (u/s: upstream, d/s: downstream).

Creek	Site Code	Easting	Northing	Description
Claremont Creek	**CC-1**	291619	6261006	Upstream of potential impact area
	CC-2	291943	6261444	Upstream of potential impact area
	CC-3	292207	6261540	Upstream or edge of potential impact area
	CC-4	292512	6261812	Within potential impact area
	CC-5	292555	6262082	Downstream or edge of potential impact are
South Creek	**SC u/s**	293219	6261551	Upstream of the potential impact area.
	SC d/s	292792	6263411	Downstream of the potential impact area.
Werrington Creek	**WC1**	291006	6263023	Control site, situated ~ 900 m u/s of confluence with South Creek.
	WC2	291952	6263170	Control site, situated ~ 400 m u/s of confluence with South Creek.

Figure 2. Survey sites situated within Claremont Creek (CC1-CC5), South Creek (SC1&SC2) and Werrington Creek (WC1&WC2). Image provided by Google Earth.

2.2 Field Methods

2.2.1 Aquatic Habitat Assessment

The condition of the aquatic habitat was assessed at each site using a modified version of the Riparian Channel and Environmental (RCE) inventory method (Chessman et al., 1997). This method involves evaluation and scoring of the characteristics of the adjacent land, the condition of riverbanks, channels and beds of the watercourse, and degree of disturbance evident at each site.

Information was collected on the following features:

- characteristics of each waterway (e.g. flow and stream width);
- occurrence of key aquatic habitat (e.g. gravel beds, pools, macrophytes, riffles and woody debris);
- water clarity;
- presence of in-stream and emergent aquatic macrophytes at each site;
- barriers to fish passage;
- presence of algae, exotic plants, bank degradation, flocculent, odour, detergents, oil rock piles or sedimentation, pipes, rubbish and point sources; and
- surrounding land uses.

Based on the original classification established by Peterson (1992), site condition was rated

- Poor for RCE scores of 0-24%;
- Fair for RCE scores of 25-43%;
- Good for RCE scores of 44-62%;
- Very good for RCE scores of 63-81%; and
- Excellent for RCE scores of 82-100%.

Other habitat features were assessed in accordance with the AUSRIVAS proforma and NSW *Policy and Guidelines for Fish Habitat Conservation and Management (Update 2013)* (DPI 2013).

2.2.2 Surface Water Quality

Where sufficient water was present, *in situ* water quality was measured using a Yeo-Kal 611 probe. Physico-chemical properties measured included electrical conductivity (µS/cm), dissolved oxygen (% saturation and mg/L), pH (pH units), temperature (ºC) and turbidity (NTU). Three replicate measures of each variable were collected from just below the water surface at each site. Alkalinity was also determined in the field, using a CHEMetrics' total alkalinity field kit.

2.2.3 AUSRIVAS Macroinvertebrates

In freshwater habitats, aquatic macroinvertebrates were sampled in accordance with the Australian River Assessment System (AUSRIVAS) protocols (Turak et al., 2004). AUSRIVAS models predict the aquatic macroinvertebrate fauna expected to occur at a site in the absence of environmental stress, such as pollution or habitat degradation, to which the fauna collected at a site can be compared (Turak et al., 2004).

Edge habitats were sampled for aquatic macroinvertebrates using a 250 µm mesh dip net. At each site (approximately 100 m long), samples were collected over a total length of 10 m, usually in 1-2 m sections, ensuring all significant edge sub-habitats within a site (i.e. macrophytes, over-hanging bank and vegetation, leaf-litter, logs) were included in the sampl (Turak et al., 2004).

The contents of each net sample were placed into a white sorting tray and animals collected for a minimum period of 30 minutes. Thereafter, removals were done in 10- minute periods, up to a total of one hour (Turak et al., 2004). If no new taxa were found within a 10-minute period, removals ceased (Turak et al., 2004).

The animals collected were placed inside a labelled container, preserved with 70% alcohol and taken to the laboratory for identification. Environmental variables required for running the AUSRIVAS predictive model, including model stream width, percentage boulder or cobble cover, latitude and longitude were recorded at each site.

In the laboratory, taxa were identified to family level except for Acarina (to order), Chironomidae (to sub-family), Nematoda (to phylum), Nemertea (to phylum), Oligochaeta (to class), Ostracoda (to subclass) and Polychaeta (to class) using a stereo microscope. Families of Anisoptera (dragonfly larvae) that include listed species were identified to species.

All samples were retained in appropriate containers and preservative to allow further examination later if required. After checks on identifications, numbers of each type of animal were entered into spreadsheet format and data checked against laboratory data sheets.

2.3 Laboratory Methods

In the laboratory, AUSRIVAS samples were sorted under a binocular microscope (at 40X magnification) and identified to family level with the exception of Acarina (to order), Chironomidae (to sub-family), Nematoda (to phylum), Nemertea (to phylum), Oligochaeta (t class), Ostracoda (to subclass) and Polychaeta (to class). Some families of Anisoptera (dragonfly larvae) would be identified to species, because they could potentially include threatened aquatic species listed under the *Fisheries Management Act, 1994* (FM Act).

Up to 25 animals of each family were counted, in accordance with the AUSRIVAS protocol (Turak et al., 2004) and the SIGNAL2 (Stream Invertebrate Grade Number Average Level) biotic index developed by Chessman (2003).

2.4 Data Analysis

The water quality measurements taken during the site inspection were used to assess water quality within the study area in terms of health of aquatic ecosystems by comparison with guideline values recommended by ANZECC and ARMCANZ (2000).

The macroinvertebrate data were analysed using the appropriate AUSRIVAS predictive models developed for New South Wales. The ecological health of the waterways was assessed by comparing the macroinvertebrates collected at a site (i.e. Observed) to those predicted to occur (Expected) if the site is in an undisturbed or ‘reference’ condition.

The principal outputs of the AUSRIVAS model include:

- Observed to Expected ratio (OE50): the ratio of the number of macroinvertebrate families collected at a site which had a predicted probability of occurrence of greater than 50 % (i.e. Observed) to the sum of the probabilities of all of the families predicted with greater than a 50 % chance of occurrence (i.e. Expected) (Ransom et al., 2004);
- BAND: for each model, the OE50 taxa ratios are divided into bands representing different levels of impairment. Band X represents a more diverse assemblage of macroinvertebrates than control sites; Band A is considered equivalent to reference condition; Band B represents sites below reference condition (i.e. significantly impaired); Band C represents sites well below reference condition (i.e. severely impaired); and Band D represents impoverished sites (i.e. extremely impaired) (Ransom et al., 2004).

The Stream Invertebrate Grade Number Average Level (SIGNAL2) biotic index developed by Chessman (2003) was also calculated, to give an indication of water quality at the sites sampled. The SIGNAL2 score for a macroinvertebrate sample is calculated by averaging the pollution sensitivity grade numbers of the families present, which may range from 10 (most sensitive) to 1 (most tolerant). SIGNAL2 values are as follows:

- SIGNAL >6 = Healthy habitat
- SIGNAL 5-6 = Mild pollution
- SIGNAL 4-5 = Moderate pollution, and
- SIGNAL <4 = Severe pollution.

2.5 Quality Assurance/Quality Control (QA/QC)

Data collected in the field was checked for accuracy and completeness before leaving each site. In the office, field data and other records were incorporated into appropriate excel data sheets and checked. Spreadsheets were locked prior to analysis to prevent accidental over-writes or corruption.

In the laboratory, macroinvertebrate samples were identified by an appropriately qualified staff member. Data for each sample were entered into an excel spreadsheet and then checked

2.6 Limitations

Sampling was unable to commence until 5 June 2024 due to rainfall and high flow related delays. Prolonged periods of high flow conditions can reduce the likelihood of identifying a range of potentially occurring species that may use habitats in the Study Area. Water quality measurements collected during the biological sampling only provide a snapshot of quality at the time of sampling under the prevailing flow conditions. However, the results from previou stream health surveys undertaken for the Project in different seasons and across several years have been incorporated into this report to help address this limitation (GHD, 2016; AEI, 2022).

3.0 RESULTS

3.1 Survey Dates and Rainfall

The selected sites were sampled on 5 June 2024 by Dr Sharon Cummins (Senior Scientist – Applied Aquatic Ecology) and Mr William Roberts (Senior Environmental Technician). Within the two months prior to the field survey, a total of 273 mm of rainfall was recorded at the nearest AWS (Station ID: 67081). A total of 40.4 mm of rainfall was recorded in the week prior to the survey.

Within the two months prior the stream health survey, mean water levels measured at the nearest gauge, in South Creek at the Great Western Highway (Station ID 212048), ranged from 0.255 m (28 April 2024) to 5.077 m (7 April 2024). At the time of the current survey, mean water level was 0.433 m (5 June 2024).

3.2 Aquatic Habitat Characteristics

The sections of Claremont Creek, South Creek, and Werrington Creek within the Study Area are mapped as Key Fish Habitat by the New South Wales (NSW) Department of Primary Industries (DPI) (NSW DPI, 2024).

Information collected by the current survey has been used to describe the aquatic ecology values at sites that occur within the Study Area, on Claremont Creek, South Creek and Werrington Creek (Figure 1).

Claremont Creek

At Site CC1, situated upstream of the Great Western Highway, the stream channel has been highly modified by development and flood control activities. Riparian vegetation has mostly been cleared along this section the stream channel, and replaced by exotic grasses with occasional *Typha* sp., *Cyperus eragrostis* and *Persicaria decipiens*. Surface water habitat was present in occasional temporary, shallow (up to 20 cm deep) depressions. Conductivity of the water within these depressions ranged from 791 to 9,076 µS/cm. This site received an RCE score of 14 (27%). Aquatic habitat was mostly absent and significant barriers to fish movement were present.

Plate 1: Claremont Creek (CC1) (5 June 2024)
View upstream

Plate 2: Claremont Creek (CC1) (5 June 2024)
View downstream

Downstream of the Great Western Highway to the confluence with South Creek, Claremont Creek consisted of pools up to 6 m wide and 1.2 m deep. Unlike the findings of a recent survey (AEI, 2022), pools were connected by flow along the creek channel, including upstream and downstream of the crossing at Site CC4 (Plates), indicating that flow along this section of Claremont Creek is intermittent.

The active channel bed is composed primarily of silts and clay (as are the banks of the main channel) overlying a mostly gravel bed. A range of habitats were available for fish, including large woody debris, rocks and submerged aquatic macrophytes, including Water Ribbons (*Vallisneria* sp.) and Blunt pondweed (*Potamogeton ochreatus*). Emergent macrophytes included Phragmites and River Club-Rush (*Schoenoplectus validus),* both of which commonly grow in fresh to brackish water. Marsh Clubrush (*Bolboschoenus fluviatilis*), Swamp Club-Rush (*Isolepis inundata*), Typha, Umbrella Sedge (*Cyperus eragrostis*) and Slender knotweed (*Persicaria decipiens*) were also common. Water visibility was good to fair (Plates 3-10).

Despite evidence of recent scouring by elevated flows, the stream banks appeared relatively stable, due to the presence of mature trees (predominantly Casuarina and Eucalyptus). Exotic weeds, including Privet (*Ligustrum* sp.), Ballon vine (*Cardiospermum grandiflorum*), Trad (*Tradescantia albiflora*) and grasses were common (Plates 3-10). The overall condition of aquatic habitats at site's CC2 to CC5 was classified as good, with an RCE score of 25 (48%). The downstream reaches of Claremont Creek are classified as Class 2, Type 2 (moderate) fish habitat according to the DPI (2013) classification.

Plate 3: Claremont Creek (CC2) (5 June 2024)

View upstream

Plate 4: Claremont Creek (CC2) (5 June 2024)

View downstream

Plate 5: Claremont Creek (CC3) (5 June 2024)

View upstream

Plate 6: Claremont Creek (CC3) (5 June 2024)

View downstream

Plate 7: Claremont Creek (CC4) (5 June 2024)

View downstream

Plate 8: Claremont Creek (CC4) (5 June 2024

View across-stream

Plate 9: Claremont Creek (CC5) (5 June 2024)
View upstream

Plate 10: Claremont Creek (CC5) (5 June 2024
View downstream

South Creek

Site SC1 is situated on South Creek, approximately 740 m upstream from the confluence with Claremont Creek (Figure 2). At the time of the survey, there were signs of recent flooding, including severe scouring of the stream channel and rubbish caught in tree branches (Plates 11-14). Water clarity was considered poor.

This section of the creek is generally characterised by a large pool (up to approximately 14 m wide and 1.6 m deep) upstream of a weir. Immediately downstream of the weir, the stream channel was approximately 8 m wide. The active channel bed is composed primarily of silts and clay (as are the banks of the main channel) overlying a mostly gravel bed. A range of habitats were available for fish, including large woody debris, rocks and the submerged aquatic macrophyte, *Vallisneria* sp. Flow was rapid and water visibility poor (Plates 11&12).

The tree canopy was comprised by mostly Casuarina and Eucalyptus species and some exotic trees. Spiny-head mat-rush (*Lomandra longifolia*), Slender knotweed, and the exotic species, Trad and Alligator weed (*Alternanthera philoxeroides*), and grasses were common, particularly in areas where there were breaks (at intervals of between 5 and 30 m) in the riparian strip. The overall condition of aquatic habitats at Site SC1 was classified as fair, with an RCE score of 35 (67%).

Site SC2 is situated approximately 2.2 km downstream of Site SC1, approximately 1.2 km downstream of the confluence with Claremont Creek (Figure 1).

There were signs of recent flooding, including severe scouring of the stream channel (Plates 13&14). The pool sampled upstream of the bridge was up to 12 m wide and 1.4 m deep. Water clarity was considered poor (Plates 13&14).

The active channel zone at both sites was composed of poorly sorted gravel overlain by fine-grained sediments (13&14). Large woody debris contributed habitat to the stream channel. The tree canopy was comprised by mostly Casuarina and Eucalyptus species and some exotic trees. *Lomandra longifolia* (Spiny-head mat-rush), and grasses were common. The overall condition of aquatic habitats at Site SC2 was classified as fair, with an RCE score of 35 (67%). The downstream reaches of South Creek are classified as Class 2, Type 2 (moderate) fish habitat according to the DPI (2013) classification.

Plate 11: South Creek (SC1) (5 June 2024)

View upstream

Plate 12: South Creek (SC1) (5 June 2024)

View downstream

Plate 13: South Creek (SC2) (5 June 2024)

View upstream

Plate 14: South Creek (SC2) (5 June 2024

View downstream

Werrington Creek

Site WC1 is situated on Werrington Creek, approximately 1.6 km upstream from the confluence with South Creek (Figure 2). At the time of the survey, there were signs of recent flooding, including severe scouring of the stream channel and rubbish caught in tree branches (Plates 15-18). There was a strong smell of sewage at Site WC1. The tree canopy at both sites was comprised by mostly Casuarina and Eucalyptus trees and some exotic trees. Spiny-head mat-rush, Trad and exotic grasses were common. The active channel zone (0.4 to 1.5 m wide) was composed of poorly sorted gravel overlain by fine-grained sediments. The native submerged macrophyte species, *Stuckenia pectinata* (Sago pondweed) and the introduced species, *Egeria densa* (Dense waterweed), were abundant at Site WC1 (Plate 16). Water clarity was considered poor at both sites. The overall condition of aquatic habitats at Site WC1 & WC2 was classified as fair, with an RCE score of 25 (48%).

Plate 17: Werrington Creek (WC2) (5 June 2024)
View upstream

Plate 18: Werrington Creek (WC2) (5 June 2024
View downstream

3.3 Surface Water Quality

Mean physico-chemical water quality measurements from 5 June 2024 are summarised in Table 2. Values highlighted in bold type indicate where results were outside the appropriate default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000).

The main findings for the water quality survey are summarised as follows:

- pH levels (range = 7.4 – 7.8) were within the DTVs recommended by the ANZECC/ARMCANZ (2000) guidelines at all of the sites sampled
- Mean conductivity levels (range = 657 to 4,320 µS/cm) exceeded the upper DTV a Site CC1.
- Dissolved oxygen levels (range = 63 to 109.3 % saturation) were below the lower DTV at all sites except site 2 situated on South Creek (Site SC2)
- Turbidity levels (range = 40 to 100 NTU) exceeded the upper DTV at both sites sampled within South Creek (i.e., Site SC-1 and SC-2) (Table 2).

Table 2. Mean (+ SE) values of water quality variables recorded at each site (5 June 2024). Values highlighted in bold type indicate where results were outside the recommended DTV values

Site	DTV*	CC1	CC2	CC3	CC4	CC5
Temperature °C	-	16.0 (0.8)	12.9 (0.0)	12.7 (0.0)	12.6 (0.0)	12.4 (0.0)
pH	**6.5-8.0**	7.6 (0.4)	7.8 (0.0)	7.6 (0.0)	7.6 (0.0)	7.5 (0.0)
Conductivity (µS/cm)	**125-2200**	**4,320** (2469)	1,963 (0.3)	1,921 (0.9)	1,822 (0.0)	1,860 (0.3)
Dissolved Oxygen (%)	**85-110**	**63.0** (27.8)	**80.5** (0.0)	**71.4** (0.1)	**74.0** (0.0)	**70.9** (0.0)
Turbidity (NTU)	**6-50**	27.8 (14.2)	22.6 (0.2)	24.0 (0.2)	22.5 (0.0)	24.4 (0.1)
Alkalinity (mg/L $CaCO_3$	-	40	40	50	100	70
Site	**DTV***	**SC1**	**SC2**	**WC1**	**WC2**	
Temperature °C	-	12.1 (0.0)	12.2 (0.0)	13.2 (0.0	12.4 (0.0)	
pH	**6.5-8.0**	7.5 (0.0)	7.5 (0.0)	7.4 (0.0)	7.4 (0.0)	
Conductivity (µS/cm)	**125-2200**	966 (0.3)	961 (0.0)	657 (0.0)	872 (0.0)	
Dissolved Oxygen (%)	**85-110**	**71.0** (0.1)	109.3 (0.0)	**67.2** (0.1)	**69.1** (0.1)	
Turbidity (NTU)	**6-50**	**129.8** (0.2)	**136.7** (1.1)	31.0 (0.2)	24.4 (0.1)	
Alkalinity (mg/L $CaCO_3$)	-	100	70	50	70	

* DTVs are based on the ANZECC/ARMCANZ (2000) guidelines for the protection of slightly disturbed aquatic ecosystems in lowland rivers (i.e. systems at < 150 m altitude) in south-east Australia. Bold values indicate results that were outsides the DTVs.

3.4 Aquatic Macroinvertebrates

A total of 28 taxon were identified from edge habitat samples collected at the nine sites sampled on 5 June 2024 (Table 3). The number of taxa ranged from 1, at Site SC2, and 13 at Site CC1 (Table 3). Corixidae (water boatmen) were the most common taxa collected, occurring at eight of the nine sites sampled (Table 3). Tubificidae (segmented worms), Physidae, Bithyniidae and Hydrobiidae (freshwater snails) were collected at five of the sites sampled (Table 3). Freshwater snails (Hydrobiidae, Physidae and Bithyniidae) and true fly larvae (Chironomidae and Tanypodinae) were the most abundant taxa collected (Table 3). Th alien fish, *Gambusi*a *holbrooki*, was present in samples collected at the Site CC3, SC1, SC2 and WC1 (Table 3). Two freshwater eels (*Anguilla* sp.) were observed at each of Sites CC2 and CC3.

No individuals of threatened dragonfly species, including the Adams emerald dragonfly (*Archaeophya adamsi*) (Family Corduliidae) (NSW Fisheries, 2002) or Sydney hawk dragonfly (*Austrocordulia leonardi*) (Family Austrocorduliidae) (NSW Fisheries, 2007), or fish, including Macquarie Perch (*Macquaria australasica*) or Australian Grayling (*Prototroctes maraena*) were observed or collected within the Study Area.

AUSRIVAS Scores

The OE50 Taxa Scores ranged from 0.00 (WC1) to 0.54 (CC1) (Table 4). Of the nine sites sampled on 5 June 2024, one was grouped within Band B (CC1), three within Band C (CC3, SC1 and WC2), and five were grouped in Band D (CC2, CC4, CC5, SC2 and WC1) (Table 4). Thus, fewer families of macroinvertebrates than expected were collected from the sites sampled compared to reference sites selected by the AUSRIVAS model (Ransom et al., 2004). Taxon with > 0.85 probability of occurrence but not collected included the Acarina (Water mites) and Veliidae (Small water striders) families at all sites and Leptoceridae (caddis flies) at all sites except Site CC3 (Table 3). Leptophlebiidae (mayflies) family, were expected with > 0.79 probability but not collected at all sites (Table 3).

The SIGNAL2 scores ranged from 2.00 (Site SC2) to 3.09 (CC4) (Table 4). SIGNAL 2 values less than 4 (i.e., at all sites) generally indicate that the macroinvertebrate assemblage is dominated by pollution tolerant taxa (Chessman, 2003).

Table 3. Macroinvertebrate taxa collected using the AUSRIVAS protocol (5 June 2024).

Family	CC1	CC2	CC3	CC4	CC5	SC1	SC2	WC1	WC2
Dugesidae	0	0	0	0	0	0	0	1	0
Hirudinea	1	0	0	0	0	0	0	0	0
Lumbriculidae	0	0	2	0	0	0	0	1	0
Tubificidae	0	0	1	2	4	0	0	2	3
Physidae	19	19	12	2	1	0	0	0	0
Glyptophysa	6	7	1	0	1	0	0	0	0
Hydrobiidae	0	20	20	15	11	0	0	0	1
Bithyniidae	9	0	4	0	4	0	0	10	3
Lymnaeidae	4	0	0	0	2	0	0	0	0
Oniscidae	0	0	0	1	0	0	0	0	0
Atyidae	1	0	3	0	0	1	0	0	0
Isotomidae	0	1	0	0	0	0	0	0	0
Sisyridae	0	0	0	0	0	0	0	1	0
Sphaeriidae	0	0	0	0	0	0	0	3	0
Baetidae	0	0	0	0	0	0	0	0	1
Coenagrionidae	0	0	0	0	0	1	0	2	0
Megapodagrionida	0	0	0	2	0	0	0	0	0
Libellulidae	1	1	0	0	0	0	0	2	0
Corixidae	2	1	1	1	0	1	2	1	1
Gerridae	0	0	0	5	0	0	0	0	0
Notonectidae	1	0	0	0	0	0	0	0	0
Dytiscidae	2	0	0	0	0	0	0	0	0
Ceratopogonida	2	0	0	0	0	0	0	0	0
Chironominae	24	2	3	0	0	0	0	0	2
Tanypodinae	19	0	0	0	1	0	0	0	1
Simuliidae	0	0	0	0	0	0	0	0	2
Stratiomyidae	0	0	0	0	0	0	0	0	1
Leptoceridae	0	0	1	0	0	0	0	0	0
Number of Taxa	**13**	**7**	**10**	**7**	**7**	**3**	**1**	**9**	**9**
Gambusia			13			14	7	1	

Table 4. Number of taxa, SIGNAL 2 and AUSRIVAS scores

Site	No. Taxa	SIGNAL2	OE50	Band
CC1	13	2.43	0.54	B
CC2	7	2.44	0.1	D
CC3	10	2.60	0.29	C
CC	-	-	-	-
CC4	7	3.09	0.1	D
CC5	7	2.50	0.1	D
SC1	3	2.33	0.15	C
SC2	1	2.00	0.07	D
WC1	9	2.73	0	D
WC2	9	2.82	0.21	C

4.0 DISCUSSION

Downstream of the Great Western Highway to the confluence with South Creek, Claremont Creek consisted of pools up to approximately 6 m wide and 1.2 m deep. The active channel bed was composed primarily of silts and clay (as are the banks of the main channel) overlying a mostly gravel bed. Unlike the findings of a recent aquatic ecology survey done during August 2022 (AEI, 2022), the pools were connected by flow. Such a disparity between flows suggests that waterflow is ephemeral with upstream and downstream habitats connected intermittently during periods of high rainfall.

Importantly for this investigation, pools overlying areas experiencing water drawdown were full and there was flow along the creek channel. If water movement between the stream and underlying aquifer have been altered, recent rainfall within the catchment appears to have mitigated any changes to availability of aquatic habitat within the overlying creek channel. The overall condition of aquatic habitats at site's CC2 to CC5 was classified as good, with an RCE score of 25 (48%). The presence of eels (*Anguilla* sp.) indicates that Claremont Creek continues to provide habitat for native species of fish.

Aquatic macroinvertebrate fauna within Claremont Creek continues to be dominated by pollution-tolerant taxa (see AEI, 2022). Low macroinvertebrate indices were not unexpected given historical and continued exposure to multiple stressors (e.g., elevated levels of salinity, nitrogen and excessive algal and aquatic plant growth) that can adversely affect the condition of aquatic habitat. Small numbers of some pollution sensitive taxa were present in the creeks sampled, including mayfly and caddis fly families, but groups within these families (particularly Baetidae) as well as Chironomidae and several freshwater snails and worms that were present, are amongst the most salt-sensitive freshwater macroinvertebrates (Kefford et al., 2003; Rutherford and Kefford, 2005). Sites with high salinity (i.e. CC1 791 to 9,076 µS/cm) could represent localised groundwater seepage points. High salinity commonly recorded within the area is thought to be related to the increased water table recharges due to reduced vegetation water use by land clearing, over irrigation of golf courses, sport fields, parks, gardens, crops and improved pastures, and leakage from farm dams, water supply and stormwater services (DLWC, 1998).

The introduced Mosquito fish (*Gambusia holbrooki*) has also commonly been collected (AEI, 2022), including at the time of the current survey. Predation by Mosquito fish is listed as a Key Threatening Process on Schedule 3 of the *Threatened Species Conservation Act 1995* [29 January 1999], because of known effects on frogs, freshwater fishes and other organisms such as aquatic macroinvertebrates.

Importantly, the taxonomic composition of assemblages of macroinvertebrates remains similar to the previous survey and where changes did occur, they were comparable (in direction and magnitude) with those that occurred at the sites sampled in South Creek (GHD, 2016; AEI, 2022). Moreover, macroinvertebrate indices obtained at external control sites sampled within Werrington Creek were similar to those obtained at the Claremont Creek and South Creek sites. No individuals of threatened species, including the Adams emerald dragonfly, Sydney hawk dragonfly, Macquarie Perch or Australian Grayling were observed o collected in net samples within the Study Area.

5.0 CONCLUSIONS & RECOMMENDATIONS

At the time of the current survey, there was no evidence of reductions in the availability and connectivity of aquatic habitat within Claremont Creek related to localised decreases in water table levels. If the observed water draw down is influencing water availability within the Claremont Creek catchment, such impacts have been mitigated by recent rainfall patterns within the catchment. The detection of continued groundwater drawdown should trigger further investigations into the potential impacts on stream flow and subsequent impacts on aquatic ecology.

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